

**Explicating the Prominent Researched Factors
Contributing to Couple Relationship Well-being:
A Multi-Grounded Meta-Synthesis**

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Abstract

This study comprehensively reviews and summarises the multi-disciplinary relationship science research to elucidate the key factors involved in developing and maintaining couple relationship well-being. The aim was to develop an explanatory model based on a significant body of experimental knowledge that can be used to inform and guide therapists, educators, researchers, and couples in the betterment of couple relationships. To achieve this a pragmatic five-phase Multi-Grounded Theory investigation allowed:

1. The collation of more than 25,000 academic publications into Endnote.
2. The identification of more than 1,000 relevant factors being researched in these studies, creating a dictionary-codebook.
3. Network modelling of the ten most prominent factors in the literature and their co-occurrence with other factors in research studies.
4. The interpretation of these findings by reviewing the literature they were drawn from.
5. The diagrammatical structuring of the findings into an explanatory model.

The ten factors found to be the most researched relating to couple relationship well-being in the collated corpus were: Attachment, personality, emotion, perception, emotion regulation, conflict, communication, neurological, biological sex differences, and stress. Research throughout the last seventy years has repeatedly affirmed these factors as critical to the development and maintenance of couple relationship well-being outcomes (both negatively and positively). As attachment and personality were the most prolifically researched of these ten and were the factors most researched conjunctively with other factors, these became pivotal in the creation of the explanatory model. In the model, attachment and personality are shown as significantly influencing individual and relational patterns of emotion, perception, and emotional regulation which in turn influence conflict and communication patterns. Attachment and personality are themselves influenced by biopsychosocial factors, including genetic and neurological factors, as well as biological sex differences. Stress and stress-related contexts – both historical and current – influence all these factors. The final explanatory model created in this study is a unique summation of an exceptionally large corpus of empirically-based knowledge, offering an unprecedented and readily accessible overview of the multi-disciplinary research findings regarding couple relationship well-being.

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Attestation of Authorship

"I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning."

A handwritten signature in blue ink, appearing to read 'J. Gold', with a large, stylized loop at the beginning.

Jennifer Ann Gold

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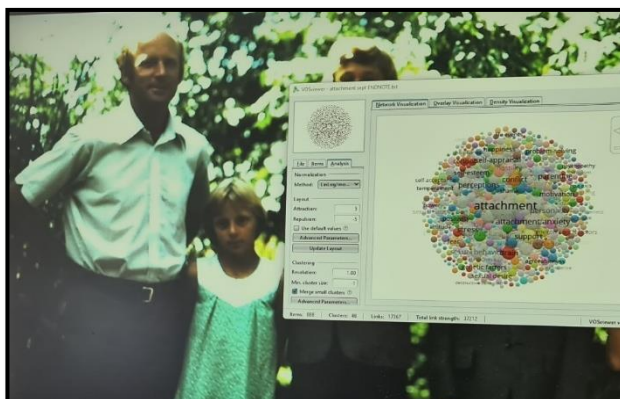
Thank you for applying your eagle eye to the proofing of this work.

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Thank you for paying the bills while I followed my dream. You have shouldered a double load through a worldwide pandemic, and I deeply appreciate it.

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Barbara Mitchell, your love and kindness shaped my life perspective. You always encouraged me to share my understanding and experience for the benefit of others. In our last conversation, you spoke with passion about the urgent need to educate those with the least resources available to them – to enable them to have thriving families. Your passion for education that helps and empowers others has shaped my mahi (work).

Special Acknowledgement: The Researchers

Finally, I would like to extend my gratitude and respect to the thousands of researchers from all around the world represented in this study. I have felt honoured to curate your work. More than most, I believe I can accurately state how your combined contributions to the science of relationships truly are world-changing. To see the mass of work – the decades of labour – the connecting of such brilliant minds and genuinely benevolent hearts in this collaborative endeavour has been awe-inspiring for me. I hope you can sense in reading this thesis that each effort, no matter large or small, has been meaningful for the betterment of human well-being.

Ethics Approval and Consent to Participate

Ethics approval was not required for this study as the data used was published literature.

Keywords

Attachment, bibliometric analysis, biopsychosocial, communication, conflict, couple relationship well-being, couple therapy, divorce, emotion, emotion regulation, Endnote, family therapy, literature review, marital therapy, marital well-being, Multi-Grounded Theory, network modelling, neurology, perceptions, personality, relationship dysfunction, relationship science, relationship well-being, relationship well-being factors, romantic relationships, scoping review, sex differences, stress, stressful environment, stressful history, VOSviewer.

Mihimihi¹

“If you were to ask me, what is the most important thing in the world?

I will tell you, it is people, it is people, it is people.”

“Ui mai ki ahau, he aha te mea nui o te ao?

Māku e kī atu, he tangata, he tangata, he tangata.”

- Maori whakataukī²

The knowledge shared in this thesis is a weaving together of the contributions of many, some passed down from one generation to another over the course of human existence, and therefore I would like to acknowledge our forebears who have gone ahead of us whose ceiling became our floor. I would also ask our children to take this knowledge and build on it as their own floor, moving us towards increasingly kind society. I am thankful that my feet are grounded in Aotearoa New Zealand, and grateful for the implied equitable societal principles of our governing Te Tiriti o Waitangi. My hope is that this study will contribute to increasing acknowledgement of the principle that people are our greatest treasure and love is our greatest goal.

Ko ngā kōrero āhuareka kei roto i tēnei tuhinga whakapae he tāpaetanga kua rārangahia e te tini me te mano. Ko ētahi kōrero he tāonga tuku iho mai ngā mātua tūpuna, ā, kua tākoha mai ēnei kōrero ki ngā reanga o inaianei. Nō reira, ka tika me tuku au i āku mihi maioha ki ā tātou kauwheke kua riro ki tua. Rātou i whakatau i tā rātou tuanui hei tūāpapa mo tātou. Ka werohia ā tātou tamariki mokopuna e au ki te kapohia i ēnei mātauranga o roto hei hanga i tā rātou ake tūāpapa hei porihanga mākohia mo te anamata. E whakamānawa atu ana ahau ki tōku whenua o Aotearoa, ā, ka tika me whakamānawa hoki au i ngā whanonga pono o Te Tiriti o Waitangi. Ko te manako nui ka tāpaetia tēnei tuhinga whakapae ki te whakaaro tūtohunga nei, arā, ko tō tātou huia kaimanawa ko te tangata. Ko tō tātou whāinga matahiapo ko te aroha.³

¹ *Introductory greeting.*

² *This common Māori saying – whakataukī - is in this instance transcribed from Metge, J., & Jones, S. (1995). He taonga tuku iho nō ngā tūpuna; Māori proverbial sayings – a literary treasure. New Zealand Studies, 5(2), 3-7*

³ *Kindly translated by Katarina Taumaha Turu-Heretaunga.*

CHAPTER ONE: AN OVERVIEW OF THE STUDY

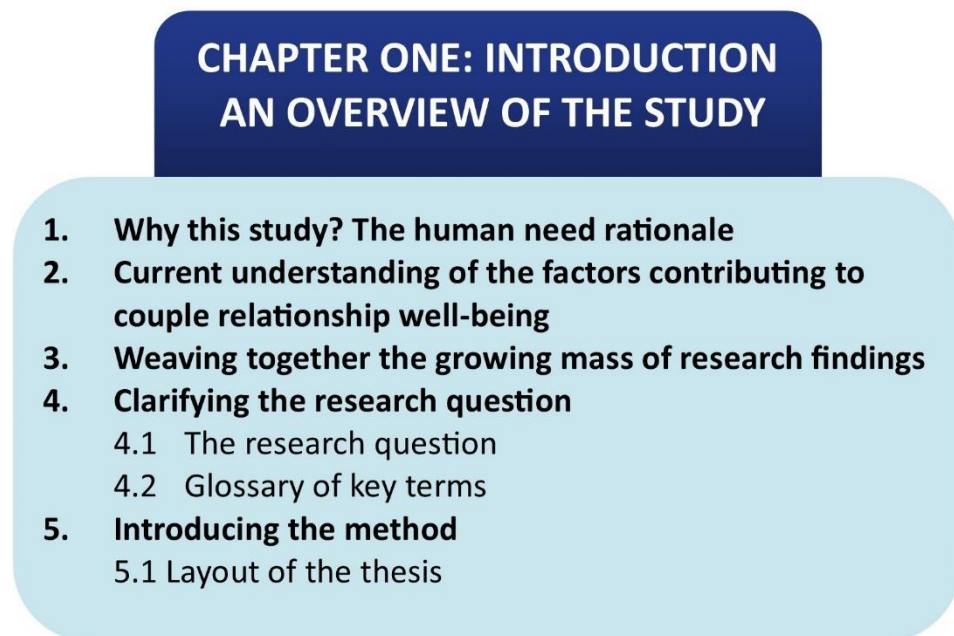
“Relationship scientists have the responsibility to develop, evaluate, and disseminate theories and protocols that will improve the clinical work of practitioners everywhere.”

Harry Reis (2007, pp. 8-9)

Overview

Chapter One outlines the study's rationale and objectives, providing a foundation for the subsequent chapters. The human need rationale for the study is explicated, the current state of research elucidated, and a brief introduction to the research question and method is provided. The outline of Chapter One is shown in Figure 1.

Figure 1. *Outline of Introduction*



1. Why This Study? The Human Need Rationale

Having stable, satisfying relationships is a basic human need (Ryan & Deci, 2000). Humans are a social species who thrive through collaboration. By contributing to

one another's welfare, we lessen our own load and create a layer of protection between ourselves and the inevitable hardships of life (Beckes & Coan, 2011). Our relationships keep us biologically and physically safe and are therefore fundamental to our survival (Slavich et al., 2023).

Couple relationships are a universal and important subset of human relationships, impacting individual health, wealth, and well-being outcomes across all age groups. Most people have a desire to attain this kind of partnership (Apostolou, 2022; Campbell et al., 2012; Fletcher et al., 2015; Keller, 2012) and find meaning and happiness in life through a sense of reliable belonging (Feeney & Collins, 2015b; Finkel et al., 2017; Lambert, Stillman, et al., 2013; Van Tongeren et al., 2016). Committed couple relationships potentially offer the rewards of a caring and dependable companion, an available sexual partner, and a stable situation for the accruing of resources and the raising of children and not having these basic human needs met can contribute to negative well-being outcomes (Steverink et al., 2019). For many people, therefore, knowing what to do to develop and maintain a happy, stable couple relationship – where dysfunction is resolved or reduced – is paramount to their well-being.

With over four billion people worldwide currently married or in another version of a couple relationship (United Nations Department of Economic and Social Affairs, 2019), integrating research findings that inform couple relationship outcomes holds relevance for a large portion of humankind. In their watershed article Baumeister and Leary (1995) theorise that the “need to belong – is a fundamental human motivation” (p. 520) and people need “frequent, non-aversive interactions within an ongoing relational bond” (p. 497). However, around 30% of couples are ‘severely discordant’ in their relationships – enduring very poor-quality relationships marked by stressful conflict (Whisman et al., 2008) and the eventual likelihood of dissolution of the relationship (Gottman & Levenson, 1992; Levenson & Gottman, 1985). At any given time between one-third (Whisman et al., 2008; Whisman et al., 2009), and two-thirds (Kanter, Lannin, et al., 2021) of these couples struggle with relationship difficulties, and more than half of the married⁴ respondents in a nationally

⁴ Of note, the terms ‘married’ or ‘marriage’ are used rather than the term ‘couple relationship’ when this version of a couple relationship is what was specifically being investigated in studies.

representative American study stated they had at some point felt their marriage was “in serious trouble” (National Divorce Decision-Making Project, 2015, p. 3). A quarter of married couples have considered leaving their spouse in the last six months (Hawkins, Galovan, et al., 2017; Lebow et al., 2012) and up to half of all marriages do end (Raley & Sweeney, 2020; Wu & Penning, 2018), indicating the gravitas of these self-reports.

Relationship conflict and disruption are viewed as serious problems for those experiencing them (Schoebi et al., 2012; The Centre for Social Justice, 2019), and problems that people would prefer to resolve (Doherty et al., 2011; Hawkins, Galovan, et al., 2017). They therefore invest significant emotional energy into this endeavour (National Divorce Decision-Making Project, 2015). This significant investment is warranted when considering the negative well-being outcomes of couple relationship distress and dissolution. As renowned relationship researchers, John and Julie Gottman write (2017a, p. 7):

“There is no doubt that people in happy, stable, committed relationships – versus people who are alone, in uncommitted relationships, or in unhappy or unstable relationships – live significantly longer, are healthier physically and psychologically, become wealthier, and have children who do better in most aspects of living...Relationship success or failure has enormous consequences for people everywhere on the planet”

These consequences justify the investigation of the factors that contribute to couple relationship well-being and provide a ‘human need’ rationale for this study.

The quality⁵ and stability⁶ of adult couple relationships have significant impact upon people’s:

- *health* (e.g., Chung & Kim, 2014; Holt-Lunstad et al., 2017; Kojima et al., 2020; Kubricht et al., 2017; Lawrence et al., 2018; Liu & Upenieks, 2021; Margelisch et al., 2017; Newton et al., 2014; Robles et al., 2014);
- *longevity* (e.g., Bourassa et al., 2020; Buettner & Skemp, 2016; Choi &

⁵ *Relationship quality, as understood by relationship science researchers, typically refers to the subjective evaluation of the overall satisfaction, happiness, and well-being experienced within a romantic or intimate partnership and may encompass multiple dimensions, including emotional intimacy, communication effectiveness, trust, commitment, compatibility, and the fulfilment of needs and desires within the relationship (Hassebrauck, & Fehr, 2002).*

⁶ *Stable, ongoing duration.*

Marks, 2011; Dupre et al., 2009; Kravdal et al., 2018; Laugesen et al., 2018; Lawrence et al., 2018; Rendall et al., 2011; Roelfs et al., 2011; Shor et al., 2012; Tatangelo et al., 2017; H. Wang et al., 2020; Whisman, Gilmour, et al., 2018);

- *wealth accumulation* (e.g., Kapelle, 2022; Kapelle & Baxter, 2020; Lersch, 2017; Ruel & Hauser, 2013; Zagorsky, 2016); and,
- *mental well-being and happiness* (e.g., Amato, 2015; Braithwaite & Holt-Lunstad, 2017; Chapman & Guven, 2016; Downward et al., 2022; Grundstrom et al., 2021; Hung et al., 2019; Leach et al., 2013; Lee & Ono, 2012; Liu & Upenieks, 2021; Purol et al., 2020; Rapp & Stauder, 2020; Rizzato et al., 2023; Simon, 2014).

Couples in happy, high quality marriages have, on average, better physical and emotional health and well-being than couples in low quality marriages (Hudson et al., 2020; Robles et al., 2014; Shrout, 2021; Thomas et al., 2017; Wickrama et al., 2020). Robles (2014)'s meta-analytic review of 126 published empirical articles describing how couple relationship quality impacts health (spanning a 50-year period with a cohort of more than 72,000 people from eleven nations) clearly demonstrated the significance of couple relationship quality to well-being outcomes. In their review, being in an unhappy long-term marriage was found to have a worse impact upon health outcomes than daily cigarette smoking. In another study of a representative sample of 19,000 American adults, the unhappily married had 20% more likelihood of dying early compared to the happily married, leading the authors to summarise that "reducing marital dissatisfaction through primary, secondary, and tertiary prevention and intervention may have a widespread and far-reaching impact in improving health and longevity" (Whisman, Gilmour, et al., 2018, p. 1044). Chapman and Guven (2016, p. 549) state that the quality of a couple relationship "is a fundamental determinant of well-being" and this statement has been extensively affirmed.

Conflictual and poor-quality relationships cause stress-related physiological reactions (Birmingham & Holt-Lunstad, 2018). In fact, in Gottman and Levenson's studies the strength of physiological reaction to relationship conflict or distress was the single most accurate predictor of eventual divorce. In other words, relationship quality has a biopsychosocial impact on an individual with significant reverberating effects. When relationship quality is high, couples are also more likely to influence

one another towards behaviours and attitudes that lead to increased personal well-being (Dush & Amato, 2005; Ermer & Proulx, 2019; Proulx & Snyder-Rivas, 2013; Valtorta et al., 2018; Zhu et al., 2018), but it may be the emotional buffer from stress and social pain that a warmly responsive partner offers that most potently confers the health benefits (Farrell & Simpson, 2017; Lebowitz, 2017; Stein & Smith, 2015).

Being able to talk through issues, and gain perspective and advice from another person may increase lifespan (Delaney et al., 2018), and spousal warmth and support correlate with longer telomere length to enhance longevity (Barger & Cribbet, 2016; Vaiserman & Krasnienkov, 2020; Whittemore et al., 2019). Those people who have someone to confide in, or to emotionally support them, exhibit reduced stress and blood pressure (Birditt et al., 2014; Cornelius et al., 2019) and attenuated cardiovascular and neuroendocrine strain (Hostinar & Gunnar, 2015), and hypothalamic reactivity (C. Brown et al., 2017), leading to health gains down the line. Having the basic psychological need for relatedness met lowers stress, and this lowers cortisol (a stress biomarker), and additionally inhibits cortisol's detrimental effect on telomere length – the attrition of which correlates with shortened lifespan (e.g., Thakur et al., 2023).

In contrast with the positive outcomes of high quality couple relationships, Bookwala and Gaugler (2020)'s investigation of data drawn from two waves of the 'National Social Life, Health, and Aging Project' (N=1,734) showed a correlation between couple negativity, particularly spousal criticism, and increased likelihood of death five years later. Relationships characterised by open or hidden hostility are usually experienced as chronically stressful (S. Lee et al., 2021), thereby triggering emotional dysregulation (Contardi et al., 2016), and provoking systemic inflammation (Fagundes et al., 2011; Wilson et al., 2021; Yang et al., 2014) by upregulating the sympathetic nervous system and the hypothalamic–pituitary–adrenal (HPA) axis, and impacting negatively upon the immune system (Shrout et al., 2022; Woods, 2019), which has a negative downstream effect on health outcomes (Slavich & Irwin, 2014; Uchino et al., 2018; Wheeler et al., 2019). It is not surprising, therefore, that a stressful, conflictual, or lonely marriage significantly increases one's likelihood of becoming sick or depressed (Choi & Marks, 2013; Jaremka, Lindgren, et al., 2013).

In a nationally representative United States sample of more than 15,000 individuals, the unhappily married were twice as likely to report poor health than the happily

married, and 40% more likely to die early. This was a worse result than for single, widowed, and divorced adults (Lawrence et al., 2018). Increased relationship negativity and decreased relationship positivity correlate with incidences of significantly increased blood pressure (Birditt et al., 2014), cardiovascular reactivity (Donoho et al., 2015), coronary artery disease (Smith et al., 2012; Uchino et al., 2014), cardiovascular disease (Joseph et al., 2014; Tulloch & Greenman, 2018), cardiac arrest (Isiozor et al., 2019), fibromyalgia (Huang et al., 2018; Milrad et al., 2019), diabetes (Whisman et al., 2014), leaky gut (Kiecolt-Glaser et al., 2018), inflammation burden (Yang et al., 2014), impaired cellular immune function and weakened immune systems (Bergamini et al., 2018; Brown et al., 2018; Haase et al., 2016; Hasselmo et al., 2018; Jaremka, Glaser, et al., 2013), sleep (Beattie et al., 2015), chronic fatigue syndrome (Band et al., 2015; Blazquez et al., 2012), abdominal obesity (Birditt et al., 2019; Kiecolt-Glaser et al., 2015), overall obesity (Jaremka, Lindgren, et al., 2013; Kouvonen et al., 2011; Skoyen et al., 2018), reduction in general well-being (Birditt et al., 2018), and also mortality generally (Shen et al., 2017; Stanton et al., 2019).

Couples who stay partnered or married, but in low-quality relationships i.e., high-strain, low support, high criticism, low understanding, fractious (Aguilar-Raab et al., 2022; Bourassa et al., 2015; Hammett et al., 2016) can also have reduced mental well-being. These kinds of strained relationships can contribute to brain inflammation (Jaremka, Lindgren, et al., 2013; Lee & Giuliani, 2019), which in turn has been shown to increase depression (Du et al., 2016). A 20-year-long study of 1,208 American adults found that negative partner responsiveness precipitated depression as well as earlier mortality (Stanton et al., 2019). Couples in regularly hostile and negative relationships also demonstrate an increased likelihood of suicidal thoughts or attempts (Blow et al., 2019; Love et al., 2018; McNulty et al., 2019) and staying in a low-quality unhappy marriage has been shown to lower overall life satisfaction (Whitton et al., 2014), and self-esteem (Bell & Harsin, 2018).

The exiting of a couple relationship is also problematic. A 16-year-long Swiss study found the health detriments of divorce to be three times greater than the health benefits of stable marriage (Kalmijn, 2017), and the divorced or separated have a significantly higher mortality rate than those remaining married (Sbarra, 2015; Sbarra et al., 2011; Shor et al., 2012), with a meta-analytic sample of more than 600 million adults from 24 countries (Shor et al., 2012) showing that the divorced or separated, on average, had a 30% higher risk of early death compared to the

married. In another meta-analysis of 34 international studies with over 2 million participants the divorced were approximately 33% more likely to die from heart disease and 133% more likely to die of stroke, than the married (Wong et al., 2018). A Swedish study (N=27,214) reiterated these correlations (Lindstrom & Rosvall, 2019). Nielsen et al. (2014)'s 28-year-long study of more than 5.6 million people showed that those who were divorced had a 48% higher chance of being diagnosed with an infectious disease than those who were married. Additionally, divorced men and women diagnosed with serious illness are significantly more likely to die from it, including those with heart disease and myocardial infarction (Bjørnnes et al., 2017; Eaker et al., 2007; Floud et al., 2014; Idler et al., 2012; Kewcharoen et al., 2021; Quinones et al., 2014; Schultz et al., 2017), cancer (Alvi et al., 2019; Dinh et al., 2018; Krajc et al., 2022; Tang et al., 2022), diabetes (Escolar-Pujolar et al., 2018), and kidney disease (Z. Wang et al., 2021).

The divorce/health-detriment correlation also extends to mental health, where married adults predictably exhibit higher levels of mental health and generic well-being (Becker et al., 2019; DeMaris, 2017; Ding et al., 2021; Soons et al., 2009; Uecker, 2012), than the separated or divorced (Darghouth et al., 2015; Musick & Bumpass, 2012) across many domains (Scott et al., 2010) including depression (Grundstrom et al., 2021; Quashie & Andrade, 2018; Recksiedler & Stawski, 2018; Roberson et al., 2018; Stokes & Moorman, 2018) and suicidal thought or behaviour (Stack & Scourfield, 2013; Yip et al., 2012; Yip et al., 2015), psychiatric disease (Bjorkenstam et al., 2013) and long term cognitive decline (Elovainio et al., 2017; Liu et al., 2020; Sommerlad et al., 2018). Divorce is also a powerful risk factor for first onset drug abuse (Edwards et al., 2018) and increased alcohol abuse (Kendler et al., 2017; Liang & Chikritzhs, 2011).

Relationship well-being outcomes seem to be universal. Despite variations in cultural values around couple relationship structures (Perelli-Harris et al., 2018), stable, committed couple relationships seem to produce generically human rather than culturally arbitrated benefits, with studies from many cultures showing evidence of this correlation (e.g., Lee & Ono, 2012; Manzoli et al., 2007; Verbakel, 2012), including *Japan* (e.g., Bierman, 2013; Li et al., 2016; Lim & Raymo, 2016), *China* (Fu & Noguchi, 2016), *Taiwan* (Kubricht et al., 2017), *East Asia* (Chung & Kim, 2015), *India* (Perkins et al., 2016; Strohschein & Ram, 2017; Verma et al., 2019), *Russia* (Kravchenko et al., 2015), *Iran* (Alipour et al., 2019; Rouzbahani & Dehghani, 2019), *Mexico* (Gutiérrez-Vega et al., 2018), *Canada* (Gere &

Schimmack, 2013; Zella, 2016), the *United States* (Baker et al., 2013; K. Ross et al., 2019; Wickrama et al., 2020), *Australia* (O'Flaherty et al., 2016), *Czechoslovakia* (Pechholdová & Šamanová, 2013), *Norway* (Gustavson et al., 2015; Kravdal, 2017) Gustavson et al., 2015), *Switzerland* (Margelisch et al., 2017), *England* and *Wales* (Franke & Kulu, 2018), and the *United Kingdom* (Meadows & Arber, 2015). Numerous other international studies have shown similar results (e.g., Berkman et al., 2004; Bosnes et al., 2019; Choi et al., 2018; Giles et al., 2005; Pantell et al., 2013; Tanskanen & Anttila, 2016).

The outcomes of couple relationship quality and stability are significant and widespread. Considering that relationship strain has such detrimental consequences to peoples' personal well-being, and considering that divorce is defined as one of the greatest stressors people experience (Carr & Springer, 2010), (second only to the death of a spouse in the Holmes-Rahe Stress Inventory (2019)), improved understanding of the factors that lead to relationship break-down can be viewed as a significant public mandate (Amato, 2014; Amato et al., 2011; Zemp et al., 2015)⁷. As Tatangelo et al. (2017) state in their review of 33 international studies into all-cause mortality: "It is crucial we better understand human relationships given the clear impact these have on our health and survival" (p. 68). Clarity is needed regarding which factors are most significant to couple relationship well-being outcomes to be able to effectively address these factors in treatment, or conversely, to better support couples in choosing to stay in or leave relationships. Therefore, this thesis considered what researchers understand to be the significant empirically validated factors contributing to and maintaining couple relationship well-being (both negatively and positively), with the goal of contributing to 'best practice' in improving couple relationship well-being.

2. Current Understanding of Relationship Well-Being Factors

2.1 Lay Understanding of Relationship Well-Being Factors

To begin this thesis, current understanding of these factors, and of 'best practice' in addressing these factors, needed to be ascertained. Couples themselves identify the factors contributing to their relationship problems as being: communication

⁷ The significant impacts of couple relationship well-being are also noted in the impact on their children and on society more broadly. These are commented on in Appendix 2.

issues, commitment issues, infidelity, lack of emotional affection and closeness, sexual problems, growing apart, accumulation of stress, or financial problems, sharing of household labour, aggression and abuse (Bodenmann, Charvoz, et al., 2016; Boisvert et al., 2011; Hawkins, Willoughby, et al., 2012; Lampard, 2014; Scott et al., 2013; Williamson et al., 2019; Yucel & Koydemir, 2015). Incompatibility is also a vague but commonly cited reason (e.g., Al Gharaibeh & Bromfield, 2012). Gottman et al. (2020)'s large assessment (N= 40,681) showed that 97.4% of couples who presented for therapy reported feeling overwhelmed during conflict interactions, and 83% reported serious problems with their sexual and romantic intimacy.

Lay conceptualisation of relationship well-being factors have shown substantial overlap with researcher and therapist conceptualisation (Williamson et al., 2018), however, identification of presenting problems does not clarify how they came into existence, how they have been maintained, and how they might therefore be resolved. While these factors have face validity, they do not necessarily represent the underlying factors contributing to problems that need to be targeted in therapy.

2.2 How Couples Therapy Modalities Define Relationship Well-Being Factors

Currently, the most scientifically proven means of understanding our human relationships is through empirical research investigations⁸, and the most scientifically proven means of improving our relationships is through empirically validated help⁹ from a therapist trained in a specific, researched therapy modality (Carr, 2018). Therapy modalities are typically (intentionally or not) built upon relationship theories, which are suppositions or systems of factors “intended to explain something” (Online Oxford Dictionary, 15th July 2023). These theories help to clarify what factors are considered significant in explaining an outcome, and how these factors are inter-related (Fried, 2020).

A critical first step in couples therapy, and a unique skill that trained psychotherapists and clinical psychologists often provide, is case conceptualisation or formulation (Bieling & Kuyken, 2003; Borsboom et al., 2021; Godoy & Haynes,

⁸ Research based on observation and measurement of phenomena.

⁹ Therapy validated by empirical research.

2011; Ingram, 2016; Kuyken et al., 2008). Eells (2015, p. 16) describes psychotherapy case formulation as “a process for developing a hypothesis about, and a plan to address, the causes, precipitants, and maintaining influences of a person’s psychological, interpersonal, and behavioural problems in the context of that individual’s culture and environment” (p. 16), which is aligned with the American Psychological Association (2006, p. 273)’s encouragement to integrate “the best available research with clinical expertise”. In other words, case conceptualisation creates a theory around what the couples’ presenting problems are, and what precipitates and perpetuates these problems, in order to then create a suitable strategy for addressing the problems at each of these levels. However, while counselling therapists are encouraged to use scientifically validated knowledge in their therapy conceptualisations and practice (Crane & Hafen, 2002), there is a noted lack of connection between research findings and therapeutic training and endeavours (Dattilio et al., 2014; Lebow, 2020), which also implies that empirically proven relationship factors and theories are not being widely taught to therapists or applied in therapy.

2.2.1 Training of Couples Therapists

In the USA, 75% of general psychologists (Norcross et al., 2023), 49% of generalist therapists (Berke et al., 2011), and 50% of clinical psychologists (Norcross & Karpiak, 2012) perform couples therapy, however, couples counselling is usually a very minor component of their education. Crane et al. (2010), found that during the whole training for six different mental health professions in the USA, all of which may carry out couples therapy, an average of 2.52 hours was spent on family therapy (including counselling children). As many as 76% of clinical or counselling psychology doctoral programs in the USA do not require any couples therapy training at all (Norcross & Rogan, 2013), yet according to an American survey of 2,100 adults, around 45% of people who seek general professional counselling do so with the aim of remedying couple relationship problems (University of Phoenix, 2013). In other words, nearly half of all clients seeking counselling in the USA potentially to do so specifically for relationship help, yet most of their therapists have had minimal, if any, specific training in couple therapy or theory, meaning that couples they are working with may find their therapy experience to be ineffective (Goldberg et al., 2016; Hsueh et al., 2012; Johnson & Bradbury, 2015; Withers et al., 2017), and the therapists themselves may lack clarity on the empirically validated factors that need to be targeted to effectively help couples in need.

Additionally, many therapists completed their training long before significant research findings challenged and reshaped older theoretical knowledge about these factors (e.g., Bradbury & Lavner, 2012; Melchert, 2016). Karney and Bradbury (2020) noted in their decade review that many recent findings have challenged conventional thinking about the mediating and moderating factors leading to relationship satisfaction and stability. These changes have subsequently altered the conceptualisation of best practice in therapy (Tasca et al., 2015). Many well-known couples' therapy interventions were developed in the 1980s (e.g., Bailey, 2012; Gurman, 2011), and therefore were created based on theoretical premises that have now been updated (Karney & Crown, 2007), however, even recently trained therapists are in some cases still being trained in outdated methodologies, including in universities (Schramm et al., 2017; Wampler et al., 2019).

To reiterate: most psychological therapists will have clients approach them for relationship help, yet most will lack specific training in this field, and training they have had may be outdated and lacking a clear theoretical basis. Pragmatically speaking, all generalist psychological therapists should be trained in clear and empirically established relationship processes theory (Hawkins et al., 2019), and the therapy modalities and programs used should be proven in their effectiveness in helping improve couple relationship well-being.

2.2.2 Efficacious Therapy Modalities

Efficacy studies (RCTs) are deemed the most scientifically rigorous method for testing the effectiveness of modalities and programs (Hariton & Locascio, 2018), and have been used to endorse some couple therapy models (Carr, 2018; Doss et al., 2021; Lebow et al., 2012) including Behavioral Couple Therapy (BCT), Cognitive Behavioral Couple Therapy (CBCT), Emotionally Focused Therapy (EFT), and Integrative Behavioral Couple Therapy (IBCT). However, those therapy modalities that are being taught in marriage and family therapy (MFT) programs (N=52) in the United States include Emotion Focused Marriage and Family Therapy (EMFT), Emotionally Focused Therapy (EFT), Gottman Therapy (GMCT), Motivational Interviewing, Multidimensional Family Therapy, and Strategic Family Therapy (Marlowe et al., 2020). However, of those mentioned, only EMFT, and EFT are well-established couples therapy modalities, in other words, modalities that have been proven in at least two controlled studies to be more effective than placebo, and

other approaches have yet to be discerned as ‘well-established’¹⁰. Many other couple therapy approaches also exist and are being taught, and in all likelihood, couple therapists use a mixture of approaches in the therapy room (Klann et al., 2011; Zarbo et al., 2015).

2.2.2.1 Behavioral Couple Therapy (BCT)

Behavioral Couple Therapy (BCT)¹¹ and some modified versions (e.g., Enhanced Cognitive-Behavioral Couple Therapy (ECBT) (Epstein & Baucom, 2002)), have shown efficacy in reducing negative communication and emotional arousal during conflict, and increasing positive communication, intimate safety, conflict resolution, and tolerance (e.g., B. Baucom, E. Sheng, et al., 2015; K. Baucom et al., 2015; Bélanger, Laporte, et al., 2014; Briggs et al., 2015; Christensen et al., 2010; Christensen & Glynn, 2019; Coop et al., 2019; Cordova et al., 2014; Doss et al., 2016; Doss et al., 2019; Doss et al., 2021; Dugal et al., 2018; Fischer et al., 2016; Hawrilenko et al., 2016; Roddy et al., 2018; Roddy, Stamatidis, et al., 2020; Trillingsgaard et al., 2016).

2.2.2.2 Emotionally Focused Therapy (EFT)

Emotionally Focused Therapy (EFT) (Johnson et al., 1999)¹² has shown significant

¹⁰ *The criteria for being a ‘well-established’ couples therapy is described by Southam-Gerow and Prinstein (2014) as therapies that are statistically superior to placebo, or superior to another well-established treatment in at least two independent studies involving randomised controlled design, treatment manual usage, reliable and valid assessment measures, and a clearly delineated population. Of note, efficacy studies have been questioned in recent years with effect sizes found in effectiveness studies in real-world settings being “considerably lower than those found in efficacy studies” (Roesler, 2020, p. 390).*

¹¹ *Behavioral Couple Therapy (BCT) (Azrin, Naster, & Jone, 1973; Jacobson, & Margolin, 1979; Stuart, 1980; Weiss, 1975; Weiss, Birchler, & Vincent, 1974; Weiss, Hops, & Patterson, 1973) has been around the longest and has therefore been the most studied of all the couple relationship therapies, and is one of the few to be consistently featured in meta-analytic reviews (Shadish, & Baldwin, 2005; Snyder, & Halford, 2012). Over time, therapy components have been added to BCT to enhance its outcomes. These enhanced versions include Integrative Behavioral Couple Therapy (IBCT) (Christensen, Atkins, Berns, Wheeler, Baucom, & Simpson, 2004; Baucom, & Epstein, 1990).*

¹² *EFT evolved from Emotion-focused therapy for couples (EFT-C) (Greenberg, & Johnson, 1988).*

positive therapy results¹³ (Beasley & Ager, 2019; Rathgeber et al., 2019) through shaping/reshaping adult romantic attachment bonds (Dalglish, Johnson, Burgess Moser, Lafontaine, et al., 2015; Dalglish, Johnson, Burgess Moser, Wiebe, et al., 2015; Greenman et al., 2019; Vanhee et al., 2018; Wiebe, Johnson, Burgess Moser, et al., 2017; Wiebe, Johnson, Lafontaine, et al., 2017), using pursuer-softening events, emotional experiencing (Dalglish, Johnson, Burgess Moser, Lafontaine, et al., 2015; McKinnon & Greenberg, 2017; Moser et al., 2018; Wiebe, Johnson, Burgess Moser, et al., 2017), and by resolving attachment injuries (Halchuk et al., 2010). Reducing attachment insecurity has correlated with increased maintenance of treatment gains post-therapy (Moser et al., 2015; Myung et al., 2022), and the greatest gains are noted during the ‘softening event’ stage of therapy – where, “a previously hostile/critical partner asks, from a position of vulnerability and within a high level of emotional experience, for reassurance, comfort, or for an attachment need to be met” (Bradley & Furrow, 2004, p. 234).

2.2.2.3 Do These Therapies Work?

Studies have shown that couple therapies may improve individuals’ sense of well-being and couples’ relationship satisfaction (e.g., Baucom, & Crenshaw, 2019; Callaci, Vaillancourt-Morel, Labonte, Brassard, Tremblay, & Peloquin, 2021; Doss, Mitchell, Georgia, Biesen, & Rowe, 2015; Doss, Roddy, Wiebe, & Johnson, 2021; Fischer, Baucom, & Cohen, 2016; Hawkins, Blanchard, Baldwin, & Fawcett, 2008; Hewison, Casey, & Mwamba, 2016; Knobloch-Fedders, Pinsof, & Haase, 2015; Lebow, 2018; Lebow, Chambers, Christensen, & Johnson, 2012; Roddy, Nowlan, Doss, & Christensen, 2016; Roddy, Walsh, Rothman, Hatch, & Doss, 2020; Wiebe, & Johnson, 2016) and Bradbury, & Bodenmann (2020)’s review found this was the case for 60–80% of distressed couples who had attended behavioural or emotion-focused couple therapy. However, as many as 30-50% may show no improvements at all and may even have deteriorated at the end of treatment (Roesler, 2020; Snyder, & Halford, 2012).

Improvements may also be mixed. For example, couples who attended BCT had sustained reductions in negativity and withdrawal, however, they also had

¹³ *Efficacy studies have shown that 50-79% of couples receiving EFT have recovered from their targeted relationship distress at the immediate completion of therapy (Wiebe, & Johnson, 2016).*

reductions in positivity (Baucom, Sevier, Eldridge, Doss, & Christensen, 2011). Rathgeber, Burkner, Schiller, & Holling, (2019)'s meta-analysis showed significant relationship satisfaction improvements at the conclusion of BCT, EFT and EFCT in comparison to a control group. However, 12 months after treatment these improvements had almost vanished. Other studies have also questioned the long-term efficacy of couple therapy (Bradbury, & Bodenmann, 2020; Gottman, & Gottman, 2017b; Schmit, Schmit, Lenz, Hawkins, Silveus, & Chuyou-Campbell, 2020; Stratton, Silver, Nascimento, McDonnell, Powell, Nowotny, 2015), indicating that across the gamut of therapies available their effectiveness is potentially being undermined by inadequate theory or inadequate personalised matching of clients to modalities.

2.2.2.4 How Are These Therapies Theorised to Work?

A meta-analysis of 58 couple therapy studies (N=2,092 couples), which included Behavioral Couple Therapy (BCT), Cognitive Behavioral Couple Therapy (CBCT), Integrative Behavioral Couple Therapy (IBCT), Emotionally Focused Therapy (EFT), and other therapy modalities, noted couple relationship improvements in the specific domains of “emotional intimacy, relationship cognitions, self-reported communication, observed communication, and partner behaviours” (Roddy, Walsh, et al., 2020, p. 590). The obvious factors being manipulated in these well-researched therapy modalities are cognitions, behaviours, and emotions (Atkins et al., 2003; Johnson, 2019) and these outcomes indicate a synchrony between each modality's theory and practice. However, it is intriguing to note that there were no differences found in modality effectiveness in Roddy, Walsh, et al., (2020)'s study despite the variation among the factors being therapeutically manipulated, which raises the theoretical question of precisely how and why couples are changing.

Attachment style is theorised as underpinning of relationship behaviours in EFT (Johnson, 2019) and EFT developers have worked hard to align their practice with their theory. BCT and IBCT focus on communication skills and behavior change, with IBCT adding in emotional acceptance and tolerance of partner differences (Atkins et al., 2003). Benson et al. (2013)'s longitudinal study considered the impact BCT and IBCT attendance had on attachment changes in distressed couples. Their results indicated that, while the therapy did not target attachment change directly, it did indirectly. In this case, rather than attachment changes producing relationship improvement, relationship improvement appeared to produce attachment changes.

It bears consideration therefore that just because therapies don't articulate theoretical components does not mean they are not circuitously addressing them. Likewise, just because a modality's therapy processes are theoretically informed does not necessarily mean those theorized processes are what drive change outcomes.

Novak (2015)'s study indicated that therapist 'atunement' to their client may be impacting EFT's positive results even more than theorised factors. Owen et al. (2014)'s study of therapist effects investigated 158 couples receiving therapy from eighteen different therapists¹⁴. The least successful of these therapists saw relationship satisfaction improvements in an average of 30% of their clients, whereas the most successful therapists saw improvements in approximately 75%. This represents a vast gap in therapy effectiveness potentially resulting directly from therapist factors rather than modality factors. Additionally, Willis et al. (2021)'s study suggests that therapist factors accounted for 9.4% of couples prematurely dropping out of treatment. When this attrition rate is added to the equation, as Imel et al. (2015) did in their study, the least effective therapists are only seeing improvements in 18% of their clients compared to the most effective therapists who see improvements in 84% of their clients. Therapist factors, many of which may be trainable, may therefore account for a significant amount of variance in the value for clients of attending couples' therapy.

2.2.3 Couple Relationship Education Programs

Couple relationship education programs¹⁵, as distinct from couples therapy, have been used on an extremely large scale in the United States (Stanley et al., 2019). Markman et al. (2022)'s recent review of these programs identified that they tended to lack theoretical clarity. Most programs teach communication skills and a few

¹⁴ "There were 11 female therapists and 7 male therapists (all were White, Euro-Scandinavian), 9 of whom were licensed psychologists, 8 were licensed social workers, and 1 a licensed psychiatric nurse. All therapists professed an eclectic orientation, using a variety of approaches—solution-focused, narrative, cognitive-behavioral, humanistic, and systemic" (Novak, 2015, p. 491).

¹⁵ These include: Communication Program (Nunnally, 1971, Prevention and Relationship Enhancement Program (PREP) (Markman, Floyd, Stanley, & Storaasli, 1988), Couple CARE Program (Halford, Sanders, & Behrens, 2001), Couples Coping Enhancement Training (Bodenmann, Pihet, Shantinath, Cina, & Widmer, 2006), PREPARE/ENRICH Program (Fowers, & Olson, 1986), and the Relationship Enhancement Program (Accordino, & Guerney, 2003).

studies have linked communication up-skilling to relationship improvements (e.g., Barton et al., 2017; Hawkins, Sage, et al., 2017), but others counter these findings (e.g., Williamson, Altman, et al., 2016)¹⁶. Hawkins and Fackrell (2010)'s meta-analysis (N=15 studies) of the effectiveness of relationship education programs indicated that teaching communication skills (usually understood as techniques enabling less conflictual conversation) improved couple communication outcomes, but this improvement did not correlate with significant improvements in relationship quality outcomes. Similarly, the Loving Couples, Loving Children (LCLC) curriculum developed by John and Julia Gottman targets communication factors and was used in the United States government-led *Healthy Marriage Initiative* where it produced no significant improvements, and in some cases a lowering of marital satisfaction was observed post training (Hsueh et al., 2012). Similarly, Carlson et al. (2014)'s study (N=130) of the Prevention and Relationship Enhancement Program (PREP)'s speaker-listener technique showed that learning this communication skill did not improve couple satisfaction. In Scott et al. (2013)'s study (N=306), 30% of PREP recipients said they had difficulty using the relationships skills, particularly in the heat of conflict.

It may be that increasing communication skills only helps those couples who have poor communication, or poor communication is not the only factor contributing to couples' distress, or not a significant factor at all (Barton et al., 2017; Bodenmann et al., 2009). Interestingly, the one factor that seemed to predict positive outcomes for couples in Hawkins, Stanley, et al. (2012)'s meta-analysis of relationship education studies was simply the length of time couples spent in the program, with 9-20 hours

¹⁶ *Their long-term effectiveness in preventing or halting relationship unhappiness or dissolution has shown mixed and often insignificant results, or even negative results in multiple studies (e.g., Arnold, & Beelmann, 2019; Bir, Lerman, Kofke-Egger, Nichols, & Smith, 2012; Blanchard, Hawkins, Fawcett, & Baldwin, 2009; Bradbury, & Lavner, 2012; Cobb, & Sullivan, 2015; Cowan, Philip, & Cowan, 2014; Clyde, Wike, Hawkins, & James, 2020; Doss, Knopp, Roddy, Rothman, Hatch, & Rhoades, 2020; Fawcett, Hawkins, Blanchard, & Carroll, 2010; Doss, Knopp, Roddy, Rothman, Hatch, & Rhoades, 2020; Halford, Rahimullah, Wilson, Occhipinti, Busby, & Larson, 2017; Hawkins, 2019; Hawkins, & Erickson, 2015; Hawkins, Hokanson, Loveridge, Milius, Duncan, Booth, & Pollard, 2022; Hawkins, Stanley, Cowan, Philip, Fincham, Beach, Cowan, Rhoades, Markman, Daire, 2013; Hsueh, Alderson, Lundquist, Michalopoulos, Gubits, Fein, & Knox, 2012; Lebow, Chambers, Christensen, & Johnson, 2012; Lowenstein, Altman, Chou, Faucetta, Greeney, Gubits, Harris, Hsueh, Lundquist, Michalopoulos, & Nguyen, 2014; Owen, Chapman, Quirk, Inch, France, & Bergen, 2012; Owen, Duncan, Anker, & Sparks, 2012; Owen, Manthos, & Quirk, 2013; Reck, Higginbotham, & Dew, 2019; Sinha, Porter, Leeper, & Owen, 2021; Wood, McConnell, Moore, Clarkwest, & Hsueh, 2012).*

being ideal. Javadivala et al. (2021)'s similar meta-analysis found that longer time spent in the program was imperative for some of the improvements seen for husbands. It is possible that an important but unexamined or 'hidden' theoretical factor is influencing this outcome, such as the display of commitment shown when both partners persevere with a program to enhance their relationship, or that over time therapeutic alliance induces change extraneous to the program content (e.g., Owen et al., 2011).

These findings point to a variety of ways in which therapy may help couples, while also alluding to the confusion prevalent in this field. Karen Wampler and her colleagues' review of couple relationship therapy concluded that there has been a lack of "research-based validation of foundational theories in the last 50 years" (Wampler et al., 2019, p. 10). Some couple therapy modalities seem to be somewhat effective, however, without a common theoretical framework to draw from, many lack a synchronised understanding of which factors to prioritise in therapy to produce desired change in couple relationship well-being (Muthukrishna & Henrich, 2019). Bradbury and Lavner (2012) note that the obvious necessity is for basic research to determine the factors that contribute to couple relationship well-being, and Markman et al. (2022, p. 270) recently stated that "we need a greater commitment to uncovering the mechanisms of change" in couple therapy. The current study therefore aimed to identify and understand the empirically validated factors that researchers have observed as having a reliably significant correlation with couple relationship well-being outcomes, and to weave these findings together into a coherent model that could help enhance clarity for therapists and researchers working in this field.

3. Weaving Together the Growing Mass of Research Findings

Synthesising existing knowledge is critical for advancing an academic research domain (Glass, 1964). Prior to this study, the multi-disciplinary research base regarding couple relationship well-being factors has not been broadly synthesised, in part because the related fields are diverse and extensive. Couple relationship well-being outcomes are influenced by a variety of factors including biological, psychological, social, cultural, and environmental influences from micro to macro levels. The academic disciplines involved include anthropology, behavioural economy, biology, communication, couple and family therapy, economics, epidemiology, evolutionary theory, animal behaviour, medicine, motivation science,

neuroscience, philosophy, political science, sexology, sociology, and socio-biology, and, within psychology, clinical psychology, cognitive psychology, developmental psychology, health psychology, and social psychology (Fletcher et al., 2019). There are numerous theories already established in each of these fields of science but humans have a limited capacity to retain and utilise information (Baddeley et al., 2020), and therefore breaking down these theories into their individual factors, analysing their prominence and patterns in the research, and summarising these, helps to make the vast amount of information in the research corpus more easily accessible.

The enormous scale of this research corpus has been described as a “critical mass of clinically compelling theory” (Gurman, 2011, p. 281), and the sheer volume of this research has made it difficult (and expensive) for therapists to stay up-to-date with the latest findings (Berke et al., 2011; Grzywacz & Allen, 2017). Since the 1980s when collating and reading published research required accessing microfiche records manually at a library (at least this was my early experience), to the 2022’s where online libraries have transformed this process, the corpus of published studies has grown exponentially (Sharkey, 2021). The challenge in this era is no longer accessing or storing the publications, but rather dealing with the deluge of information on offer. James Chandler from BenevolentAI notes that, “A new scientific paper is published every 30 seconds and there are 10,000 updates to PubMed every day” (Liu, 2016, p. 1). With information accruing at such an accelerated rate, trying to keep up with the latest findings is like “trying to drink from a fire hose” (Kee, 2014, p. 28).

Although the field of relationship science¹⁷ has expanded to the point of information overload (Sigal & Pettit, 2012), only a fraction of the vast amount of scientific data generated becomes useable information, or has translated over to psychotherapeutic practice (Gurmin, 2011). The vastness of the field has caused relationship researchers to narrow their focus to specialised fields of study (Gelso et al., 2021; von Bertalanffy, 1953), resulting in a potential siloing of scientific branches of knowledge (Mermelstein & Revenson, 2013) and a loss of valuable collaboration, shared understanding, and a theoretical disconnect with the broader scientific

¹⁷ *Relationship science is the study of “the structure and trajectory of relationships, how relationships operate, and how relationship outcomes are influenced by both the personal characteristics that people bring to their relationships and the broader context in which relationships are embedded” (Finkel, Simpson, & Eastwick, 2017, p.384)*

landscape (Muthukrishna & Henrich, 2019). This study therefore aimed to review the research from across the academic fields and synthesise the collaborative shared understanding therein.

Previous reviews of the literature pertinent to couple relationships include those carried out by Ted Huston and George Levinger (1978) (who focused on interpersonal attraction and similarity), Margaret Clark and Harry Reis (1988) (who wrote about interdependence, emotion, intimacy, love, and individual differences in the relationship process), John Holmes and Susan Boon (1990) (who overviewed communication and Social Exchange Theory and noted that the research on close relationships was now sufficiently amassed to inform policy), John Gottman (1998), (who covered the growing study of psychophysiological responses in relationships), Margaret Clark and Edward Lemay, Jr (2010) (who identified responsiveness as a key factor in developing positive close relationship outcomes), and Eli Finkel, Jeffry Simpson and Paul Eastwick (2017) (who defined 14 core principles of the psychology of close relationships). These have all helped to move the field of relationship science forward towards more coherent underlying theory.

Literature reviews are useful for recognising and articulating recent developments in a scientific field. Reviews help to condense vast amounts of knowledge into comprehensive accounts of the key findings and their inter-relationships across the research base, thereby making that knowledge more accessible and useable. Reviews can also provide a recalibration of our general understanding of where we are currently, valuable scrutiny of key findings and directions, and reflection on where we should be heading with future research endeavours. As new evidence is continuously emerging in the scientific databases, out-of-date reviews may cause problems, especially for those using them to guide research or therapy (Knottnerus & Tugwell, 2014).

It is hoped that this thesis with its extensive, in-depth review of the literature will also aid in moving the field forward. Attempting to synthesise the multi-disciplinary research to find key factors related to couple relationship well-being was ambitious, nonetheless, it has been repeatedly called for (Campbell & Surra, 2012; Clark, 2018; Reis et al., 2000). Back in the 1980s, renowned social psychologist Harold Kelley (1983) encouraged relationship scientists to draw from neighbouring disciplines to clarify the central factors contributing to couple relationship outcomes. In the 1990s Ellen Berscheid (1999) wrote that relationship researchers needed to

work towards coherence among the myriad of scholarly fields. In the 2000s Harry Reis (2007) lamented that “we often have difficulty weaving together theories and findings...into a cohesive account...If we do not attend to these central principles, our findings run the risk of becoming scattered and arcane” Reis (2007, p. 7). More recently, Timothy Loving and Ted Huston (2012, p. 275) expressed the need for relationship science to, “overcome the disciplinary isolation that undermines a holistic understanding of relationships”, Jeffry Simpson and Lorne Campbell (2013) described relationship science as moving towards an interdisciplinary, theoretically integrated future, and Eli Finkel, Jeffry Simpson and Paul Eastwick reiterated that relationship science would benefit from “greater integration across theories (to reduce redundancy)” (2017, p. 383).

Only in the present era has the comprehensive examination of this literature become feasible, driven by three distinct factors:

1. The proliferation of published articles numbering in the thousands.
2. The widespread availability of these articles online.
3. The advent of specialised software tools such as Endnote and VOSviewer, which enable the storage and analysis of facets of this extensive body of literature.

Consequently, this study aimed to identify the “core organising principles” (Reis, 2018, p. 32) of relationship well-being through a cross-disciplinary exploration of the prominent factors documented in numerous research studies. This endeavour aimed to foster integration within the field of relationship science, addressing the existing gaps of connectivity, and clarifying strengths in the research base, to construct an empirically grounded model that visually represents these fundamental organising principles in alignment with their prevalence and validation in the research literature.

4. Clarifying the Research Question

The specific aim of this study was to gain an overview of the key researched factors contributing to and maintaining couples’ relationship well-being in order to create an explanatory model of the factors that would be helpful for informing researchers, therapists, and other interested parties. The research question guiding this process is shown in Figure 2. The terms used in this question are further explained below.

Figure 2 *The Research Question*

What factors contribute to, and maintain, couple relationship well-being according to existing published research?

4.1 Glossary of Key Terms

A glossary was created to clarify these, and other unique terms used in this study and is shown in Appendix 1. Some of these key terms are further defined below.

4.1.1 Factors

The ‘what’ of this study centred around understanding what factors contribute to and maintain relationship well-being. Factors are those circumstances, facts, or influences that contribute to a result (Oxford Online Dictionary, 2022). In this case, the result was couple relationship well-being. Case conceptualisation involves gaining clarity of predisposing, precipitating, and perpetuating factors pertinent to the presenting problem, therefore, factors could be those that predispose the individual or couple to certain outcomes (e.g., individual differences), those that precipitate outcomes (e.g., stressful events), and those that perpetuate those outcomes (e.g., a belief that things can’t be changed).

4.1.2 Well-being

The ‘well-being’ definition used in this study sits on a continuum, with high well-being at one end and low well-being at the other end. Well-being therefore describes both the positive and negative impact of factors on couple relationship function/dysfunction and satisfaction/dissatisfaction, in other words, factors may contribute to couples’ high well-being or low well-being.

Feeney and Collins (2015a) describe social well-being as having “deep and meaningful human connections, positive interpersonal expectations, a prosocial orientation toward others, and faith in others/humanity” (p. 116). According to Self-Determination Theory, high well-being requires the satisfaction of three innate, basic psychological needs: competence, relatedness, and autonomy (Deci & Ryan, 2009), therefore well-being is postured as the state of feeling competent to relate well with one’s partner, feeling connected, cared for, affirmed, and understood by them, and

feeling a sense of self-management and responsibility in the relationship (Patrick et al., 2007). Considering these descriptions, low relationship well-being would include shallow human connections, negative interpersonal expectations, an anti-social orientation, distrust in others, and a lack of sense of competence, relatedness, and autonomy in the relationship.

4.1.3 Couple Relationships

This was a study of couple relationships, across the lifespan, across cultures and contexts, across various relational configurations, utilising thousands of studies¹⁸. However, the bulk of the literature used in this study was relationship science research which has been predominantly drawn from populations of monogamous, heterosexual, and married couples (as noted by Hiekel & Wagner, 2020; Woods et al., 2020), which is the adult romantic relationship variation currently most commonly engaged in world-wide (Holland, 2017; United Nations Department of Economic and Social Affairs, 2019; United Nations Statistics Division, 2018; UNO, 2017), and where research over the past five decades has primarily paid attention (Finkel et al., 2017). Therefore, for this study the ‘who’ was recognised as typically couples in adult, committed (usually married), sexually involved, heterosexual, and monogamous relationships. Other kinds of relationships were not investigated specifically, but some of the included studies were comprised of populations where relationship status was not defined or included a mixture of types.

Research suggests that the principles of healthy human relating are generalisable across relationship variations (Finkel et al., 2017; Kurdek, 2004), however, it was not within the scope of this thesis to address this and it is hoped that future research might provide more critical and in-depth evaluation of these variations in relationship type as well as variations in study populations and contexts.

¹⁸ *Across various human societies and throughout history, long-term committed relationships between a man and a woman have been recognised and socially sanctioned (Bell, 1997; Fletcher, Simpson, Campbell, & Overall, 2015; Henrich, Boyd, & Richerson, 2012; Jankowiak, & Fischer, 1992; Malinowski, 1922; Sorokowski, Groyecka, Frackowiak, Blazejewska, et. al., 2017), providing “a socially approved union that links sexual access to rules concerning the care, legitimacy, and social affiliation of children” (Mody, 2015, p. 599), however, couple relationships are increasingly societally legitimised as taking a variety of forms, including variations regarding the gender of partners, the number of partners, and the formalisation of those partnerships.*

5. Introducing the Method

This study set out to examine the research literature and elucidate and synthesise the factors found therein that influence the well-being of couple relationships. The method is outlined below as it occurs in the thesis.

5.1 Layout of the Thesis

CHAPTER ONE: Introduction

Chapter One introduces this study and the need for consilience of the mass of relationship science findings. The research question is also described.

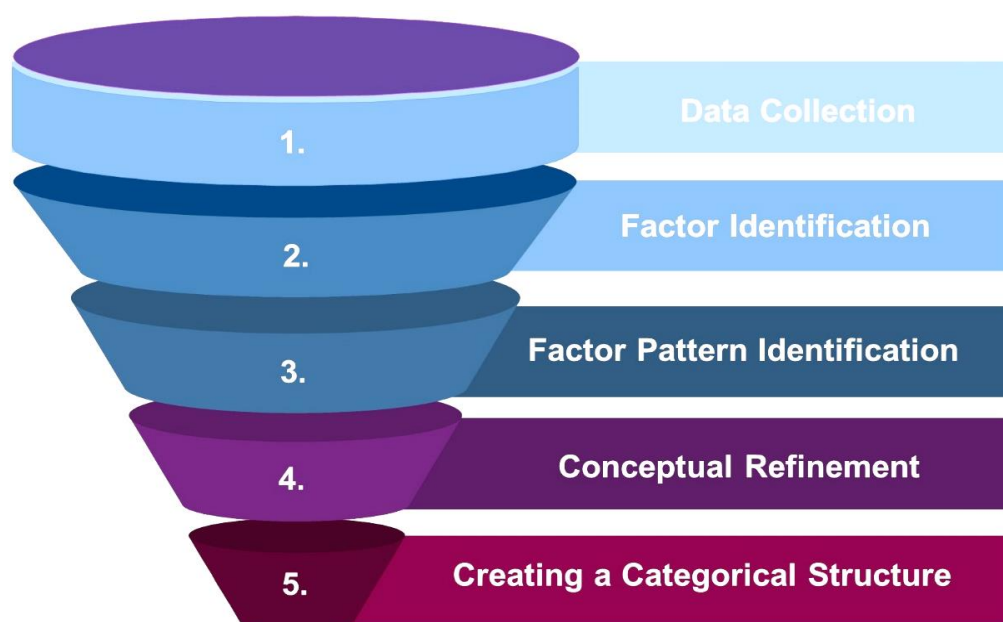
CHAPTER TWO: Methodology and Method

Chapter Two provides an overview of the methodological framework for this thesis. Using the model development phases found in Multi-Grounded Theory a pragmatic approach is defined, wherein the study findings are grounded in the multiplicity of verification from the broader community of researchers. The methods and tools used are described.

CHAPTER THREE: Weaving Together the Relationship Science Findings

Chapter Three divides the overall method into five distinct phases mirroring Multi-Grounded Theory process, as shown in Figure 3.

Figure 3 *The Multi-Grounded Theory Research Process*



PHASE ONE: Data Collection: Collating the Research

Chapter Three: Phase One outlines the collection of research articles from peer reviewed journals into Endnote software following Scoping Review guidelines. The nature of this collated library including its authorship, publishers, and key theories is examined, and reported.

PHASE TWO: Factor Identification: Extracting and Coding the Factors

Chapter Three: Phase Two outlines the extraction of the factors from the collated literature abstracts, titles, and keywords, employing Endnote and VOSviewer software, and their arrangement into a dictionary-codebook to define meanings, and a thesaurus for use in the network modelling phase.

PHASE THREE: Factor Pattern Identification: Network Modelling the Factors

Chapter Three: Phase Three outlines the network modelling of the factors using computational technology (VOSviewer) to identify patterns among the factors by analysing their prominence in the literature and their links to other factors in studies. The top ten most occurring factors (most prominent in the research) are separately network modelled, and factor inter-relationships are examined and described.

PHASE FOUR: Conceptual Refinement: Literature Review the Factors

Chapter Three: Phase Four outlines the interpretation of the network models by reviewing and summarising the literature in accord with the key network model findings.

PHASE FIVE: Creating a Categorical Structure: Building the Explanatory Model

Chapter Three: Phase Five outlines the categorisation and micro-diagramming of the factors before their synthesis into an explanatory model using a Multi-Grounded Theory process (MGT).

CHAPTER FOUR: Discussion

Chapter Four discusses the findings. Limitations and future directions are noted.

6. Summarising the Goal of this Thesis

This thesis aimed to present a comprehensive model of the empirically verified factors contributing to and maintaining couple relationship well-being. These factors were found by examining published research findings. Factors were network modelled using bibliometric software to discern the prominent factors and their inter-relationships in the research. The literature was then reviewed to explain factors' prominence and inter-relationships and these findings informed the creation of the presented explanatory model. The final simplified visual model is intended to make the findings from thousands of research studies easily accessible and understandable to stakeholders.

CHAPTER TWO:

METHODOLOGY AND METHOD

“Science is a complex, dynamic network in which scientists, institutions, concepts, physical entities, and forces ‘knit, weave and knot’ together into an overarching scientific fabric”.

Shi et al. (2015, p. 73)

Overview

This chapter introduces the pragmatic ontological methodological approach of this study, and describes the methods used for data extraction and analysis. The overall goal was to elucidate, examine, and synthesise the factors that influence the well-being of couple relationships, as found in the research corpus. A novel method was developed comprising of the collection of relevant research literature, coding of the factors found in the literature, bibliometric network modelling of these factors, interpretation of the findings by reviewing the literature, and finally building a model to explain the findings regarding the factors contributing to and maintaining couple relationship well-being. The Chapter Two: Methodology and Method outline is shown in Figure 4.

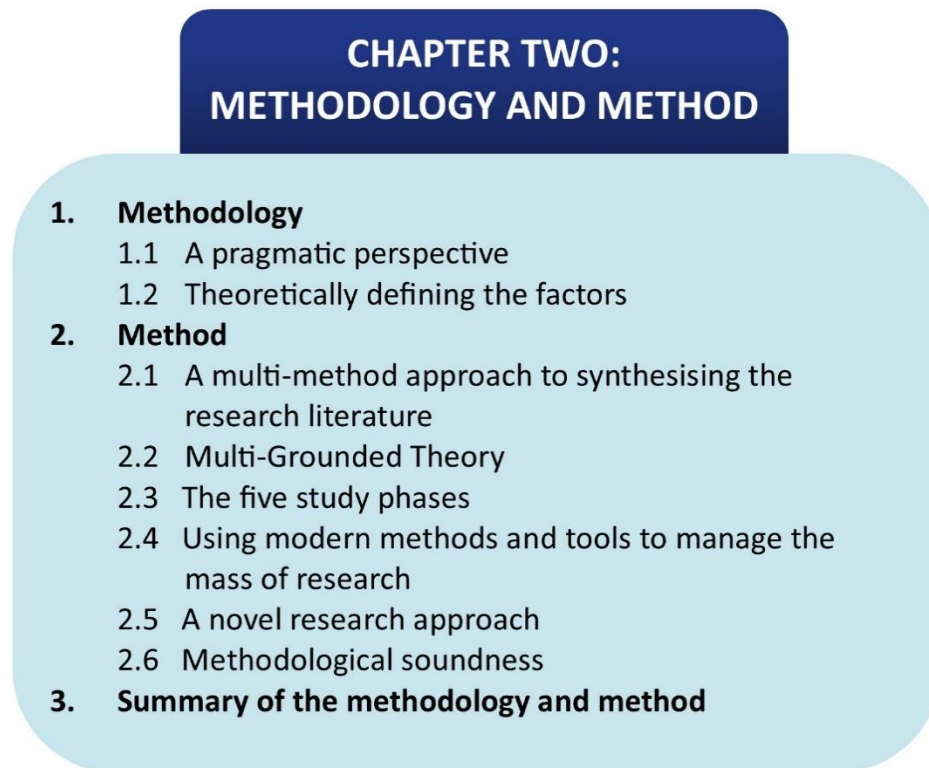
1. Methodology

1.1 A Pragmatic Perspective

This thesis embarked on a comprehensive exploration of the factors that researchers have rigorously examined and confirmed to be instrumental in nurturing and sustaining the well-being of couples in relationships. Leveraging their combined wisdom and specialised expertise, the aim was to discern the reliable and predictable factors found in thousands of research publications to create an explanatory model that was grounded in the data and incorporated multiple perspectives and sources of information. This would be presented as a simplified, idealised representation of complex theoretical systems, with the aim of producing socially useful knowledge. This study therefore aligned with a pragmatic perspective where “knowledge should not only describe the past (as patterns of cause and effect), but also be used in a constructive way to contribute to change and

improvement” (Goldkuhl, 2012, p. 87).

Figure 4 *Methodology and Method Outline*



From a pragmatism perspective, “the tried-and-true method for arriving at seaworthy assertions is that followed by a community of rigorous albeit fallible inquirers putting beliefs to the test in the world” (Fesmire, 2014, p. 102). The early pragmatic philosopher Charles Peirce (1878a, p. 45) wrote that “the opinion which is fated to be ultimately agreed to by all who investigate, is what we mean by the truth”. Consensus regarding validated knowledge provides the building blocks for future expansion of that knowledge. “Scientific knowledge is based on the accumulated findings from prior research in a research domain, where individual studies constitute building blocks” (Paul & Barari, 2022, p. 1099). Therefore, from a pragmatic perspective “trustworthy knowledge emerges when the results of repeated studies converge” (Johnson, 2021, p. 1), and where these continue to coalesce affirmatively over time.

Collating and considering multiple sources of evidence was therefore to be a critical element in this study in order that the factors used to create a final explanatory model would represent a summation and a consensus of the valued variables in these studies. The assumption was that published empirical research (using direct

or indirect observation and experience to test a hypothesis) produces replicable findings, and these findings are sufficiently generalisable to a significant percentage of couples. The more studies that have produced similar findings, the more confident we can be of their generalisability. When multiple sources of verification affirm a common understanding regarding what factors contribute to and maintain couple relationship well-being, and how they inter-relate, consilience occurs wherein “the linking of facts and fact-based theory across disciplines ... create a common groundwork of explanation” (Biglan et al., 2020, p. 1). My goal in this thesis was therefore to take advantage of the accrued empirical research to gain a synthesised and simplified overview of what thousands of experts collectively agree upon as the significant factors contributing to and maintaining couple relationship well-being.

1.2 Theoretically Defining the Factors

The first step in synthesising knowledge into a model is to identify the relevant factors (Borsboom et al., 2021). To determine what constituted a factor in this study, various theorisations were considered:

1.2.1 Factors Should be Empirically Proven

Peer-reviewed research findings illuminate the factors that pragmatically ‘work’. Factors are the specific characteristics being manipulated or controlled experimentally that are being observed or measured in a study, allowing researchers to draw cause-and-effect, or correlational, conclusions about their inter-relationships. The factors could be described as ‘variables’, ‘mechanisms’, or ‘constructs’, but for simplicity’s sake ‘factor’ was the term used in this study. Factor is a Latin word meaning ‘doer’, highlighting its active role as a component in bringing about a result (i.e., does it work?) (Oxford Online Dictionary, 2022). By drawing the factors from researchers’ existing published scientific knowledge, they would be those that numerous researchers have deemed to be the ‘best explanation’ for what works given the limits of our research practice (Haig, 2005).

1.2.2 Factors are Predisposing, Precipitating, and Perpetuating

In model construction, factors need to be identified, and then relationships between factors need to be identified (Borsboom et al., 2021). Given that the goal of this thesis was to generate socially valuable knowledge, focus was given to the relevance of these factor relationships to the requirements of therapists working with

couples. The ‘Scientist-Practitioner Model’ serves as a guiding principle of ‘best practice’ for couple therapists, encouraging them to possess a comprehensive understanding of empirically validated factors that influence couple relationship well-being, and to stay up-to-date regarding the most effective clinical practices for treatment (Jones & Mehr, 2007). Case conceptualisation (or case formulation) is typically considered an aspect of best practice as it allows therapists to identify a problem’s predisposing, precipitating, and perpetuating factors (Barker, 1988; Bolton, 2014; Carr, 1999), and then develop a coherent plan based on research informed theory to effectively target these factors (van Rijn, 2015), thereby potentially enhancing couple relationship well-being outcomes. Therefore, an understanding of the proven predisposing, precipitating, and perpetuating factors is imperative to effectively treat couple relationship problems.

1.2.3 Factors are Components of Systems

Smaldino (2021, p. 297) recently stated that “you cannot form a strong theory of human psychological processes without at least some understanding of humans as social, cultural, and biological creatures”, thus, the predisposing, precipitating, and perpetuating factors of human relationships are recognised as components of biopsychosocial+environmental systems. Systems theory is an inter-disciplinary approach to understanding complex phenomena (Bronfenbrenner, 1977; von Bertalanffy, 1950). A system is a dynamic and interconnected whole, made up of autonomous but interdependent and interrelated parts that interact with one another within their context. In this study, the couple relationship is the system, and the components of the system are the factors. The factors are understood as derived from human biology, psychology, personal social environment (Engel, 1977) and the broader cultural environment (Tretter & Löffler-Stastka, 2019), and as being reciprocally and systemically influential.

1.2.4 Factors are Influenced by Time and Developmental Changes

Many of the factors that predispose, precipitate, and perpetuate human well-being outcomes develop cumulatively via many events with small effects (Syme & Hagen, 2020). Some system components are easily observable patterns of behaviour in a couple relationship, but traceable to unseen factors, such as historic influences, (as noted by Maani and Cavana (2007)). Sociologist Nikolas Rose (2013, p. 5) described the individual person as:

“located in a dimension of temporality and development, and constitutively

open to their milieu – a milieu that ranges in scale from the intracellular to psychological, biographical, social and cultural”.

Therefore, in this study some factors were recognised as being proximal (close to the presenting behaviours), and other factors are distal (dimensionally or temporally distant from the presenting behaviours).

1.2.5 Adopting a Metatheoretical Approach to Defining the Factors

In summary, as every human being has a unique biology, unique psychology, and unique social developmental and contextual factors (Overton, 2014), the factors influencing couple relationship outcomes are shaped by multiple, interrelated factors and systems, including biological, psychological, social, and environmental factors, as well as predisposing, precipitating, and perpetuating factors. Factors may be both internal and external to each individual, involving both the natural, physical, observable world and the individual's subjective psychological reality. Marsh and Boag (2014, p. 51) state that human behaviour:

“Emerges from an evolved genetic inheritance, which interacts with the environment over the course of ontogeny to produce individual configurations capable of ongoing calibration and learning. The overt reactive behaviours of such organisms are the result of both real-time sensory stimulation and acquired biases and variations in neural structures owing to past experience”.

Human individuals in relationship with one another are dynamic, embodied, contextualised systems within systems (Harris et al., 2015) and this is how couple relationships and their composite factors are viewed ontologically in this study.

2. Method

The method outlines the research process used for finding, defining, analysing, and synthesising the factors contributing to couple relationship well-being. Academic research synthesis is classically conducted through systematic literature reviews or meta-analyses. However, these methods are limited in their ability to interpret the findings of thousands of studies. Other methods were considered for use in this study including meta-ethnography (Noblit & Hare, 1988), grounded theory (Strauss & Corbin, 1990), narrative synthesis (Popay et al., 2006), thematic analysis (Braun & Clarke, 2006), content analysis (Berelson, 1952), and multiple types of reviews (e.g., Goldsmith et al., 1979). Each of these methods provided inspiration about process, but this study was beyond the scope of any of these methods singularly.

Multiple methods for answering the research question were required and a multi-method, multi-phase process was developed.

2.1 A Multi-Method Approach to Synthesising the Research Literature

This study intended to investigate established research findings that had been rigorously tested from a positivist perspective. However, the intent went beyond simply acknowledging these findings; it was to glean meaningful insights and to present these insights in an accessible and quickly understood model. This required a research strategy that integrated both positivist and interpretative methods in an approach which aligns with the epistemological pluralism of pragmatism.

Pragmatism sees value in multiple research methods for generating knowledge and uncovering different facets of reality (Shaw et al., 2010). From a pragmatism perspective, this adoption of multiple methodologies is seen as a strength (Morgan, 2014), not a limitation, increasing the robustness and richness of the investigation and enabling a more comprehensive and nuanced analysis.

2.2 Multi-Grounded Theory

Multi-Grounded Theory (MGT) (Goldkuhl, 2004) is a pragmatic method approach developed by Swedish researchers Goran Goldkuhl and Stefan Cronholm (2006). MGT comfortably incorporates positivistic and interpretative perspectives. It has evolved from Grounded Theory (Glaser & Strauss, 2010; Strauss & Corbin, 1990), however, pure Grounded Theory is classically understood to be a solely inductive process. MGT, on the other hand, allows, “a knowledge synthesis of extant theories” (Goldkuhl & Cronholm, 2010, p. 188) wherein new abstractions of theory could evolve with less risk of isolation from existing knowledge (Cronholm, 2004). As MGT works with, and adds to, existing theories (Gilje & Skirbekk, 2001; Goldkuhl & Cronholm, 2010) and allows an “interplay between deduction and induction” (Axelsson & Goldkuhl, 2004, p. 5), it was of crucial usefulness in this thesis where the end goal was an integration of the factors found in the numerous well-researched theories that have already accumulated in the field of relationship science.

While MGT is not well known in New Zealand it has been used in Europe since 2004 (Goldkuhl, 2004), and used in published synthesis research and dissertations (e.g., Bircher & Kuruvilla, 2014; de Leeuw et al., 2018; Kuruvilla et al., 2014; Layne, 2018) particularly those seeking to extend, “beyond summarising findings to

synthesise higher level interpretive findings and systematically develop a theoretical model” (Kuruvilla et al., 2018, p. 3). MGT has also been recommended for doctoral candidates wanting to navigate qualitative and quantitative data for theory building (Freeman, 2018).

2.2.1 The MGT Process

Using MGT data is systematically analysed by abstracting and organising it into categories and theoretical constructs. As MGT has evolved from Grounded Theory, it shares many of its qualities, allowing researchers to, “immerse themselves in data, search for themes while coding, and develop or discover theories directly from the data” (Freeman, 2018, p. 1163). MGT’s stages were followed in this study including:

1. Data collection
2. Factor identification (similar to open coding)
3. Factor pattern identification (similar to axial coding and selective coding)
4. Conceptual refinement; and
5. Creating a categorical structure (condensing the theory) (Cronholm, 2004)

2.2.2 Data Collection

Grounded Theory traditionally collects data from interview transcripts. In this study, using MGT, data was gleaned from thousands of published research articles. This was an unusual form of data generation, even within the MGT framework, and consideration needed to be given as to how to extract the required data with the least possible researcher bias. Therefore, Scoping Review guidelines were adopted to provide transparency regarding the process involved in searching the academic databases and collecting the publications into Endnote software.

2.2.3 Factor Identification

Using MGT, factor identification is the initial stage of data analysis where the data is systematically examined and broken down into discrete concepts termed codes (initial labels representing concepts, actions or processes) (Goldkuhl & Cronholm, 2010). In this study the data was the research publications, and the codes were the factors contributing to and maintaining couple relationship well-being. This process required immersion in the data through reading and analysing every publication abstract. Factors relevant to the research question were subsequently ‘copy and

pasted' from the abstracts, titles, and keywords of each article into the 'keyword section' of Endnote. These factors (codes) were then uplifted from the Endnote library and added into an Excel file where they could be edited into a codebook. The codebook was used to organise the data by defining and describing every factor (creating a study dictionary), and merging factors with common meanings (creating a study thesaurus). Thus, factors were defined, compared, contrasted, and refined.

2.2.4 Factor Pattern Identification

Factor pattern identification involves identifying relationships between the factors. In this study a unique method was developed incorporating network modelling technology.

Network modelling represents a type of meta-analysis of research texts suitable for datasets of 1000s (Donthu et al., 2021). Network models show the intricate patterns of factor use produced by thousands of researchers across multiple studies allowing for a multi-lens view of the patterns of factors used in thousands of empirical studies (Jones & Robinaugh, 2021). In this study, network modelling using computational technology made the process of managing an overview of this exceptionally large body of literature possible, increasing methodological rigour.

The network models have three valuable properties which were useful for this study:

1. They characterise the structural and dynamical factors contributing to couple relationship well-being as presented in the published research.
2. Due to the large dataset investigated, they characterise generally agreed upon factors that have been rigorously validated.
3. They characterise a collective accumulation of established knowledge that is linked directly to the dataset providing an objective quantitative analysis of the inputted data.

The factors (codes) were entered into VOSviewer bibliometric network modelling software, which then produced visual models representing each factor's prominence in the research literature and their patterns of relationships with other factors. Thus, network modelling illustrated factors' use and re-use in studies, and therefore commensurately their potential theoretical influence and their potential significance and reliability. This assumes that factors that do not produce significant results in research typically will not be repeatedly investigated. Of course, the absence of

statistically significant results does not necessarily mean that a factor is unimportant or does not warrant further investigation. There are several reasons why non-significant results might occur, such as insufficient sample size, flawed research design, or measurement errors. Additionally, some research questions might inherently lead to non-significant results due to the complexity of the factors being studied. However, in this study using research from more than seven decades, the emphasis was on the reliability of factors over a prolonged period and from an exceptionally large research corpus, reducing the risk of missing significant but unnoticed factors.

While no previous examples of this use of network modelling could be found, this was a form of enumerative coding, and while not often acknowledged, enumerative coding is commonly used in qualitative research, for example, where the frequency of word use in interview texts is used to determine their thematic relevance or importance (Bochenski, 2012; Glaser, 1998; Glushko, 2016). This initial enumerative analysis helped identify patterns among the factors found in the research. As Liu (2022, p. 9) recently noted:

“the starting point of exploratory factor analysis is a correlation matrix that displays one variable’s correlation with the rest of the variables ... similar to the constant comparative analysis utilised by grounded theory. These two methods aim to build connections among different variables or categories based on their correlation” (p. 9).

In this study, computational factor analysis is therefore used to enumeratively code the data and reduce a large corpus of text to core concepts, as is typically done manually and subjectively in the Grounded Theory process.

2.2.5 Conceptual Refinement

Once these patterns of factors had been determined, further qualitative investigation was needed to clarify why these factors had been prioritised and interrelated and to refine the core concepts. The network modelling had shown the most prominent factors in the research but not why they were most prominent. Additionally, the network modelling showed what factors were co-occurring in studies, but not why they were deemed to inter-relate. As Grzanka and Moradi (2021) note: “That something occurs most often in the data does not necessarily indicate that it the most meaningful”. Meaning needed to be defined through an in-depth literature review.

2.2.5.1 Literature Review

MGT founders, Goldkuhl and Cronholm (2010, p. 4), advise that “codes and concepts must be emergent, that is, grounded in the data although... they can (and must) be ‘put into dialogue’ with existing concepts and knowledge”, which is the conceptual refinement phase of this study. MGT allows and encourages the use of existing theory to guide the creation of meaning among patterns in the data, and therefore reviewing the literature to understand researchers theorisations of the factors and their inter-relationships was an important component of analysis (Cronholm, 2004).

In this study the findings in the network modelling analysis needed to be corroborated with researchers’ theorisations of their prominence and correlations. The research review is considered an important step in qualitative inquiry (Fryer, 2022), creating “a firm foundation for advancing knowledge and facilitating theory development” (Snyder, 2019, p. 1), and they are frequently carried out to aid in the development of a conceptual explanatory model (Booth et al., 2012). For this study a structured review of the literature was therefore undertaken to examine and elucidate factor relationships.

2.2.6 Creating a Categorical Structure

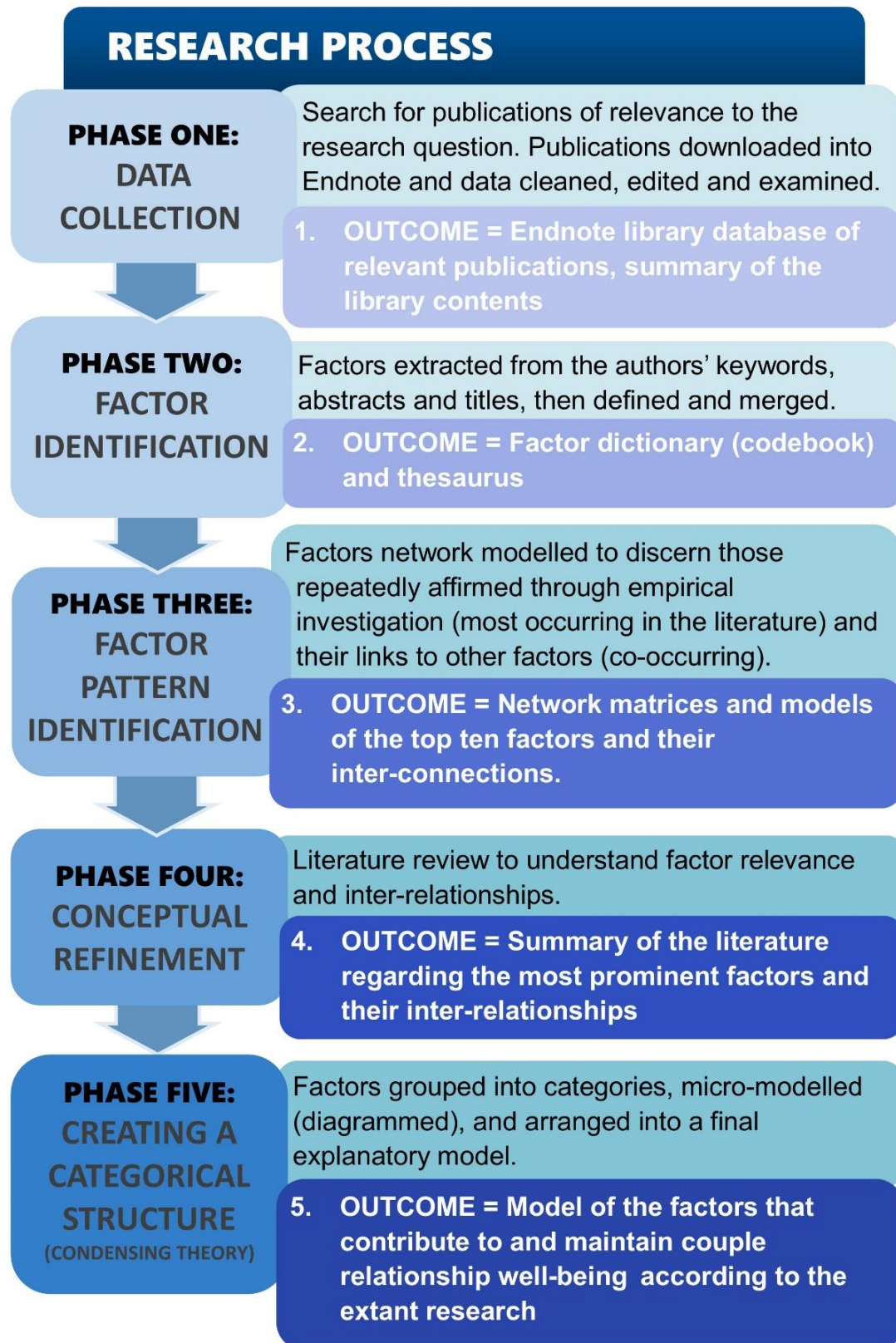
Informed by the literature review the factors were then categorised and arranged into a final model that condensed the findings into a clearly communicated visual narrative. As part of this process the factors and categories were ‘micro-modelled’ (diagrammed) to confirm that interrelationships made practical, workable sense. The final model, according to the MGT perspective (Goldkuhl & Cronholm, 2010), was subsequently grounded in:

1. **Empirical data** (factors found in multiple research studies)
2. **Pre-existing theories** (considering the theorisations of researchers carrying out those research studies); and
3. **Explicit congruence** (workability) between the elements of the model

2.3 The Five Study Phases

Following the MGT approach, this study was divided into five distinct yet cumulative phases. The study method is laid out as per Figure 5.

Figure 5 *The Research Process Explanation and Illustration*



1. **Phase One: Data Collection:**
Collating relevant research publications into Endnote software following Scoping Review guidelines.
2. **Phase Two: Factor Identification:**
Manually cutting and pasting factors directly from the publication text (abstracts, title, and keywords), and clarifying (comparing and contrasting) their meanings in a unique dictionary-codebook and thesaurus, providing a coding manual for this study.
3. **Phase Three: Factor Pattern Identification:**
Bibliometric network modelling of these factors using VOSviewer software to provide a quantitative content analysis of factors' frequency of use and inter-relationships in the literature.
4. **Phase Four: Conceptual Refinement:**
Interpreting the most prominent factors and their inter-relationships by reviewing the research.
5. **Phase Five: Creating a Categorical Structure:**
Categorising, diagramming, and structuring the factors into a final explanatory model.

2.4 Using Modern Methods and Tools to Manage the Mass of Research

The last few decades have seen the development of new technologies which are able to perform analyses with large amounts of data (Khalil et al., 2021). Scoping reviews have arisen to allow broad consideration of extensive research fields (Pham et al., 2014). Endnote software can store and organise thousands of publications, and bibliometric network analysis tools (VOSviewer in this study) have been developed to provide objective and reliable analysis of the themes and trends of an extensive corpus of publications (Diodato & Gellatly, 2013). This study draws on these tools, and these are described in more detail below.

2.4.1 Scoping Review

Scoping reviews are a recently developed research method suited to exploring the current state of a research domain (Munn et al., 2018) to gain a sweeping overview of a topic (Arksey & O'Malley, 2005). They provide "rich contextual details useful in establishing theories" (Tricco et al., 2016, p. 40). Scoping reviews map evidence across a range of interacting academic systems and theories to synthesise large and diverse literatures (Pham et al., 2014, p. 373). They do not specifically

investigate the quality of these studies, or critically appraise them. This was suited to this study's large-scale endeavour which collated thousands of articles; however, this study far surpassed the 'large' data collection of most scoping reviews (average $N = 344$, Pham et al., 2014). Therefore, Arksey and O'Malley (2005)'s scoping review guidelines were not precisely replicated but used as a guideline, as outlined in Chapter Four Phase One.

2.4.2 Endnote

Literature was loaded into Endnote X9 (The EndNote Team, 2013) – a software package commonly used by researchers to store and manage articles and books (Agrawal, 2009). Endnote classifies referencing details (e.g., title, authors, journals, keywords, abstracts, etc.), which can then be viewed, highlighted, searched, grouped, and coded. PDFs can also be attached to the document record which provided an ideal platform for managing the data used in this thesis, and allowed a clear, reproducible approach which, as noted by Peters (2017), helps to enhance the rigour of the study. As per scoping review recommendations (Foster, 2016; Morris et al., 2016) a librarian Endnote specialist¹⁹ was consulted in the Endnote set-up process.

2.4.3 VOSviewer

VOSviewer is a free network modelling bibliometric analysis software programme developed by Nees Jan van Eck and Ludo Waltman (VOSviewer.com, 2022) which is particularly suited for analysing large datasets (van Eck & Waltman, 2014), and constructing and visualising quantitative networks using information sourced from literature (<https://www.vosviewer.com/>)(van Eck & Waltman, 2014).

VOSviewer software technology was utilised to,

1. Help analyse the exceptionally large amount of text extracted in this study,
2. Illustrate this analysis in clear visual form.

Network modelling is a unique visualised form of factor analysis. VOSviewer calculated each factor's eigenvalue, showing its prominence and position in the literature corpus. This process has comparisons to that used to identify the Big Five

¹⁹ Andrew South, Auckland University of Technology

personality factors²⁰, and was premised on the theory that human language represents human experience (Allport & Odbert, 1936; Oliver & Srivastava, 1999), and the more a word is commonly used, the more likely it is to be prominent in human experience. Analogously, in this study factors were drawn from a large text-based sample of the corpus of relationship science related research. Correlational matrices were created in VOSviewer and used to find the ten most commonly used factors (super factors) represented in the research findings. These correlational matrices were then network modelled to enable visual examination of the factors unique inter-relationships with other factors in the research.

2.5 A Novel Research Approach

This method approach using these tools appeared unprecedented at the outset of this study, presenting a unique and novel way of understanding, and summarising, an unusually large library of research findings. Other studies have since been published that follow similar, although not identical strategies. For example:

- Whelan et al. (2021) used a scoping review to collect studies on ‘gonorrhoea’, and then extracted related findings from their abstracts using Papyrus software. These were then used to produce a visual ‘map’ illustrating the key findings.
- Hoemann et al. (2021) used a scoping review to gather publications about individual differences in emotional experience. They extracted codes and categories from the publications, defined them, and used network mapping to illustrate a descriptive network of the inter-relationships between these.

2.6 Methodological Soundness

For optimal research rigour in evidence synthesis, Donnelly (2018) advise incorporating four principles:

1. **Inclusivity**: considering multiple sources of evidence.
2. **Rigour**: using the most comprehensive body of evidence available, attempting to recognise and reduce the bias in data collection.
3. **Accessibility**: making the findings easily available in simple to

²⁰ In the case of Tupes & Christal (1961)’s reanalysis using the correlational matrices of Cattell (1964)’s 22 factors, where terms relevant to personality characteristics were directly extracted from Webster’s New International Dictionary text (Goldberg, 1992) then grouped and categorised under ‘super factor’ content categories, representing a comprehensive assortment of thousands of text-based descriptions labelled the ‘Big Five’.

understand language; and,

4. **Transparency:** clearly describing the research question and method process and acknowledging own assumptions and biases.

An attempt was made throughout the study to incorporate these principles, and how this was achieved is expanded on in more detail in the final discussion (chapter four). My initial considerations of methodological rigour are presented below.

2.6.1 Inclusivity

Scoping review guidelines were followed to maintain consistency and transparency and reduce the risk of article selection bias. Utilising the work of a multiplicity of researchers should moderate their individual biases and idiosyncrasies— leading to greater clarity and broadness of perspective of the final explanatory model (Fesmire, 2014; Peirce, 1878d). In other words, when hundreds of researchers carry out thousands of studies, their findings should compose a reliable body of generalisable knowledge which can then be used to base future hypotheses upon. Therefore, the literature collection process needed to be comprehensive and reach a point of suitable saturation in which new data would not bring about significant changes to the final model.

2.6.2 Rigour

It was important to create a study dictionary-codebook to help systematise the process of investigating hundreds of differently worded factors. The codebook would aid in standardising the factors, helping to ensure they were applied and understood consistently across the network models and in the final model. The work of creating the dictionary-codebook would allow a structured approach to prevent important insights from being overlooked while at the same time enhancing the descriptiveness and conciseness of the factors that were used in the models.

The network modelling would comprehensively manage and illustrate an exceptionally large set of data, producing a detailed and explicit rapid overview of the way the research community was relationship science research. Using the statistical factor analysis provided by the VOSviewer software would enhance the study's replicability and credibility, adding an additional layer of understanding to the findings, and synthesising a vast amount of information from across an inter-disciplinary knowledge base. It would be important to apply the correct techniques and processes for the software programs, and courses were attended to help with

this, and expert advice was sought from specialist librarians and software developers.

A systematic literature review would be used to qualitatively analyse the network model findings and triangulate the categories and concepts with existing theory, helping to translate the quantitative findings from the network models into theoretical propositions for why these factors had been so well-researched and how they were conceptually inter-related according to the experts who were researching them. Creating a system guided by the most prioritised factors in the literature (super factors) would help to narrow the mass of information to those factors that had been most researched and affirmed as relevant, and rigour would be increased through this systematisation.

2.6.3 Accessibility

The final development of the explanatory model would follow a multi-grounded-theory (MGT) approach, using diagramming of factor interrelationships, and categorising of commonly themed factors as further confirmation of their position in the final model. Visually arranging and rearranging factors into diagrams would help create a clear and intuitive representation of how these factors interrelated within the context of the model. Meticulously categorising factors sharing common attributes would help to streamline the complexity of the model. Iterative exploration of these processes would help confirm the logical structure of the model and emphasise the most salient components and any gaps in the model. Presenting a final simplified visual model would enhance its communication effectiveness, contributing to its comprehensibility and robustness.

2.6.4 Transparency

There would be elements of subjectivity in the many decisions being made regarding the study direction. As Cordelia Fine (2020) states: “It’s impossible to do science without background theories and assumptions that influence the many decisions scientists must make.” As a married, heterosexual, cis-gender, able-bodied, Pākehā (New Zealand European) citizen living in Aotearoa New Zealand, raised with Christian values in a large and cohesive family in a rural context, I came into this study with certain pre-conceptions regarding couple relationships. Additionally, I have completed a Bachelor of Social Sciences (psychology and education, 1987), and a Master’s Degree with an endorsement in Clinical

Psychology (2004), and I have more than 30 years of part-time counselling practice. To aid in my personal reflexivity throughout this study, as suggested by Manicas (2009), a regular written record of the reflective process was maintained. Regular feedback from my supervisors also aided in personal reflection.

Cultural differences are included among the contextual influences that may impact upon relationship well-being processes, as well as influencing my own approach to this research, and I considered these in the initial stages of the study as well as being made aware of these by those supervising my work. This study, while being international in scope, is performed within the unique context of Aotearoa New Zealand, of which Māori are the Indigenous people. I have a large extended family with mokopuna (grandchildren) whose whakapapa (ancestry) extends from the regions of Te Tai Tokerau to the Waikato, and Tairāwhiti, and I was cognisant of my responsibility to produce work that benefitted those coming after me, while also recognising those who came before. As such, I was influenced by the four tikanga (Māori cultural values) of: whakapapa (relationships on all levels); tika (correctness or equity, in this case, the correct and equitable ordering of relationships); manaakitanga (cultural and social responsibility, especially supporting and caring for people in ways which honour their individual worth); and mana (power, especially considering ways in which this study empowers the disempowered) (Hudson et al., 2010). These were guiding ethical principles in relation to the purpose of this study. In particular, the essence of whakapapa – “the process of layering one thing over another” (Ngata, 2011, p. 6) – has shaped my thinking about the nature of human relationships, the way these are woven together over time, through connection to our surroundings, through ongoing generational narratives, through the power-sharing involved in reciprocal dialogue, and through deep examination of multiple paradigms of reality (Mahuika, 2019).

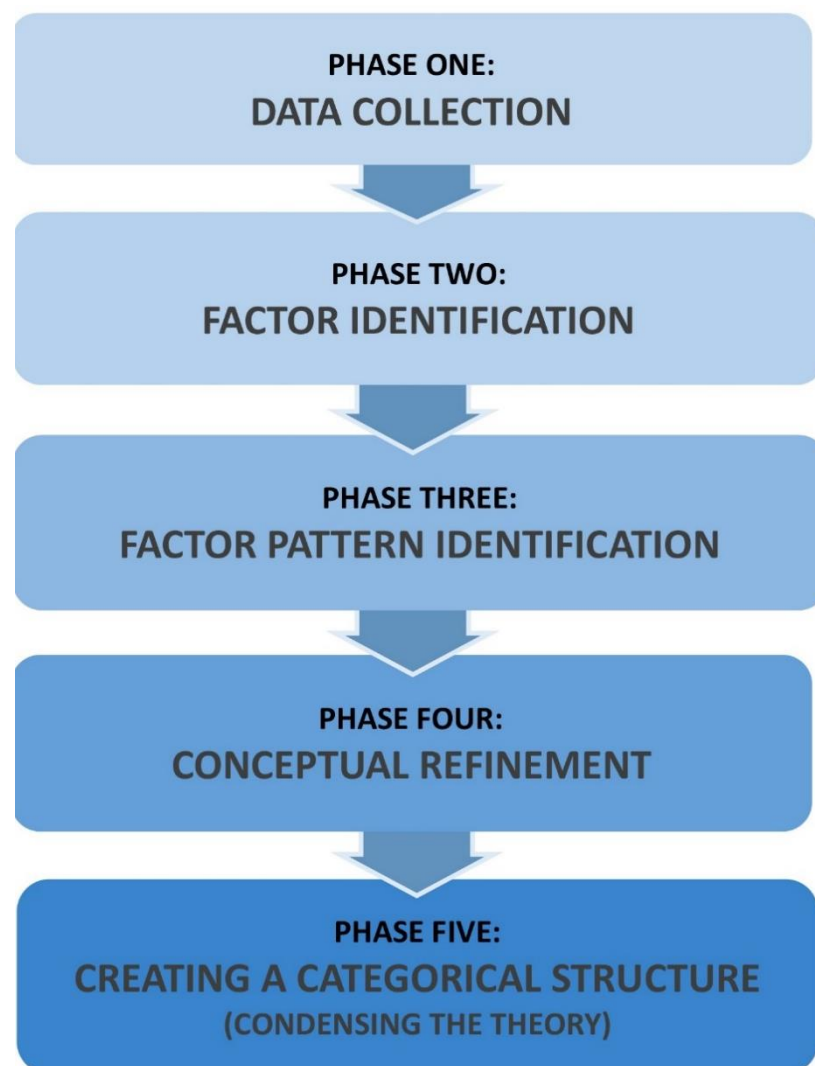
3. Summary of the Methodology and Method

The aim of this study was to construct an explanatory model that elucidates the most researched and validated factors contributing to and maintaining couple relationship well-being. This was achieved by scrutinising a comprehensive and interdisciplinary body of research studies, extracting factors from these studies, creating a dictionary-codebook of the factors, subjecting the factors to network modelling, reviewing the prominent factors and their inter-relationships, and ordering these into summative diagrams and categories which were finally simplified into a

summative explanatory model. To ensure the validity of the findings a rigorous process was employed that systematically considered multiple sources of evidence. The culmination of this analytical process was a richly descriptive model intended to deepen and broaden understanding of the dynamics of couple relationships in order to enhance human well-being.

CHAPTER THREE: WEAVING TOGETHER THE RELATIONSHIP SCIENCE FINDINGS

Figure 6 *Chapter Three: The Five Research Phases*



CHAPTER THREE PHASE ONE: DATA COLLECTION

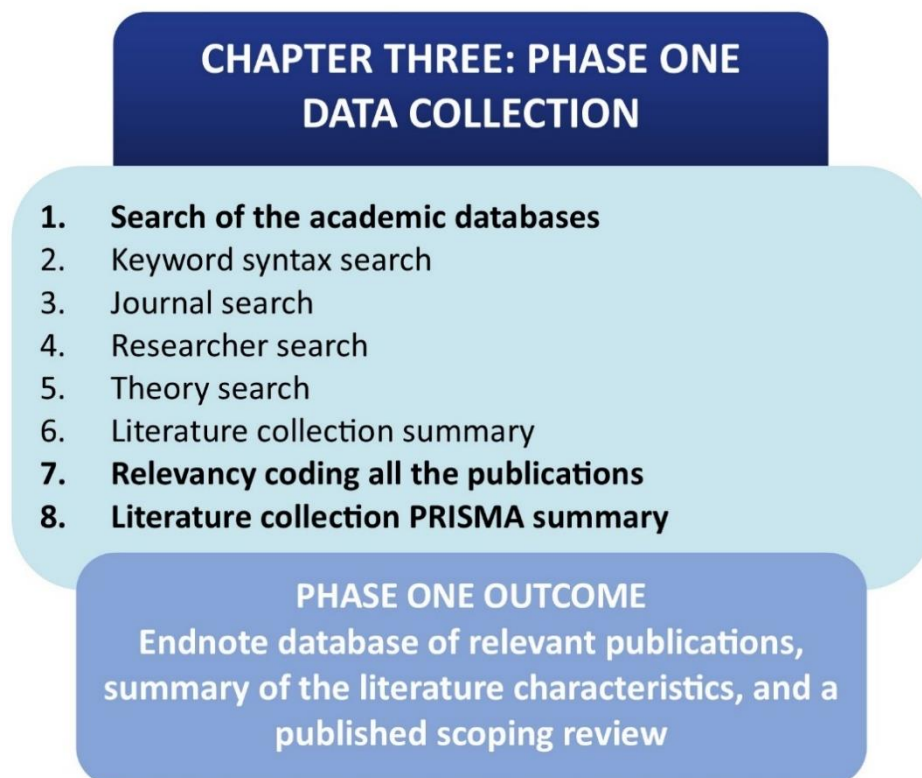
“The progress of relationship science has been impeded by the absence of clear consensus about the core phenomena of the field: What common knowledge do we possess about these phenomena? Which major theories would most scholars agree represent dominant approaches to the core phenomena of relationship science?”

Harry Reis (2007, p. 6-7)

Overview

Determining the factors that contribute to and maintain couple relationship well-being was to be pragmatically determined through the multiplicity of verified research findings, so the aim was to identify and collate as many studies as was practicable. In Phase One the academic databases were thoroughly searched using adapted scoping review guidelines to collate a large library of research publications relevant to the research question. The nature of this library was analysed and presented. The outline of Chapter Three: Phase One is shown in Figure 7.

Figure 7 Chapter Three: Phase One Data Collection



1. Search of the Academic Databases

To find the publications used as the literature dataset in this study the scientific research platforms EBSCO, Ovid, PUBMED, Sage, Scopus, Web of Science, and Wiley were accessed. These are commonly used standardised library platforms, and they were all accessed using the AUT university library online.

1.1 Selection Criteria

Peer-reviewed research was used in this study (as recommended in the PRISMA preferred review reporting system Moher et al., 2009). Journal articles made up most of the publications collected (more than 99% of the total publications used in the final analysis, with the remaining being academic books that had usually been edited by an academic team). Their peer review permitted a degree of confidence in the credibility of the findings. No restrictions were imposed on the language (where translatable to English), or country of origin.

Due to the large size of the search database, and the impossibility of downloading the millions of articles potentially relating to the research question, research published in the last ten years was given precedence (but not exclusivity) over earlier work – as per Vogt (2014)'s review recommendations. Up-to-date research subsumes older research in that it builds upon the older work, with potentially more fine-tuned research methods, with access to more longitudinal studies, and often with larger or more representative samples. Recent research is also carried out in a modern context meaning it is more likely to represent current societal paradigms regarding adult relationships. Additionally, those factors that have endured over time typically represent factors that have been repeatedly tested and found valid, whereas older factors that have not endured are more likely to be those that were not validated in the research. Nonetheless, an effort was made to include research from every era, especially highly cited research. While the search began with a standard keyword syntax search approach, highly contributing journals were searched, highly contributing authors were searched, highly used theories were searched, and these searches were iterative over four years.

Publication types included primary and secondary accounts, quantitative and qualitative studies, and experimental, observational, and theoretical types of research, as shown in Table 1.

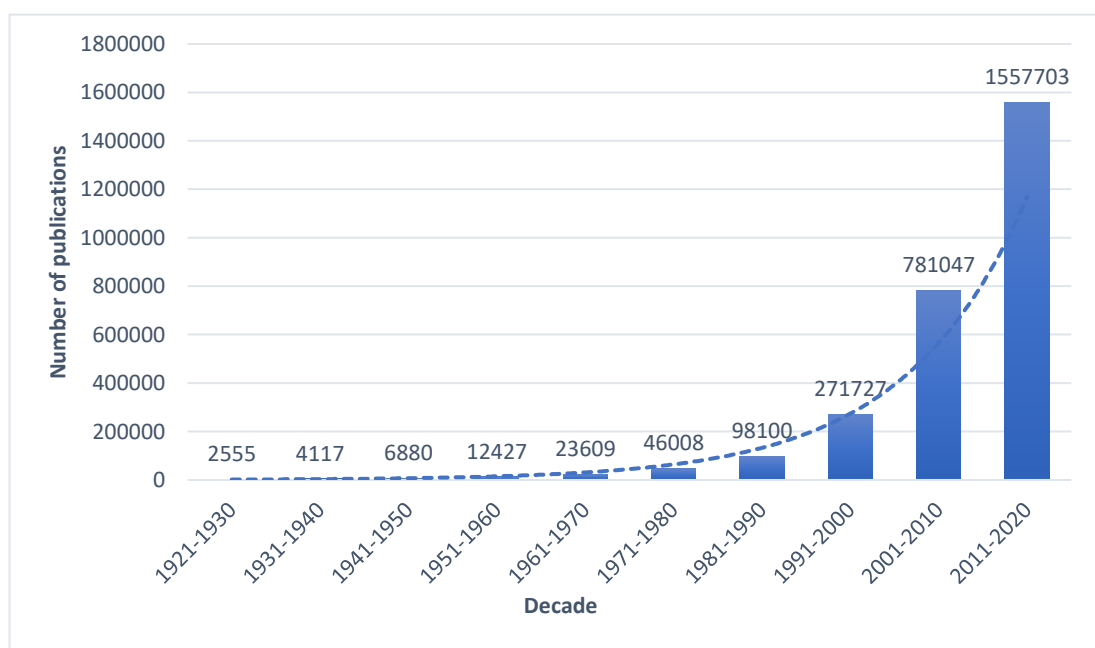
Table 1 *Types and Populations of Studies*

Types of studies reviewed	• Randomized controlled trials • Non-randomized controlled trials • Quasi-experimental studies • Before-and-after studies • Prospective cohort studies • Retrospective cohort studies • Case-control studies • Cross-sectional studies • Other quantitative, qualitative, and mixed-method studies

1.1.1 A Century of Relationship Science Research: Publication Increase

As a way of comprehending the exponential growth in couple relationship science over the last century a keyword search was made in EBSCO of the syntax: “(romantic OR couple OR marriage) relationship”. This search was limited to books, reports, conference materials, dissertations, and academic journals. The graph was demarcated to ten-year periods and is presented in Figure 8. These findings helped to provide justification for delimiting the later journal search to the past decade, given that this one decade comprises more literature (N=1,557,703) than is found in all the preceding decades (N=1,246,470).

Figure 8 *Scholarly Publications from 1921–2020 Using the Search Syntax “(romantic OR couple OR marriage) Relationship”*



1.2 Study Identification

Relevant studies were identified following Petticrew and Roberts (2006)'s recommended process. They were first screened for applicability to the research question by reading the titles and abstracts. If the title pertained to predisposing, precipitating, or perpetuating factors of couple relationship well-being, abstracts were then perused to verify relevance. Those that were potentially applicable were retained²¹.

To make sure the literature was sufficiently interrogated to capture a true representation of the research findings, articles were sought that researched human relationships specifically (at close proximity) and relationship factors broadly (at distal proximity). Studies were included that encompassed biological, psychological, and social aspects of human relating. This included studies of the:

1. Historical and current context in which individuals are situated
2. Underlying psychological substrates
3. Underlying biological substrates
4. Individual differences
5. Emotions, cognitions, motivations, and perceptions
6. Actions and interactions (behaviours)

1.3 Storing the Studies in Endnote

Publications were added to, and edited in Endnote, including title, authors, year of publication, publisher details, and reference location, DOI and weblinks where available, as well as the PDF document itself. Abstracts were also cut and pasted into the searchable content. This allowed for 'search and find' later in the process.

Once the articles had been downloaded into Endnote, they were cleaned – primarily involving the tidying up of author name presentation. Author names can present in varying forms and may present differently over time. For example: John Gottman (Gottman, 1976), compared to John M. Gottman (Gottman & Porterfield, 1981). Left

²¹ For example, an article such as "Empathy and social support provision in couples: Social support and the need to study the underlying processes" (Devoldre, Davis, Verhofstadt, & Buysse, 2010) was included, but a less obvious article such as "Emotion as personal relatedness" (Hobson, 2012) was also included as it described a potential factor contributing to, or maintaining, relationship well-being.

unedited these would show up as different authors in the Endnote record. Journal names may also be presented differently and these needed refining in the Endnote software.

The abstracts were read and marked up with highlighter in Endnote to help keep track of which abstracts had been read and what the key factors in each article were relating to the research question. This 'highlighting' process would later aid in finding the factors in abstracts. An example of this storing and editing of publications is shown in Figures 9a and 9b. The first image (9a) is the article as it arrives into Endnote, the second image (9b) is the article after edits have been made.

Figure 9a Editing Publications in Endnote: Before Editing Example

This screenshot shows the initial Endnote record for the article. The metadata on the left includes the author list (Sprecher, Susan; O'Sullivan, Lucia F.; Drouin, Michelle; Verette-Lindenbaum, Julie; Willetts, Marion C.), the year (2019), the journal title (The Significance of Sexual Debut in Women's Lives), and the journal name (Current Sexual Health Reports). The abstract and keywords are visible on the right. The author list in the record is: Susan Sprecher¹ · Lucia F. O'Sullivan² · Michelle Drouin³ · Julie Verette-Lindenbaum⁴ · Marion C. Willetts¹.

Figure 9b Editing Publications in Endnote: After Editing Example

This screenshot shows the same Endnote record after editing. The metadata on the left has been updated to reflect the changes. The author list is now: Sprecher, S.; O'Sullivan, L.; Drouin, M.; Verette-Lindenbaum, J.; Willetts, M. The year remains 2019. The journal title is 'The Significance of sexual debut in women's lives' and the journal name is 'Current Sexual Health Reports'. The abstract and keywords are also visible. The author list in the record is: Susan Sprecher¹ · Lucia F. O'Sullivan² · Michelle Drouin³ · Julie Verette-Lindenbaum⁴ · Marion C. Willetts¹.

2. Keyword Syntax Search

To search for articles in the scientific research platforms, a search approach was created that included keywords and their truncated variants that described the population of interest and the factors under investigation. As the aim of this phase was to find published research determining couple relationship factors these were targeted first²². An initial search syntax was therefore created based on these keywords:

("couple relationship*" OR marital OR "marital relation*" OR marriage OR "close relationship*" OR "romantic relationship*") AND (satisfaction OR function* OR conflict OR happiness OR well-being)²³.

Using this search syntax to search all fields in the AUT online library, 4,698,450 article results were found. This number needed to be reduced for manual article collection, so other search syntaxes and strategies were needed to comprehensively trawl the academic libraries for relevant studies.

2.1 Creating a Keyword Cloud

Early on in the overall collection process the Endnote collection (at the time N=500) was uploaded into NVivo to create a word cloud (as used by Elliott-Mainwaring, 2021). This enabled a visualisation of the word usage in these collected articles to discern what new iterations of the keyword syntax would prove fruitful for later searches. A word cloud weights the most common word usage in the articles. The largest words in the word cloud are those most frequently referenced. This process helped evaluate which relationship factors are already well established in the relationship science literature and would prove fruitful for informing further keyword syntax investigations. This word cloud is depicted in Figure 10.

²² Many early relationship relevant studies included married heterosexual couples as the sole population of interest (whether overtly stated or not), whereas in recent times the populations of interest have extended to include diverse relationship groupings. Subsequently, the terms 'married', or 'marriage', appear frequently in older studies and much less frequently in modern titles or abstracts. Consequently, only using one or other of these terms in the search syntax would skew the relevant results.

²³ In search syntax the * denotes all words containing the preceding word. For example, relationship* could be relationship or relationships. Bracketed words refer to use of any of the words in that bracket in the search. OR refers to using one word OR the other. AND refers to using one word AND the other. "" denote that the words within quotation marks are searched as one term. Hence the search can contain multiple combinations of these words.

Figure 10 *Word Cloud of Key Words*



2.2 Systematising Syntax Development

New keyword syntaxes were created using the words found in the word cloud. Additional keywords searched for included: emotion*, behavior*, sex*, dyad*, satisfaction, divorce, dissolution, separat*, interaction, interpersonal, couple*, communication, personality, neuroscience, physiolog*, husband, wife, coping, stress*, motivation, neuroticism, value*, cultur*, commitment. Further searches were also made as shown in the examples in Table 2. These searches involved adding the terms relating to relationship variations in column one into the first search box in the online library, and the possible factors in column two into a second search box. These keywords were repeatedly searched until no new articles relevant to the research question were found to add.

Table 2 *Examples of Some of the Keyword Syntax Search Term Combinations*

1. First search box		2. Second search box
Marriage or marital	X	Personality
Couple relationship		Attachment or avoidance or anxious or ambivalent or disorganised
Interpersonal relationships		Sexual relations or sexual intimacy or sexual behaviour or pornography
Marriage or marital instability		Friendship or respect or consideration or responsiveness or reciprocity
Divorce		Brain or neural or neurology or neuroscience
Marriage or marital separation		Hormones or oxytocin or dopamine or testosterone or physiological factors or gender or sex differences or 'male and female'
Marriage failure		Trust or commitment or culture or children or parenting or family of origin or intergenerational transmission
Family relationships		Cognitions or attitudes or thinking or perceptions or beliefs or expectations or ruminations or motivations or appraisals
Human relationships		Life purpose or meaning or relationship investment or relationship maintenance

2.3 Keyword Syntax Search Results

At the end of this first stage of syntax searches 15,403 publications had been added to Endnote, and their abstracts read.

Number of records identified through database searching of
KEYWORD SYNTAXES N=15,403

3. Journal Search

Having searched the database thoroughly using keyword syntaxes, and having explored what many of the initially prominent factors were, the next step was to trawl journals. Whittemore and Knafl (2005) and other literature review specialists (e.g., Hopia et al., 2016) consider manual journal searches as integral to a thorough gathering of relevant material.

The initial 15,403 articles that had already been collected originated from a total of 1,750 different journals. No restrictions were placed on the research field of journals, so journal topics were as diverse as (and not exclusive to):

- Relationship science
- Family systems
- Social systems
- Communication
- Human interdependence
- Cognition
- Emotion
- Behaviour
- Motivation
- Human biology
- Endocrinology
- Neurology
- Sexual expression/behaviour
- Health and well-being
- Gender
- Positive psychology
- Therapeutic processes

Journals published across a range of nations were included to incorporate a universal representation. Only peer-reviewed journals were sought out for in-depth interrogation. All the journals (N=1,750) were tabled in an Excel file and those journals from which more than 10 articles had already been gleaned (N=204) were trawled extensively, edition by edition, starting with the most recent edition and going back to 2010 editions. The choice of only going back to 2010 for the journal search was based on the decision to prioritise recent research given time restraints. The decision to only trawl already highly contributing journals was also necessary given time constraints. The choice of ten articles as a cut off point for searching a journal is arbitrary but a cut-off point at any number would be arbitrary therefore common numerical rounding considerations dictated ten being the number decided upon. These arbitrary choices regarding search cut-off points were made throughout the study due to the impossibility of reaching search saturation through manual means.

204 journals were investigated issue by issue, and a further 15 journals were also extensively investigated due to their high SC Imago Journal Ranking (SJR) (and being in the first quartile (Q1) – the top 25% of journals for their classified sub-discipline) – indicating the recognition these journals have regarding the high quality

of work they publish (University Libraries Research Guide, 2022). In total, 219 journals were thoroughly trawled for relevant articles up until March 2022.

3.1 Journal Search Results

A full list of the journals contributing to this study (where more than one article was retrieved) can be found in Appendix 3. Table 3 lists the fifty journals providing the most articles for this study.

Table 3 *The Top 50 Journals Numerically Adding to the Endnote Database*

JOURNAL NAME	Endnote database count
1. Personality and Individual Differences	953
2. Journal of Personality and Social Psychology	775
3. Journal of Social and Personal Relationships	614
4. Frontiers in Psychology	606
5. Journal of Family Psychology	578
6. Personality and Social Psychology Bulletin	527
7. Emotion	520
8. Personal Relationships	417
9. Journal of Personality	381
10. Journal of Marriage and Family	374
11. Journal of Research in Personality	329
12. Current Opinion in Psychology	328
13. PLoS ONE: (Mainly Psychology)	325
14. Neuroscience and Biobehavioral Reviews	251
15. Family Process	249
16. Social Psychological and Personality Science	241
17. Social Cognitive and Affective Neuroscience	241
18. Journal of Family Issues	239
19. Psychoneuroendocrinology	237
20. Journal of Marital and Family Therapy	213
21. European Journal of Personality	210
22. Cognition and Emotion	202
23. Attachment & Human Development	201
24. The Family Journal	184
25. The American Journal of Family Therapy	177
26. Journal of Couple and Relationship Therapy	161
27. Developmental Psychology	157
28. Emotion Review	156

JOURNAL NAME	Endnote database count
29. Journal of Sex & Marital Therapy	155
30. Psychosomatic Medicine	153
31. Family Relations	151
32. Development and Psychopathology	149
33. The Journal of Sex Research	145
34. Psychological Bulletin	140
35. Motivation and Emotion	139
36. Marriage and Family Review	138
37. Psychological Science	135
38. Journal of Experimental Social Psychology	133
39. Journal of Divorce & Remarriage	131
40. Biological Psychology	130
41. Social and Personality Psychology Compass	128
42. Archives of Sexual Behavior	127
43. Psychophysiology	126
44. Current Opinion in Behavioral Sciences	124
45. Social Neuroscience	122
46. Journal of Child and Family Studies	122
47. Journal of Aggression, Maltreatment & Trauma	116
48. Journal of Happiness Studies	114
49. Current Directions in Psychological Science	111
50. Journal of Family Theory & Review	111

3.2 Journal Topics

Of these fifty journals, the top twenty comprise just over 1% of the overall journal pool (N=1,670) in this study and yet provide 42% (N=6,502) of the utilised research data. These journals' home web pages were perused to understand the typical material published therein. The dominant themes published by these twenty journals include:

- Understanding the bio-social nature of human being and human relating.
- Relationships between human social, psychological, and behavioural features, and neurobiological processes.
- Individual differences in personality and the factors stimulating these differences.
- Cognition and emotion and their structure and regulation.
- Promotion of healthy relationship processes and mending of dysfunctional ones.

- Family relationships within networks and larger systems.

Journal search of the top ranking and most relevant (i.e., contributing the most articles to this study) journals continued throughout the course of this study as new articles were being published regularly. However, the initial journal search phase ended in March 2020 and an additional 3,112 articles were added to the database at that time, bringing the overall total to 18,515.

Additional records identified through methodological searching of
219 KEY CONTRIBUTING JOURNALS N=3,112
 TOTAL records collected into Endnote **N=18,515**

4. Researcher Search

In Endnote, authors were searched by name and those who had contributed more than three articles as a lead author, and at least ten as an author in a team, were identified and added to an Excel file. This helped identify those authors who had significantly contributed work relevant to the research question, and whose work could therefore be further sought to add to this database. As there were more than 6,000 individual authors noted in the Endnote database, this limitation based on amount of published work produced was necessary given time limitations. Even with this limitation a total of 469 authors were investigated.

In Endnote several authors share the same initials, and these were carefully investigated to check name details. For example, Sarah C. E. Stanton has written 22 articles collated in the database, but these needed to be distinguished from Steven J. Stanton's work (N = 3). Finding all iterations of authors' names has been noted as critical for producing clean and reproducible results (Rush et al., 2021).

Once author names had been discerned in the Endnote collection, an extensive investigation was made of the work of relevant, noteworthy, and influential relationship researchers. These were discovered by numerical investigation of their input into the accrued database. An additional thirty-six authors were also included in consideration of their key contribution to the field of relationship science based on their development of key theories, even though there were not ten or more of their articles contributing to the database. Many of the early theorists had fewer articles published than current-day researchers, in part due to technological changes in

publication processes. Nonetheless, their work was mentioned repeatedly in proceeding studies, so these authors were also searched for in the online library in order that their early theorisations could be read for historical context. Additional studies were added to Endnote as a result of this search. Notes were made in Excel of the quantity and content of each author's work and prominent author's websites were perused where applicable. Several Clarivate Web of Science 2020's most highly cited researchers were found among these authors (as noted on the Clarivate Web of Science (2020) website).

4.1 Researcher Search Results

A final total of 505 key authors/researchers were investigated. A full list of these researchers can be found in Appendix 4. Table 4 shows the fifty most prolific authors in the Endnote collection, along with their specific topics of research.

Table 4 *Fifty Most Downloaded Authors in this Study*²⁴

Author	No. of articles	Key factors researched
Shaver, Phillip	144	Resolving conflict and enhancing relationship success
Gottman, John	120	Communication patterns, relationship trajectories
Simpson, Jeffry	119	Close relationships and interpersonal processes
Bodenmann, Guy	113	Dyadic coping and stress, prediction of divorce
Bradbury, Thomas	112	Attachment, stress, dyadic coping and communication
Fincham, Frank	112	Appraisals and forgiveness
Kuppens, Peter	105	Theories of emotion appraisal and individual differences
Overall, Nickola	103	Resolving conflict and enhancing relationship success, attachment style impacts
Mikulincer, Mario	101	Attachment, emotional regulation
Impett, Emily	87	Approach-avoidance motivation in close relationships
Karney, Benjamin	84	Attachment and relational processes
Reis, Harry	79	Psychological processes of close relationships
Stanley, Scott	76	The nature of commitment in romantic relationships

²⁴ Note: The quantification represents the number of articles found that were deemed relevant to this study of romantic relationship processes and mechanisms and therefore do not necessarily represent the number of actual publications of each author

Author	No. of articles	Key factors researched
Uchino, Bert	75	Social support and health
Gross, James	72	Emotion regulation
Rhoades, Galena	72	Romantic relationship development and functioning
Finkel, Eli	70	Interpersonal attraction, conflict resolution, and goals
Markman, Howard	69	Relationship education
Clark, Margaret	67	Emotion expression and regulation
Doss, Brian	61	IBCT, couples therapy
Smith, Timothy	61	Personality and social risk factors for health
McNulty, James	60	Positive psychology and relationships
Busby, Dean	57	Relationship education, communication
Decety, Jean	57	Affective neuroscience, oxytocin, and empathy
Johnson, Matthew	56	Development of relationship distress
Chopik, William	54	Cross-cultural, lifespan, health, and attachment factors
Halford, W. Kim	54	Relationship education
Christensen, Andrew	53	Demand-withdraw, conflict and interventions
Fraley, R. Chris	53	Attachment across the lifespan
Aron, Arthur	52	Relationship neuroscience and self-expansion theory
Beach, Steven	52	Marital discord and mental and physical health
Campbell, Lorne	52	Perceptions, humour, and pornography
Sbarra, David	52	Psychological and biological correlates of divorce
Cummings, E. Mark	50	Hostility and conflict communication in families
Whisman, Mark	50	Functioning in intimate relationships, mental health
Baucom, Donald	50	Relationship maintenance and psychotherapy
Cacioppo, John T.	49	Relationships and health, neurology
Davies, Patrick	49	Socioemotional development
Feldman Barrett, Lisa	48	The neurology of emotion
Keltner, Dacher	48	The social function of emotion
Kiecolt-Glaser, Janice	48	Relationships and health
Denissen, Jaap	46	Self-esteem, neuroticism, personality, social interactions
Eisenberger,	46	Neural bases of social pain

Author	No. of articles	Key factors researched
Naomi		
Muise, Amy	46	Sexuality in the context of relationships
Gillath, Omri	45	Attachment and relational processes
Holmes, John	45	Interdependent minds
Birnbaum, Gurit	44	Sexuality
Lebow, Jay	43	Couple therapy
Robinson, Michael	43	Personality in interactions
Zeigler-Hill, Virgil	43	Personality and emotional responses

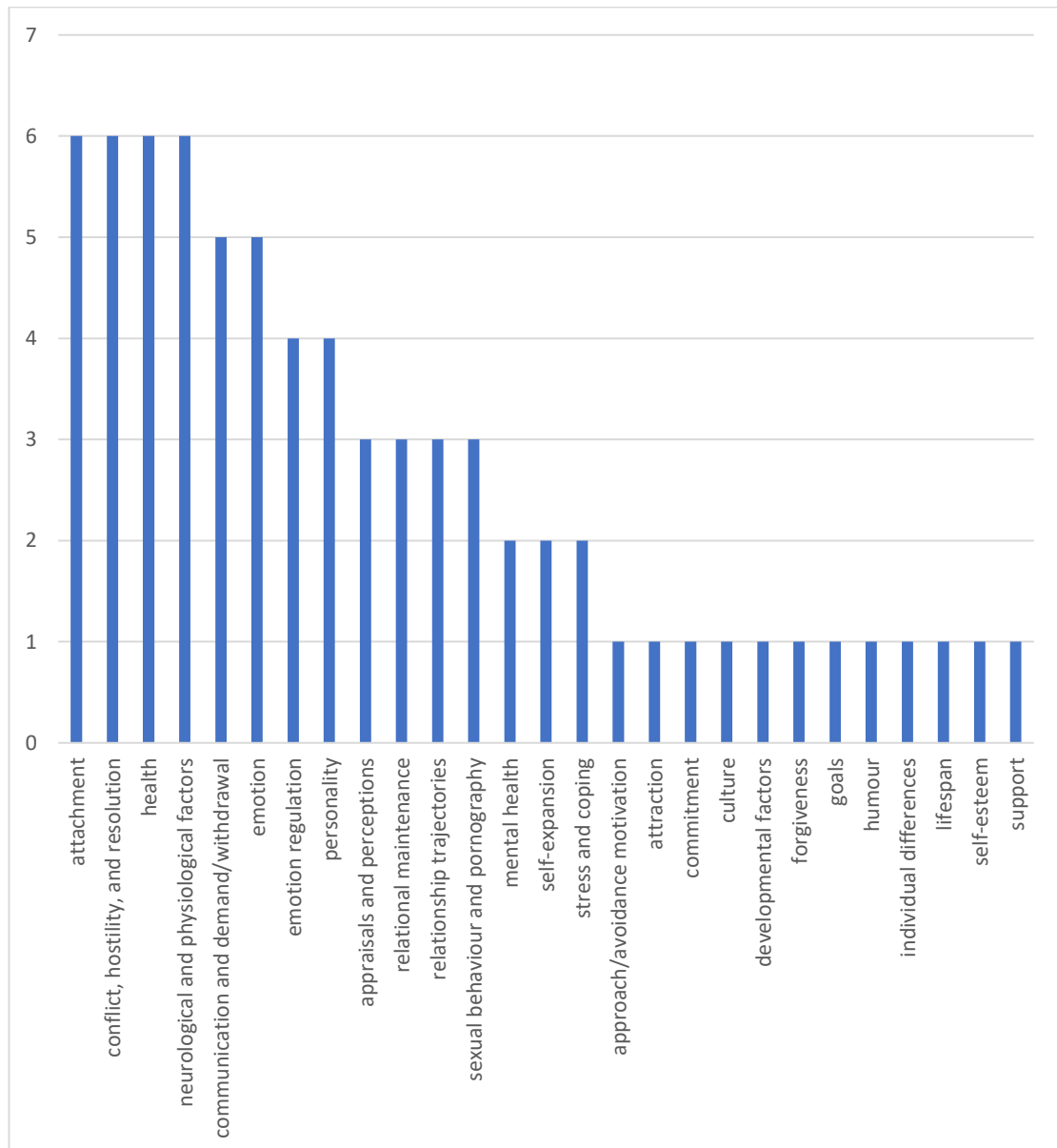
4.2 Researcher Topics

The main topics and themes these researchers investigated included:

- Close relationships and interpersonal processes
- Resolving conflict and enhancing relationship maintenance
- Communication patterns in relationships
- Romantic relationship development, function, and trajectories
- Psychological processes that affect the course and conduct of close relationships
- Relationship perceptions and appraisals
- Individual differences
- Emotional regulation
- Dyadic coping and stress
- Prediction of divorce and relationship distress
- Attachment
- Social support
- Approach-avoidance motivation in close relationships
- Goal achievement in relationships
- Humour
- Forgiveness
- Interpersonal attraction
- Personality
- Commitment to the relationship and partner
- Affective neuroscience
- Neurohormonal responses, oxytocin, and empathy
- Emotion Focused therapy (EFT)
- Positive psychology and relationships
- Relationship education
- Cross-cultural and lifespan factors in relationships
- Sexual behaviour
- Adultery and pornography

These topics were tabled in Excel and the most commonly occurring factors in these fifty authors' research interests are summarised in Figure 11.

Figure 11 *Researchers' Topics of Study*

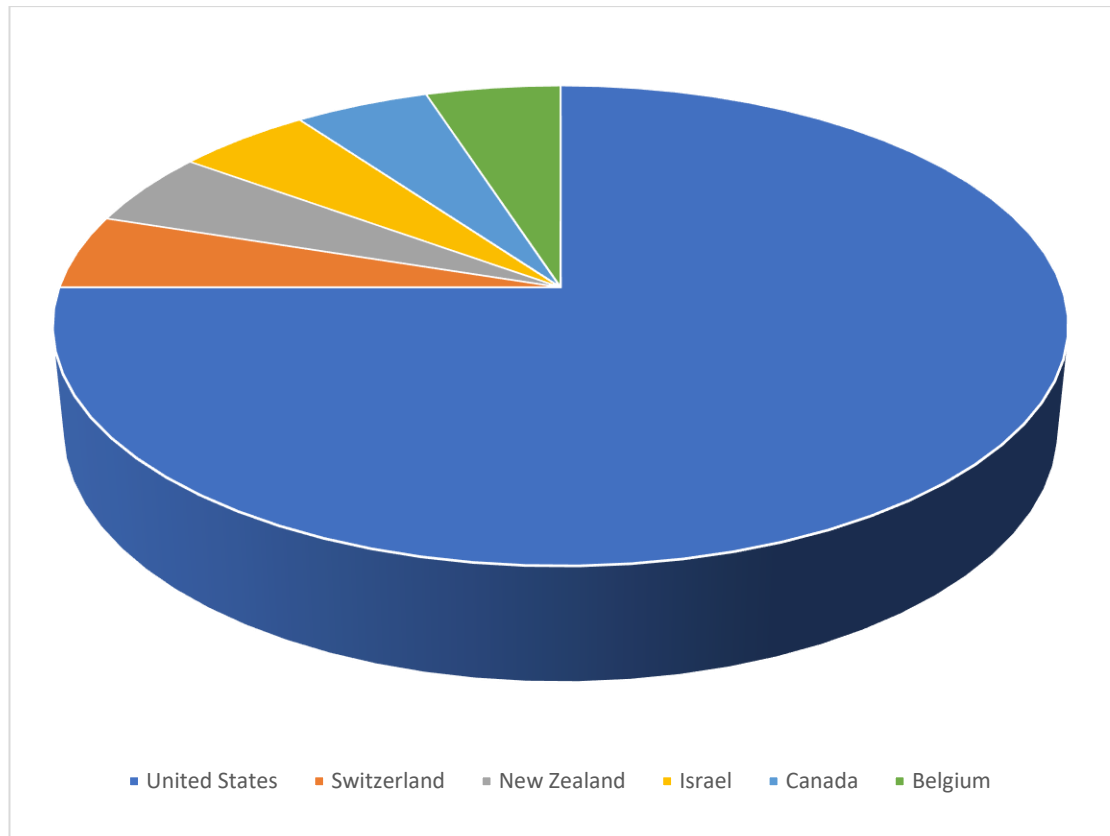


4.3 Researcher Nationalities

Of the 505 authors investigated, the most prolific twenty researchers provide 10% of the utilised research in this study while representing only 4.26% of the authors. Of the twenty most prolific authors, only four are women. Most researchers (75%) are based in the United States, with one (Peter Kuppens) from Belgium, one (Guy Bodenmann) from Switzerland, one (Nickola Overall) from New Zealand, one (Mario

Mikulincer) from Israel, and one (Emily Impett) from Canada, as shown in Figure 12. The populations of research studied by these authors are similarly from western, educated, industrialized, rich, and democratic (WEIRD) nations.

Figure 12 20 Key Author Nationalities



As a result of these author searches an additional 2,523 articles were added to the article database, bringing the total number of articles in the Endnote database to 21,038.

Additional records identified through searching the work of
505 KEY CONTRIBUTING AUTHORS N=2,523
 TOTAL records collected into Endnote **N=21,038**

5. Theory Search

Finally, an investigation was made of prominent relationship science models and theories, i.e., those occurring in numerous studies. Given the importance of

repeatedly utilised theories in influencing the study of the factors contributing to couple relationship well-being, an understanding of these theories was helpful in guiding factor recognition. Theories are defined as sets of conceptual definitions with domain limitations, inter-relationships, and explanatory power (Wacker, 1998). Models are representations of these theories (Wunsch, 1994). Seminal theory identification occurred through searching in Endnote for articles with 'theory' or 'model' in the title or abstract, as well as through general reading that was occurring during this process. Theories and models that were mentioned in articles were added into an Excel file.

5.1 Theory Search Results

716 unique theories were identified. Once theories were identified an 'any field +PDF with notes' search was carried out in Endnote to determine the number of articles that mentioned the theory anywhere in the article content (1 per publication, even if the theory was mentioned multiple times in that publication). Seminal theory authors were identified, and a summary of each theory was added to Excel (often from online sources so these summaries have been omitted from the Appendices). A full list of these theories can be found in Appendix 5.

The prominent theories were further searched for in the academic online libraries. An additional 493 articles were added to the database in this process, bringing the number of articles to 21,531.

Additional records identified through searching for research mentioning

KEY THEORIES N=493

TOTAL records collected into Endnote N=21,531

5.2 The Most Cited Theories

The twenty most cited theories are tabulated below in Table 5. This shows a quantitative measure of a theory's use historically, not a qualitative measure of the theory's usefulness in the present.

Table 5 *The 20 Most Cited Theories in this Study*

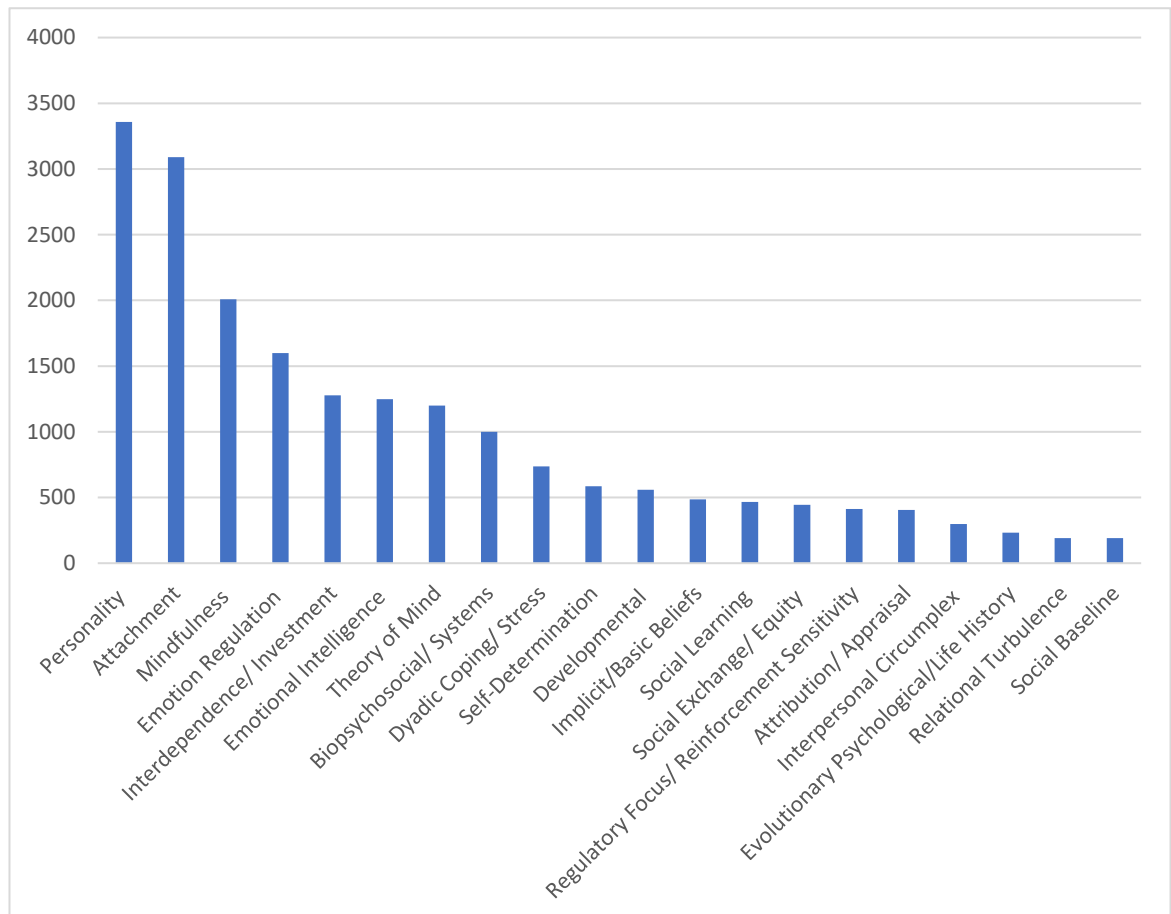
Theory or Model	No. of articles
Personality theory (including Big Five, Big Two, HEXACO, OCEAN, Five Factor Model)	3,358
Attachment theory (including Adult Attachment theory)	3,091
Mindfulness and acceptance theories	2,008
Emotion Regulation theory	1,598
Interdependence theory/ Investment model	1,277
Emotional Intelligence theory	1,248
Theory of Mind	1,200
General systems/ biopsychosocial theories, Family systems theory (FST)	1,000
Dyadic Coping theory/ Stress theories (including Vulnerability-Stress-Adaptation (VSA) model and Diathesis-Stress model	737
Self-Determination Theory (SDT)	586
Developmental theories	558
Implicit theories/Basic beliefs	485
Social learning theory	466
Social exchange theory/ Equity theory	445
Regulatory focus theory/ Approach and avoidance goals/ Reinforcement sensitivity theory (RST) (including revised)	413
Attribution theory/ Appraisal theory	404
Interpersonal circumplex model	297
Evolutionary Psychological theory/Life History theory	232
Relational turbulence model	192
Social baseline theory	191

An illustration of these theories numerical occurrence in the Endnote library is shown in Figure 13.

Some of these prominent theories were also noted in Galovan, Orbuch, et al. (2022)'s recent review (attachment, interdependence, the VSA model, family systems theory, social learning theory, and stress theories). Of note, the search was limited to the theory name given in the table. In reality many theories go by various names meaning an accurate count was difficult. Additionally, Endnote could not search many of the older articles due to their out-of-date formatting style, and this meant some older theories were neglected. To remedy this problem, the theory names were added into the 'notes' section of Endnote where they could be searched, and the final results represent this. This does however highlight that there

may be other omissions that have not been considered. For these reasons, this record of the most utilised theories in the Endnote library is interesting, but not definitive.

Figure 13 *The Numerical Occurrence of Theories in the Database*



Aside from these most occurring 20 theories, other commonly used theories included: The actor-partner interdependence model (APIM) (Kashy & Kenny, 1999); Love styles (Hendrick & Hendrick, 1986); Interpersonal circumplex theory (IPC) (Leary, 1957; Wiggins & Trobst, 1997); Sociometer theory (SMT) (Kirkpatrick & Ellis, 2001; Leary & Downs, 1995); Reinforcement sensitivity theory (RST) (Gray, 1973); Self-expansion model (Aron & Aron, 1996); Triangular theory of love (Sternberg, 1986); Relational competence theory (L'Abate, 2010); Relational turbulence model (Solomon & Knobloch, 2004); The family stress model (Conger et al., 2010); The sound marital house (Gottman et al., 2002); Relationship self-regulation theory (RSR) (Halford et al., 1994); Risk regulation model (Murray et al., 2006); Affection exchange theory (AET) (Floyd, 1997); Convoy model (Levitt, 2005); and, The circumplex model of marital and family systems (Olson, 1989).

5.3 Recent Theories

The most recent theories are also interesting to note. These are generally built upon older theories and therefore give an indication of their cumulative impact. Emerging theories and models also reflect current research directions and potentially give an insight into future research directions. The most recent theories and models include: Hierarchical model for interpersonal verbal communication (Jiang et al., 2021); The emotional bookkeeping hypothesis (Schino & Aureli, 2021); Reciprocal impact of relational conflict on physiological resilience (Kiecolt-Glaser et al., 2021); Happy, healthy, safe relationships (HHSR) continuum (C. Murray et al., 2020); The quadruple theory (Tobore, 2020) (love is explained as attraction, connection, trust, and respect); Culturally based romantic relationship (CBR2) model (Fonseca et al., 2020); Love as caring maturity model (Hedayati, 2020); Microbial effects on social behaviour (Sarkar et al., 2020); Model of the social-safety system (S. Murray et al., 2020); Social safety theory (Slavich, 2020); and, Gene-environment model (Paris, 2020).

5.4 Contextualising Theories and their Factors

To gain insight into the significance of the theories and their composite factors that have risen to the fore in research studies it is important to understand their contextual influences. As Jill Morawski (2011) writes:

“Fuller historical understanding is important for all social psychologists, whether they want greater accuracy in their ongoing research programs or seek innovative, interdisciplinary models... In this sense, appealing for greater awareness of the field’s history is analogous to calls for representative sampling of research participants” (p. 20).

The academic study of human relationships is less than a century old (Finkel et al., 2017) but its published research corpus has grown exponentially over this time, doubling almost every decade (Sharkey et al., 2021). Each decade the focus of researchers has evolved, and often changed (Melchert, 2016) with each stage prescribing proceeding stages. Research builds upon research, and this is not a straightforward journey but one that is influenced by cultural and academic times and seasons. Therefore, understanding how the focus of research has evolved, and how this has influenced current understanding of the factors being endorsed by modern researchers, helped to inform the final model produced in this study.

Briefly described below is a history of the noted prominent factors and some of the researchers who defined their evolutionary journey. (A complete version of this investigation showing the highlighted factors decade by decade, utilising the network modelling process, was created later in the study. This is shown in Appendix 3).

2.1.1 Previously Researched Relationship Science Factors

Personality: Human personality is a factor which has had an enduring interest and influence among relationship scientists due to its impact upon relationship-related perceptions, emotions, and behaviours. In the 1930s, Gordon Allport and Henry Odbert (1936) collated a compendium of adjectives that described observable behaviour markers denoting personality traits (building on Francis Galton's work on behaviour genetics), and Henry Murray (1938) published 'Explorations in Personality' explicating his system of human needs. Later, D. W. Fiske (1949) described the personality traits of social adaptability, emotional control, conformity, and inquiring intellect, which were to inform the making of the Big Five Personality Model, also influenced by Raymond Cattell (1943, 1946, 1947, 1950, 1957; 1995)'s work on the description and measurement of personality. The controversial but highly cited personality psychologist – Hans Eysenck²⁵ (e.g., 1952) theorised that personality was genetically influenced. Harry Stack Sullivan (1953) explored the inter-relational nature of personality development. Tupes and Christel (1961) continued to advance the science of personality with their testing of the Big Five²⁶ personality factors. Paul Costa, Robert McCrae, Lewis Goldberg and Warren Norman, carried out a large survey in the 1980s which further defined the Big Five and led to the development of the current version of the Five-Factor Personality Model – widely deemed the most robust model of personality available, with 80% of personality variance observed in its five dimensions (Zhao & Seibert, 2006).

²⁵ *Eysenck espoused racist views regarding the genetics of intelligence, and due to research errors, many of his publications have been retracted from the public record (Craig et. al., 2021).*

²⁶ *The Big Five factors were originally described as: Surgency (or Extraversion), Agreeableness, Conscientiousness, Emotional Stability (versus Neuroticism), and Culture. Culture has been relabelled as Intellect (Peabody & Goldberg, 1989), or Openness to Experience (McCrae & John, 1992).*

Individual Difference Factors: Individual factors also influence relationship-related perceptions, emotions, and behaviours. Nearly a century ago, Lewis Terman (1935; 1938) proposed that individual difference factors such as family background, social status and personality factors contributed to static adult characteristics that dictated relationship aptitude. His work informed much of the direction taken by relationship researchers (for a review see Wamboldt & Reiss, 1989). Individual differences have been understood variously however, 'The Encyclopedia of Social Psychology' defines these as enduring personality traits, values, and intelligence (Baumeister & Vohs, 2007a). Walter Schumm contributed significantly to the growing investigation and assessment of other individual factors influencing relationship well-being outcomes (e.g., self-esteem, number of children, religion, violence, emotional intimacy, stressors, coping, sex differences) (e.g., 1981, 1984; 1980; 1986; 1985; 1982). Johnson and Booth (1998)'s study helped to redirect the research of relationship factors from simply intra-personal factors to inter-personal factors stating that "marital quality is due largely to the dyadic perception of the relationship" (p. 883). The study of both intra- and inter-personal factors has continued into the new century, however, individual difference factors have been more clearly specified and have formed their own fields, for example, the individual difference of attachment style.

Attachment: Attachment styles influence relationship-related perceptions, emotions, and behaviours. Prescient to Attachment Theory, Lewis Terman concluded that "children who are strongly attached to their parents and have little conflict with them are more likely than others to be happy in marriage when they become men and women" (1938, p. 34). In the 1950s Harry Harlow, with his controversial experiments, introduced the world to the detriments of caregiving neglect for infant monkeys (1958). John Bowlby, influenced by ethologist Nikolaas Tinbergen (Van der Horst et al., 2007) advanced existing thought about the nature of healthy child development and consequent adult relationship outcomes alongside Mary Ainsworth and Robert Hinde (e.g., Ainsworth et al., 1978; Bowlby, 1958, 1969, 1973; Bowlby, 1979, 1980, 1988). In 1987 Cindy Hazan and Phillip Shaver published a paper hypothesising that attachment theory concepts apply not only to childhood relationships, but also to romantic adult relationships. The Adult Attachment Scale (AAS) was created, based on Ainsworth's original infant-mother categories (1978). This was later assessed, showing three primary adult attachment profiles: secure, avoidant, and anxious (Collins & Read, 1990). By the 2000s the unique and nuanced influences of attachment avoidance and anxiety on relationship

well-being outcomes had been investigated multiple times (as evidenced in meta-analyses including Candell & Turliuc, 2019; Groh & Narayan, 2019; Li & Chan, 2012).

Developmental Factors: Developmental factors influence both attachment and personality, and thereby influence couple relationship outcomes. Erik Erikson (1950, 1968) conceptualised that an individual's capacity to connect with others had an enduring and significant impact upon their development (Erikson, 1959). Abraham Maslow positioned love, affection, and a sense of belonging at the top of his influential psychological model of motivational behaviour 'Needs Pyramid' (Maslow, 1954). In the 1950's Murray Bowen investigated the dyadic influences between mothers' parenting style and the mental health outcomes of their children which was later to form the basis for Bowenian Intergenerational Theory (Bowen, 2013), which theorised that relational patterns are passed from one generation to the next, and that family systems are influential on couple relationship outcomes.

Love: Love, while a factor in couple relationship literature, has been difficult to conceptualise and study (Berscheid, 2010). Love was a highlighted research topic in the 1980s with researchers exploring facets of love, including passion and commitment (Fehr, 1988; Hatfield et al., 1984). Clyde and Susan Hendrick (1986) published a typology of love. The same year, their contemporary, Robert Sternberg (1986), published his Triangular Theory of Love which describes love as consisting of passion, intimacy, and commitment. Arthur and Elaine Aron (1986) published 'Love and the expansion of self: Understanding attraction and satisfaction', which explained that the feelings, thoughts and behaviours associated with love are motivated by the need for self-expansion.

Emotions: Emotion, particularly negative and positive emotion (e.g., Gottman, 1982; Gottman & Levenson, 1986; Rowan et al., 1995), as well as empathy (Goodman & Ofshe, 1968), hostility (Newton & Kiecolt-Glaser, 1995), self-esteem (Kawash & Scherf, 1975), and depression (Coleman & Miller, 1975) have been widely researched over a lengthy period of times as emotion related factors influencing couple relationship outcomes. In 2001, Ted Huston and his colleagues published a novel study investigating couples in the early stages of their relationships. Their findings highlighted the importance of the emotional climate of the marriage, particularly the development of emotional warmth or coldness between partners. Nancy Collins and Brooke Feeney (2000) championed this

concept of creating a “safe haven” of warm attachment in the marital relationship, and the giving and receiving of support in relationships was broadly investigated in this era (e.g., Cramer, 2006; Goldsmith et al., 2000; Iida et al., 2008). Much work has been carried out to understand basic emotions generally (e.g., Nair, 2008), including understanding the cultural variations of emotional responses (e.g., Kuppens et al., 2008). Emotion regulation, emotion appraisal, and emotional intelligence have also been factors of interest to many researchers (e.g., Gross, 2002; Nezlek & Kuppens, 2008; Richards et al., 2003; e.g., Smith & Kirby, 2009; Smith et al., 2008).

Relationship Behaviours and Commitment: Lawrence Kurdek’s studies (e.g., 1991, 1993, 1995, 1997) investigated divorce predictors from multiple perspectives (e.g., commitment, intimacy, companionship, attractive alternatives, support etc.) and greatly added to the understanding of what behavioural factors contribute to couple relationship well-being. Commitment, meaning a state or quality of allegiance of devotion to a partner (Oxford Languages Dictionary, 10th August 2023), is included as a behavioural factor in view of the indications of commitment being shown in behaviour reflecting investment into the relationship. Caryl Rusbult (1983) introduced the Investment Model of Commitment which determined commitment in a couple relationship to be directly related to an increase in relationship investment, and a decrease in perception of desirable partner alternatives. This model was the forerunner to Sandra Murray, John Holmes, and Nancy Collins’ Risk Regulation Model which theorised how couples balance closeness, interdependence, vulnerability, and potential rejection (2006). Deception, betrayal, abuse, and commitment were widely researched through the early 2000s (e.g., Vangelisti & Perlman, 2006), along with forgiveness (e.g., Finkel et al., 2002).

Attraction: Attraction has been studied as the initial impetus, and sometimes as a maintenance factor, for couple relationship development. Theodore Newcomb (1960) defined categories of interpersonal attraction (admiration, personal trust, role support, respect, value support—and a combined general attractiveness). Don Byrne (1961) investigated the correlation between interpersonal similarity and attraction. Ellen Berscheid and Elaine Hatfield (1969)’s publication *Interpersonal Attraction* introduced the notion of attraction being motivated by reward²⁷.

²⁷ Berscheid and Walster’s approach designated human relationships as central to human

Communication: Communication in some form has been investigated as a factor in the relationship literature for many decades. Sidney Jourard (1964, 1971) noted that open disclosure of feelings fostered trust and facilitated more satisfying relationships. Irwin Altman and Dalmas Taylor (1973) outlined Social Penetration Theory which proposed that relationships with significant others were vital to the intrinsically human goals of autonomy, competence, and relatedness. Communication, particularly self-disclosure, was deemed a key mechanism in reaching these goals. George Levinger and his colleagues (Huston & Levinger, 1978; Levinger, 1974, 1976; Levinger & Snoek, 1972; Rands & Levinger, 1979) studied the individual factors contributing to effective communication, particularly the interchange of positivity within couples.

John Gottman opened a couple relationship research centre at the University of Washington campus in 1986 (<https://www.gottman.com/love-lab/>), and has since been recognised as one of the top ten most influential psychotherapists of his generation (Cook et al., 2009). Gottman and his colleagues began observing couple communication and following their relationship trajectory longitudinally (Gottman & Levenson, 1999b; Gottman & Silver, 1994) which was a novel research method at the time (e.g., Bentler & Newcomb, 1978; Constantine & Bahr, 1981; Gottman, 1991), and produced multiple new insights into the precedents of divorce.

In the 1990s communication also became a primary target of early cognitive behavioural programs (Epstein & Baucom, 2002; Fincham & Beach, 2010; Hawkins et al., 2008; Jacobson & Margolin, 1979; Stanley et al., 1999), for example, teaching couples to use “I statements” during conflict or teaching active listening skills (Folger & Poole, 1984; Glick et al., 2000; Gottman, 1979; Gottman & Krokoff, 1989; Gottman & Notarius, 2000; Margolin & Weiss, 1978). These factors broadly infiltrated public thinking (Cahn, 1992; Carroll et al., 2010), with the overall premise being the need to eliminate negative conflict communication.

In 1995 Benjamin Karney and Thomas Bradbury carried out a comprehensive review of the published research regarding marriage quality and stability. This study

well-being, and while they faced challenges – such as the allegation in 1975 that their research was a waste of taxpayer money (Benson, 2006) – their persistence created a significant upward movement in relationship science research by highlighting successful relationships as prescient to success in almost every other life domain and central to the broader science of psychology (Reis et al., 2013).

encompassed 115 longitudinal studies representing over 45,000 marriages. It seemed to confirm that communication difficulties between couples such as expressions of contempt and lack of respect for each other's ideas were predictors of divorce and therefore should be the targets of change in therapy. However, this research data had a variety of sampling complexities – including 43% of the data sampling only including one partner in the dyad – leaving gaps in the interpretation of interpersonal communication dynamics.

Conflict: Conflict was an early prominent factor in couple relationship research. Ernest Burgess and Leonard Cottrell's (1939) theory of marital stability was based on mutual accommodation between partners, particularly when in conflict. In 1948 Kurt Lewin (1951) stipulated that conflict behaviour was a function of the person and the environment ($B = f(P, E)$). Lewin went on to mentor several influential relationship scientists, including Leon Festinger, Stanley Schachter, John Thibaut, Harold Kelley, and Morton Deutsch (Reis, 2011).

Through the 1990s, John Gottman and his colleagues monitored the dynamic affective processes during conflict within the couple dyad and found they could predict divorce to an accuracy of 92.7% simply from watching and coding the positive and negative affect present in a couple's repair conversation after conflict (Gottman & Levenson, 1999b) and by analysing the behaviour and affect from just the first three minutes of a couple's conflict conversation (Carrère & Gottman, 1999). This accuracy increased to approximately 94% by assessing the amount of fondness, we-ness, negativity, and chaos in a couple's description of their marital history (Buehlman et al., 1992). Divorce could also be independently predicted simply through recording a couple's sweat and heart rate – with physiological monitoring during conflict proving to be an even more powerful prediction tool than interview observation (Levenson & Gottman, 1985).

These studies helped to define the 1990s as focussed on marriage communication and conflict factors and led Frank Fincham and Steven Beach to conclude that "the investigation of conflictual interaction has a privileged status in this research" (1999, p. 48). However, over the long-term, study results have been mixed (Johnson & Bradbury, 2015) and many researchers now acknowledge the key foci of 'negative' communication and conflict may have caused a misdirection in relationship science (e.g., Hawkins & Fackrell, 2010; J. Ross et al., 2019). Through the 2000s researchers began to describe the avoidance of conflict in marriage as potentially

hazardous to the relationship (e.g., Bertoni & Bodenmann, 2010; Papp et al., 2009) – a complete variation from earlier conceptualisations.

Reciprocity and Equity Factors: Mutual giving and receiving of care was seen as an important factor in couple relationship well-being outcomes from the 1950s. Interdependence Theory was described by Harold Kelley and John Thibaut (1959) – with relationship interactions seen as a function of the given situation and the behaviours of the individuals in that situation ($I = f(A, B, S)$). Newcomb (1965) introduced the Reciprocity Principle where it was noted that people reciprocate interactional behaviours. William Lederer and Don Jackson (1968) positioned couples as dyadically influential rather than as two individuals independently co-existing. Equity theory was introduced by J. Stacy Adams (1965) and later extrapolated by G. William Walster, Ellen Berscheid and Elaine Walster (1973), who advanced Newcomb (1965)'s reciprocity principle by proposing that the ratio of a couple's reciprocated behaviours was key to their sense of power equity in the relationship. Thomas Wills, Robert Weiss and Gerald Patterson (1974) published their behavioural analysis of the determinants of marital satisfaction highlighting Reinforcement Theory – the theory that behaviours are shaped by their consequences. Burgess and Huston published their Social Exchange Theory in (1979) which identified mutually rewarding communication/relationship behaviour as a key mechanism for building intimacy in couple relationships. Trust was seen to develop through confidence in each partner's willingness to invest in the well-being of the other (Clark & Mills, 1979), and couple's therapist Clifford Sager (1994) expounded on the relational impact of uncommunicated expectations.

Responsiveness: Harold Kelley formalised his Theory of Interdependence in 1978 and highlighted responsiveness as an undergirding principle of mutually satisfying couple communication (1979; 1978). He was awarded the Kurt Lewin Memorial Award in 1990 and Albert Pepitone (1991, p. 1) stated that "Kelley's current theoretical synthesis of the conceptual types of dyadic interdependence and attribution of personal dispositions will bring us to the frontier in our understanding of interpersonal relationships." Kelley's thesis of relationship interdependence (1983) – that partners influence one another – helped shift research focus from simply intra-individual factors to inter-individual factors. Responsiveness has risen in prominence as a factor since these early accounts. Harry Reis and Shelly Gable (2015, p. 67) state that "current research has homed in on responsiveness as the active ingredient that underlies many of the important qualities that define satisfying,

healthy relationships”.

Stress and Stressors: In 1949, Reuben Hill presented the ABC-X Model which illustrated the impact of stressors and family resources on family outcomes. This model had an “immense impact” on the field of family science (Olson & Boss, 1986, p. 1), although stress as a factor doesn’t show up as widely researched until the 1980s. Benjamin Karney and Thomas Bradbury (1995) proposed the Vulnerability-Stress-Adaptation Model which theorised that couple relationship behaviours/communication mediate the effects of personal vulnerabilities (e.g., personality) and stressors on relationship well-being outcomes. Guy Bodenmann has since researched extensively on these factors (e.g., 2005; 2019; 2006; 2009).

Sexual Behaviour: The study of sexual behaviour in couple relationships has had a diverse history over the last century. The sometimes controversial sexual behaviour researcher, Alfred Kinsey, forged close ties with the American Association of Marriage Counsellors in the 1940s (Dowbiggin, 2014), thus cementing sexual behaviour as a relationship well-being factor. William Masters and Virginia Johnson began their influential research investigating couple’s sexual behaviour in 1957 (Maier, 2009), and there has been a renewal of the study of sexual behaviour and its impact upon relationship well-being in the 2010s (e.g., Maxwell & McNulty, 2019), with Emily Impett investigating it from a mutually beneficial perspective (e.g., 2020; 2018), and others investigating how attachment styles impacted sexual desire and behaviour (e.g., Busby et al., 2020).

Perceptions: The study of perceptions gained momentum in the 1950’s. In 1954 Leon Festinger introduced Social Comparison Theory, which considered how people appraise their social worth in comparison with others. Eleanore Luckey (1960a, 1960b) published articles describing how couples’ perceptions and expectations influence their relationship outcomes. George McCall and Jerry Simmons (1966) noted that when partners affirm behaviours that corresponded with their own vision of their identity, their attachment to one another grew. Carl Rogers (1961) made an enduring impact with his thesis on the importance of unconditional positive regard between people in the fostering of open and intimate relationships. Frank Fincham and Thomas Bradbury brought an increased focus to the study of the impact of appraisals, perception, and expectations on relationship outcomes (e.g., Bradbury & Fincham, 1987, 1988; Fincham, 1985; Fincham et al., 2000).

Contextual Factors: Urie Bronfenbrenner investigated the impact of socio-contextual factors on relationships in the 1970s, and Ecological Systems Theory (1977) has been widely adopted across multiple disciplines with Bronfenbrenner's published work cited thousands of times (Neal & Neal, 2013). The Convoy Model of Social Relations (Antonucci & Akiyama, 1987) also contextualised the individual as interacting among and influenced by their broader relationships.

Biological Factors: Psychological Evolutionary Theory ascended through the 1980s and lent insight in the coming years into the ways in which human relationships determine adaptation, how the brain efficiently and purposefully regulates relationships, and how biological sex differences between men and women explained distinct adaptive behaviours (e.g., Buss, 1995; Buss & Schmitt, 1993a, 2019; McKusick, 1986; Tooby & Cosmides, 1992). Paul Amato published extensively on the significant physiobiological well-being outcomes of stable (enduring) marriage (e.g., 1991; 1991a; 1991b, 1991c). Shelley Taylor's 'Tend and Befriend Model' (2006; 2000) raised awareness of the impact of biological sex differences on human relating and highlighted the biopsychosocial nature of relationships (along with other studies e.g., Adler, 2009; Garland & Howard, 2009). Through the 2000s understanding of the hormonal (e.g., Floyd & Riforgiate, 2008), neurological (e.g., Bartels & Zeki, 2004) and physiological (e.g., Loving et al., 2009) processes that influence the ways people interact with one another has continued to grow. The neuropsychological structures and processes contributing to social emotion, thought, and behaviour (e.g., Bartels & Zeki, 2000; Bartz & Hollander, 2006; Depue & Morrone-Strupinsky, 2005; Eisenberger et al., 2007), and the biopsychosocial integration of research factors have been researched prolifically (e.g., Fletcher et al., 2013) partly due to the rise in fMRI research availability.

5.4 Explication of Prominent Theories and Related Factors

Psychological theories are often confined to siloed areas of research (Burghardt & Bodansky, 2021). For example, Self-Determination Theory is rarely used outside of the field of social psychology, yet the factors predominant in Self-Determination Theory – autonomy, competence, and relatedness – are commonly used in other fields of psychology and sociology. Breaking down the theories into their composite parts enabled a lowering of cross-disciplinary barriers that may otherwise obscure the coherent nature of the wider body of research.

To aid in the breaking down of theories into factors a brief description of the top 20 most cited theories was tabled, along with an explanatory model illustrating this theory and the factors each theory was explicitly composed of. This table is shown in Appendix 6. A small example of this larger table of theory description is shown in Table 6, presenting the description for Mindfulness Theory.

Table 6 *Brief Example from the Theories Table (Mindfulness Theory)*

Theory	Description	Factors
Mindfulness Theory Authors: Hayes (2003); Kabat-Zinn (2003)	Mindfulness is an approach to life that emphasises kindness, acceptance, and openness towards oneself and others. It involves intentionally and non-judgmentally focusing on the present moment. By cultivating mindfulness, individuals can become more aware of their interconnectedness with others and give greater attention to their current experiences. This process involves accepting one's current state of mind and emotions without condemnation, which can lead to greater self-awareness and insight. This insight may help individuals to be more aware of their own internal reality, and also their partner's, and consequently increase their empathy and thoughtfulness towards them.	<i>Mindfulness</i> <i>Kindness</i> <i>Acceptance</i> <i>Openness</i> <i>Connectedness</i> <i>Closeness</i> <i>Self-compassion</i> <i>Non-judgemental</i>
	<i>Mindfulness Theory Model Example</i>  <pre> graph TD A((Acceptance Being non-judgmental about ones thoughts and feelings)) --- C((MINDFULNESS)) B((Compassion Kindness towards self and others)) --- C D((Balance Emotional and cognitive flexibility)) --- C E((Awareness Self-awareness of thoughts and feelings, body and environment)) --- C </pre>	

5.5 Finding Factors in the Theories

Several of the most cited theories were found to include co-occurring factors, suggesting conceptual inter-relationships and the increased possibility of theoretical coherence of these underlying factors (Haig, 2005). The factors are shown collectively in Table 7. While this is not a comprehensive list, it highlights the factors noted in the prominent theories as relevant to couple relationship well-being.

Table 7 *Factors Drawn from Key Theories*

Factors	
Acceptance	Critical
Affection	Dependable
Affiliation	Developmental factors
Age and stage	Differentiation
Agency	Disorganised attachment
Agreeableness	Dominance
Aloofness	Dyadic coping
Antagonism	Emotional intelligence
Anxiety	Emotional stability
Anxious attachment	Emotion expression
Appraisal	Emotion regulation
Arrogance	Emotion suppression
Assertiveness	Empathy
Attention	Encouraging
Attractive alternatives	Enduring vulnerabilities
Attribution	Enthusiasm
Autonomy	Environmental factors
Avoidant attachment	Evaluations
Behavioural activation	Extraversion
Behavioural approach	Fear of abandonment
Behavioural inhibition	Fight Flight Freeze
Behaviour regulation	Friendliness
Belonging	Goals
Brain and neural factors	Heart rate
Calm	Helpful
Careless	Honesty-Humility
Closeness	Hostility
Cognitions	Ideal standards
Coldness	Impulsiveness
Commitment	Industriousness
Companionship	Intellect
Compassion	Interdependence
Competence	Intergenerational patterns
Connectedness	Intimacy

Factors	
<i>Conscientiousness</i>	<i>Introversion</i>
<i>Control</i>	<i>Kindness</i>
<i>Cooperative</i>	<i>Laziness</i>
<i>Coping</i>	<i>Life history</i>
<i>Costs</i>	<i>Lifespan</i>
<i>Mindfulness</i>	<i>Self-compassion</i>
<i>Modelling</i>	<i>Self-regulation</i>
<i>Motivation</i>	<i>Sexuality</i>
<i>Need frustration</i>	<i>SNS arousal</i>
<i>Need satisfaction</i>	<i>Social context</i>
<i>Neuroticism</i>	<i>Social network</i>
<i>Non-judgemental</i>	<i>Social skills</i>
<i>Openness</i>	<i>Social support</i>
<i>Orderliness</i>	<i>Stress</i>
<i>Parental sensitivity</i>	<i>Stressful events</i>
<i>Perceptions</i>	<i>Stress appraisals</i>
<i>Personality</i>	<i>Stress management</i>
<i>Physiological reactions</i>	<i>Stressors</i>
<i>Politeness</i>	<i>Stress responses</i>
<i>Quarrelsomeness</i>	<i>Submissive</i>
<i>Reappraisal</i>	<i>Support</i>
<i>Relatedness</i>	<i>Suspicious</i>
<i>Relationship threats</i>	<i>Theory of mind</i>
<i>Reserved</i>	<i>Trusting</i>
<i>Resilience</i>	<i>Uncertainty</i>
<i>Rewards</i>	<i>Volatility</i>
<i>SAM activation</i>	<i>Warmth</i>
<i>Secure attachment</i>	<i>Withdrawal</i>
<i>Self-awareness</i>	

6. Literature Collection Summary

Inevitably novel findings instigated a new round of data collection. As per the Cochrane Intervention Reviews (MECIR) standards (Bramer, 2018), the database was continuously updated throughout the study up until the final model development. Given the considerable number of articles utilised in this study – collating, and editing the publications took an immense amount of time. Each article needed to be found, accessed, downloaded, edited in Endnote, read (abstract), and marked up with highlighter pen. The top fifty most drawn from journals were searched issue by issue throughout the study, resulting in a further 5,470 articles added into the Endnote database for use in the next phase of the study, bringing the total number of articles used in Phase Two and Three to 27,001.

Additional records added N=5,470
TOTAL records collected into Endnote N=27,001

6.1 Discarding Duplicates

As there were numerous events of data collection, documents were uploaded into Endnote numerous times, and each time duplicate records were eliminated using the Endnote 'References' function "Find duplicates". Therefore, no exact count was made of the overall number of duplicates removed.

7. Relevancy Coding all the Publications

At this stage all 27,001 abstracts had been read and highlighted with highlighter pen (in Endnote). A smaller, more manageable number of publications needed to be prioritised for thorough reading of the entire publication in the final model development in Phase Four. Additionally, by coding the articles using Endnote's coding system, those not pertaining to the research question could be easily removed from the corpus used in Phase Two and Three.

A relevancy coding scheme was therefore created. This is shown in Table 8. Data was relevancy coded into five groupings (1-5). Code 1 represented the articles not relevant to relationship well-being theory or its potential processes or properties. Code 5 represented those most relevant. Consideration was also given to the article's recency and credibility, with higher codes given to meta-analyses, randomised controlled trials, and systemic within-subject designed studies (Ward et al., 2016).

Table 8 *Article Relevancy Coding Scheme*

Relevancy Coding Scheme 1-5	
1	NOT RELEVANT: Is unrelated to couple relationships or relates to couple relationships but not to their well-being factors e.g., "Family science and students: Pedagogical connections that transform our lives" (Allen, 2022).
2	LEAST RELEVANT: Relates to couple relationship well-being indirectly in a distant

	supplementary manner e.g., “Does marriage make us healthier? Inter-country comparative evidence from China, Japan, and Korea” (Fu & Noguchi, 2016).
3	RELEVANT: Relates to a couple relationship well-being in a direct manner but is either older material or relates to less significant factors e.g., “The influence of educational expansion on partnership stability: A cohort study of first partnerships in Switzerland” (Kessler, 2017).
4	HIGHLY RELEVANT: Relates to couple relationship well-being in a direct manner, regarding significant factors e.g., “To stay or to leave? The role of attachment styles in communication patterns and potential termination of romantic relationships following discovery of deception” (Jang et al., 2010).
5	MOST RELEVANT: Directly and significantly relates to couple relationship well-being and utilises the most up to date or thorough/foundational theoretical insights e.g. “A preliminary meta-analysis of the Big Five personality traits’ effect on marital separation” (Spikic & Mortelmans, 2021).

This selection was subjective, but as only those articles coded one (and therefore missing factors related to couple well-being in their abstracts) were discarded from the study this subjectivity had minimal impact upon the factor investigations in Phase Two and Three. An example of this coding using Endnote’s star system is shown in Figure 14. (The black and white circles were used to identify which articles had been read right through).

Figure 14 *Relevancy Coding the Literature in Endnote: Example*

●	Rating	Year	Title
○	★★★★	2013	Marital well-being and religiousness as mediated by relat
○	★★★	2017	Marital, parental, and whole-family predictors of toddlers
○	★★★	2022	Markers of emotion regulation processes: A neuroimagin
○	★★	2018	The marketing of love: How attachment styles affect rom
○	★★	1965	A Markov chain model of human needs: An extension of
●	★★	2015	Marriage
○	★★	2013	Marriage (still) matters: The contribution of demographic
○	★★★★★	2017	Marriage advantage in subjective well-being: Causal effec
○	★★	2016	Marriage advantages in perinatal health: Evidence of mar
○	★★	2010	Marriage and child well-being: Research and policy persp

7.1 Relevancy Coding Results

Of the 27,001 publications in Endnote, 1,178 were deemed irrelevant to the research question. These were discarded. This left a total of 25,823 publications remaining that were used in this study. Relevancy coding produced the results shown in Table 9.

Table 9 *Article Relevancy Coding: Numerical Quantities*

Relevancy code	Number of articles
1 (not relevant)	1,178 (discarded)
2	8,851
3	9,982
4	5,272
5 (most relevant)	1,718
TOTAL	27,001
TOTAL RELEVANT ARTICLES	25,823

8. Literature Collection PRISMA Summary

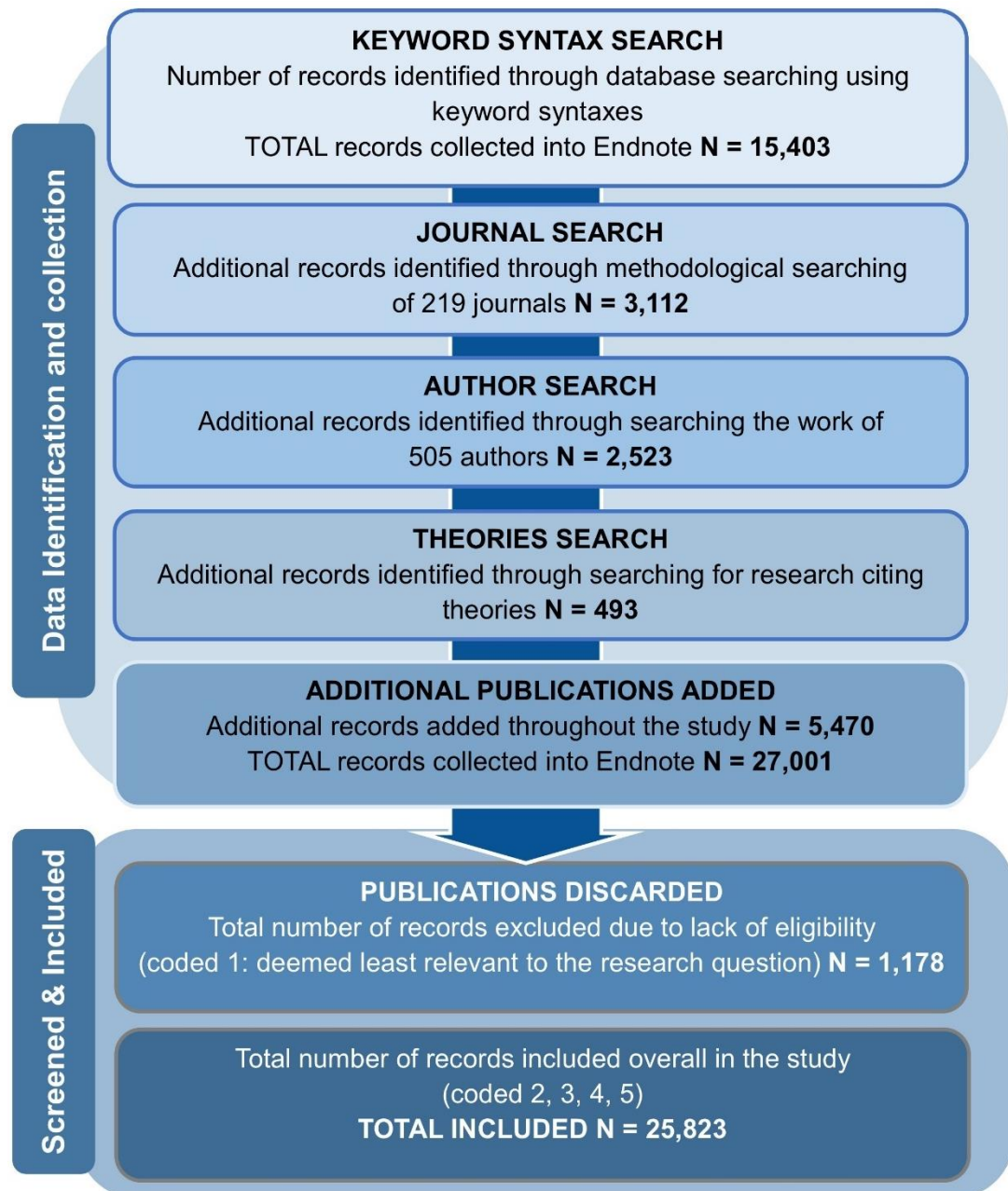
The literature search was an iterative process which took place from 2018 to 2022. A flowchart of the entire method process, following an adapted PRISMA review structure, is shown in Figure 15.

9. Publication of this Scoping Review

An article overviewing this phase of the study, titled “The current state of relationship science: A cross-disciplines review of key themes, theories, researchers and journals” (Sharkey et al., 2021) was published in the Journal of Social and Personal Relationships. The article can be read at: <https://doi.org/10.1177/02654075211047638>.

Of note, this article was published prior to finishing this study and data collection continued post-publishing, therefore, this thesis presents a more comprehensive account of the study results.

Figure 15 *PRISMA Flow Diagram (a version of: Moher et al., 2009)*



10. Phase One Summary

The 25,823 publications collated in Phase One originated from 3,112 different academic journals indicating the breadth of interest in human relationships across diverse fields of science. Of these journals, 219 were extensively searched for the period 2010-2022. The dominant publishing themes of the most prolific relationship science related journals include: Understanding the bio-social nature of human being and human relating, relationships between human social, psychological, and

behavioural features and bodily processes, individual differences in personality and the factors stimulating these differences, cognition and emotion and their structure and regulation, promotion of healthy relationship processes and mending of dysfunctional ones, family relationship networks and larger systems, and family therapy.

The main topics investigated by the most prolific relationship researchers included: Close relationships and interpersonal processes, resolving conflict and enhancing relationship success, communication patterns in relationships, relationship trajectories, psychological processes that effect the course and conduct of close relationships, theories of emotion appraisal and individual differences, emotional regulation, dyadic coping and stress, prediction of divorce and relationship distress, attachment, social support, approach-avoidance motivation in close relationships, goal achievement in relationships, relationship perceptions and appraisals, humour, personal relationships and forgiveness, interpersonal attraction, romantic relationship development and functioning, personality and social risk factors, commitment in romantic relationships, affective neuroscience, Emotion Focused therapy (EFT), Integrative Behavioral Couple Therapy (IBCT), the demand/withdraw pattern, relationship education, cross-cultural and lifespan factors in relationships, sexual satisfaction, and pornography.

Dominant theories noted in the research were: Attachment theory (including adult attachment theory), Big five personality model, emotional intelligence theory, theory of mind, dyadic coping theory and stress theories, reinforcement sensitivity theory (including revised), general systems and biopsychosocial theories, self-determination theory, evolutionary psychological theory, interdependence theory, family systems theory, life history theory, relational turbulence model/theory, interpersonal circumplex theory, social cognitive theory, appraisal theory, social exchange theory, affection exchange theory, vulnerability-stress-adaptation model and attribution theory. The bioevolutionary perspective undergirding many of these theories (e.g., attachment theory, life history theory) is also noted. These theories stand out as those currently most influential in this field of science due to their continued and popular use and recurrent testing (Peirce, 1878b), and resultant “structural corroboration” (Eisner, 1998, p. 55).

CHAPTER THREE PHASE TWO: FACTOR IDENTIFICATION

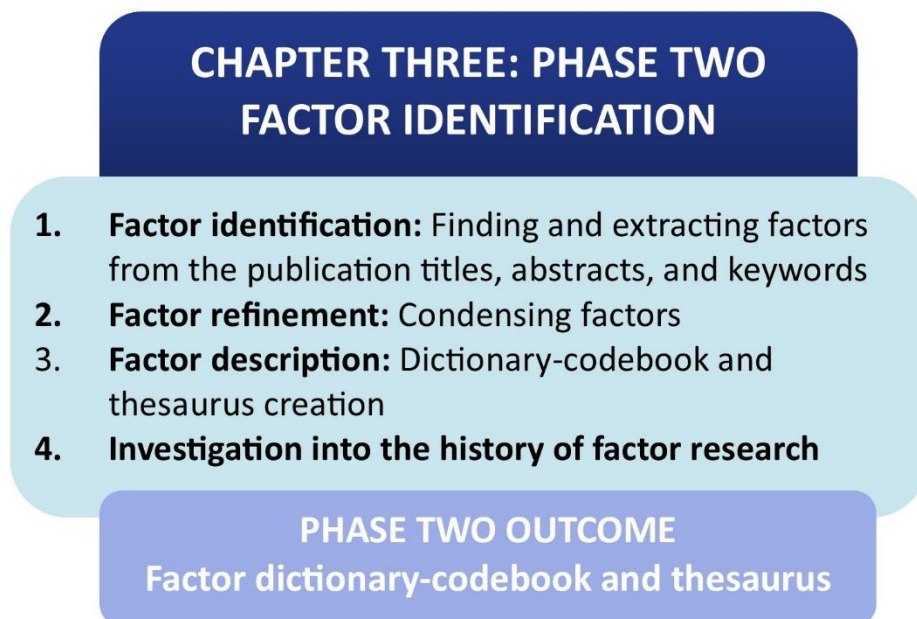
“Without data you’re just another person with an opinion.”

Katarzyna Kolasa et al. (2020, p. 1)

Overview

In Phase Two, factors were systematically extracted from publication keywords, abstracts, and titles. These factors were then described and merged to form a factor dictionary-codebook and a factor thesaurus. This was a semantic approach, extracting terms directly from the texts, and therefore a dictionary needed to be created to clarify common meaning similar to a codebook. The ‘dictionary-codebook’ standardised the factors by bringing together those that mean the same thing but are phrased in slightly different ways, and therefore this was the early stage of categorisation of the factors. This process mirrors MGT’s inductive coding stage and resulted in a dictionary-codebook made up of 2,276 identified and merged factors. A thesaurus was also created to abridge the factors for later use in the network modelling phase. The Chapter Three: Phase Two outline is shown in Figure 16.

Figure 16 *Chapter Three: Phase Two Factor Identification*



1. Factor Identification

To create an explanatory model of the factors contributing to and maintaining couple relationship well-being according to the existing literature required firstly identifying what the factors were, and then clarifying their meaning. Across, and even within academic fields, theorists may use varying descriptions and definitions for the same factors. Zagaria et al. (2020)'s analysis of introductory psychology textbooks found that even fundamental terms such as 'cognitive function' or 'emotions' are undefined or diversely defined by different authors. The varying use of terms is a common and confusing problem for researchers and for their readers. Therefore, clarifying their meaning would help bring a consistency to the disciplinary terminology used in this study, and a lucidity to the subsequent model.

1.1 Identifying Factors from Publication Keywords

The factors first needed to be identified in the literature. Research studies typically test casual variables or factors of a phenomena (Nilsen, 2022) and therefore these factors are usually easily recognisable in the abstracts, titles, and keywords of research publications. Keywords are usually chosen by the article author and represent important and significant concepts found in the study. An example of this is shown in Figure 17, where keywords can be identified to the left of the abstract as: *oxytocin, cortisol, social buffering, early life stress, mother-child relations, longitudinal studies*.

Figure 17 Example of Keywords in a Published Article

Human attachment triggers different social buffering mechanisms under high and low early life stress rearing Karen Yirmiya^{a,b}, Shai Motsan^{a,b}, Orna Zagoory-Sharon^a, Ruth Feldman^{a,*} ^a Baruch Ivcher School of Psychology, Interdisciplinary Center, Herzlia, Israel ^b Department of Psychology, Bar-Ilan University, Israel	
ARTICLE INFO Keywords: Oxytocin Cortisol Social buffering Early life stress Mother-child relations Longitudinal studies	ABSTRACT Social buffering - the attenuation of stress by maternal safety signals - is a co-management mechanism implicating two ancient systems: the oxytocinergic and the cortisolergic. In the current study, we examined whether and how human attachments are representation-based, understanding social buffering mechanisms through the assessment of relationship history and consideration of early life stress (ELS), we followed a unique trauma-exposed cohort across childhood, versus a low-stress observed maternal sensitive, safety-promoting style. In adolescence, we used an attachment task that exposed children to both live and reminders of attachment safety signals and n

1.1.1 Using VOSviewer and Endnote to Refine the Factors

Bibliometric network modelling tools typically factor-analyse these unedited keywords. In this study, VOSviewer was the bibliometric network modelling tool used. Publication data is usually downloaded from online academic databases (e.g., Scopus, Web of Science) directly into VOSviewer, however, VOSviewer has an upload limit of 2,000 publications when being directly uploaded from online library databases. As this study investigated a much larger corpus of work, Endnote was employed as a mediating tool allowing thousands of publications to be uploaded into VOSviewer at a time from an Endnote file. Endnote software automatically extracts a publication's own keywords into the Endnote keyword section at the time of uploading.

VOSviewer uses the keywords from these publications as nodes in its network modelling. In other words, using the example in Figure 17, the keywords *oxytocin*, *cortisol*, *social buffering*, *early life stress*, *mother-child relations*, *longitudinal studies*, would all show up as nodes. As terms such as *longitudinal studies* were not factors contributing to or maintaining couple relationship well-being, they were not useful in the network models and therefore, these needed to be edited out of the Endnote keyword sections of each article. Additionally, there is substantial variation in the keyword content extracted from each publication into the Endnote keywords section. Some publication's keywords are not added at all, and some have extra information added. An example of this is shown in Figure 18, with the keywords shown on the left being those automatically added by Endnote.

Figure 18 Example of Endnote's Keyword Section Selection

Keywords	ARTICLE INFO
Humans	
Female	
*Stress,	Keywords:
Psychological/psychology	Sex
*Hydrocortisone	Stress
Sex Characteristics	Psychopathology
Gender	Gender
Psychopathology	
Sex	
Stress	
conflicts of interest to disclose with respect to the authorship or publication of this article.	

1.1.2 Creating an Unedited VOSviewer List and Network Model

Due to these issues it became apparent that the keyword sections needed to be edited to make sure only relevant keywords representing factors contributing to couple relationship outcomes were used in order to produce accurate and clear models derived from this data. This was a type of “data-cleaning” (Hogarth, 2012).

To begin this process an initial keyword screen of the entire Endnote library was performed to attain a list of all the current unedited keywords and to see how the network models would look if the typical VOSviewer process of simply using a publication's own offered keywords was followed²⁸. Keywords were exported from Endnote into VOSviewer. This process produced a list of all the unedited keywords from the entire Endnote library data set. Once processed this list was exported from VOSviewer into an Excel file. This Excel file list was the starting place for developing a dictionary-codebook and thesaurus of factors. The process of acquiring this list is shown step by step in Table 10 (using the software's own terminology).

Table 10 *Tabulating the Factors Using VOSviewer*

Step 1	Export the whole Endnote library as a (*.txt) file (output style APA 7 th).
Step 2	Open VOSviewer and create a ‘map based on bibliometric data’ from “reference manager files” (Endnote). Uploading the *.txt file from all files (*.*)).
Step 3	Click on co-occurrence, keywords, full counting.
Step 4	Include unconnected factors. Note: Endnote can only process 1,000 factors and 10,000 links at a time, and it automatically prioritises the highest occurring and co-occurring.
Step 5	Once the network model has been created save this as a VOSviewer map file type (all files *.*).
Step 6	Open the .txt file and copy and paste it into Excel to create a table.

Using this process, the whole Endnote library of 25,823 publications was uploaded into VOSviewer. This created an Excel file list of 30,686 words/terms (authors' own unedited keywords).

²⁸ *Of note, this unedited version is how network models are usually created using bibliometric network modelling software.*

Figure 19 *Network Model of Original Keywords*



²⁹ Of note, VOSviewer only uses the 1,000 most occurring keywords (used 4+ times in this network model) in the graphic visualisation.

psychological, conflict tactics, conflict avoidance, conflict resolution. As this created confusion in the network models, the complete set of 30,686 keywords needed to be refined and condensed. Therefore, each of the 25,823 articles' titles and abstracts was re-read, and their keyword section in Endnote manually edited to remove errant words and terms and also to add in missing factors, as many of the articles had uploaded into Endnote with keywords missing altogether.

2.1 Removing Irrelevant Keywords

All non-factors (e.g., asterisks, brackets, study methods etc.) were removed from the keyword's sections in Endnote. With such a large collection of literature used in this study there were thousands of irrelevant keywords.

2.2 Adding Relevant Missing Keywords

Additionally, in the Endnote collection there were thousands of articles missing keyword data completely (Endnote had not transferred them to the keywords section). This meant that the network model was also missing thousands of sets of data. To remedy this, keywords were manually added. Each publication's own keywords were perused, and those representing factors relating to couple relationship well-being outcomes were added into each publication's Endnote keyword section.

2.3 Adding Relevant Factors from Abstracts and Titles

During the keyword editing process, it was noticed that the published keywords were also frequently missing key factors found in the titles and abstracts. This may be a result of journals not offering all keyword options, or an author bias to certain keywords. For example:

- The article titled "The development of social value orientation: Attachment styles, number of siblings, age, and a comparison of measures" (Liu et al., 2022) has as its keyword offering: social value orientation, adult attachment, siblings, replication. In the title age is mentioned as a variable but not listed as a keyword. Additionally, in the abstract, prosociality, avoidant attachment, secure attachment, and sex differences (in siblings) are also noted as more

specific factors under investigation³⁰.

Simply using each publication's own keywords in the bibliometric analysis could subsequently produce poorly descriptive results regarding the factors being studied or included in the findings, therefore, missing factors had to be manually determined and selected by extracting them directly from the publication titles and abstracts. Each publication title and abstract were read (specifically focusing on the sections that had already been marked up with highlighter in Phase One) to check if there were missing relevant factors that could also be added to the keywords section in Endnote. Missing factors were simply 'copy and pasted' from the text into the keywords section.

This process of factor 'code' refinement was laborious but worthwhile to produce a closer representation in the network models of the factors being studied by researchers.

2.4 Endnote Editing Example

An illustration of this Endnote factor refinement process is shown in Figure 20. This shows the article "Does stress make us more—or less—prosocial? A systematic review and meta-analysis of the effects of acute stress on prosocial behaviours using economic games"(Nitschke, Forbes, et al., 2022). At its arrival into Endnote the keywords section contained the terms: *Humans, *Social Behavior, *Altruism, Acute stress, Costly punishment, Economic games, Meta-analysis, Prosocial behaviour, Social decisions, Systematic review, to declare*. After reading the abstract and title and editing the keyword section it contained the factors: *Altruism, Acute stress, Costly punishment, Prosocial behaviour, Sex/gender, Stressor*, as shown in Figure 21.

³⁰ Another example was the article titled: "Sex differences in trauma-related psychopathology: A critical review of neuroimaging literature (2014–2017)" did not include sex differences or psychopathology in the keywords. Sex differences was an interesting case in point as they have been noted in the relationship science literature throughout the last seventy years and are frequently included in studies as a variable, however, the term rarely makes it into keyword offerings. It may be that sex differences were seldom the key factor being investigated, but it may also highlight a bias in the literature where sex differences have not been deemed to be a pertinent variable in study outcomes as has notably been the case in medical research (Cahill, 2021; Lima et al., 2022).

Figure 20 Example of Article Added into Endnote

Title Does stress make us more-or less-prosocial? A systematic review and meta-analysis of the effects of acute stress on prosocial behaviours using economic games Journal Neurosci Biobehav Rev Volume 142 Pages 104905 Epub Date 2022/10/14 Date Nov ISSN 1873-7528 (Electronic) 0149-7634 (Linking) DOI 10.1016/j.neubiorev.2022.104905 Accession Number 36228924 Keywords Humans *Social Behavior *Altruism Acute stress Costly punishment Economic games Meta-analysis Prosocial behaviour Social decisions Systematic review to declare.	Review article Does stress make meta-analysis of t economic games Jonas P. Nitschke[*], Pa <i>Social, Cognitive, and Affective Neurosci</i> ARTICLE INFO Keywords: Acute stress Prosocial behaviour Costly punishment Social decisions Economic games Meta-analysis Systematic review

Figure 21 Example of Endnote Keywords Section Edit

DOI 10.1016/j.neubiorev.2022.104905 Accession Number 36228924 Keywords Altruism Acute stress Costly punishment Prosocial behaviour Sex/gender Stressor	difference (SMD=— stressor complex there is c highlight

2.5 Creating an Edited Excel List of Factors

Once the editing of each publications keyword section in Endnote was completed, a new Excel list of all the edited factors was created following the same process used earlier in Table 10. 26,796 extraneous terms had been removed during this process. This generated a much-reduced list of 3,890 edited factors. The full table of these factors is shown in Appendix 7.

TOTAL publications added into Endnote N=25,823
TOTAL keywords in Endnote post-editing N=3,890

3. Factor Description: Dictionary-Codebook and Thesaurus Creation

The keywords had now been edited to only include those relevant to couple relationship well-being outcomes. However, further editing was needed to clarify their common meaning. Of the factors³¹ many had similar denotations (e.g., deceive, deceiving, deception) or were the same word written in different forms (e.g., victimisation, victimization). Therefore, factors needed to be defined and compounded.

3.1 Merging Factors

To merge the factors into common meanings, factors were filtered in the Excel file list of factors from greatest to least occurrence in the literature. Each factor was then carefully examined to see if they could be merged into other keywords, starting with those least used, and therefore least common in the academic vernacular, and therefore more likely to be able to be merged with a more commonly used term. For example, the factor *self-delusion* (“the act of allowing yourself to believe something that is not true” (Oxford Languages online dictionary, 2023)) only occurred twice, so it was subsumed under the much more commonly used term *self-deception* (“the action or practice of allowing oneself to believe that a false or unvalidated feeling, idea, or situation is true” (Oxford Languages online dictionary, 2023)).

Much of the original keyword clarification work was amalgamating double ups, for example, the words *accommodation*, *accomodation*, and *accommodating* were all

³¹ As the edited keywords now described only those factors relevant to couple relationship well-being outcomes they are henceforth simply called factors.

condensed to the single word *accommodation*. However, some factors needed to be further clarified to best understand how, and if, to amalgamate them. There were often subtle differences between words and a dictionary-codebook helped to clarify exactly what was meant by different terms. For example, *adaptability* – meaning the ability to adjust to new conditions – was amalgamated with the word *adjustment*, and with the word *flexibility* – meaning being able to adjust. But many of the terms were less obvious to refine, for example, *emotional arousal* was also expressed as *arousal*, *emotion arousal*, *emotion reactivity*, *emotional reactivity*, and *emotion escalation*. Searching the literature to understand the definitions that key relationship scientists were working with helped to clarify that *emotion escalation* refers to the steepness of increase or change in *emotion arousal* whereas *emotion reactivity* refers to the trajectories of change in *emotion arousal* (Fischer et al., 2019). These differences are subtle but may have been important in the final model, therefore *emotion escalation* was left unmerged, while *arousal* and *emotion arousal* were merged under *emotional arousal*, and *emotion reactivity* was merged under *emotional reactivity*.

The dictionary-codebook creation process was iterative in that knowledge of each factor's meaning accrued as more articles were read. For example, belligerence was looked up in the Merriam-Webster dictionary online (www.merriam-webster.com), where it was described as “an aggressive or truculent attitude, atmosphere, or disposition”. Synonyms for belligerence included: aggression, contentiousness, combativeness, and defiance. Aggression was also included in the factors list so a decision needed to be made as to whether belligerence was a subset of aggression or should be kept separate. In this case, belligerence was left as a standalone keyword. The final factors needed to describe real life events common to couple relationships (Rousseau et al., 2018). Belligerence was seen as representing a combative attitude in conflict not represented simply in the term aggression. However, later in the process it was subsumed under the keyword ‘antagonism’ meaning “active hostility or opposition” (Oxford Online Dictionary, 2022).

This resultant dictionary-codebook created in Excel during this process was used to describe the merged factors and was reviewed by the supervisory team to check that factors had been condensed without minimising or trivialising their conceptual scope or sacrificing their utility. Each factor needed to stand on its own - not interchangeable or redundant – as clarified by Attride-Stirling (2001). Internal

homogeneity (did each word being merged represent the same construct?) and external heterogeneity (were the words adequately different that they shouldn't be merged with another?) were considered and discussed (Patton, 1990). This dictionary-codebook 'standardised' the factors, providing descriptive validity that they comprehensively and succinctly represented what was intended by the researchers.

The dictionary-codebook uses descriptions that are often cut and pasted from other's work, but these are unreferenced due to the extent of them. Online dictionaries had been used, and Baumeister and Vohs (2007a)'s Encyclopaedia of Social Psychology had been consulted. Because these have not been referenced, the dictionary-codebook is not included in the appendices, however, an example of the dictionary-codebook is shown below in Table 11.

Table 11 *Dictionary Example*

FACTOR	ALSO	DESCRIPTION
Antisociality	<i>antisocial behaviours, anti-social, antisocial behaviours, antisocial behaviour, antisocial behaviour</i>	Marked by behaviour deviating sharply from the social norm
Anxiety	<i>worry, concern, nervousness</i>	A feeling of worry, nervousness, or unease about something with an uncertain outcome
Anxiety disorder	<i>phobia, social anxiety disorder, separation anxiety disorder, panic disorder</i>	A group of mental health conditions that involve persistent or recurring nervousness and worry that interfere with daily living
Apathy		Lack of interest, enthusiasm, or concern
Apology	<i>apologizing, apologies</i>	An expressed regretful acknowledgement of an offence or failure
Appraisals	<i>appraisal, judgement, judgment, evaluation, evaluations, relationship appraisal, relationship evaluations</i>	Judgments or evaluations of a situation or person that then determine the emotions felt in response
Appreciation	<i>value, valuing</i>	Acknowledgement of the good qualities of someone and

FACTOR	ALSO	DESCRIPTION
		therefore feeling a positive emotional connection to them
Approach and avoidance motivation	<i>approach, approach goals, goals, approach motivation, Approach-avoidance, approach-avoidance motivation, approach and avoidance goals, motivation</i>	Approach and avoidance motivation encompass two fundamental components: Approach motivation, characterised by an inclination to gravitate towards or uphold contact with a rewarding stimulus, and; Avoidance motivation, marked by a natural tendency to retreat from a punishing stimulus. Motivation is the process that energises and directs behaviour. Central to the differentiation between approach and avoidance is the valence of stimuli.
Approval seeking	<i>recognition seeking</i>	Intentionally seeking approval and respect from others
Argument	<i>arguments, argumentative, arguing, disagreement, disagreements</i>	An exchange of diverging or opposite views, typically a heated or angry one
Arrogance	<i>superiority, overbearance</i>	An attitude of superiority manifested in an overbearing manner
Aspirations	<i>life dream, life dreams, dreams</i>	A hope or ambition of achieving something
Assertiveness	<i>assertive</i>	The quality of being confident and not frightened to say what you want or believe
Assurances		A promise to cause someone to feel certain by removing doubt

3.2 Thesaurus Creation

In the process of creating the dictionary-codebook of factors, a thesaurus was co-created, and this thesaurus is shown in Appendix 8. VOSviewer allowed me to add this thesaurus when running the software program to automatically merge keywords in the network models. In other words, the thesaurus merges common-meaning words in the Endnote keyword tab into one word or term used in the network model. For example, it could merge *verbal aggression* with *verbal abuse*, or *economic strain* with *economic hardship*. This was a helpful feature for factor refinement, making the final network models more readable and allowing common-meaning

words to be grouped and therefore increasing their numerical power in the final visualisations.

The VOSviewer thesaurus consists of two Excel columns – one containing the word to be merged, and one containing the final label that would be used in the visualisation. The two columns are labelled: 1. Label; 2. Replace by (this was important for VOSviewer to be able to process the data). Factors to be subsumed/merged by other factors were listed in the first Excel column named 'label'. In the second column named 'replace by', the factor they would be subsumed by was listed. This constituted the VOSviewer thesaurus, and this could then be saved as a *.txt file and uploaded into VOSviewer at the 'chose type of analysis' stage. VOSviewer then used the thesaurus to filter the words used in the network model visualisations. An example of the VOSviewer thesaurus is shown below in Table 12.

Table 12 *Thesaurus Example*

LABEL	REPLACE BY
active listening	listening
adaptive anger regulation	anger regulation
addictions	addiction
adjustment	adaptability
admit fault	confession
adult attachment	attachment
adultery	infidelity
adverse events	adversity
adverse experiences	adversity
adverse life events	adversity
adverse life experience	adversity
affair	infidelity
affairs	infidelity
affect contagion	emotion contagion
affect labeling	emotion labelling
affect labelling	emotion labelling
affect reciprocity	emotion contagion
affect regulation	emotion regulation

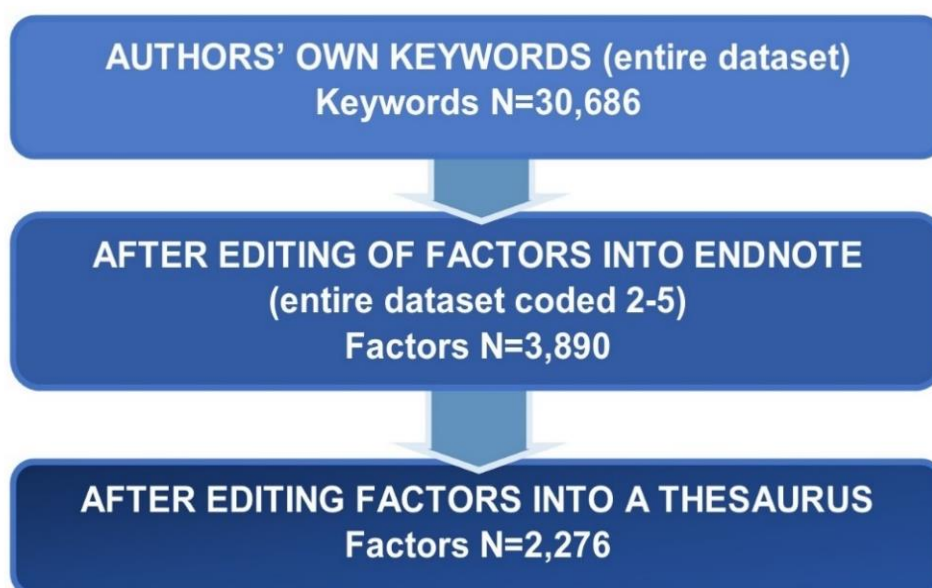
Due to the large number of factors to be investigated this way (N=3,890) the list was created and reviewed more than 100 times using VOSviewer to help decide which would be used in the final network models. VOSviewer has a convenient alert

message whenever there are double-ups in the thesaurus data so these can be corrected. This was helpful when dealing with hundreds of factors and more than 1,000 corrections were made using this feature.

Double-ups could still occur when using the thesaurus. For example, if adverse events and adverse experiences had both been added into an article's keyword tab in Endnote their corresponding label adversity would be doubled up for that article and therefore loaded twice into VOSviewer. To eliminate these double-ups each article was rechecked in Endnote to attempt to alleviate this occurrence in the keyword tab. However, with 25,823 articles to manually check, this process will have inevitably missed some of these double-ups. These discrepancies, along with the subjective nature of word merging, present a limitation in this process, however, due to the very large dataset, this limitation is reduced. The final thesaurus was used in all the VOSviewer visualisations and can be viewed in Appendix 9.

The final thesaurus contained 1,140 factors. There were also 957 factors that were not merged, so the total number of keywords was 2,276. These findings are shown in Figure 22.

Figure 22 *Findings from Phase Two*



4. Investigation into the Research History of Relationship Factors

During this phase of the study, it seemed prudent to do a side study of the history and contextual influences of relationship science research over the past century. This helped to inform the clarification of factors and their meanings and the context within which they were studied. There have been variations over the decades in the way researchers have viewed the development and maintenance of couple relationship well-being factors. The interests, values, societal contexts, and academic practices of researchers have long-standing influence on research outcomes, and the trajectory of relationship science over time (Stricker, 1992). As newer academic studies build upon the success of older studies the factors drawn from this literature would be those that have ‘stood the test of time’ through rigorous academic verification from the broader community of researchers. A theory’s longevity indicates its continued relevance, validity, and reliability (Fesmire, 2014). Additionally, language use changes over time, and it was helpful to understand the nomenclature adaptations through the decades. Therefore, a decade-by-decade review of the development of the academic field of relationship science theory and practice was carried out. A version of this review can be seen in Appendix 3.

5. Phase Two Summary

Identifying and defining the factors by comparing and clarifying them across thousands of studies helped to ensure collective understanding and agreement, and thereby provided empirical rigour, meaning the network models created in Phase Three would have improved accordance with empirical observations of the world in the research corpus. Conceptual refinement occurred in this process, and theoretical validity was increased through factor meaning being compared and refined (as described by Goldkuhl and Cronholm (2010) in their thesis on MGT). The resulting factors were subsequently strongly linked to the data, were anchored to scientifically measured events, had high inter-researcher agreement, and cohered across the whole data set, adding to the rigour of the network modelling results in Phase Three. By identifying, refining, describing, and merging the factors there was now a concise set of 2,276 factors with which to begin the network modelling.

CHAPTER THREE PHASE THREE: FACTOR PATTERN IDENTIFICATION

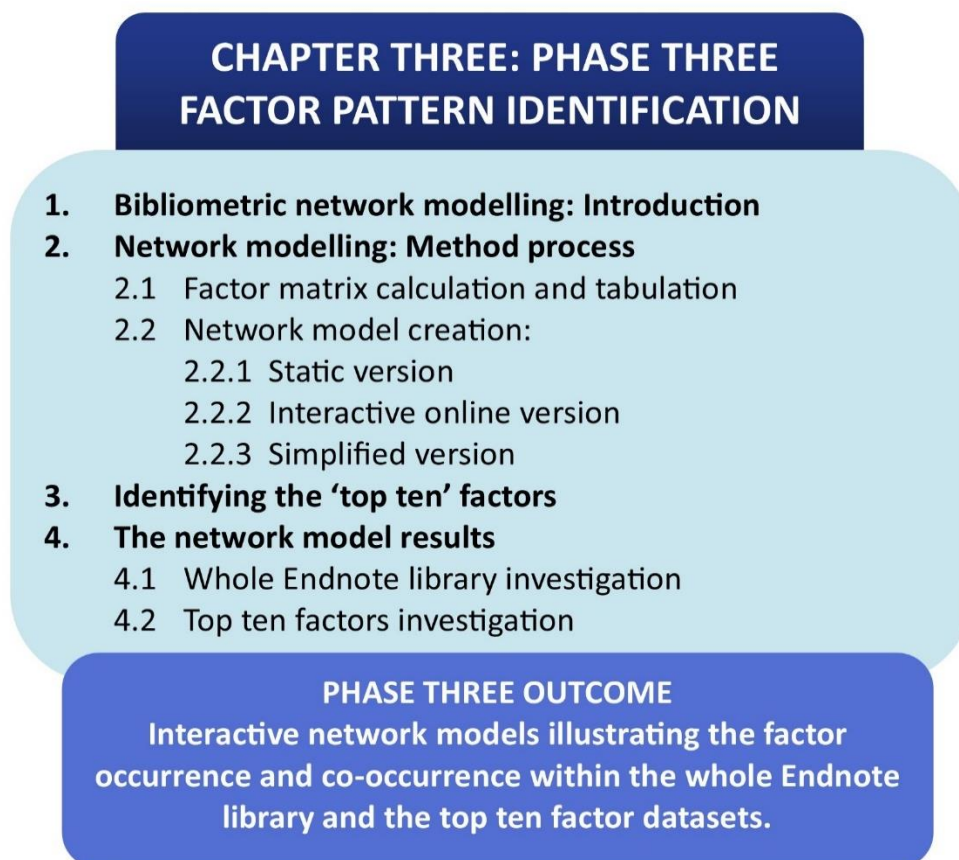
*“Problem solving and discovery occur
by wandering over complex conceptual networks”.*

Feng Shi et al. (2015, p. 84)

Overview

Phase Three involved uploading the factors defined in Phase Two into VOSviewer software to create bibliometric network matrices (tables) and models. This Phase produced a series of nuanced network models that allow an easily accessed overview of the factors that researchers have prioritised and linked in their research. The whole Endnote library dataset of factors was investigated, and then the ten most occurring factors from the whole library were individually investigated using their own dataset of factors. Phase Three is summarised in Figure 23.

Figure 23 *Chapter Three: Phase Three Factor pattern identification*



1. Bibliometric Network Modelling

By network modelling the (edited) factors compiled in Endnote, the prominence of factors and the patterns between them in the research were able to be visualised and examined. Researchers' hypotheses are typically derived from prior theoretical knowledge, therefore the models' illustrated factors that were theoretically informed. The more prominent a factor is in the network model, the more often it has been studied, and the more rigorous its theoretical foundation becomes. For example, if *attachment* is repeatedly used in the research this indicates that multiple researchers have found a theoretical connection between *attachment* and relationship well-being outcomes. If *attachment* is strongly linked with *support* in a network model, this indicates that multiple researchers have firstly found a theoretical connection between *attachment* and *support* and then potentially found an observable connection in their study findings.

The assumption in this study was that strongly linked factors in the network models indicate theoretically agreed and observationally validated factors in the research. The assumptions made during the network modelling phase would undergo additional scrutiny in Phase Four by meticulously examining the literature from which the factors were derived. This process aimed to corroborate (triangulate) the findings by aligning them with researchers' own theoretical insights.

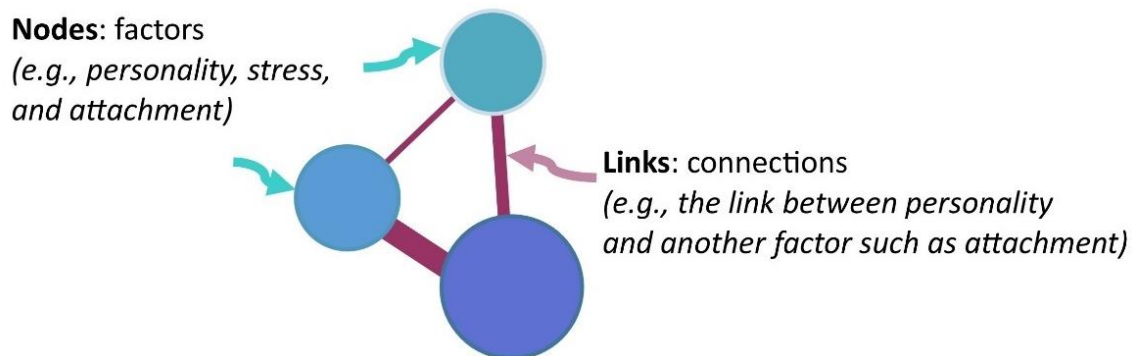
1.1 Interpreting Bibliometric Network Models

In bibliometric networks, nodes (circles) are connected by links (lines). Nodes represent the factors, and the links between nodes represent the connections between factors in the literature.

1.2.1 Node and Link Size

The numerical significance of each factor is shown in the size of each node: The more times they occur – the larger the node. The numerical significance of each factor's co-occurrence with other factors in the literature is shown in the thickness of the line between them: The more times two factors show up in the same piece of research – the thicker the line between them. This network modelling of factors is illustrated in Figure 24.

Figure 24 *Nodes and Links Example*



1.2.2 Factor Centrality

A factor (node) with a high degree of centrality in the network model is connected to many other factors in that network. Those factors situated on the outer edge of the network model are conversely found in the margin of the research field. For example, as *attachment* and *personality* are repeatedly investigated in the literature, they will appear centrally in the network model and their nodes will be larger, whereas a less frequently occurring factor such as *gut-brain axis* will be peripheral and smaller.

1.2.3 Factor Co-Occurrence

Attachment and *personality* also co-occur in studies as factors, and therefore the line between them in the network model will be thicker than the line between factors that have been less frequently researched together (for example, the *gut-brain axis* and *attachment*). Factors that are similarly coloured occur frequently in similarly themed publications in the literature.

2. Network Modelling: The Method Process

To begin, the whole Endnote library dataset of factors was used to create a comprehensive network model of all the factors found in the literature. From this whole Endnote dataset, the ten most occurring factors in the whole Endnote library dataset were discerned by tabulating the entire set of factors in order of their frequency of occurrence in the literature (this process is explained in detail in section 3). Each of the 'top ten' factors were then individually network modelled using their own factor datasets from the Endnote library. Therefore, in all, there were eleven separate network model investigations carried out: firstly, for the whole

library dataset, then for each of the top ten factors using their unique library datasets. For each investigation these three steps were taken:

1. **Factor matrix** calculation and tabulation.
2. **Network model creation** (visualisations):
 - a. Static version.
 - b. Interactive online version.
 - c. Simplified version.
3. **Visual analysis of the factor network connections.**

2.1 Factor Matrix Calculation and Tabulation

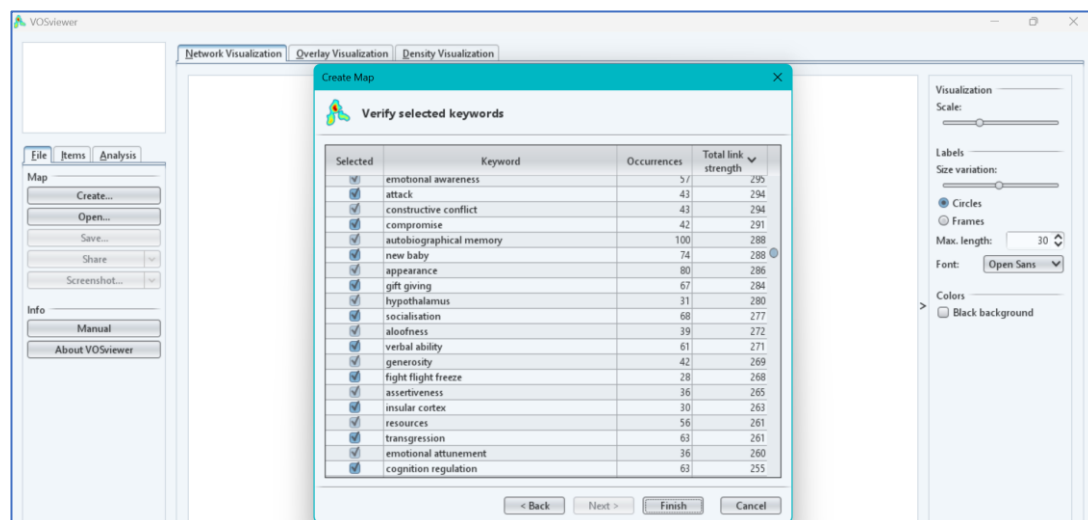
VOSviewer uses mathematical models³² to represent and analyse the relationships between factors. VOSviewer automatically calculates factor co-occurrence regularity and factor similarity using a clustering algorithm. These are calculated using eigenvalues. Eigenvalues calculate centrality measures for nodes in the network models, indicating their importance in the network, and eigenvalues are also used in factor analysis to understand the amount of variance explained by each factor in the dataset. In this study, the eigenvalues calculated each factor's prominence in the literature and connection to other factors in the literature. Once calculated, these were arranged into a matrix (table). The matrix for each network model investigation could then be downloaded from VOSviewer into an Excel³³ table. A screenshot of VOSviewer automatically tabling the matrix is shown in Figure 25³⁴.

³² This algorithm is based on a hybrid approach that combines elements of agglomerative hierarchical clustering and modularity optimisation. The algorithm starts by assigning each keyword to its own cluster, and then iteratively merges clusters that are most similar to each other based on their co-occurrence patterns. The similarity between clusters is measured using a distance metric which quantifies the degree of similarity between two clusters based on the co-occurrence patterns of their constituent factors. As the algorithm merges clusters, it uses a modularity optimisation approach to identify the optimal number and composition of clusters. Modularity is a measure of the strength of the division of a network into communities or clusters, and the algorithm seeks to maximise the modularity of the resulting clusters by iteratively reassigning keywords to different clusters and evaluating the resulting modularity score. The result of the clustering algorithm is a set of clusters, each of which represents a group of factors that are closely related to each other based on their co-occurrence patterns.

³³ Excel is a spreadsheet program produced by Microsoft which enables users to format, organise and calculate data in a spreadsheet.

³⁴ As VOSviewer does not show the matrix actually being created, this screen shot shows the tabling of the matrix in the last step before the network model creation where only

Figure 25 VOSviewer Matrix Creation Example



In Excel, the factors could be sorted in ascending order of their numerical occurrence in the Endnote library, in other words, in order of their frequency of occurrence in the keywords sections of the publications uploaded into Endnote, hence those occurring most frequently in a library dataset were positioned at the top of the table under 'occurrences'. These were typically also those co-occurring most frequently with other factors in that dataset, and the strength of this linkage to another factor is shown under 'links'.

Each matrix numbered in the hundreds of factors, therefore, due to limited space, the results presented for each investigation in this thesis show a much shorter table with only the thirty³⁵ most occurring factors. The full matrix table for each dataset is viewable in the appendices. The matrix table was used to illuminate which factors were most occurring in each of the library datasets under investigation, and their level of co-occurrence with other factors.

2.2 Network Model Creation

VOSviewer was then used to convert each matrix into a graphic visualisation (a network model). Table 13 describes the VOSviewer matrix and network model

occurrences and total link strength are viewable.

³⁵ *Thirty was an arbitrary cut-off number for the presented table in this thesis, and thirty factors could later also be easily represented in the simplified network model.*

creation process step by step using the specific VOSviewer program instructions.

Table 13 *Steps for VOSviewer Use*

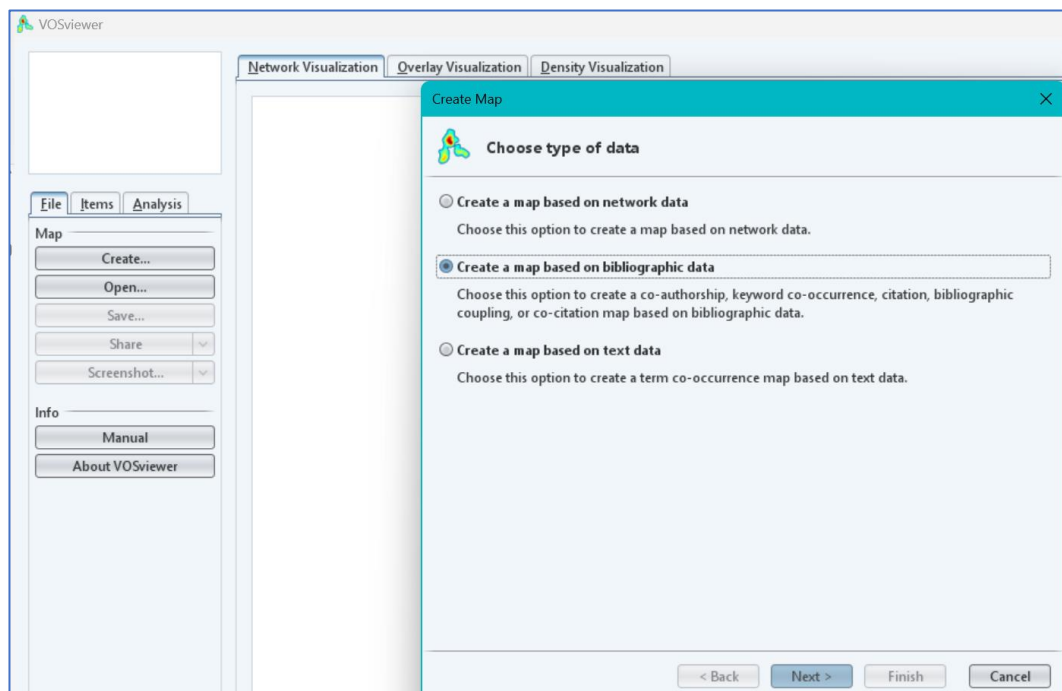
Step 1	The datasets were exported from Endnote as a .txt file (APA 7 th) into a folder on my computer.
Step 2	VOSviewer was opened, the create tab was clicked, and a 'map based on bibliometric data' was created by uploading the .txt file (*.*) as "reference manager files" (Endnote).
Step 3	Co-occurrence, keywords, full counting were clicked on and the thesaurus (*.txt) file was uploaded from my computer (previously saved from Excel).
Step 4	Unconnected factors were included. Note: Endnote can only process 1,000 factors and 10,000 links at a time, and it automatically prioritises the highest occurring and co-occurring.
Step 5	Once the network model had been created the analysis settings were adjusted: For the online interactive model: Method= Association strength, attraction 2, repulsion 0. Resolution= 1. Minimum cluster size = 1 (merge small clusters). For the static model presented in the hard copy of the thesis: Method= LinLog/ modularity, attraction 10, repulsion -10, resolution at .5. For the simplified model a maximum of 100 lines (only showing the lines between factors co-occurring in 100 or more articles), with the top ten factors removed.
Step 6	The matrix was saved to my computer (all files *.*), then opened and copy and pasted into Excel to create tables.
Step 7	To create the online interactive network models, the models were saved (under file) as a JSON file and loaded onto a webpage.
Step 8	To create the static network models, the models were saved as screen shots.

Three examples of the VOSviewer software program being used to create a network model following these steps are shown in Figure 26.

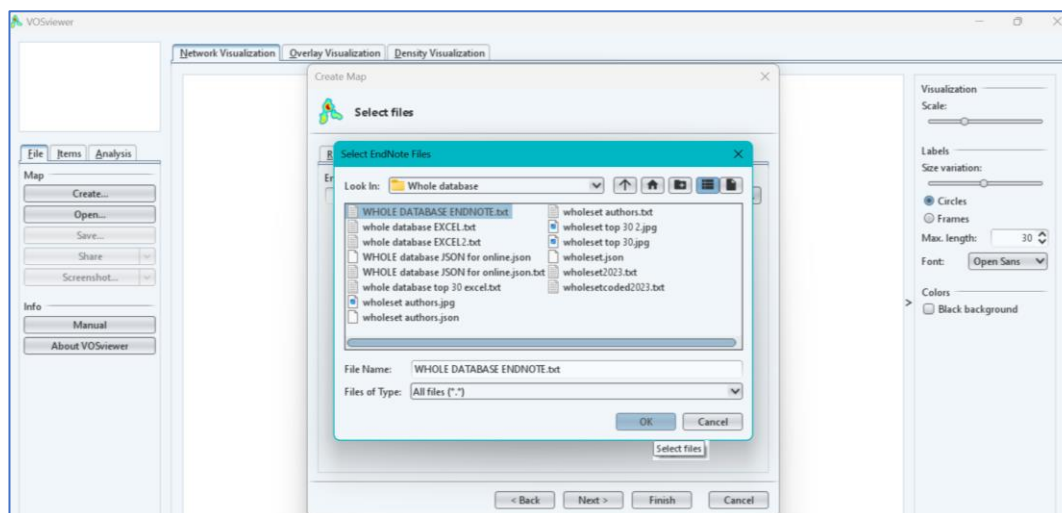
1. *Example One:* The first image shows the creation of a network visualisation (map) shown in step 2 of Table 13.
2. *Example Two:* The second image shows the selection of the .txt file from my computer folder (using all files *.* as the file type) shown in step 2 of Table 13.
3. *Example Three:* The third image illustrates using the analysis tab of the VOSviewer program to refine the produced network model visualisation shown in step 5 of Table 13.

Figure 26 Examples of VOSviewer Software Program in Use

Example One



Example Two



Example Three

Static images were downloaded from the resultant network model creations, and then cut and pasted into the thesis to present an overview of the key factors dominating each network model. When creating the network models for the top ten factors, it was noted that each static visualisation was completely dominated by the top ten factor. These factors appeared so many times in the literature set that their node was too large for other nodes to be seen. Therefore, the top ten factors were removed from their own network models to make viewing the underlying factors possible. An example of this dominance of the key factor in the static visual is shown in Figure 27 for the *attachment* factor.

Figure 27 *Example of Key Factor (Attachment) Dominating the Static Visual*

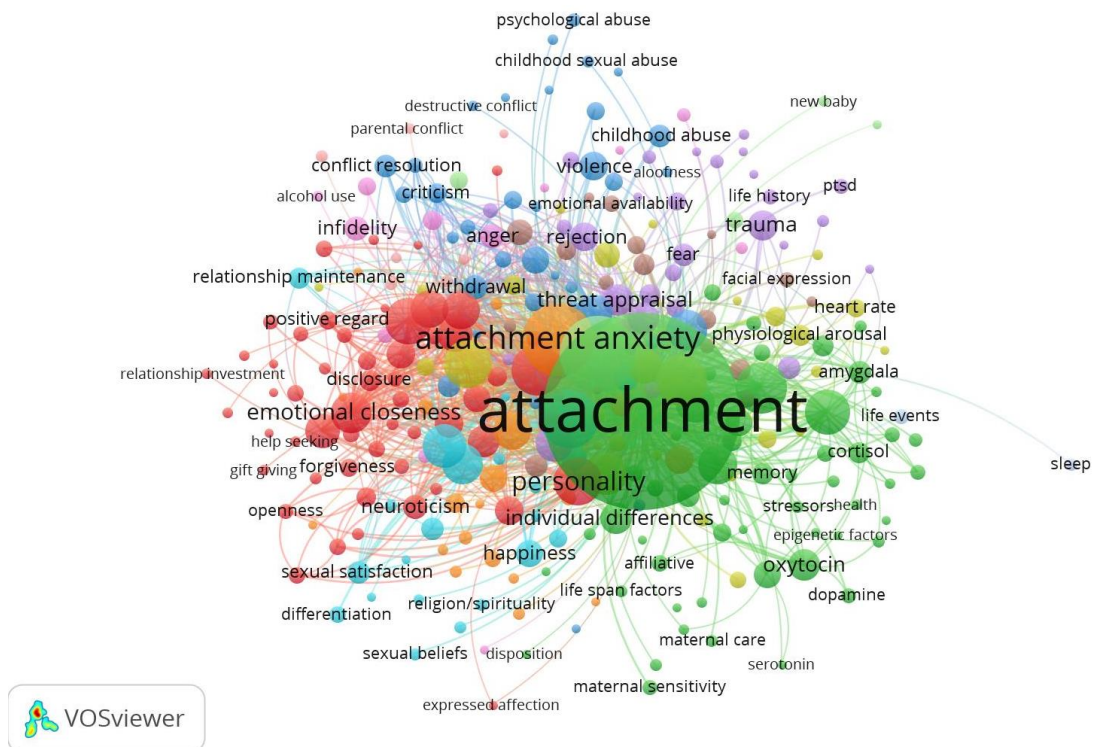
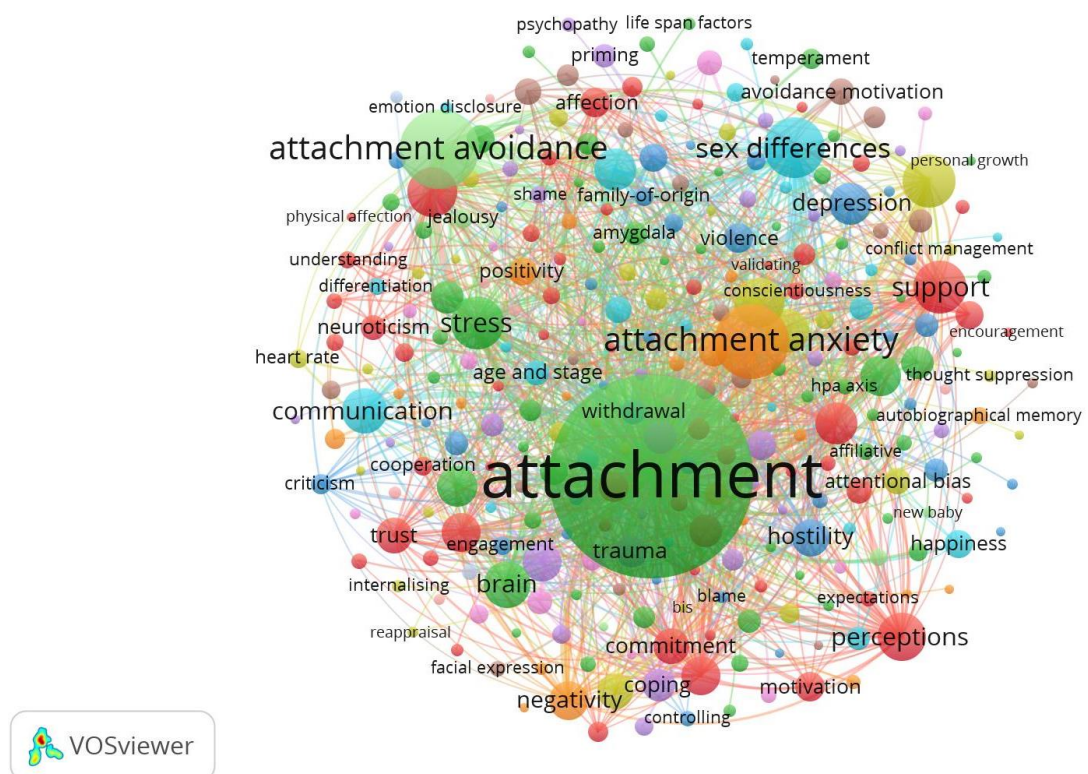


Figure 28 *Example of Decentralised Network Model*



2.2.2 Interactive Online Version

Due to the large number of nodes in each model, some are still obscured even in the decentralised models. Additionally, as noted, the decentralised versions do not show the accurate positioning of nodes in the models. Therefore, the centralised models have been uploaded online at <https://www.relationship-science.com>. There the models are viewable in the same way that they are in the VOSviewer software, and can be viewed interactively to examine the actual positioning of the factors in each model. By clicking the arrow on the right side of the online webpage it is possible to change the link size to max, increase the maximum links to 10,000, and reduce the scale of the nodes. This makes the models easier to read.

2.2.3 Simplified Version

As the network models contained so many factors (up to 1,000), an additional simplified network model of only the thirty most numerically prominent factors was also created for each dataset to make viewing the numerically significant factors and their links simpler. As the top ten occurring factors were already shown to be highly co-occurring in each other's datasets, these were removed from the simplified network model visualisations of the top ten factors for the purpose of revealing what other underlying factors were unique to each dataset. Had the top ten factors been left in the static visualisations, these would have visually obscured the other factors. Each simplified network model highlighted the strength of the links between factors, in other words, the thicker the line the more research studies in which the two linked factors co-occur.

2.3 Visual Analysis of the Factor Network Connections

Once the network models had been created in VOSviewer they could be explored interactively, allowing an analysis of the prominent factors, along with their inter-connections.

2.3.1 Zooming in on Factors and their Links

By zooming in and out of the network models it was possible to view and consider which factors were centrally located (and therefore viewed as significant in the scientific literature) or peripheral (and therefore viewed as less significant to that unique body of literature). By clicking on each of the top ten factor nodes in the interactive network models all the links to that node become visible. An example of the VOSviewer process showing the zoomed in *communication* network model with

consider, prioritisation was given to the strongest links (thickest and/or closest).

By investigating each network model in this way, it was possible to discern what factors researchers frequently correlated in that specialised field of relationship science. For example, in the literature investigating *attachment*, it could be noted that *personality* and *support* were also frequently researched. By understanding how researchers prioritised and connected the factors in their studies, a picture began to form about the importance of these factors and their inter-relationships.

3. Identifying the ‘Top Ten’ Factors and their Datasets

To investigate the top ten factor libraries individually the top ten factors had to firstly be identified, and then their library datasets had to be identified and grouped in Endnote for use in VOSviewer.

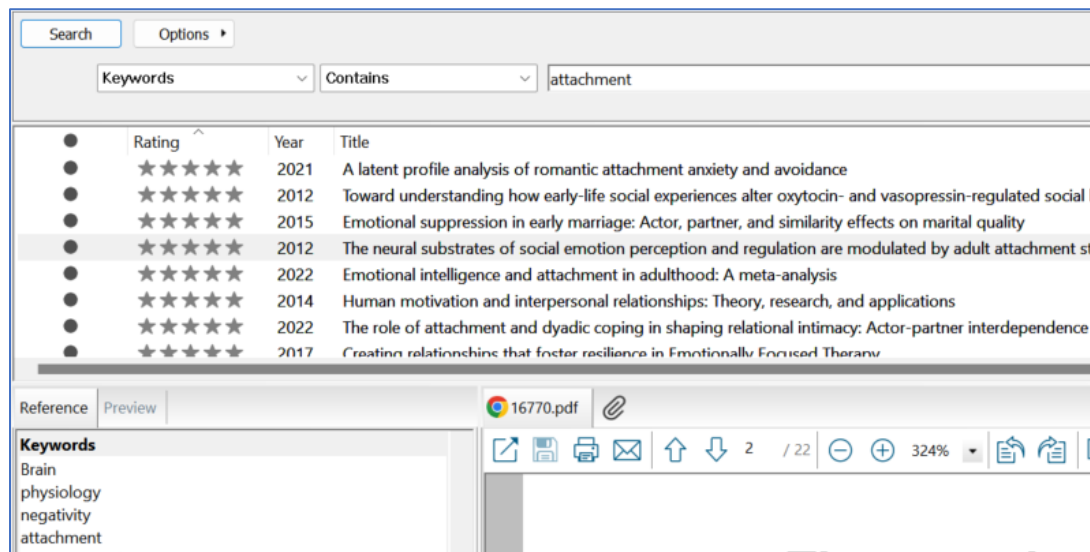
3.1 Identifying the ‘Top Ten’ Factors in the Endnote Dataset

By downloading the whole Endnote library matrix from VOSviewer into an Excel file and ordering the factors according to their frequency of occurrence in the database, the top ten factors occurring most frequently in the keywords, abstracts, and titles in the whole collated Endnote research corpus were able to be defined and investigated. The term ‘top ten’ will hereafter be used to refer to these ten most occurring factors.

3.2 Finding the Top Ten Factor Datasets in Endnote

To network model the top ten factor datasets, the publications relevant to each factor were found and grouped from the Endnote library to produce a network model specifically illustrating the key factors being used in research in that specific publication group. To collate these datasets Endnote was searched for publications featuring the top ten factor in their keyword section. An example of this search process using the search for *attachment* publications is shown in Figure 30.

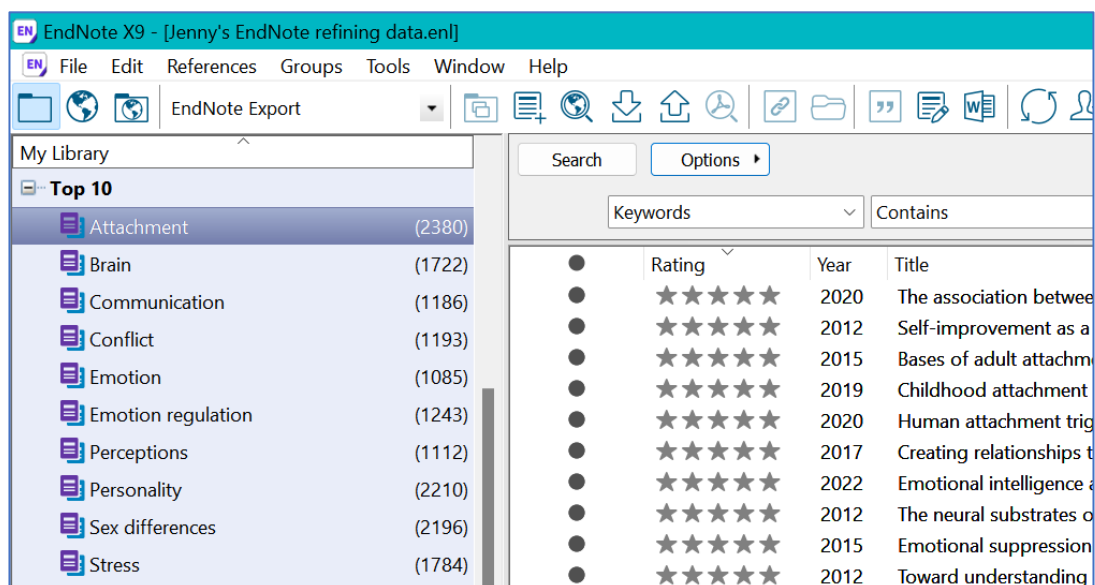
Figure 30 Example of Keyword Search for Factors in Endnote – Searching for ‘Attachment’ in the Keyword Sections



3.3 Creating Top Ten Factor Groups in Endnote

In Endnote, new group tabs were created named after the top ten factors. The publications (coded 2-5) with that factor in their keywords section in Endnote – were added into these groups accordingly. These groups of publications were then individually uploaded in VOSviewer to create the top ten network models. Figure 31 shows a screenshot example of the Endnote groupings.

Figure 31 Endnote Screenshot of the Top Ten Category Groupings



4. The Network Model Results

The network models are now presented, beginning with the whole Endnote library.

4.1 Whole Endnote Library Investigation

The first investigation was of the whole Endnote library dataset.

4.1.1 Factor Matrix: Whole Endnote Library

The complete set of Endnote publications coded 2-5 (N=25,823) was uploaded into VOSviewer software. These publications contained 2,276 factors, and of these, the 1,000 most commonly occurring and co-occurring were automatically selected by VOSviewer for use. This list of 1,000 factors was then extracted from VOSviewer and copied into an Excel file which can be viewed in Appendix 10. In Excel this list was filtered from largest to smallest for occurrence frequency and the most occurring thirty factors in the whole Endnote library are shown in Table 14.

Table 14 *Whole Endnote Library –The 30 Most Occurring Factors*

Factor	Occurrences	Links
1. attachment	2380	598
2. personality	2210	565
3. sex differences	2196	622
4. stress	1784	561
5. brain	1722	497
6. communication	1243	503
7. conflict	1193	559
8. emotion regulation	1186	556
9. perceptions	1112	526
10. emotions	1085	508
11. support	942	486
12. hostility	937	524
13. depression	905	442
14. empathy	839	453
15. negativity	793	524
16. sexual behaviour	789	399
17. self-control	764	436
18. motivation	712	422
19. neuroticism	692	391
20. positivity	682	470
21. self-esteem	628	402

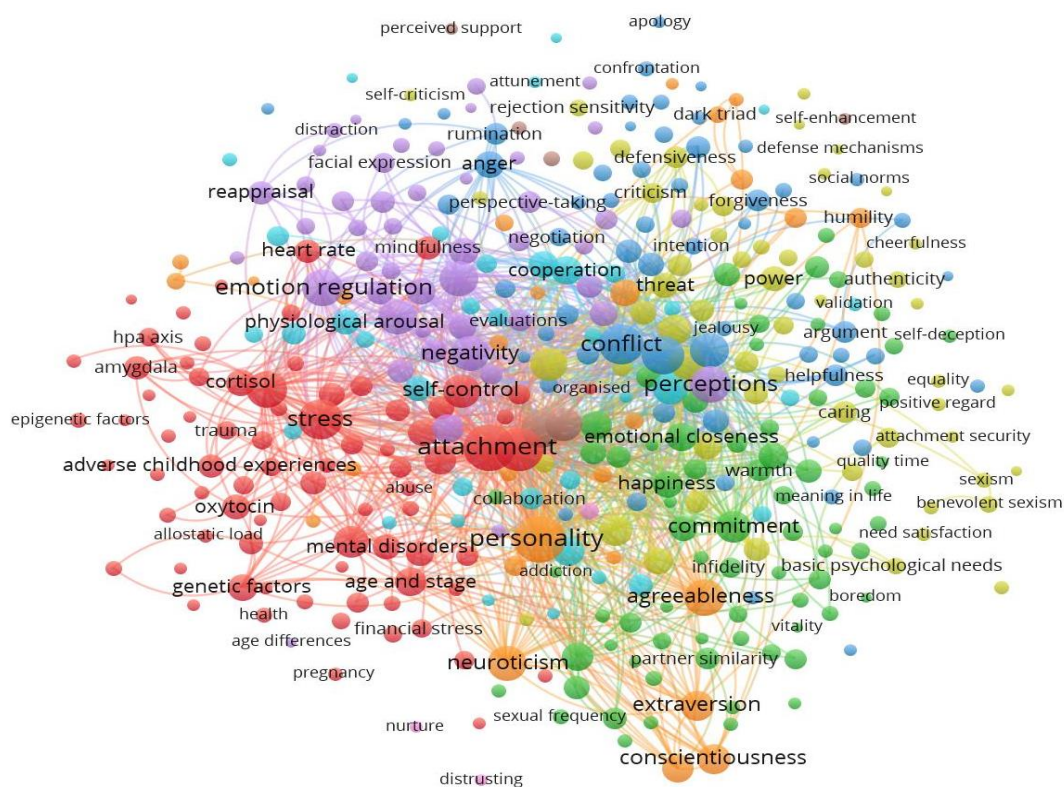
22. self-appraisal	605	393
23. developmental factors	563	356
24. agreeableness	561	347
25. culture	559	380
26. psychological maladjustment	544	339
27. genetic factors	522	303
28. violence	516	303
29. happiness	512	366
30. commitment	501	383

The top ten factors both for occurrence and inter-connection in the whole Endnote library are highlighted in the table.

4.1.2 Network Model: Whole Endnote Library – Centralised

The initial whole Endnote library network model is presented in Figure 32 as a centralised static image. The whole Endnote library network model does not show the labels of every node due to the large size of the data set. In the online visualisation these can be zoomed in on.

Figure 32 Network Model: Whole Endnote Library (complete dataset N=25,823) Centralised



This online interactive network model can be found at www.relationship-science.com. As can be seen by their centrality in the image, and by their larger size, certain factors showed prominence in the literature. Similarly coloured nodes represent keywords that co-occurred most often in articles. For example, conflict, communication, and coping are very close together in the network model representing their frequent co-occurrence in research studies. They are also presented in the same colour in the network model, suggesting they share a common theme or topic.

4.1.2.1 Explaining the Original Model Versus the Edited Model

Of note, this network model of the whole Endnote library differs markedly from the original authors' keyword network model shown in Figure 18 (Phase Two). The original network model showed an unedited version of publications keywords where the keyword 'conflict' was prominent. The edited version presents quite differently. This is partly due to the editing process wherein double up of words³⁶ was eliminated allowing other factors to become apparent in the visual presentation of the network model. This was also potentially due to a keyword choice bias. When considering the historic account (as described in Appendix 3) conflict has been a predominant topic of research interest since the first relationship science articles were published. Therefore, it makes sense for conflict to be prioritised as a keyword in the non-edited version of authors' own keywords. It seems that when choosing keywords for article publication purposes, some journals offer a restricted selection of options, and some authors may also choose to select commonly known keywords for publication. Therefore, it may be that what has changed in this new edited network model is not that conflict has reduced as a research topic, but rather that more recently utilised factors such as neurological have been exposed. This would be an interesting area for further research.

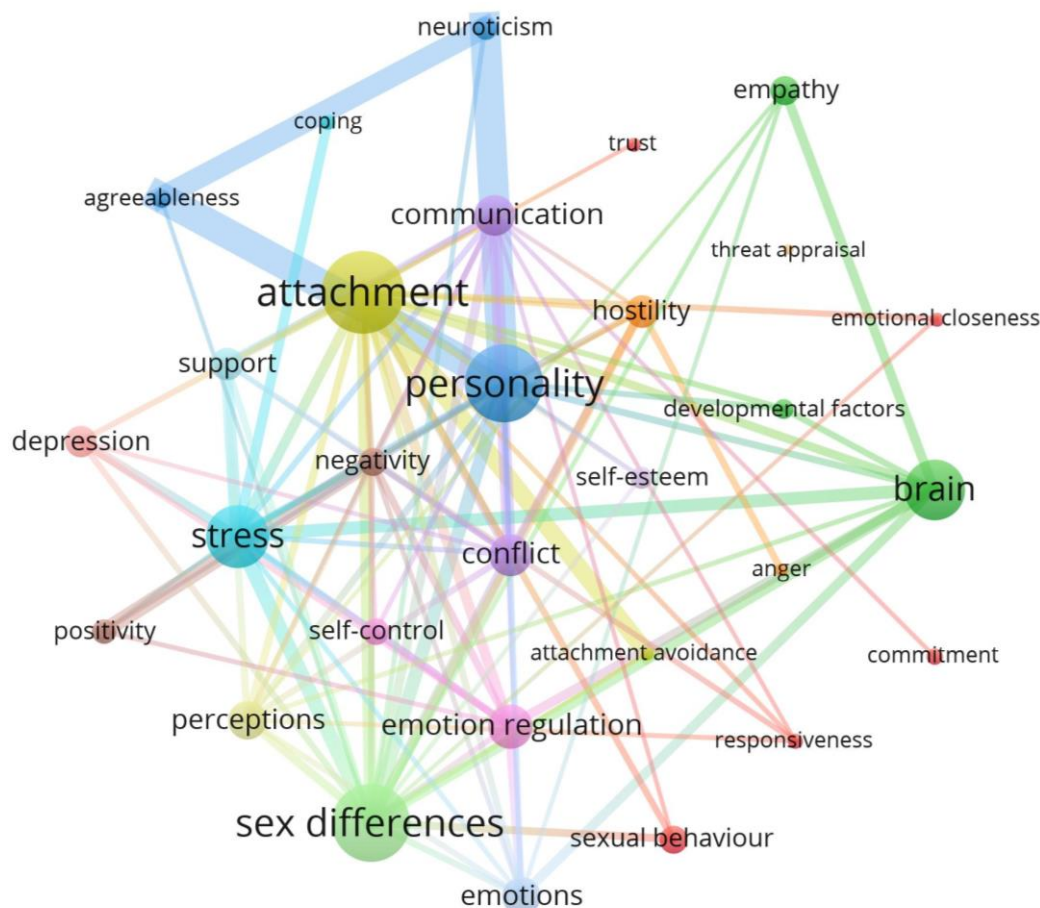
4.1.3 Network Model: Whole Endnote Library – Decentralised

Having produced a centralised network model of the whole set of factors shown in Figure 26, a decentralised network model that could show each of the top ten factors clearly was created. Figure 33 shows this decentralised version of the whole

³⁶ For example, conflict, conflict (psychology), marital conflict, *conflict (psychology), conflict psychological, conflict tactics, conflict avoidance, conflict resolution all showed up in the original version.

models). This (decentralised)³⁷ simplified whole Endnote library network model is shown in Figure 34.

Figure 34 *Simplified Network Model Static Version: Whole Endnote Library*



4.1.5 Whole Endnote Library Analysis of Top Ten Factor Connections

The top ten factors from the whole Endnote library are listed in Table 15, along with a description of the factors that they were specifically and notably connected within the whole Endnote library network model. Of note, not all linked factors are described in the table, rather the closest factors (representing the importance of that factor to the other factor in the literature), and the largest of these (representing their frequency of occurrence in the literature).

³⁷ The simplified model is also decentralised to allow the factors to be clearly seen in the static image. To create a centralised model in the online version – click on the arrow on the left side of the screen, then reduce the maximum links to 100. This helps to show the positioning of factors in the model, although it is not a simple version, and the actual group factor is still visible in the model meaning it obscures the other factors positions somewhat.

Table 15 *Whole Endnote Library Table of Connections*

TOP TEN FACTOR	How the WHOLE ENDNOTE LIBRARY Top Ten Factors Co-occur
Whole Endnote Library Set	The whole Endnote library network model shows the centrality of attachment , personality , emotion regulation , and sex differences in the whole Endnote library – with these factors being the most well-connected with all other factors in the dataset. In other words, a large number of studies have been carried out featuring these factors in combination with other factors. Emotion sits close to personality and emotion regulation. Conflict , communication , and perceptions are very closely linked indicating their repeated investigation together in studies. On the periphery of the network model, indicating their lower co-occurrence with the other factors in the whole Endnote library, and therefore their less central significance in this library, are stress and brain (neurological factors). Despite their peripheral position, they both occur frequently in the library. The next ten most occurring factors after the top ten were: support , hostility , depression , empathy , negativity , sexual behaviour , self-control , motivation , neuroticism , positivity , and self-esteem .
Attachment	Clearly attachment theory was highly used in the research (cited in 2,380 studies). In the whole Endnote library factor network model, attachment is shown as co-occurring very regularly with sex differences . In other words, studies of attachment also often include sex differences as a variable. Attachment is strongly linked with all the other top nine factors (as are all the factors), along with parenting , developmental factors , adverse childhood experiences , violence , hostility , threat appraisal , psychological maladjustment , neuroticism , depression , trauma , fear , rejection , self-esteem , empathy , affection , emotional closeness , commitment , sexual behaviour , cortisol , and oxytocin .
Personality	Personality was highly researched (cited in 2,210 studies) in the Endnote library collection. In the whole Endnote library factor network model, personality is shown as closely linked with emotion regulation . In other words, studies of personality also often include emotion regulation as a variable. Personality is strongly linked with all the other top nine factors and closely linked with empathy , hostility , self-control , and depression .
Sex differences	Sex differences were highly researched (cited in 2,196

TOP TEN FACTOR	How the WHOLE ENDNOTE LIBRARY Top Ten Factors Co-occur
	studies) in the Endnote library collection. In the whole Endnote library factor network model, sex differences are shown as central and co-occurring very regularly with attachment . In other words, studies of sex differences also often include attachment as a variable. Sex differences are strongly linked with all the other top nine factors and closely linked with stress, violence, depression, age and stage, developmental factors, and stress buffering .
Stress	Stress was highly researched (cited in 1,784 studies) in the Endnote library collection. In the whole Endnote library factor network model, stress is shown as peripheral indicating that it is well-researched but less central to the field in regard to the co-occurrence of its factors. It is linked most closely with sex differences, attachment, and brain . In other words, studies of stress also may include these factors as variables. Stress is linked with all the other top nine factors closely linked with developmental factors, age and stage, sociodemographic factors, environmental factors, financial stress, adverse childhood experiences, psychological maladjustment, and cortisol .
Brain	Brain was highly researched (cited in 1,722 studies) in the Endnote library collection. In the whole Endnote library factor network model, brain sits on the perimeter and is linked distally with the other top nine factors indicating that it is well-researched but less central to the field in regard to the co-occurrence of its factors. Brain is linked closely with oxytocin, amygdala, prefrontal cortex, genetic factors, psychopathology, and dopamine .
Emotion regulation	Emotion regulation was highly researched (cited in 1,243 studies) in the Endnote library collection. In the whole Endnote library factor network model, emotion regulation is shown as centrally located and co-occurring very regularly with personality and emotions , as well as with all the other top nine factors. It is closely linked with empathy, neuroticism, hostility, anxiety, self-control, physiological arousal, emotional intelligence, emotional arousal, distraction, memory, and heart rate .
Conflict	Conflict was highly researched (cited in 1,193 studies) in the Endnote library collection. In the whole Endnote library factor network model, conflict is shown as co-occurring very regularly with perceptions and communication . In other

TOP TEN FACTOR	How the WHOLE ENDNOTE LIBRARY Top Ten Factors Co-occur
	words, studies of conflict also often include these as variables. Conflict is linked with all the other top nine factors along with support, connectedness, power, self-esteem, self-appraisal, responsiveness, coping, culture, and negativity.
Communication	Communication was highly researched (cited in 1,186 studies) in the Endnote library collection. In the whole Endnote library factor network model, communication is shown as co-occurring very regularly with perceptions and conflict . In other words, studies of communication also often include these as variables. Communication is linked with all the other top nine factors along with support, connectedness, power, self-esteem, self-appraisal, responsiveness, coping, culture, and negativity.
Perceptions	Perception was highly researched (cited in 1,112 studies) in the Endnote library collection. In the whole Endnote library factor network model, perception is shown as co-occurring very regularly with conflict and communication . In other words, studies of conflict also often include these as variables. Perception is linked with all the other top nine factors and is closely linked with support, power, personal goals, culture, expectations, self-appraisal, negativity, responsiveness, autonomy, and self-esteem.
Emotion	Emotion was highly researched (cited in 1,085 studies) in the Endnote library collection. In the whole Endnote library factor network model, emotion is shown as co-occurring very regularly with personality and emotion regulation . In other words, studies of emotion also often include these as variables. Emotion is linked with all the other top nine factors and closely linked with anxiety, positivity, anger, appraisals, emotion expression, emotional intelligence, decision making, anxiety, hostility, neuroticism, memory, and cognitive processing.

4.2 Top Ten Factors Investigation

The top ten network models are now presented. These are shown in Table 16 in order of each factor's frequency of occurrence in the literature and in order of how the results are presented. An explanation of each factor is also provided taken from the factor dictionary-codebook.

Table 16 *Order of the Network Model Results*

4.2.1 Attachment: The way in which a child forms and maintains emotional bonds with caregivers, which shapes their expectations and behaviours in adult relationships.
4.2.2 Personality: The distinctive characteristics, behaviours, and patterns of thought and emotion that define an individual and distinguish them from others.
4.2.3 Sex Differences: The biological differences between men and women.
4.2.4 Stress: The physiological and psychological experience of perceived threats or challenges, the response to which can manifest biologically, emotionally, and cognitively, including stressors both present and past tense.
4.2.5 Brain: The neurological factors that affect the functioning of the nervous system including genetics, brain structure and chemistry, and the networked biological functions of the human body.
4.2.6 Emotion Regulation: The process of managing and modifying emotional responses in order to achieve desired behavioural outcomes, such as reducing stress or improving relationships.
4.2.7 Conflict: The exchange of communication in through verbal or non-verbal means in which there is clash of opinions, values, or desires, resulting in defensiveness, resistance, disagreement, withdrawal, or attack.
4.2.8 Communication: The exchange of thoughts and emotions between individuals through verbal or non-verbal means.
4.2.9 Perceptions: The way in which a person interprets and makes sense of the world around them, including attentional biases, expectations, and cognitive schemas which influence the way that person perceives information.
4.2.10 Emotions: The complex physiological states triggered by internal or external stimulus and characterised by physiological arousal, subjective experience, and behavioural expression.

4.2.1 Attachment Investigation

Attachment theory has been described as one of the most influential theoretical frameworks in the social and behavioural sciences (Thompson et al., 2022), and this study concurs with that description. Attachment is the factor mentioned most frequently, and second only to personality in its connectedness to other factors in the literature.

4.2.1.1 Factor Matrix: Attachment

The whole-set of Endnote publications with the factor 'attachment' in their keyword section (N=2,380) was uploaded into VOSviewer software. 669 factors were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed. The thirty most frequently occurring factors in the attachment group (minus the top ten) are shown in Table 17. The ten most occurring factors in each group are highlighted in a darker colour for ease of viewing.

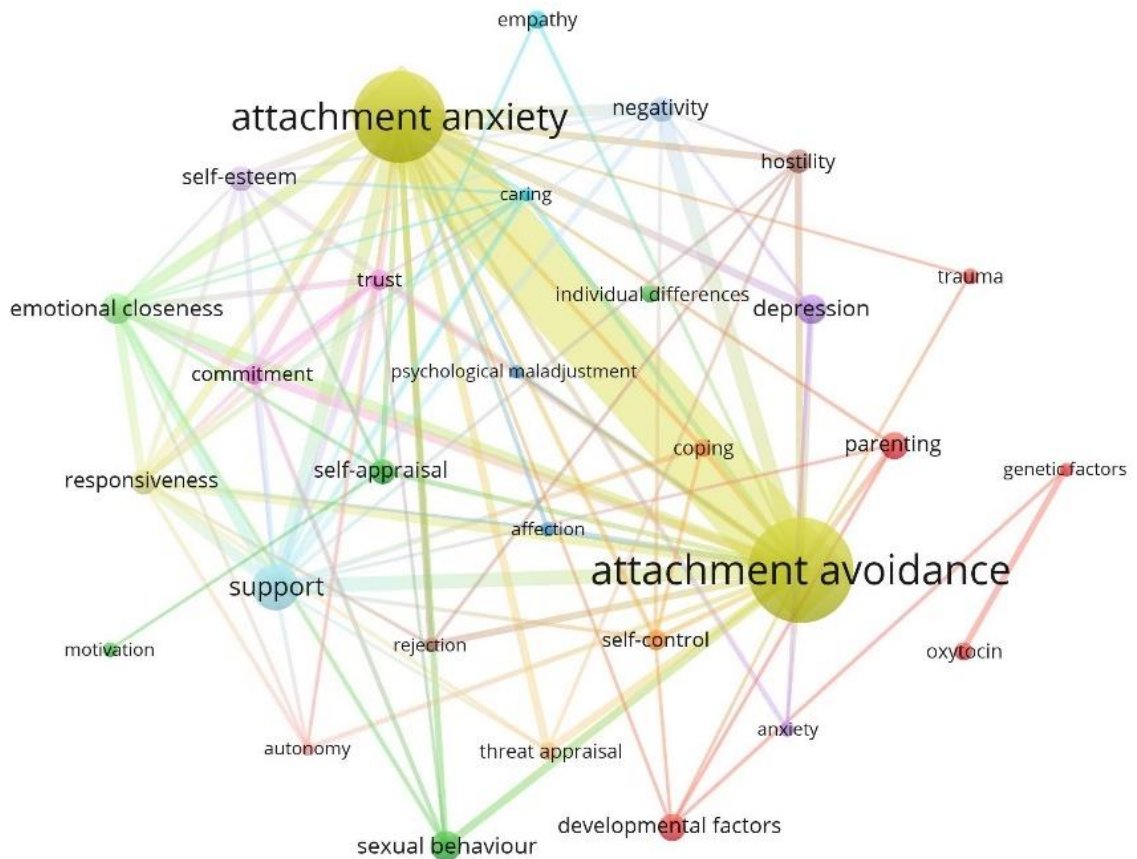
Table 17 *Network Matrix: Attachment*

Factor	Occurrences	Links
attachment avoidance	362	29
attachment anxiety	318	29
support	160	29
emotional closeness	108	26
sexual behaviour	107	26
depression	103	27
parenting	97	27
developmental factors	96	28
negativity	89	29
self-esteem	89	26
responsiveness	87	28
self-appraisal	87	28
hostility	83	28
commitment	73	27
self-control	73	29
trust	73	29
coping	65	28
threat appraisal	65	28
oxytocin	64	24
empathy	63	26
individual differences	61	26
trauma	57	23

4.2.1.3 Simplified Network Model: Attachment

To summarise the most occurring thirty attachment factors a simplified network model was created in VOSviewer. The top ten factors are excluded. This is shown in Figure 36.

Figure 36 *Simplified Network Model Static Version: Attachment*³⁸



4.2.1.4 Attachment Analysis of Top Ten Factor Connections

Table 18 shows the top ten factors (in the left column) and their notable relationships with other factors in the attachment network model (co-occurring in articles).

³⁸ The missing green node label is responsiveness.

Table 18 Attachment Table of Connections

TOP TEN FACTOR	How the ATTACHMENT Factors Co-occur
Attachment	The ten most occurring factors in the attachment network model (including the top ten factors) were: attachment avoidance, attachment anxiety, sex differences, personality, emotion regulation, stress, support, conflict, brain, perceptions, and communication.
Personality	Attachment and personality are linked directly through support in the attachment network model. Conflict, self-appraisal, negativity, and perceptions are linked close by. In the attachment network model, neuroticism is the most researched personality trait. Neuroticism sits closely with trust .
Sex differences	Sex differences link with numerous attachment factors in the attachment network mode, with notable links being attachment avoidance and attachment anxiety, and also communication, threat appraisal, empathy, support, and emotions.
Stress	In the in the attachment network model stress is strongly linked to attachment, and also with developmental factors, coping, and emotion regulation.
Brain	Brain (or neurological factors, including neuroendocrinal factors) sits on the periphery of the attachment network model. Oxytocin, cortisol, and environmental factors are closely aligned with brain, while amygdala and genetic factors are more distantly aligned.
Emotion regulation	Emotion regulation has a close link with attachment in the in the attachment network model, and also with self-control, support, empathy, and coping.
Communication	Communication sits closely with avoidant and anxious attachment and sex differences in the attachment network model and is strongly linked with self-appraisal, support, threat appraisal, emotions, withdrawal, defensiveness, and negativity.
Conflict	Conflict is closely linked with perceptions, negativity, self-appraisal, withdrawal, and rejection in the attachment network model.
Perception	Perceptions is closely aligned with negativity and positivity in the in the attachment network model, and well as with responsiveness.
Emotions	Emotions sit centrally in the attachment network model. In between emotions and attachment sits self-control.

4.2.2 Personality Investigation

Personality was the most connected factor in the literature, in other words, it co-occurred with more factors in the research studies than any other factor. Personality has also been recognised as a key theory in the relationship science literature (Sayehmiri et al., 2020).

4.2.2.1 Factor Matrix: Personality

The whole set of Endnote publications with the factor 'personality' in their keyword section (N=2,210) was uploaded into VOSviewer software. Of the 700 factors entered from this dataset, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the personality group (minus the top ten) are shown in Table 19.

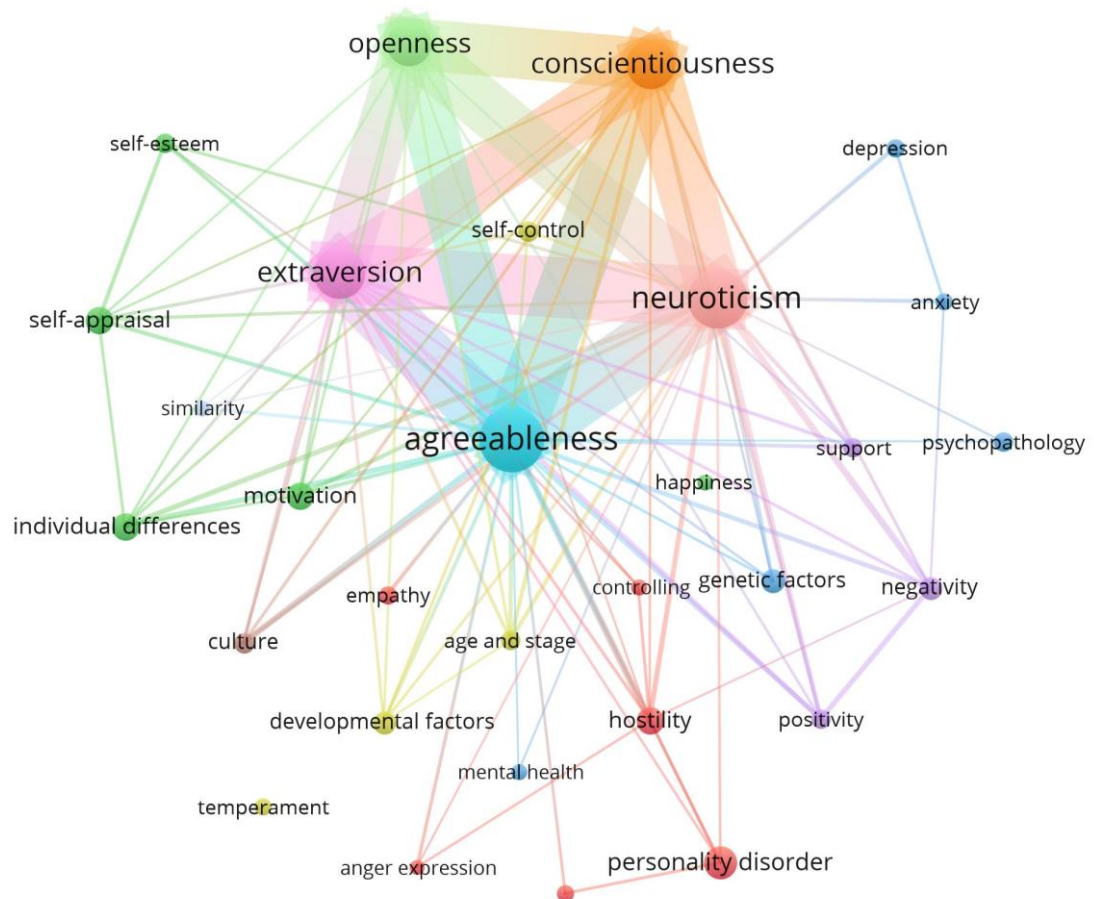
Table 19 *Network Matrix: Personality*

Factor	Occurrences	Links
agreeableness	552	226
neuroticism	478	227
extraversion	364	213
conscientiousness	334	196
openness	290	198
personality disorder	280	157
individual differences	203	137
hostility	161	122
self-appraisal	127	116
genetic factors	121	101
motivation	120	95
negativity	118	91
developmental factors	113	89
culture	109	80
self-control	109	79
self-esteem	100	74
psychological maladjustment	90	73
positivity	88	70
psychopathology	87	68
age and stage	78	67
support	75	66
depression	68	65
empathy	68	60

4.2.2.3 Simplified Network Model: Personality

To summarise the most occurring thirty personality factors a simplified network model was created in VOSviewer. The top ten factors are excluded. This network model is shown in Figure 38.

Figure 38 *Simplified Network Model Static Version: Personality*³⁹



4.2.2.4 Personality Analysis of Top Ten Factor Connections

Table 20 shows the top ten factors (in the left column) and their notable relationships with other factors in the personality network model (co-occurring in articles).

³⁹ The small node missing description in the network model is antisocial personality disorder

Table 20 *Personality Table of Connections*

TOP TEN FACTOR	How the PERSONALITY Factors Co-occur
Personality	The ten most occurring factors in the personality network model (including the top ten factors) were: agreeableness, neuroticism, extraversion, conscientiousness, openness, mental disorders, sex differences, attachment, individual differences, self-appraisal, and hostility.
Attachment	In the personality network model attachment is central, and closely linked to agreeableness, neuroticism, emotion regulation, hostility, personality disorder, developmental factors, and stress.
Sex differences	Sex differences also appear centrally in the personality network model and are notably linked to culture.
Stress	Stress is linked to hostility and self-control in the personality network model.
Brain	Brain/neurological factors are in the periphery in the personality network model, linked also with psychopathology, personality disorder, developmental factors, and genetic factors.
Emotion regulation	Emotion regulation is central in the personality network model, and also linked strongly with neuroticism, agreeableness, positivity, and negativity.
Communication	Linked with communication in the personality network model are support, cooperation, and negativity.
Conflict	Conflict links in the personality network model with support, affection, and commitment.
Perception	Perceptions are linked with self-awareness, self-appraisal, evaluations, and emotions in the personality network model.
Emotions	Emotions link in the personality network with motivation and defensiveness.

4.2.3 Sex Differences Investigation

Sex differences were unexpected in regard to how frequently they are mentioned as a factor in research studies. This may be an artefact of most self-report studies asking participants if they are male or female as part of a questionnaire. It is only in recent years that this has referred to anything other than biological sex differences. Modern researchers define sex differences as the biological difference between males and females, including brain and primary and secondary sexual characteristics, impacting how they behave and think (APA Dictionary of Psychology, 2022).

4.2.3.1 Factor Matrix: Sex Differences

The whole set of Endnote publications with the factor 'sex difference' in their keyword section (N=1,784) was uploaded into VOSviewer software. Of the 800 factors entered, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the sex differences group (minus the top ten) are shown in Table 21.

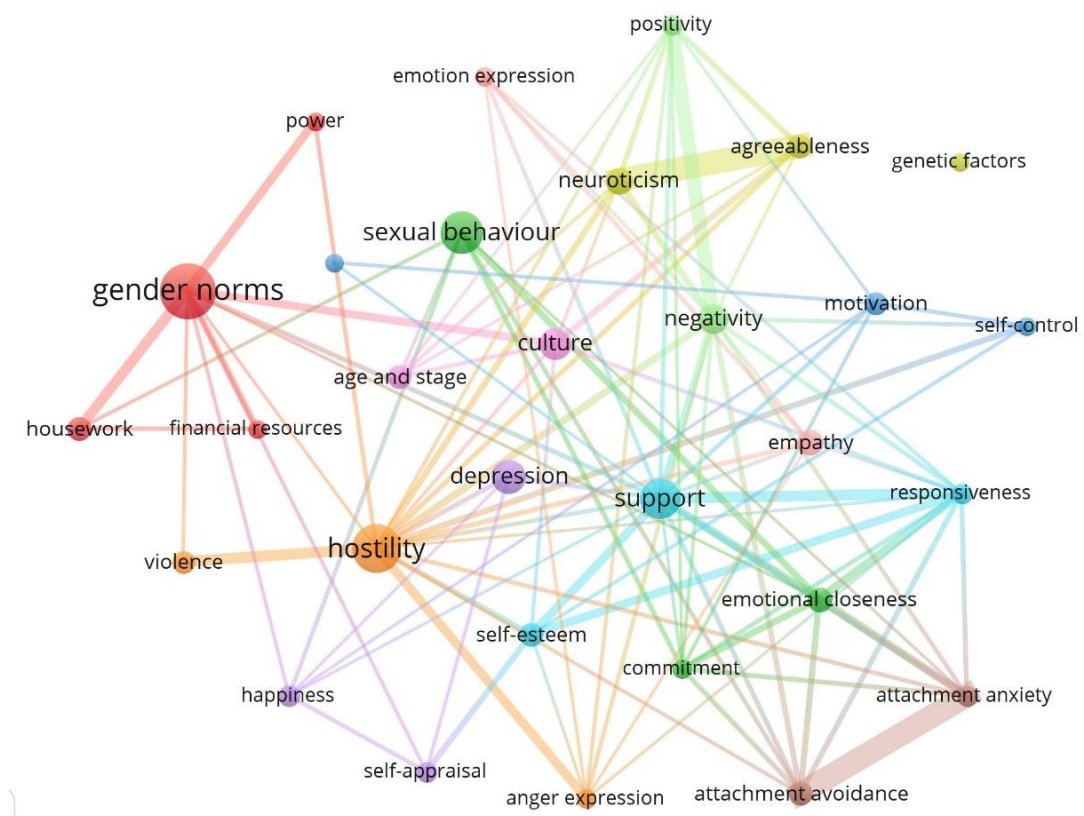
Table 21 Network Matrix: Sex Differences

Factor	Occurrences	Links
gender norms	145	24
hostility	126	28
sexual behaviour	110	25
support	104	29
depression	90	25
culture	83	25
negativity	78	29
neuroticism	70	23
empathy	68	25
emotional closeness	66	22
self-esteem	63	27
agreeableness	62	25
attachment avoidance	62	27
housework	61	14
violence	60	21
motivation	59	27
happiness	57	24
positivity	55	27

4.2.3.3 Simplified Network Model: Sex Differences

To summarise the most occurring thirty sex differences factors a new network model was created in VOSviewer. The lines show factors co-occurring in more than 100 articles. The thicker lines show factors that co-occur more frequently. The top ten factors are excluded. This network model is shown in Figure 40.

Figure 40 *Simplified Network Model Static Version: Sex differences*⁴⁰



4.2.3.4 Sex Differences Analysis of Top Ten Factor Connections

Table 22 shows the top ten factors (in the left column) and their notable relationships with other factors in the sex differences network model (co-occurring in articles).

⁴⁰ The missing node description is oxytocin.

Table 22 *Sex Differences Table of Connections*

TOP TEN FACTOR	How the SEX DIFFERENCE Factors Co-occur
Sex Differences	The ten most occurring factors in the sex differences network model (including the top ten factors) were: stress, personality, attachment, conflict, gender norms, brain, communication, hostility, perceptions, sexual behaviour, and support.
Attachment	In the sex differences network model attachment is peripheral but still strongly linked, and also linked with rejection and responsiveness.
Personality	Personality is central in the sex differences model and linked to attachment, stress, brain, genetic factors, self-control, agreeableness, neuroticism, and depression.
Stress	Stress is also central in the sex differences network model, and linked with age and stage, physiological arousal, cortisol, testosterone, and oxytocin.
Brain	Brain is on the periphery in the in the sex differences model, along with genetic factors. Brain links with stress, adverse childhood experiences, personality, amygdala, and hormonal factors.
Emotion regulation	Emotion regulation is closely linked with hostility in the sex differences network model, as well as with depression, psychological maladjustment, and cortisol.
Communication	Communication is on the periphery of the sex differences network model. It is closely linked with emotional closeness, sexual behaviour, disclosure and responsiveness.
Conflict	Conflict is also closely linked to communication and perceptions in the sex differences network model, and also with violence and empathy.
Perception	Perceptions sits between conflict and communication and is linked to gender norms, emotional closeness, and sexual satisfaction in the sex differences model.
Emotions	Emotions are central in the sex differences network model, closely linked to empathy, emotion expression, negativity, anger, and hostility.

4.2.4 Stress Investigation

The stress factor group encompasses the biological and psychological responses to the experience of stress. This group also includes stressors both present tense, and those that are historic. Levels of historic and current stress are negatively correlated with relationship satisfaction and sense of closeness (Falconier & Jackson, 2020; Neff & Karney, 2017; Randall & Bodenmann, 2017; Salo et al., 2022), and stress is a highly researched factor in regards to its impact upon couple relationships.

4.2.4.1 Factor Matrix: Stress

The whole set of Endnote publications with the factor 'stress' in their keyword section (N=1,784) was uploaded into VOSviewer software. Of the 711 factors entered from the dataset, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the stress group (minus the top ten) are shown in Table 23.

Table 23 *Network Matrix: Stress*

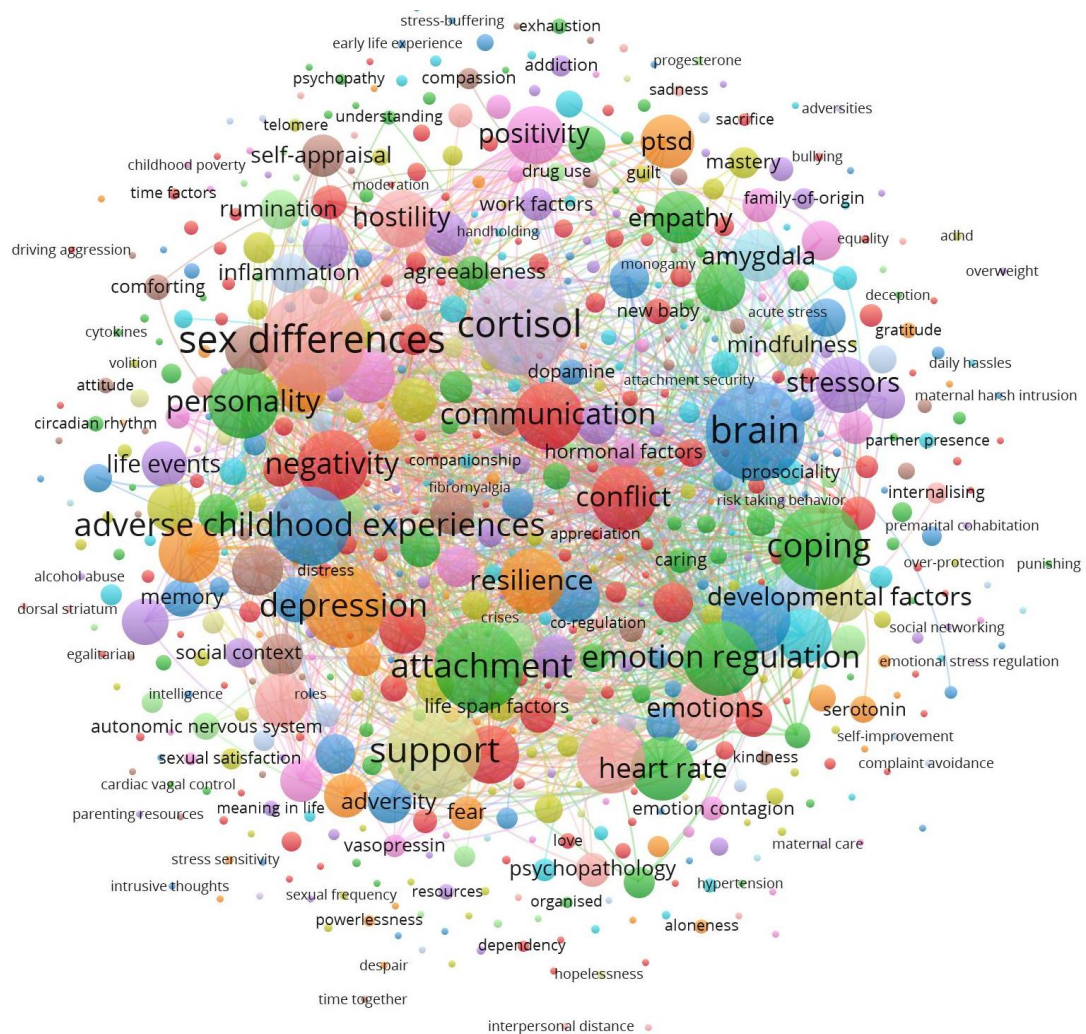
Factor	Occurrences	Links
cortisol	221	28
support	195	29
coping	164	29
depression	150	29
adverse childhood experiences	140	27
negativity	126	29
HPA-axis	112	27
psychological maladjustment	106	29
resilience	102	28
heart rate	89	26
anxiety	80	29
self-control	79	29
hostility	76	29
stressors	73	28
positivity	72	29
genetic factors	66	28
oxytocin	65	27
physiological arousal	64	24
amygdala	62	27
empathy	61	27
PTSD	61	26

developmental factors	57	26
parenting	55	26
threat appraisal	54	29
trauma	54	22
dyadic coping	51	25
neuroticism	51	25
responsiveness	49	25
sociodemographic factors	47	24
life events	46	28

4.2.4.2 Network Model: Stress

The network model in Figure 41 shows the factors in this study grouped under stress (minus stress itself).

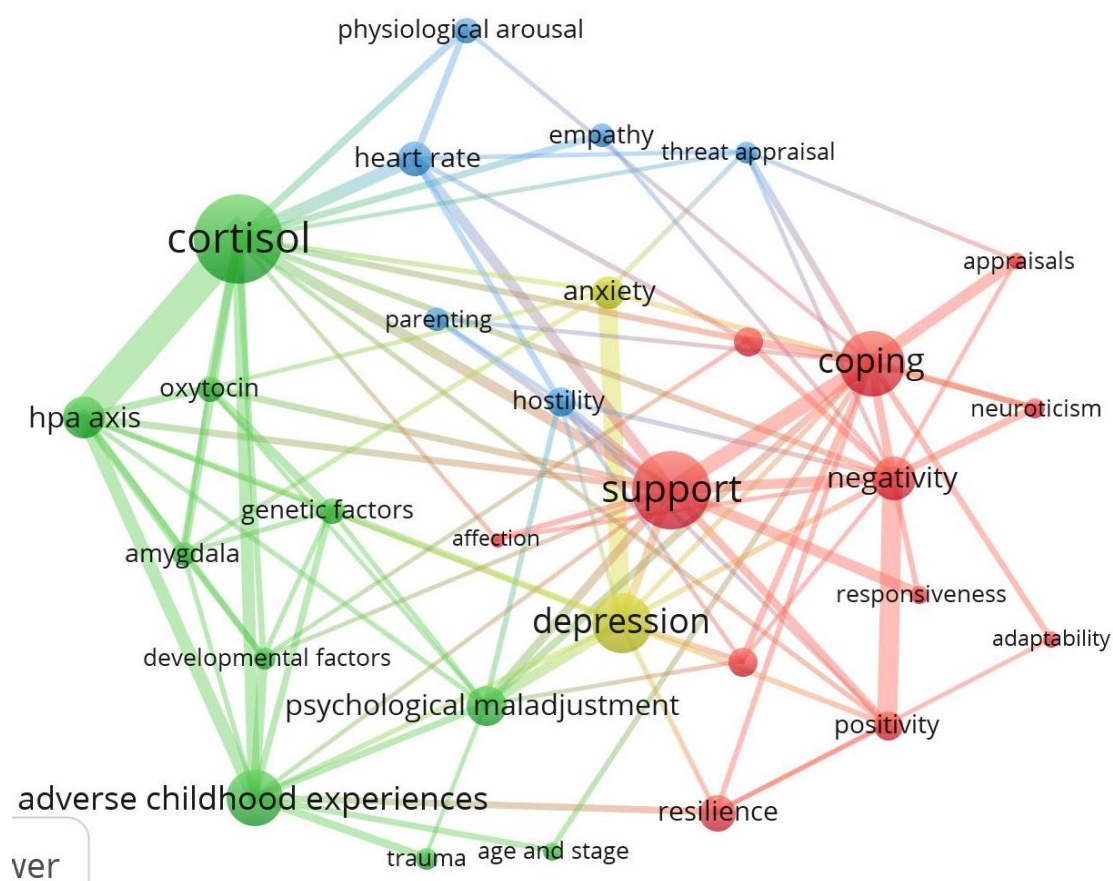
Figure 41 Network Model Static Version: Stress



4.2.4.3 Simplified Network Model: Stress

To summarise the most occurring thirty stress factors a new network model was created in VOSviewer. The top ten factors are excluded. This network model is shown in Figure 42.

Figure 42 *Simplified Network Model Static Version: Stress*⁴¹



4.2.4.4 Stress Analysis of Top Ten Factor Connections

Table 24 shows the top ten factors (in the left column) and their notable relationships with other factors in the stress network model (co-occurring in articles).

⁴¹ The lower node missing identification is stressors, and the higher node missing identification is self-control

Table 24 *Stress Table of Connections*

TOP TEN FACTOR	How the STRESS Factors Co-occur
Stress	The ten most occurring factors in the stress network model (including the top ten factors) were: sex differences, cortisol, brain, support, attachment, coping, depression, adverse childhood experiences, emotion regulation, mental disorders, and personality.
Attachment	In the stress network model attachment is central and closely linked, alongside support, coping, emotion regulation, defensiveness, empathy, and attachment avoidance.
Personality	Personality, particularly neuroticism , is linked in the stress network model with rumination.
Sex differences	Sex differences are linked with coping, support, and attachment in the stress network model.
Brain	Brain/neurological factors are peripheral in the stress network model, and closely linked with adverse childhood experiences. Close by are genetic factors, hypothalamus, amygdala, and HPA axis. More centrally connected are psychological maladjustment, cortisol, and depression.
Emotion regulation	Emotion regulation is central in the stress network model and therefore broadly studied and widely connected to other factors in the stress-related literature. It is closely linked to threat appraisal and more distally to physiological arousal, coping, and heart rate.
Communication	Communication sits on the periphery of the stress network model. Strongly linked are anger and responsiveness.
Conflict	Conflict is also on the periphery of the stress network model. Closely linked are perceptions, negativity, and support.
Perception	Perceptions are on the periphery of the stress network model, sitting closely with conflict and communication, along with responsiveness and negativity.
Emotions	Emotions are strongly linked with stress, and closely linked to empathy, defensiveness, hostility, and physiological arousal in the stress network model.

4.2.5 Brain Investigation

Brain (or neurological) factors sit on the periphery of most of the factor network models. Despite this, there has been an exponential increase over the past 20 years⁴² in research on relationships that include neurological factors.

4.2.5.1 Factor Matrix: Brain

The whole set of Endnote publications with the factor 'brain' in their keyword section (N=1,722) was uploaded into VOSviewer software. Of the 604 factors entered, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the brain group (minus the top ten) are shown in Table 25.

Table 25 *Network Matrix: Brain*

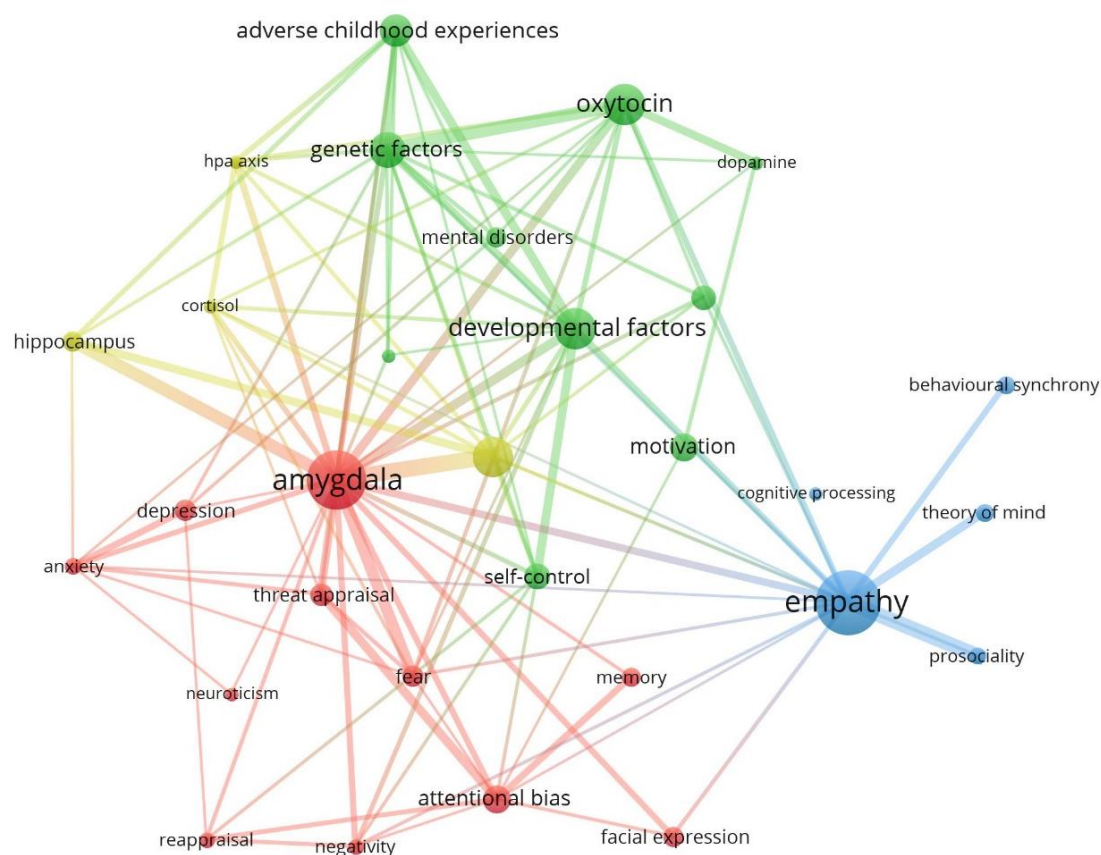
Factor	Occurrences	Links
empathy	145	27
amygdala	133	29
developmental factors	93	28
oxytocin	92	25
prefrontal cortex	90	29
genetic factors	80	25
adverse childhood experiences	72	20
attentional bias	62	26
motivation	62	26
self-control	57	26
hostility	55	21
threat appraisal	50	25
depression	48	23
fear	48	23
facial expression	45	21
hippocampus	45	23
mental disorders	45	26
memory	42	24
theory of mind	41	17
behavioural synchrony	40	15
anxiety	39	21
prosociality	39	19
negativity	36	23
reappraisal	35	18

⁴² As noted in the investigation into the history of the factors in Appendix 3

4.2.5.3 Simplified Network Model: Brain

To summarise the most occurring thirty brain factors a new network model was created in VOSviewer. The top ten factors are excluded. This network model is shown in Figure 44.

Figure 44 *Simplified Network Model Static Version: Brain⁴⁴*



4.2.5.4 Brain Analysis of Top Ten Factor Connections

Table 26 shows the top ten factors (in the left column) and their notable relationships with other factors in the brain network model (co-occurring in articles).

⁴⁴ The large node missing a descriptor is prefrontal cortex, the smaller one is HPA axis, and the smallest one is psychopathology.

Table 26 *Brain Table of Connections*

TOP TEN FACTOR	How the BRAIN Factors Co-occur
Brain	The ten most occurring factors in the brain network model (including the top ten factors) were: stress, sex differences, emotion regulation, emotions, empathy, amygdala, attachment, personality, developmental factors, oxytocin, and prefrontal cortex.
Attachment	In the brain network model, attachment is centrally located and closely linked with developmental factors, responsiveness, prefrontal cortex, genetic factors, threat, fear, stress, oxytocin, cortisol, and amygdala.
Personality	Personality is broadly linked to multiple biological factors and strongly with genetic factors, prefrontal cortex, empathy, amygdala in the brain network model.
Sex differences	Sex differences are also broadly linked to multiple biological factors including oxytocin, amygdala, hippocampus, cortisol, and vasopressin in the brain network model.
Stress	Stress is peripheral in the brain network model. It is strongly linked with adverse childhood experiences, genetic factors, environmental factors, threat appraisal, gut-brain axis, allostatic load, and psychological maladjustment.
Emotion regulation	Emotion regulation is strongly linked to developmental factors and attentional bias in the brain network model.
Communication	Communication does not feature as strongly in the brain network model, but it is linked with the amygdala.
Conflict	Conflict also does not feature strongly but is linked with emotion regulation in the brain network model.
Perceptions	Perceptions are linked to the prefrontal cortex, amygdala, facial expression, and attentional bias in the brain network model.
Emotions	Emotions are central in the brain network model, with many links including prefrontal cortex, dopamine, avoidance approach goals, and empathy.

4.2.6 Emotion Regulation Investigation

Emotion regulation is a complex process involving managing and modifying one's emotional state, intensity, or duration in response to a given situation. Emotion regulation is therefore crucial for managing one's emotions and is also related to the ability to understand and share the emotions of others, making emotion regulation an important factor for relationship well-being. In addition, emotion regulation is highly related to self-control, behaviour regulation and thought regulation. Unsurprisingly, emotion regulation correlates with relationship satisfaction (Bloch et al., 2014; Mazzuca et al., 2018; Rusu et al., 2019; Weber et al., 2021).

4.2.6.1 Factor Matrix: Emotion Regulation

The whole set of Endnote publications with the factor 'emotion regulation' in their keyword section (N=1,243) was uploaded into VOSviewer software. Of the 595 factors entered, all were automatically selected for use in the network matrix. The top ten factors were removed from the matrix and the remaining thirty most frequently occurring factors in the emotion regulation group are shown in Table 27.

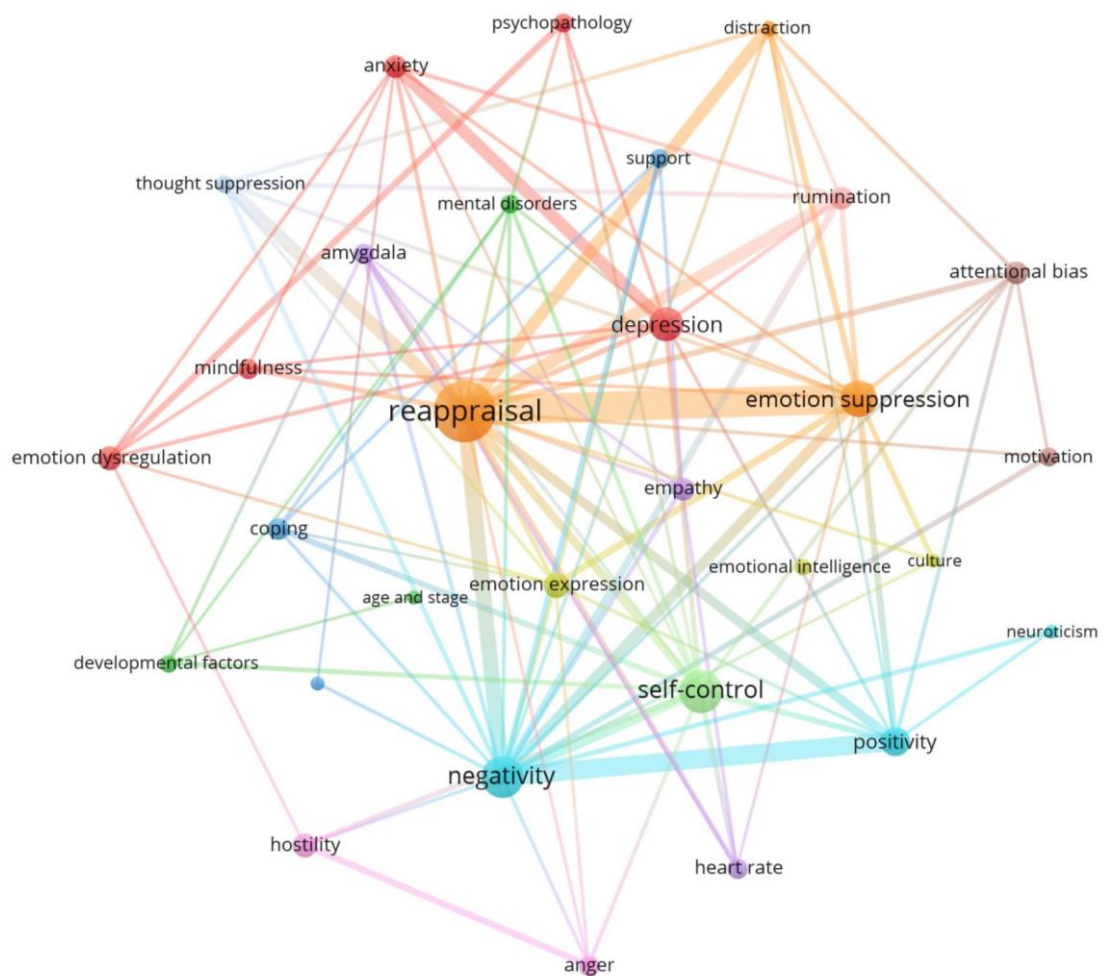
Table 27 Network Matrix: Emotion Regulation

Factor	Occurrences	Links
reappraisal	176	28
self-control	111	29
negativity	108	29
emotion suppression	92	29
depression	85	29
positivity	70	29
emotion expression	58	26
emotion dysregulation	57	21
hostility	56	26
anxiety	54	28
rumination	53	26
attentional bias	51	24
empathy	51	23
coping	50	26
mindfulness	46	26
amygdala	45	23
anger	45	25
heart rate	45	26
mental disorders	44	28
motivation	44	26

4.2.6.3 Simplified Network Model: Emotion Regulation

To summarise the most occurring thirty emotion regulation factors a new network model was created in VOSviewer. The top ten factors are excluded. This network model is shown in Figure 46.

Figure 46 *Simplified Network Model Static Version: Emotion Regulation*⁴⁵



4.2.6.4 Emotion Regulation Analysis of Top Ten Factor Connections

Table 28 shows the top ten factors (in the left column) and their notable relationships with other factors in the emotion regulation network model (co-occurring in articles).

⁴⁵ The small node missing a descriptor is threat appraisal.

Table 28 *Emotion Regulation Table of Connections*

TOP TEN FACTOR	How the EMOTION REGULATION Factors Co-occur
Emotion Regulation	The ten most occurring factors in the emotion regulation network model (including the top ten factors) were: reappraisal, attachment, brain, emotions, self-control, stress, negativity, emotion suppression, depression, mental disorders, and gender differences.
Attachment	In the emotion regulation network model attachment was central, and closely linked to attachment avoidance, shame, stress, coping, threat appraisal, affection, rumination, emotion suppression, and avoidance motivation.
Personality	Personality is linked closely with emotion suppression, neuroticism, anger, and anxiety in the emotion regulation network model.
Sex differences	Sex differences are linked with self-control , and hostility in the emotion regulation network model.
Stress	Stress is central in the emotion regulation network model and is linked with depression and attachment avoidance.
Brain	Brain/neurological factors are peripheral in the in the emotion regulation network model, and linked with threat appraisal, and physiological arousal.
Communication	Communication is peripheral in the emotion regulation network model. It is closely linked with perspective taking, expectations, emotion expression, negativity, and attachment anxiety.
Conflict	Conflict is linked in the emotion regulation network model with responsiveness, emotions, and perceptions.
Perception	Perceptions are linked with emotions, negativity, reappraisal, emotional intelligence, and stress in the emotion regulation network model.
Emotions	Emotions are linked with depression, anxiety, and emotional reactivity in the emotion regulation network model.

4.2.7 Conflict Investigation

Hocker and Wilmot (1995) describe interpersonal conflict as “an expressed struggle between at least two interdependent parties who perceive incompatible goals, scarce resources, and interference from others in achieving their goals” (p. 21). It is a common feature of couple relationships and a common factor in the literature on couple relationships.

4.2.7.1 Factor Matrix: Conflict

The whole set of Endnote publications with the factor ‘conflict’ in their keyword section (N=1,193) was uploaded into VOSviewer software. Of the 650 factors entered, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the conflict group (minus the top ten) are shown in Table 29.

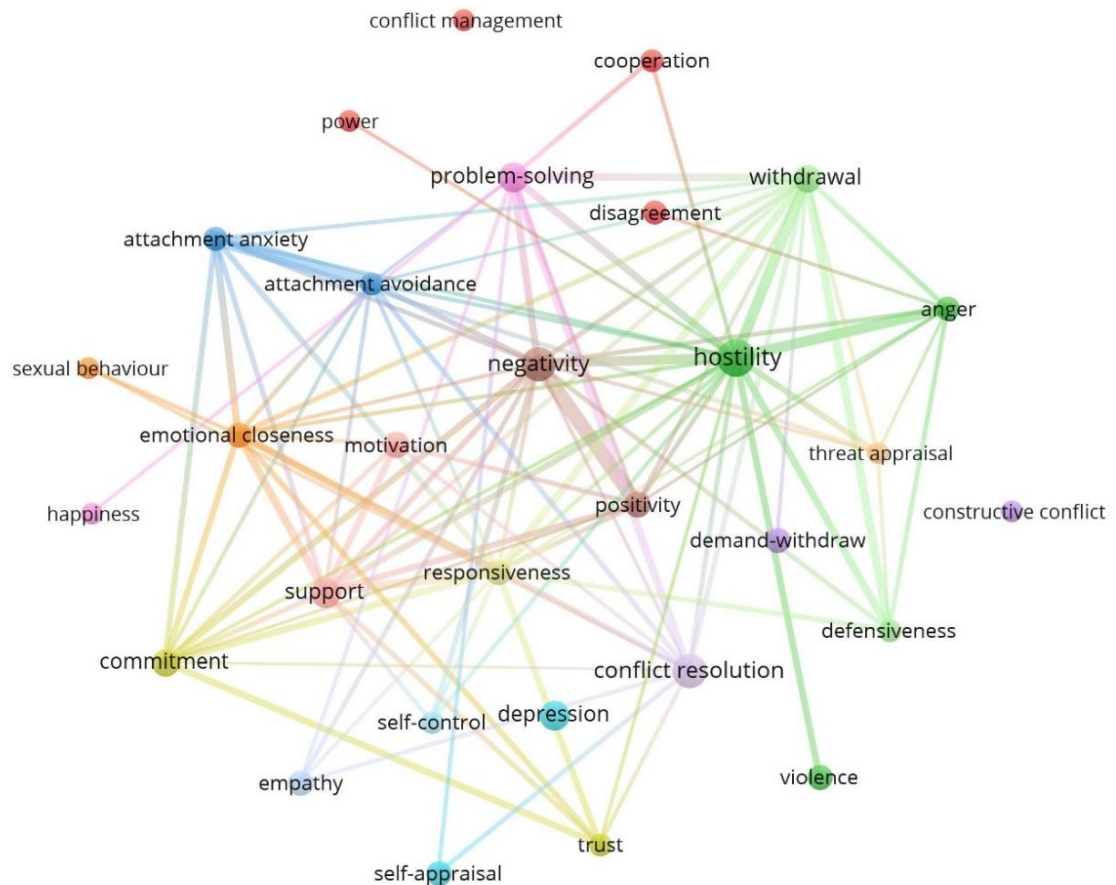
Table 29 *Network Matrix: Conflict*

Factor	Occurrences	Links
hostility	128	29
conflict resolution	111	28
negativity	106	29
support	78	28
depression	76	25
problem-solving	76	29
commitment	65	27
withdrawal	64	27
positivity	60	28
motivation	59	28
responsiveness	56	29
self-appraisal	56	28
empathy	54	28
demand-withdraw	53	27
emotional closeness	53	28
violence	53	21
anger	49	27
attachment anxiety	48	28
disagreement	48	27
self-control	46	28
attachment avoidance	45	26
trust	45	26
cooperation	44	24

4.2.7.3 Simplified Network Model: Conflict

To summarise the most occurring thirty conflict factors a new network model was created in VOSviewer. This network model is shown in Figure 48.

Figure 48 *Simplified Network Model Static Version: Conflict*



4.2.7.4 Conflict Analysis of Top Ten Factor Connections

Table 30 shows the top ten factors (in the left column) and their notable relationships with other factors in the conflict network model (co-occurring in articles).

Table 30 *Conflict Table of Connections*

TOP TEN FACTOR	How the CONFLICT Factors Co-occur
Conflict	The ten most occurring factors in the conflict network model (including the top ten factors) were: communication, sex differences, attachment, hostility, relationship repair, perceptions, negativity, stress, depression, support, and personality.
Attachment	In the conflict network model, attachment is central, and closely linked with attachment avoidance, rejection sensitivity, hostility, violence, and self-control. It is also linked with criticism, contempt, withdrawal, and empathy.
Personality	Personality is linked in the conflict network model with hostility, attachment, and sex differences.
Sex differences	Sex differences in the conflict network model are linked with attachment anxiety, and hostility.
Stress	Stress is highly central in the conflict network model, and linked with hostility, demand/withdraw, and negativity.
Brain	Brain is peripheral in the conflict network model and has no significant links to other factors.
Emotion regulation	Emotion regulation is linked in the conflict network model with emotion escalation, anger, negativity, and empathy.
Communication	Communication is broadly linked in the conflict network model. Close links include disagreement, demand/withdraw, contempt, and antagonism.
Perception	Perception is linked in the conflict network model with threat appraisal, demand/withdraw, and conflict resolution.
Emotions	Emotions are linked in the conflict network model with anger, negativity, rejection, cortisol, and empathy.

4.2.8 Communication Investigation

Communication is a venerated factor in couple relationships, and with good reason - decades of studies have confirmed the importance of communication quality to relationship outcomes (Driver & Gottman, 2004; Fincham et al., 2004; Kanter, Lavner, et al., 2021). Consequently, communication has been a highly researched factor in the relationship well-being literature.

4.2.8.1 Factor Matrix: Communication

The whole set of Endnote publications with the factor 'communication' in their keyword section (N=1,186) was uploaded into VOSviewer software. Of the 626 factors entered, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the communication group (minus the top ten) are shown in Table 31.

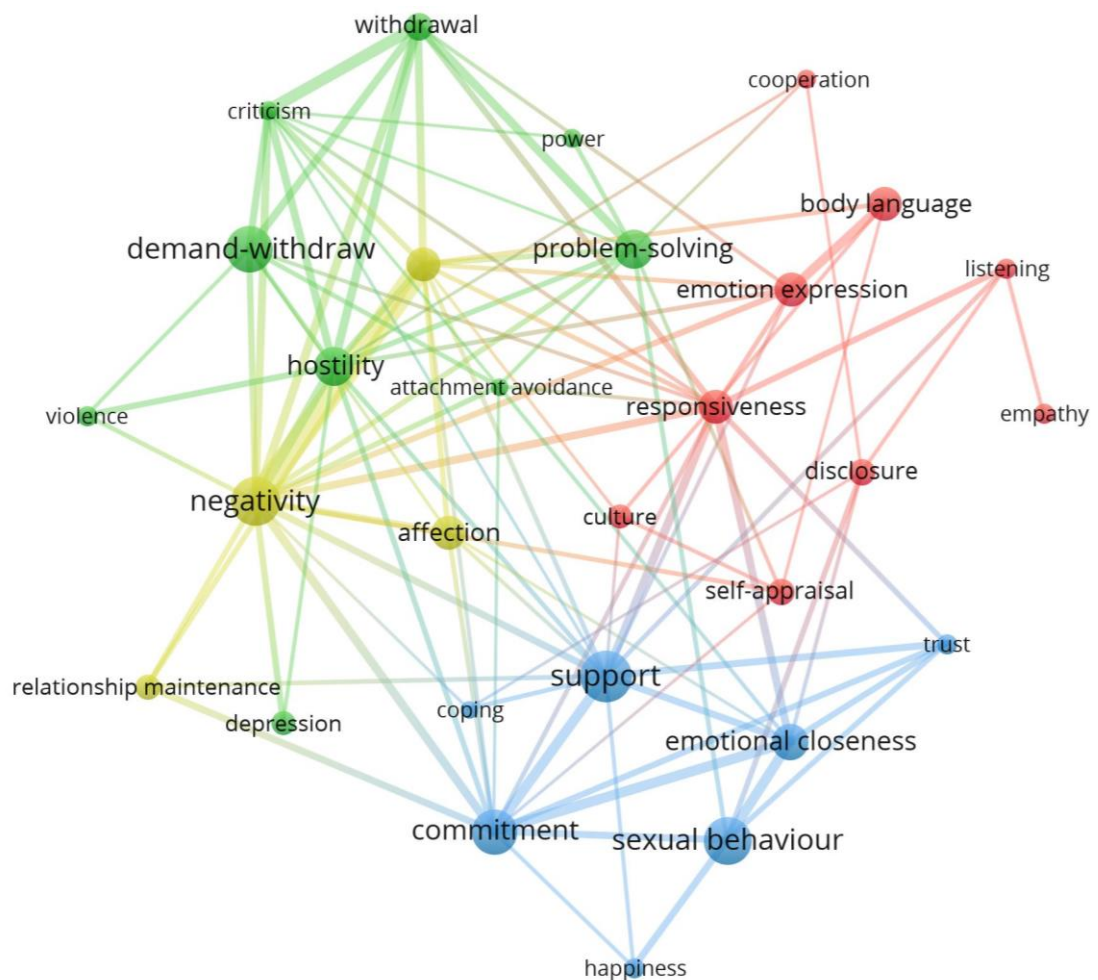
Table 31 *Network Matrix: Communication*

Factor	Occurrences	Links
support	80	29
negativity	77	30
sexual behaviour	75	25
commitment	71	29
demand-withdraw	71	25
hostility	61	30
problem-solving	61	29
self-disclosure	60	30
emotional closeness	57	29
responsiveness	57	30
affection	53	29
emotion expression	53	28
positivity	53	31
body language	52	21
withdrawal	43	25
self-appraisal	42	26
constructive communication	38	23
depression	37	25
relationship maintenance	37	20
culture	36	24
empathy	33	20
happiness	32	17

4.2.8.3 Simplified Network Model: Communication

To summarise the most occurring thirty communication factors a new network model was created in VOSviewer. This network model is shown in Figure 50.

Figure 50 *Simplified Network Model Static Version: Communication*⁴⁶



4.2.8.4 Communication Analysis of Top Ten Factor Connections

Table 32 shows the top ten factors (in the left column) and their notable relationships with other factors in the communication network model (co-occurring in articles).

⁴⁶ The missing yellow node description is positivity.

Table 32 *Communication Table of Connections*

TOP TEN FACTOR	How the COMMUNICATION Factors Co-occur
Communication	The ten most occurring factors in the communication network model (including the top ten factors) were: conflict, sex differences, attachment, perceptions, stress, support, negativity, sexual behaviour, demand/withdraw, commitment, and problem-solving.
Attachment	In the communication network model, attachment is linked with emotional availability, trust, engagement, defensiveness, and support.
Personality	Personality linked strongly in the communication network model with conflict, negativity, and hostility.
Sex differences	Sex differences linked in the communication network model with cooperation, and affection.
Stress	Stress is central in the communication network model, and closely linked with affection, positivity, cortisol, blood pressure, and emotional closeness.
Brain	Brain is peripheral in the communication network model. It is linked with behavioural synchrony, and empathy.
Emotion regulation	Emotion regulation is linked in the communication network model with emotional intelligence, perceptions, and support.
Conflict	Conflict is linked in the communication network model with demand/withdraw, negativity, power, and expectations.
Perception	Perceptions are central in the communication network model and closely linked with responsiveness, emotion expression, support, and sexual behaviour.
Emotions	Emotions are linked in the communication network model with emotion expression, emotional closeness, and responsiveness.

4.2.9 Perceptions Investigation

Perceptions of others is key to social interaction (Puscian et al., 2021). How partners and relationships are perceived has been affirmed through decades of research to impact upon relationship outcomes, making perceptions a significant factor in the research literature.

4.2.9.1 Factor Matrix: Perceptions

The whole set of Endnote publications with the factor 'perceptions' in their keyword section (N=1,112) was uploaded into VOSviewer software. Of the 603 factors entered, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the perceptions group (minus the top ten) are shown in Table 33.

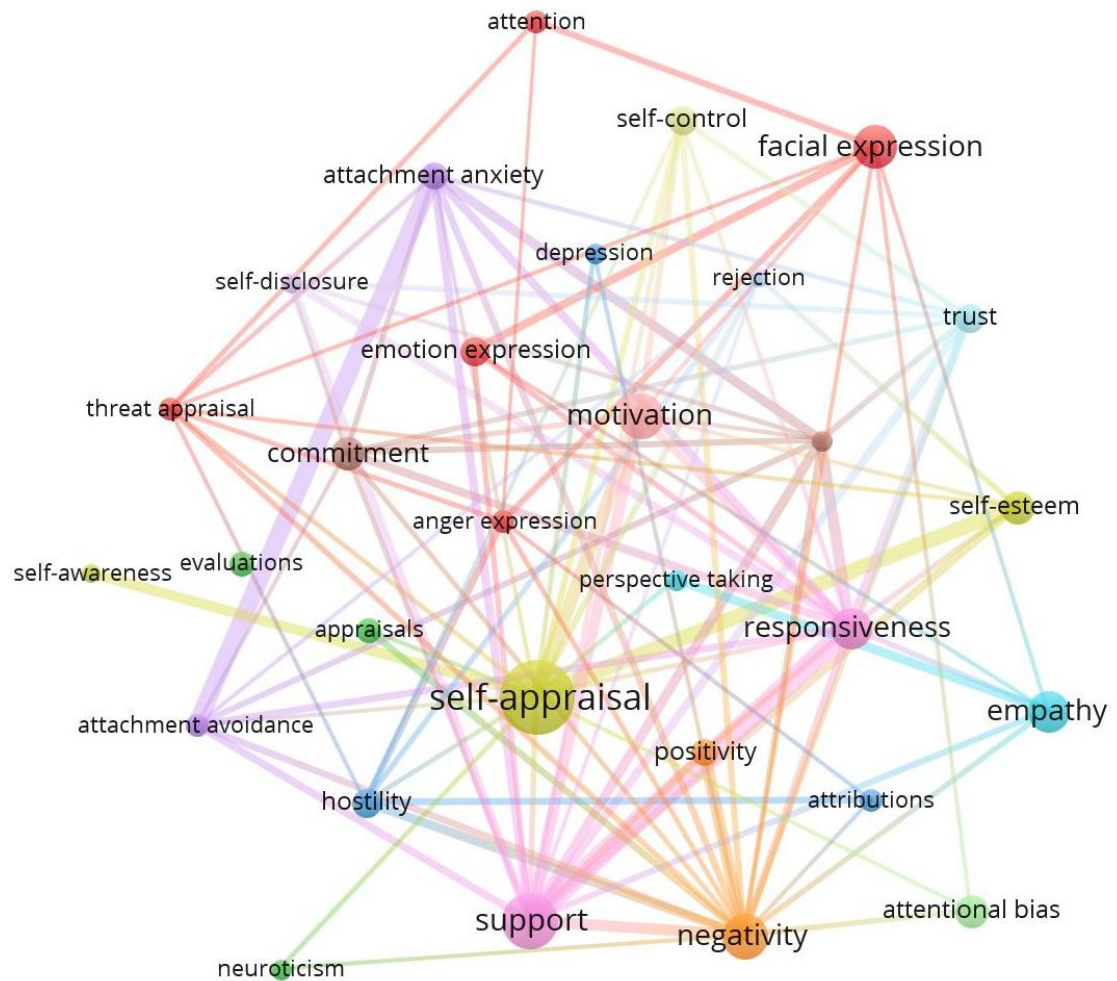
Table 33 *Network Matrix: Perceptions*

Factor	Occurrences	Links
self-appraisal	157	28
support	112	28
motivation	88	29
negativity	85	29
facial expression	81	23
empathy	78	28
responsiveness	78	28
commitment	60	23
attentional bias	59	25
self-esteem	59	28
hostility	51	28
emotion expression	50	22
trust	50	26
self-control	48	27
attachment anxiety	45	27
positivity	45	28
evaluations	42	18
appraisals	41	26
threat appraisal	39	27
anger expression	38	27
attachment avoidance	38	26
attention	36	18
attributions	36	23

4.2.9.3 Simplified Network Model: Perceptions

To summarise the most occurring thirty perceptions factors a new network model was created in VOSviewer. The top ten factors are excluded. This network model is shown in Figure 52.

Figure 52 *Simplified Network Model Static Version: Perceptions*



4.2.9.4 Perceptions Analysis of Top Ten Factor Connections

Table 34 shows the top ten factors (in the left column) and their notable relationships with other factors in the perceptions network model (co-occurring in articles).

Table 34 *Perceptions Table of Connections*

TOP TEN FACTOR	How the PERCEPTIONS Factors Co-occur
Perceptions	The ten most occurring factors in the perceptions network model (including the top ten factors) were: self-appraisal, sex differences, attachment, personality, support, conflict, emotions, communication, motivation, brain, and facial expression.
Attachment	Attachment is central in the perceptions network model. Linked with attachment is negativity, threat appraisal, empathy, and stress.
Personality	Personality is linked closely in the perceptions network model with support, and neuroticism.
Sex differences	Sex differences are peripheral in the perceptions network model, and closely linked with support, trust, comfort, and neuroticism.
Stress	Stress is linked with attachment and negativity in the perceptions network model.
Brain	Brain is peripheral in the perceptions network model. It is linked with memory, oxytocin, and attentional bias.
Emotion regulation	Emotion regulation is linked with empathy, and threat appraisal in the perceptions network model.
Communication	Communication is linked in the perceptions network model with listening, expectations, criticism, defensiveness, and negativity.
Conflict	Conflict is linked in the perceptions network model with threat appraisal, negativity, self-control, anger, conflict escalation, and disclosure.
Emotions	Emotion is linked in the perceptions network model with empathy.

4.2.10 Emotion Investigation

Emotions and couple relationships are intricately intertwined, creating a profound impact on the overall dynamics and well-being of the partnership. The ability to recognise, express, and empathise enhances the overall quality and longevity of a couple relationship (Jardine et al., 2022).

4.2.10.1 Factor Matrix: Emotions

The whole set of Endnote publications with the factor 'emotion' in their keyword section (N=1,085) was uploaded into VOSviewer software. Of the 958 factors entered, all were automatically selected by VOSviewer for use in the network matrix. The top ten factors were removed from the matrix. The thirty most frequently occurring factors in the emotions group (minus the top ten) are shown in Table 35.

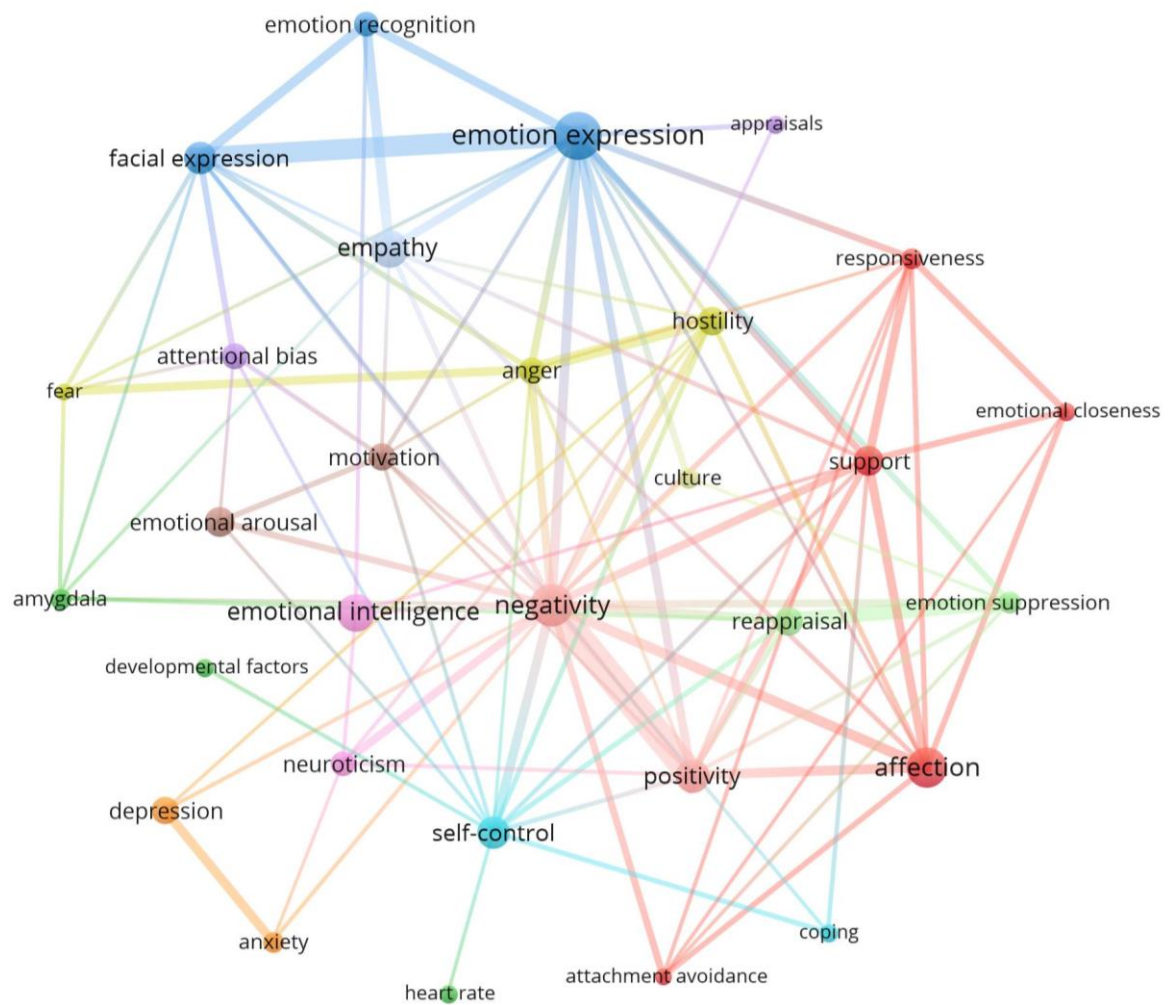
Table 35 *Network Matrix: Emotions*

Factor	Occurrences	Links
emotion expression	334	29
negativity	283	29
affection	262	27
empathy	233	29
emotional intelligence	232	27
positivity	199	29
facial expression	189	27
self-control	188	29
emotional arousal	167	27
support	167	28
reappraisal	163	27
hostility	159	29
depression	149	29
motivation	149	29
anger	141	28
attentional bias	140	28
neuroticism	135	29
emotion recognition	132	26
emotion suppression	110	27
anxiety	107	26
responsiveness	106	28
culture	105	27
amygdala	104	28
appraisals	89	27

4.2.10.3 Simplified Network Model: Emotion

To summarise the most occurring thirty emotion factors a new network model was created in VOSviewer. The top ten factors are excluded. This network model is shown in Figure 54.

Figure 54 *Simplified Network Model Static Version: Emotions*



4.2.10.4 Emotions Analysis of Top Ten Factor Connections

Table 36 shows the top ten factors (in the left column) and their notable relationships with other factors in the emotion network model (co-occurring in articles).

Table 36 *Emotion Table of Connections*

TOP TEN FACTOR	How the EMOTION Factors Co-occur
Emotion	The ten most occurring factors in the emotion network model (including the top ten factors) were: emotion regulation, brain, attachment, emotion expression, sex differences, personality, emotional intelligence, stress, negativity, affection, and perceptions.
Attachment	Attachment is linked in the emotion network model with threat appraisal, fear, negativity, and positivity.
Personality	Personality is linked in the emotion network model with culture, emotional intelligence, neuroticism, psychological maladjustment, self-esteem, hostility, positivity, and negativity.
Sex differences	Sex differences are central in the emotions network model, and is linked empathy, perceptions, and emotional arousal.
Stress	Stress is central in the emotion network model. It is linked with self-control, emotion regulation, and depression.
Brain	Brain is peripheral in the emotion network model. It is linked with amygdala, prefrontal cortex, HPA axis, memory, heart rate, and attentional bias.
Emotion regulation	Emotion regulation is broadly linked in the emotion network model. This is understandable given that emotion is a strong focus of attention in the emotion regulation literature. It is also closely linked with emotion recognition, anxiety, and depression.
Communication	Communication is peripheral in the emotion network model, and is linked with emotion disclosure, influence taking, listening, perspective taking, emotional pain, responsiveness, defensiveness, anger, contempt, affection, and support.
Conflict	Conflict is linked with contempt, criticism, attachment avoidance, withdrawal, trust, and responsiveness in the emotion network model.
Perception	Perceptions are centrally located in the emotions network model, and linked with emotion expression, attachment anxiety, negativity, positivity, and emotional arousal.

5. Summarising the Network Model Findings

Findings from the network modelling represent a version of meta-analysis – clarifying which areas of relationship science research replicate most. The more a factor is tested and proven using independent methods, the more it is agreed upon by researchers, and the more likely it is that we can rely on, and predict, its characteristics. Using bibliometric network modelling (VOSviewer) the top ten factors– those occurring most frequently and co-occurring with one another most frequently – from the already defined 2,530 factors found in the collated literature were attachment, personality, stress, sex differences, brain, emotion regulation, communication, conflict, perceptions, and emotions. These numerically significant factors were individually network modelled and these models were examined in Phase Four to further understand each factor's unique inter-connections and numeric prominence in the collated literature corpus.

CHAPTER THREE PHASE FOUR: CONCEPTUAL REFINEMENT

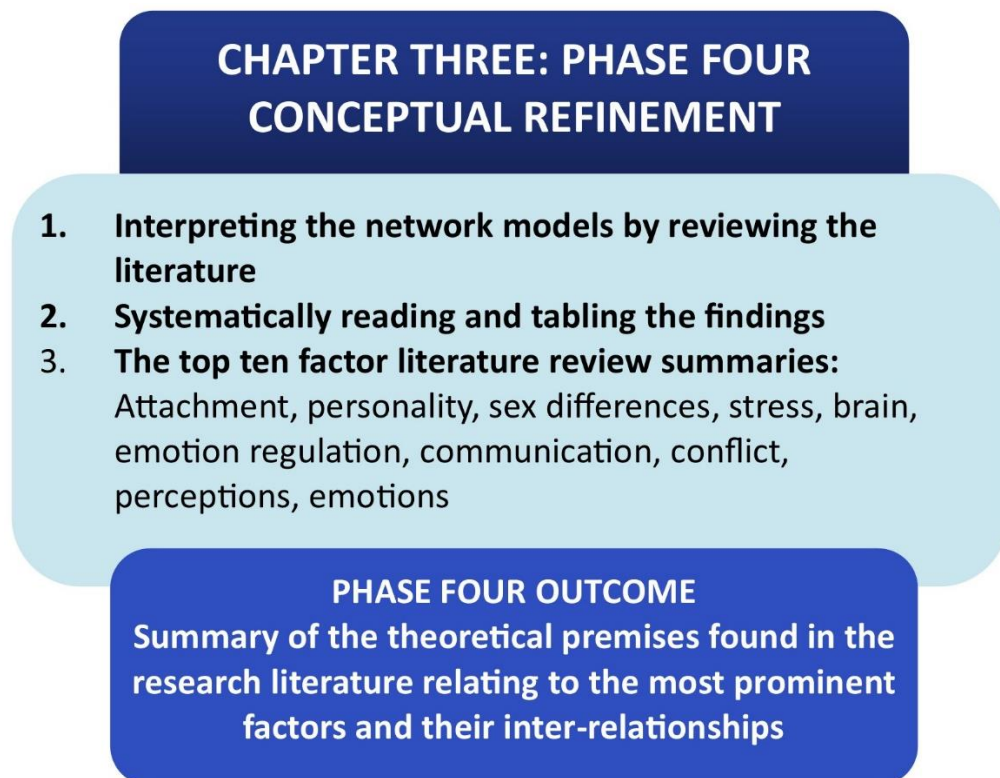
*“A thorough, sophisticated literature review is the foundation and inspiration
for substantial, useful research.”*

David Boote and Penny Beile (2005, p. 3)

Overview

While the network models showed the use and co-use of factors in research studies, the final explanatory model needed to illustrate the theoretical and causal relationships between factors. Therefore, the literature was reviewed to understand how researchers had theorised the prominent and highly connected factors in their studies. This was a systematic process using the network model findings from Phase Three to identify which factors to focus on for review. Summaries of the findings are presented for each of the top ten factors. Chapter Three: Phase Four is outlined in Figure 55.

Figure 55 *Chapter Three: Phase Four Conceptual Refinement*



1. Interpreting the Network Models by Reviewing the Literature

The network modelling of the factors showed their patterns of appearance and co-use in the research. These patterns now needed to be understood or ‘interpreted’ by reviewing the research. This stage of the study moved the findings from simple content analysis of the factors’ frequency of use and of co-use by researchers, to defining what researchers had found to be ‘meaningful’ about these factors and their interrelationships. This triangulation would ground the final model construction in both the manifest and latent⁴⁷ content found in the research.

2. Systematically Reading and Tabling the Findings

MGT suggests that to ascertain the inter-relatedness of factors, and their causal relationships, these questions could be asked: *What happened to cause this? Why does it exist? What is its origin? How did it unfold? Why did it unfold this way? What prevented alternatives? What is its context? How is the context shaping the phenomena? What current knowledge is useable and what should be discarded or added?* (Cronholm, 2004; Goldkuhl & Cronholm, 2010; Rousseau, 2014). These questions were kept in mind while reviewing the literature.

2.1 Interpreting the Network Model Findings

This was a unique type of systematic literature review – systematic in that it followed a system (Eykelbosh & Fong, 2017) that was documented, repeatable, and led to new understanding. A system protocol was developed for the methodical literature review of the prominent factors found in the network modelling and their notable inter-relationships.

2.1.1 Systematically Reviewing the Network Model Findings

Ten tables were created representing the top ten factors (attachment, personality, sex differences, stress, brain, emotion regulation, communication, conflict, perceptions, emotion) as shown in Table 37.

⁴⁷ Latent content are those ideas and conceptualisations that underlie the manifest (obvious) meaning of the factors which may not have shown up in the bibliometric content analysis.

Table 37 Literature Review: Table Example

TOP TEN FACTOR CURRENTLY UNDER INVESTIGATION e.g., ATTACHMENT	
	How the Top Ten factors co-occur in the literature with the top ten factor currently under investigation, and what other factors they notably co-occur with e.g., Attachment x Emotion Regulation.
Attachment	
Personality	
Sex differences	
Stress	
Brain	
Emotion regulation	
Communication	
Conflict	
Perceptions	
Emotion	

Each table was used to report the investigation of one of the top ten factors in regard their links with the other top ten factors, as presented in their specific network modelling visual analysis.

To begin this process the analyses of each of the top ten factors and their networks as described in Phase Three were added into the tables. An example of this can be seen in Table 38 using the findings described for the Attachment network model.

Table 38 Attachment Literature Review Table Example

ATTACHMENT NETWORK MODEL LITERATURE INVESTIGATION	
	How the Top Ten factors co-occur in the attachment literature, and what other factors they notably co-occur with.
Attachment	<i>The ten most occurring factors in the attachment network model (including the top ten factors) were: attachment avoidance, attachment anxiety, sex differences, personality, emotion regulation, stress, support, conflict, brain, perceptions, and communication. Additionally, emotions and communication are centrally situated in the</i>

	<i>attachment network model, while perception sits further out, and brain is on the edge of the model.</i>
Personality	<i>Attachment and personality are linked directly through support in the attachment network model. Conflict, self-appraisal, negativity, and perceptions are linked close by. In the attachment network model, neuroticism is the most researched personality trait. Neuroticism sits closely with trust.</i>
Sex differences	<i>Sex differences link with numerous attachment factors in the attachment network mode, with notable links being attachment avoidance and attachment anxiety, and also communication, threat appraisal, empathy, support, and emotions.</i>
Stress	<i>In the in the attachment network model stress is strongly linked to attachment, and also with developmental factors, coping, and emotion regulation.</i>
Brain	<i>Brain (or neurological factors, including neuroendocrinal factors) sits on the periphery of the attachment network model. Oxytocin, cortisol, and environmental factors are closely aligned with brain, while amygdala and genetic factors are more distantly aligned.</i>
Emotion regulation	<i>Emotion regulation has a close link with attachment in the attachment network model, and also with self-control, coping, support, and empathy.</i>
Communication	<i>Communication sits closely with avoidant and anxious attachment and sex differences in the attachment network model and is strongly linked with self-appraisal, support, threat appraisal, emotions, withdrawal, defensiveness, and negativity.</i>
Conflict	<i>Conflict is closely linked with perceptions, negativity, self-appraisal, withdrawal, and rejection in the attachment network model.</i>
Perceptions	<i>Perceptions is closely aligned with negativity and positivity in the in the attachment network model, and well as with responsiveness.</i>
Emotion	<i>Emotions sit centrally in the attachment network model. In between emotions and attachment sits self-control.</i>

These notable connections between factors were then reviewed in the literature, factor by factor. For example, Table 38 shows that in the *attachment network model*

personality is linked to *support*. Therefore, in the Endnote library, *attachment*, *personality*, and *support* were searched for, and the resulting articles coded 4* or 5* were read to understand how the links between these three factors were theorised by the researchers. An example of this search process in Endnote is shown in Figure 56.

Figure 56 Example of the Literature Search for Connected Factors (coded 4 & 5)

Search

Options ▾

Search Whole Library ▾

☐ Match Case

Keywords ▾

Contains ▾

attachment

And ▾

Keywords ▾

Contains ▾

personality

And ▾

Keywords ▾

Contains ▾

support

●	Rating ▾	Year	Title	Author
●	★★★★★	2012	The ABC of social desires: Affiliation, being alone, and closeness to partner	Hagemeyer, B.; Neyer, F.; Neberich, W.; Asendorpf, J.
●	★★★★★	2015	Social support	Gleason, M.; Iida, M.
●	★★★★★	2016	Calibrating use of emotion regulation strategies to the relationship context: An attac...	Winterheld, H.
●	★★★★★	2007	The influence of personal characteristics and relationship properties on marital supp...	Verhofstadt, L.; Buysse, A.; Devoldre, I.; De Corte, K.
●	★★★★★	2016	The prototype of indicators of a responsive partner shapes information processing: ...	Turan, B.
●	★★★★★	2016	Early adversity, temperament, attachment, and the differential development of coping	Skinner, E.; Zimmer-Gembeck, M.
●	★★★★★	2014	Coregulation in romantic partners' attachment styles: A longitudinal investigation	Hudson, N.; Fraley, R.; Brumbaugh, C.; Vicary, A.

While “to review every single article that could be relevant to the topic is simply not possible” (Snyder, 2019, p. 355), 1,718 publications were read right through and marked up. Summarised notes from the literature about factor inter-relationships were added to each table. An example of this is shown in Table 39 for the *emotion regulation* section of the *attachment network model*.

Table 39 Table Example (How emotion regulation is linked with other factors in the attachment network model)

ATTACHMENT NETWORK MODEL LITERATURE INVESTIGATION	
EMOTION REGULATION EXAMPLE	
	How the Top Ten factors co-occur in the literature, and what other factors they notably co-occur with.
Emotion regulation	NETWORK MODEL FINDINGS: <i>Emotion regulation</i> has a close link with attachment in the attachment network model, and also with self-control, coping, support, and empathy. LITERATURE REVIEW FINDINGS:

Emotion Regulation:

In Altan-Atalay (2019)'s study (N=433, with 318 women), interpersonal **emotion regulation** was shown to be moderated by individual's attachment style and their reinforcement sensitivity (how likely their BAS and BIS systems are to be activated). It makes sense theoretically that secure attachment would be strongly linked to emotion regulation as attachment correlates in studies with the development of self-regulation (Mikulincer & Shaver, 2007a). Attachment security is developed through successful transmission of self-regulation via early maternal regulation. Tammilehto et al. (2022) states that, "how (in)secure – in terms of being loved and cared for – someone feels at a certain moment can influence how one regulates one's emotions. Emotion regulation, in turn, can alter state attachment, as maintaining security and coping with insecurity are basic goals that drive daily emotion regulation" (p.1109).

Self-Control:

Attachment influences the development of **self-control** (e.g., Orehek et al., 2017; Pallini et al., 2018), which in turn affects the way individuals regulate their emotions (e.g., Brumariu, 2015). Securely attached individuals tend to have better self-control and are more effective at regulating their emotions compared to those with insecure attachment styles (e.g., Pallini et al., 2018). In contrast, individuals with insecure attachment styles, such as anxious or avoidant attachment, may struggle with self-control and experience difficulties regulating their emotions (e.g., Obeldobel et al., 2022; Yang & McGinley, 2022).

Coping:

Attachment style is also related to **coping** strategies (e.g., Wendolowska, Czyzowska, et al., 2022). Individuals with a secure attachment style tend to use more adaptive coping strategies (e.g., Gardner et al., 2020). In contrast, individuals with insecure attachment styles may use less effective coping strategies (e.g., Fitzgerald & Shuler, 2022; Mikulincer & Shaver, 2019a). Additionally,

individuals with a secure attachment style tend to have a more positive outlook on stress (e.g., Wendolowska, Stec, et al., 2022). In contrast, individuals with insecure attachment styles may perceive stress as more threatening which can lead to maladaptive coping strategies (e.g., Mikulincer & Shaver, 2019a; Morison & Benight, 2022; Shao et al., 2022).

Support

Support can be expressed in multiple ways (e.g., listening, help, affection, resources (Weinstein et al., 2022)), and involves underlying consideration of the partners' needs (e.g., Pauw et al., 2021). As the anxiously attached are uncomfortable with distance from their partner (e.g., Brennan & Shaver, 1995; Mikulincer & Shaver, 2019a), and anxious to keep them close and attendant to their needs (e.g., Collins & Feeney, 2004), they may have high expectations of being supported and low expectations of giving support (e.g., Azzi et al., 2022). Their experience has likely been that significant others won't be appropriately responsive to their needs (e.g., Kobak & Hazan, 1991) and they therefore perceive their partner and their relationship events more negatively (e.g., MacDonald et al., 2012) expecting rejection (e.g., Erozkhan, 2009) and unresponsiveness from their partner and therefore demanding more attention than the securely attached would (e.g., Collins, 1996). Highly avoidant partners are prone to assigning malintent to their partner's support efforts, which in turn may provoke cold (e.g., Kaurin et al., 2022), hostile responses or withdrawal from their partner (e.g., Overall, Pietromonaco, et al., 2022), and they are more likely to show annoyance and defensiveness (Overall et al., 2013), rather than sensitive support.

Empathy

Support-giving that appropriately meets a partner's needs involves **empathy** (e.g., Selke, 2019). The anxiously attached are likely to be empathetically accurate (e.g., Simpson et al., 2011), but lacking emotion regulation. The avoidantly attached's self-protection involves a suppression of empathy

	(Wayment, 2006), and they are therefore more likely to show coldness to their partner and respond with annoyance (covert or overt) to their negative emotions (Overall et al., 2015). They are less likely to feel empathy for their partner, or to accurately assess their partner's emotional state (Campbell et al., 2005; Gillath, Shaver, Baumeister, et al., 2008).

This literature review process was carried out for all top ten factors. As the factors were investigated in combination with the top ten factors (10x10) each of the groupings had numerous overlaps in findings. An effort has been made to streamline these overlaps to reduce repetitiveness. As a result, although the investigation was carried out systematically according to the network model findings, in each summary not all findings are mentioned, and headings are used simply to help clarify content rather than to represent the network model findings.

Systematically reviewing each of the top ten factor inter-relationships meant the network model findings of the most prominent factors in the literature were rigorously examined, and the final explanatory model aligned closely with the network model findings and the researcher theorisations found in thousands of studies. This was an extensive process involving a considerable word count (44,000+ words) so the complete draft of the findings was too large to be shown here or in the appendices.

3. The Top Ten Factor Literature Review Summaries

Following this systematic literature review of the networked factors, a summary of the top ten factor literature review findings was made and is presented below. The top ten factors are presented in order of their frequency of occurrence in the literature: Attachment, personality, sex differences, stress, brain, emotion regulation, communication, conflict, perceptions, and emotions.

3.1 Attachment

3.1.1 Attachment in the Network Models

Attachment as a factor was highly utilised in the research and was strongly linked with each of the other top nine factors, along with *parenting, developmental factors, adverse childhood experiences, violence, hostility, threat appraisal, psychological maladjustment, neuroticism, depression, trauma, fear, rejection, self-esteem, empathy, affection, emotional closeness, commitment, sexual behaviour, cortisol, and oxytocin*.

3.1.2 The Development of Attachment Style

Humans' innate yearning for social connection is an embodied and biologically motivated pursuit (Berscheid & Peplau, 1983; Fishbane, 2007; Ko et al., 2020; Mikulincer & Shaver, 2016a). Wilkowski et al. (2020, p. 1179) state that the "broadest aspects of human motivation are overwhelmingly social in nature". This drive to be in close community with trustworthy, reliable, and responsive others has been studied and affirmed across multiple cultures (Cottrell et al., 2007). From conception through to death, humans socially nurture, protect, support, and guide one another (Wendolowska, Czyzowska, et al., 2022). Ruth Feldman (2012, p. 156) states that parent–infant reciprocity "is the central context in which human infants can learn to become collaborative members of society, develop empathy, and practice intimacy". Therefore, to understand adult relationship behaviours we need to "take account of both partner's developmental histories" (Zayas & Hazan, 2015, p. 64).

Attachment is the prominent developmental theory noted in the literature elucidating this experience and answering the question of how developmental experiences impact adult relationship experiences. Attachment theory is an evolutionary, biologically-based theory that is understood to be universally applicable (Van Lange, 2020). There is debate over whether attachment is an innately conferred response, a learned one, or a combination of both (Hornstein et al., 2021), but most agree that attachment behaviours are rooted in neurophysiological systems (Batson, 2011; Coan, 2016; Feldman, 2016; Lenzi et al., 2015) with a genetic component (e.g., Acevedo et al., 2020; Bleske-Rechek et al., 2021; Denes, 2015; Donnellan et al., 2008; Ebner et al., 2019; Gillath, Shaver, Baek, et al., 2008; Golds et al., 2019;

Verhage et al., 2016)⁴⁸, arising via epigenetic processes influenced by parental accessibility, responsiveness to, and engagement with their offspring (Ainsworth et al., 1978; Bowlby, 1973; Bretherton, 1992; Feeney et al., 2008; Fonagy et al., 2014; Gagliardi, 2021; Johnson & Chen, 2011). Attachment theory postulates that early attachment experiences are integrated into stable perceptions of self and others (Bowlby, 1969; Hornstein & Eisenberger, 2018; Smrtnik Vitulic et al., 2022) which in turn influence personality (Bowlby, 1969; Girme et al., 2020) and serve as the basis for emotions, perceptions, and behaviours in the context of romantic relationships (Hazan & Shaver, 1987).

Attachment to close others is seen as providing security from which to explore the world and self-regulate throughout the lifespan (Bowlby, 1973, 1988; Mikulincer & Shaver, 2007b). The availability and accessibility of significant caregivers sets up biopsychosocial reactions in the child (Groh et al., 2019) that contribute to a ‘mental model’ – an innate emotion regulation system – throughout life (Crocker & Canevello, 2016). The quality of a child's attachment to their caregiver(s) therefore plays a critical role in sociopsychological development (Marquis-Brideau et al., 2022; Mills-Koonce et al., 2022; Schulz et al., 2023), and later adult relationship behaviour and outcomes (e.g., Costa-Cordella et al., 2021; Di Paolo & De Jaegher, 2012; Figueredo et al., 2021; Heyes et al., 2020; Li & Zheng, 2020; Szepeswol & Simpson, 2021)⁴⁹.

When the need for reassurance and proximity is not consistently met through appropriate parental responsiveness, children often resign themselves to using alternative and often less optimal attachment strategies (i.e., regulatory strategies such as deactivation or hyperactivation; Bowlby, 1969; 1982; Mikulincer & Shaver, 2016). As Maranges et al. (2022) note, “neglectful or punishing caregiving may engender an intense need for independence, lower empathic concern, and social disconnectedness—avoidant attachment. Inconsistent caregiving may engender intense fear of abandonment, need for social approval, and high empathic concern—anxious attachment” (p. 1). Mary Ainsworth and Barbara Wittig (1969)

⁴⁸ *Although some findings counter these e.g., Rosiman et. al., (2013).*

⁴⁹ *Of note, some attachment theorists, as noted by Duschinsky et al., 2021, have inferred that attachment insecurity is “the mechanism of all mental pathology rather than a correlate” (p. 364). In this study it is recognised as one of many other factors contributing in networked fashion to individual and dyadic outcomes.*

categorised three attachment styles: secure, anxious and avoidant. Deneault (2023)'s meta-analysis of North American and European children (N=8,186) showed that 53.5% were securely attached, while approximately 20-30% have an avoidant attachment and 15-20% have an anxious attachment which stays reasonably stable over the lifespan (Cassidy & Shaver, 1999; Davila et al., 1997; J. Feeney & P. Noller, 1990; Hazan & Shaver, 1987; Kirkpatrick & Davis, 1994; Roisman et al., 2007; van IJzendoorn & Bakermans-Kranenburg, 1996).

Disorganised attachment is also mentioned in the literature but much less often than the other types of attachment and it therefore failed to show as a prominent factor or co-occurring factor in the network models⁵⁰. Spangler (2013) describes disorganised attachment as set apart from the other types of attachment in that infants show disorganised attachment behaviours as a dispositional trait (from birth) rather than a necessarily developed trait (via social environmental factors). Nonetheless, several studies have shown a connection between disorganised attachment (as evidenced by conflictual or extremely distressed behaviours shown by infants on reunion with their caregiver (Deneault et al., 2023; Granqvist et al., 2017)), and couple relationship distress and hostile conflict (e.g., Spencer et al., 2021), although there is currently comparatively less research attending to this association.

3.1.3 How Attachment Style Impacts Couple Relationships

A secure attachment style in childhood seems to provide long term advantages, particularly in terms of the maintenance of helpful relationship connections throughout life (e.g., Elhusseini et al., 2023; Robinson et al., 2021). On the other hand, an insecure attachment style may have short term protective advantages for a child in regard to their imminent survival needs (e.g., Chen & Chang, 2012; Del Giudice et al., 2011; Lu et al., 2022; Szepeswol & Simpson, 2019, 2021) by helping them to respond safely to threatening situations (i.e., fight, flight, or freeze) (Bryant & Hutanamon, 2018), but long-term disadvantages in regard to the well-being of their adult close relationships (e.g., Fišerová et al., 2021; Maranges et al., 2022; Muetzelfeld et al., 2020; Nascimento et al., 2021; Sheng et al., 2022;

⁵⁰ Of note, the attachment literature is confusing due to the different terminology used to describe different attachment styles and processes. Most obviously, anxious attachment is variously described as preoccupied attachment and avoidant attachment is also known as dismissive attachment. Additionally, disorganised attachment is sometimes referred to as fearful-avoidant attachment. A thorough discourse of attachment related terminology is offered by Robbie Duschinsky, et al., (2021).

Vaillancourt-Morel et al., 2021).

Secure attachment significantly, positively predicts couple relationship satisfaction while anxious and avoidant attachment negatively predict relationship satisfaction (Candel & Turliuc, 2019; Cooper et al., 2018; El Frenn et al., 2022; Kamel et al., 2016). Novak et al. (2017)'s study showed that as much as 75% of the variance in couples' expressed relationship satisfaction was accounted for by their perception of their partners' attachment behaviours. Couples rely on each other for responsive and reliable support and care, and thus attachment style with its corresponding personality traits correlates with relationship satisfaction (Candel & Turliuc, 2019; Diamond et al., 2018) and duration outcomes (Vaillancourt-Morel et al., 2021) by influencing couple communication quality (Knapp, Sandberg, et al., 2015), relationship self-regulation (Hardy et al., 2015; Knapp, Norton, et al., 2015), problem-solving skills in relationships (Xia et al., 2018), commitment (Labonte et al., 2022), and responsiveness (Davies, Thompson, Martin, et al., 2021; Oriña et al., 2011).

3.1.4 Secure Attachment and Relationship Well-Being Outcomes

Secure attachment in childhood usually translates to secure attachment in adulthood (e.g., Koehn & Kerns, 2018; Millings et al., 2013). A secure attachment style is characterised by a sense of trust and comfort in close relationships (Fitzpatrick & Lafontaine, 2017; Ren et al., 2017). The securely attached are more likely to exhibit positive and socially desirable personality traits such as emotional stability, conscientiousness, openness, and agreeableness (Both & Best, 2017; Ferraro & Taylor, 2021; Young et al., 2019). Individuals with secure attachment styles and positive personalities tend to have positive self-appraisals (Ainsworth et al., 1978; Fraley & Shaver, 2021), high self-esteem, supportiveness, empathy, emotional stability, and thoughtfulness (Mikulincer & Shaver, 2016a; Murphy & Laible, 2013), and are more likely to be accessible, responsive, and engaged, and generally prosocial in their behaviour (e.g., Campbell & Stanton, 2019; Çolakkadioglu et al., 2017; Deneault et al., 2022), as well as showing more affection than the insecurely attached (Pauley et al., 2014), and enacting more positive relationship maintenance behaviours (Goodboy & Bolkan, 2011).

The relationship strategies of the securely attached involve cooperation and reciprocity (e.g., Collins et al., 2011; Young et al., 2019) which promote increasing

attachment security with their partner, leading to mutually supportive relationships (e.g., Çolakkadioglu et al., 2017; Crocker & Canevello, 2008; Wendolowska, Stec, et al., 2022). These factors all correlate with higher relationship satisfaction (e.g., Banse, 2016; Collins & Feeney, 2000; Feeney, 2016; Malinen et al., 2012; Park & Harris, 2022; Sandberg et al., 2012; Simpson, 1990), for example, in Wendolowska, Stec, et al. (2022)'s recent study of 114 Polish couples secure attachment was found to promote more effective coping skills including problem-solving, showing compassion, and giving supportive advice when faced with stressors, leading to both partners' increased sense of relationship satisfaction.

3.1.5 Insecure Attachment and Relationship Well-Being

Conversely, individuals with insecure attachment styles may struggle with negativity and low self-esteem (e.g., Chandler & Lawrence, 2021; Çolakkadioglu et al., 2017), anxiety, introversion, neuroticism, antagonism, callousness, aggression, and impulsivity (e.g., Banse, 2016; Bartholomew & Horowitz, 1991; Eder et al., 2021; Feeney, 1994; Mondor et al., 2011; Nettle & Shaver, 2006; Nordahl et al., 2021; Siegel et al., 2019; Simpson, 1990; Vaillancourt-Morel et al., 2021; Vollmann et al., 2019; J. Wilson et al., 2013; Yan & Chen, 2022), potentially resulting in non-collaborative reactions such as denial, defensiveness, and dissociation (Prunas et al., 2019), and subsequent relationship dissatisfaction.

The insecurely attached may also experience more stress and have more difficulty seeking and receiving social support (George-Levi et al., 2020), utilising relationally destructive strategies to keep threats to their autonomy, personal control, and belongingness at bay (e.g., Chow et al., 2014). It seems there is a homeostatic point wherein people cope best with threats, and the securely attached sit comfortably in that range, whereas the avoidantly attached seem to hypo-regulate and the anxiously attached seem to hyper-regulate their threat responses (Oliveira & Fearon, 2019). Therefore, when either partner is insecurely attached it becomes less likely that co-emotion-regulation of stress in the face of threats will occur, leading to increased negativity and conflict (Collins, 1996; Li & Chan, 2012; Simpson et al., 1996), decreased coping, and greater likelihood of relationship break down (Diamond et al., 2018; Peloquin et al., 2022).

3.1.6 The Anxiously Attached in Relationships

Anxious attachment is strongly associated in the network models, and in the literature, with rejection (Gardner et al., 2020; Overall, Pietromonaco, et al., 2022). The anxiously attached are theorised as being uncomfortable with distance from their partner (Brennan & Shaver, 1995; Mikulincer & Shaver, 2019a), and anxious to keep them close and attendant to their needs (Collins & Feeney, 2004). They may see their partner as being less willing to purposefully invest in the relationship (e.g., Labonte et al., 2021) and perceive the support their partner offers them negatively (e.g., McLeod et al., 2020), heightening their need for reassurance and validation (e.g., Murphy, 2012). Additionally, their own higher levels of self-criticism (Rogier et al., 2023), and low self-esteem (Foster et al., 2007), may mean they are more dependent on, and influenced by, their partner's affirmation (Hepper & Carnelley, 2012).

When the anxiously attached perceive their partner to be unavailable they may engage in more intensely negative and emotional communication (e.g., Li & Chan, 2012; McNelis & Segrin, 2019), and typically have more difficulty regulating their emotions in response to stressors (Altan-Atalay & Sohtorik Ilkmen, 2020; Bar-Shachar et al., 2022; Gökdağ, 2021). Their increased negativity has been correlated with decreased relationship satisfaction (Meyer et al., 2014). Defensiveness may be an immediate visceral response to their partner's compliant or criticism (Bekes et al., 2021; Karantzas & Kambouropoulos, 2019; Laczkovics et al., 2018; Schumann & Orehek, 2019), resulting in rapid escalation of emotion (Campbell et al., 2005; Overall, Pietromonaco, et al., 2022; Pollmann et al., 2020), aggression (Fournier et al., 2011), and subsequent lowered conflict resolution and relationship satisfaction (e.g., Bonache et al., 2019; Crangle & Hart, 2017; Prager et al., 2019).

The anxiously attached may also give insensitive support to their partner, in particular, under-provision of support while at the same time overestimating the quality of their own support-giving (Brock & Lawrence, 2014). They may feel too overwhelmed with their own emotional needs to attend adequately to another's emotional needs (Mikulincer et al., 2003; Mikulincer & Shaver, 2016a), and have also been shown to display less gratitude in their partnerships (Zhang et al., 2017), and more psychological abuse (Gewirtz-Meydan & Finzi-Dottan, 2020). Subsequently, the insecurely attached tend to have lowered and fragile relationship well-being (Bar-Shachar et al., 2022).

3.1.7 The Avoidantly Attached in Relationships

Avoidant attachment is strongly associated, in the network models, and correspondingly in the research literature, with *conflict, hostility, anger, blame, cortisol, stress, trauma, fear, and control* (Gustison & Phelps, 2022; Haydon et al., 2020; Houbrechts et al., 2021; Knox et al., 2022; Liddell et al., 2021). From a young age the avoidantly attached tend to prioritise self-reliance and self-regulation rather than social regulation or dyadic coping (e.g., Xiong et al., 2022; Zimmer-Gembeck et al., 2016), having limited experience that others will reliably or appropriately respond to their needs and respect their autonomy (e.g., Fitzpatrick & Lafontaine, 2017; Spielmann et al., 2013).

The relationship strategies of the avoidantly attached are characterised by a deactivation of the attachment system to maintain independence (Arriaga et al., 2018; Mikulincer & Shaver, 2016a, 2016b; Spielmann et al., 2013). As a result, they may have negative representations of others (e.g., Overall et al., 2015; Wang et al., 2017), a high degree of distrust (e.g., Bao et al., 2022; Zeigler-Hill et al., 2014), an inaccurate self-concept (Emery et al., 2018), and an over-emphasis of the negativity of a partner's emotions, intentions, or actions (e.g., Overall et al., 2015). However, as Overall et al. (2016) write, "men who find dependence threatening will struggle to navigate a range of situations central to building and sustaining relationships (e.g., support, disclosure, emotional and physical intimacy)" (p. 28).

The avoidantly attached tend to perceive threat in everyday bids for connection or support from their partner (Spielmann et al., 2013; Vrtička et al., 2012), and they respond defensively to this by deflecting, or withdrawing/ignoring (being inaccessible and unresponsive) (Bretaña et al., 2020; Fowler & Dillow, 2011), or with hostility, anger (Mikulincer, 1998b), counter-attacking (Bretana et al., 2021; Overall & Sibley, 2009a; Schumann & Orehek, 2019), or they simply disengage as a show of independence (Labonte et al., 2022). This has impacts upon conflict resolution, which is a critical element of couple relationship well-being (Bretana et al., 2023; Bretana et al., 2021).

The avoidantly attached may also distrust or negatively view the support others offer (Collins & Feeney, 2004) which can limit their access to coping resources (Winterheld, 2017). Under stress (threat/distress), or conflict (Simpson & Rholes, 2012), they may use distancing strategies to self-protect, rather than turning to their

partner for support (Collins & Feeney, 2000; Shaver & Hazan, 1993; Simpson et al., 1992), which makes it more difficult for them to regulate their stress responses effectively (Overall, Pietromonaco, et al., 2022). Attachment avoidance was associated with lower use of dyadic coping strategies in Peloquin et al. (2023)'s study, and Brock and Lawrence (2014) found that husbands' higher avoidant attachment correlated with ineffectual and at times detrimental overprovision of instrumental (not emotional) support, potentially mediated by lower emotional connection with, and awareness of their partner. On the other hand, avoidant attachment has also been correlated with under-provision of needed support (Lachmar & Seedall, 2019; Simpson et al., 2002). The avoidantly attacheds' self-protection may also result in giving their partner less needed support (Xiong et al., 2022), potentially due to viewing support-seeking of the partner as manipulative or controlling (Overall & Sibley, 2009a).

The avoidantly attacheds' self-protection involves a suppression of emotion including empathy (George-Levi et al., 2022; Gillath & Karantzas, 2007; Kural & Kovacs, 2022; Lampis & Cataudella, 2019; Li et al., 2021; Pan et al., 2022; Robin et al., 2023; Stevens, 2016; Wayment, 2006), meaning they are less likely to accurately assess their partner's emotional state (Campbell et al., 2005; Gillath, Shaver, Baumeister, et al., 2008), and more likely to feel (Monin et al., 2010) and show coldness to their partner (Kaurin et al., 2022) and respond with annoyance (covert or overt) to their partner's negative emotions (Overall et al., 2015). Impett and Gordon (2010) found the avoidantly attached were also less likely to make sacrifices for the sake of their relationship. Avoidant attachment has been correlated with remorselessness, callousness, and unemotionality (Kyranides et al., 2021; Yan & Chen, 2022). Even when the avoidantly attached have committed an obvious transgression toward their partner, they are likely to dampen empathetic responses and cope with guilt by minimising their responsibility and avoiding sincere apology (Schumann & Orehek, 2019).

Schumann (2019, p. 287) concludes that "avoidant people's less comprehensive and more defensive responses after harming their attachment partners might be a contributing factor to why they tend to have less satisfying relationships that often end prematurely", and "their low-quality responses might be especially problematic given their higher likelihood of engaging in relationship behaviours that might frustrate and upset their attachment partners, such as being distant, unempathic, or hostile". Being partnered with an avoidantly attached person may significantly

reduce relationship satisfaction (Conradi et al., 2017; Karantzas et al., 2014; Rodriguez, Coy, et al., 2020; Rodriguez et al., 2019; Roels & Janssen, 2022), leading Conradi et al. (2021) to state that reducing insecure attachment, especially avoidant attachment “must be a central target in couple therapy” (p. 1).

Unfortunately, avoidant strategies may make it difficult for the avoidantly attached to be mindful of their own responsibility in making a relationship stable and satisfying (Erkan et al., 2021; Kimmes et al., 2017), and averse to engaging in therapy (Kealy et al., 2017; Levy et al., 2018; McGonagle et al., 2021), meaning that those partnered with an avoidantly attached person may feel abandoned by them (Knox et al., 2022; Morgan et al., 2019) in their attempts to improve their relationship quality.

3.1.8 Attachment Summary

Attachment style traits shape an individual’s communication, emotion regulation, and conflict dynamics. Securely attached individuals tend to foster positive relationship dynamics characterised by trust, effective communication, and emotional intimacy. Their ability to balance autonomy and closeness supports the development of healthy partnerships marked by cooperation and mutual support. Conversely, anxious individuals, driven by fears of abandonment and uncertainty, often display heightened emotional reactivity and a persistent need for reassurance. This can lead to increased conflict frequency and emotional volatility within relationships, compromising overall satisfaction. Avoidant individuals, on the other hand, exhibit tendencies to distance themselves emotionally, resisting dependency and vulnerability. This detachment can result in emotional disconnection and difficulties in expressing needs and emotions, undermining intimacy. As such, attachment styles exert considerable influence on couple relationship well-being outcomes.

3.2 Personality

3.2.1 Personality in the Network Models

Personality was highly researched in the Endnote library collection. In the whole Endnote library network model, *personality* is shown as being closely linked with *emotion regulation*. Personality was also strongly linked with all the other top ten factors as well as *empathy*, *hostility*, *self-control*, and *depression* and the Big Five factors: *extraversion*, *neuroticism*, *agreeableness*, *conscientiousness*, and *openness to experience*.

3.2.2 The Big Five Traits

While there are many personality theories, the Big Five is the most utilised and recognised in the academic literature (John et al., 2008)⁵¹. The commonly referenced Big Five personality traits are: extraversion (sociability, assertiveness, emotional expression), agreeableness (cooperativeness, trustworthiness, warmth), neuroticism (emotional instability, negativity, coldness), openness (imaginative, creative, psychologically flexible) and conscientiousness (self-disciplined, thoughtful, responsible) (Levine et al., 2020). In Bainbridge et al. (2022)'s study extraversion aligned with fun-seeking, hope, agency, and impulsivity. Agreeableness aligned with empathy, perspective taking, positive relations, social support, and gentleness. Neuroticism aligned with worry, pain catastrophising, aggression, anger, helplessness, rumination, low self-esteem, negativity, and hostility. Openness aligned with need for cognition and personal growth, and conscientiousness aligned with self-control, grit, and perseverance⁵².

⁵¹ This model has been used since the 1980s to measure trait personality differences in individuals (Goldberg, 1990; McCrae, & Costa, 1985).

⁵² Bainbridge, Ludeke, & Costa, (2022)'s recent evaluation of the Big Five measure found that it encompassed other commonly used relevant measures. For example, the **Positive and Negative Affect Scales (PANAS)** (Watson, Clark, & Tellegen, 1988) **Rosenberg's Self-Esteem Scale** (Rosenberg, 1965), along with the **Behavioral Activation System Scale and the Behavioral Inhibition System Scale** (Carver & White, 1994), the **Emotion Regulation Questionnaire** (Gross, 2003), the **Flourishing Scale** (Diener, Wirtz, Tov, Kim-Prieto, Choi, Oishi, & Biswas-Diener, 2010), the **Interpersonal Reactivity Index-Brief (B-IRI)** (Ingoglia, Lo Coco, & Albiero, 2016), the **Gratitude Questionnaire** (McCullough, Emmons, & Tsang, 2002), the **Grit Scale** (Duckworth, Peterson, Matthews, & Kelly, 2007), the **Short Dark Triad (SD#)** (Jones & Paulhus, 2014), the **Self-Control Scale** (Tangney, Baumeister, & Boone, 2004), and the **Multidimensional Scale of Perceived Social Support** (Zimet, Dahlem, Zimet, & Farley, 1988).

3.2.3 The Development of Personality

Personality has a prominent role in the literature in predicting couple relationship satisfaction (e.g., Günaydin, 2021; Malouff et al., 2010; Solomon & Jackson, 2014; Soto, 2019; Specht, 2017) and this role seems to be actualised through individual differences in behaviour, emotions, perceptions, appraisals, and motivations (Beck & Jackson, 2022; Vater & Schröder-Abé, 2015; Verhofstadt et al., 2007) – all processes that are highly relational in derivation and impact (Wilkowski et al., 2020).

Personality is commonly viewed as developing from a combination of ‘nature and nurture’ factors (Karterud and Kongerslev, 2021, p. 2), and elements of personality are identifiable early in life (S. Wilson et al., 2013). Personality is viewed as being approximately 50% genetically influenced, and 50% socially and environmentally influenced (e.g., Bleidorn et al., 2014; Bouchard & McGue, 2003; Jang et al., 2002; Jang et al., 1996; Plomin et al., 2008; Polderman et al., 2015; Trofimova & Christiansen, 2016; Turkheimer, 2019; Vukasovic & Bratko, 2015; Zwir et al., 2020), with Krueger and Johnson (2021) stating in their review of the nature/nurture debate that “every individual-differences characteristic that could be measured is probably at least somewhat heritable, but environmental influences are also typically as great as the influences of genes” (p. 222). In J. Wagner et al. (2020)’s model, personality is viewed as arising from stable genetic differences that are guided and shaped by environmental effects (cultural, social, and physical, including stressors) and resulting perceptions, that are all mutually influential. Human volition also plays a role in personality outcomes – with Brown and Rohrer (2019)’s study of the determinants of well-being indicating that 40% of individual differences in happiness are volitional in nature.

3.2.4 The ‘Nature’ of Personality Development

Polderman et al. (2015)’s meta-analysis of trait heritability reviewed the outcomes of more than fourteen million pairs of twins and their findings provide compelling evidence regarding the genetic influences on every personality trait, (but also of the influence of shared environment). They found that some people reacted in biased ways to adversity, or to positive environmental factors, due to their genetic makeup (47% of the variation). These biases correlated with higher neuroticism and lower extraversion. Reactions to reward or punishment, and environmental sensitivity (sensitivity to rewarding and punishing aspects of the environment), are a common feature in both temperament and personality theory and have been linked to genetic

aetiology (Assary et al., 2021; Concas et al., 2021). Specific genes have also been identified that are associated with personality traits (Carere & Maestripieri, 2013; Christova et al., 2020; Kandler & Bleidorn, 2013; van Oers et al., 2023), for example, the dopamine receptor D4 gene is dominant in those who are highly extraverted (Wacker & Smillie, 2015).

Zwir et al. (2019)'s study deemed personality to depend upon genes that control and organise the dynamic functions of the brain, particularly in response to environmental rewards and punishments, to help people adapt to changing circumstances (Bratko et al., 2022). Differences in brain structure and function may therefore be associated with differences in certain personality traits (e.g., Privado et al., 2017; Read et al., 2010; Xu & Potenza, 2012). Individuals high in extraversion tend to show greater activation in brain regions associated with reward processing (Aghajani et al., 2014), while individuals high in openness tend to show greater activation in brain regions associated with cognitive flexibility and creativity (DeYoung, 2013).

In Bjornebekk et al. (2013)'s study of the neuronal correlates of personality, neuroticism was linked to smaller brain volume, and frontotemporal surface area. Extraversion was linked to a thinner inferior frontal gyrus, and conscientiousness was linked to variation in the temporoparietal junction. Those high in agreeableness show increased activation in the same prefrontal brain regions used in empathic and social interaction processes, and self-regulation (e.g., Udochi et al., 2022). Agreeable people also typically have increased bilateral anterior cingulate cortex and anterior insula volume which is associated with compassion (Hou et al., 2017) as well as left-right brain hemisphere network differences which have been associated with supportiveness (Zajner et al., 2022).

3.2.5 The 'Nurture' of Personality Development

Genetic activity and neuronal structure can also be shaped by environmental factors and life experiences (e.g., Byrd & Manuck, 2014; Shah et al., 2014). Non-social environmental factors (e.g., household environment) may impact upon personality development, with some researchers deeming them negligible (e.g., Matteson et al., 2013), and others considering them highly significant (e.g., Assary et al., 2021; Weinschenk et al., 2022). However, multiple researchers agree that social environment throughout a person's lifespan is critical to personality development

(e.g., Atzil et al., 2018; Feldman et al., 2007; Power & Pluess, 2015; Slobodskaya, 2021). For example, in Udayar et al. (2019)'s study, lack of social support was shown to have a bi-directional influence on neuroticism development.

Similarly, attachment styles have been described as personality traits that “can be construed more specifically as interpersonal attitudes toward self and toward significant others” (Gaines, 2016, p. 191). In Young et al. (2019)'s longitudinal study (which followed 170 Minnesota residents across 30 years) childhood attachment security correlated with adult agreeableness, conscientiousness, and emotional stability, whereas attachment insecurity correlated with antagonism, carelessness and neuroticism (the opposites of agreeableness, conscientiousness, and emotional stability). Agreeableness has been correlated with secure attachment in multiple studies (e.g., Both & Best, 2017; Young et al., 2019), and negatively with avoidant attachment in others (e.g., Marrero-Quevedo et al., 2018; Nettle & Shaver, 2006; Sadikaj et al., 2011), and there are acknowledged prosocial similarities between agreeableness and secure attachment (e.g., Both & Best, 2017; Marrero-Quevedo et al., 2018), with Both and Best (2017) stating that “secure attachment is associated with personality characteristics related to positive relationships and suggest an individual who is approachable and has low distress” (p. 5).

From a broader social environment perspective, cultural values and norms can also influence the development of personality traits (e.g., Boyle et al., 2020; Deng et al., 2021), although this seems to be only a marginal effect (Garcia et al., 2022). Individuals from collectivistic cultures may prioritise group harmony and social cohesion over personal achievement and assertiveness, leading to socially developed differences in personality traits compared to individuals from individualistic cultures (e.g., Proudfoot & Kay, 2022; Schouten et al., 2023). Moreover, cultural expectations and stereotypes can influence the expression and perception of personality (e.g., Sagiv & Schwartz, 2022). For instance, in some cultures, men may be expected to display more assertiveness and dominance while women may be expected to be more emotional, nurturing, and cooperative (Garcia et al., 2022; Murphy et al., 2021).

3.2.6 How Personality Impacts Couple Relationships

Walton et al. (2021)'s study found a consensus among experts on the conceptual alignment of the Big Five traits with social and emotional skills, and Beck and

Jackson (2022)'s large study (N=171,395 participants from 10 longitudinal panel studies in a mega-analytic framework) concurred that personality traits predict social outcomes through their outworking in an individual's emotions, perceptions, and behaviours. In Buss et al. (1990)'s study spanning 37 cultures, a high value was given to partner personality characteristics of dependability, emotional stability, kindness, understanding, and intelligence. It seems that people in general are better liked when they have more cooperative, warm, polite, humble, and grateful personality traits, and less negative, irritable, short-tempered, offensive, devious, suspicious, manipulative, and conceited ones (Wortman & Wood, 2011). As Fles and Lakey (2017) note, supportive partners tend to be agreeable (kind and sympathetic), extroverted (cheerful and optimistic), emotionally stable (calm and secure), conscientious (reliable and scrupulous), and open (insightful and perceptive). In Malouff et al. (2010)'s meta-analysis (N=3,838), emotional stability (the opposite of neuroticism) was the strongest predictor of partners' relationship satisfaction, followed by agreeableness, conscientiousness, and extraversion.

Generally, expressions of extraversion, agreeableness, openness, and conscientiousness have been correlated with higher relationship satisfaction and stability while neuroticism has been negatively correlated (e.g., Amani et al., 2019; Cano-Prous et al., 2013; Caughlin et al., 2000; Claxton et al., 2012; Kreuzer & Gollwitzer, 2021; Malouff et al., 2010; Roberts et al., 2007; Solomon & Jackson, 2014; Weidmann et al., 2017; Woszidlo & Segrin, 2013a; Y. Zhou et al., 2017), partly as a result of negative communication patterns (e.g., Caughlin et al., 2000), and antagonism, has also been shown to have relationally detrimental qualities (Lynam & Miller, 2019). Personality traits can influence how individuals express and cope with conflict (Kaurin et al., 2021). Individuals who score high on traits such as neuroticism, aggressiveness, and antagonism are more prone to expressing hostility and experiencing interpersonal conflicts (Chester & West, 2020; Hyatt et al., 2020; West & Chester, 2022), while individuals with high levels of agreeableness tend to be cooperative and compassionate, which can help them to resolve conflicts and reduce hostility (e.g., Kokkinos et al., 2017; Saeed Abbasi & Alghamdi, 2021).

3.2.7 Agreeableness

Agreeableness and neuroticism were found to be the most frequently studied personality traits in this study. Of all the Big Five traits, agreeableness, with its selfless concern for others, and generous, supportive, considerate, trustworthiness

and trusting attitudes (e.g., Costa et al., 1991; Digman, 1990; Stavrova, Evans, et al., 2023), is the strongest positive predictor of prosocial traits (Wertag & Bratko, 2019)⁵³. Wilmot and Ones (2022)'s summary of 142 meta-analyses (N > 1.9 million participants) determined that agreeableness is evident in compassion, altruism, tendermindedness, politeness, straightforwardness, humility, cooperativeness, trust, and honesty. These agreeable characteristics are critically important in successful couple relationship development and maintenance.

In Ahmetoglu et al. (2010)'s study (N=16,030) agreeableness correlated with intimacy, commitment, and passion. Agreeable people are likely to be cooperative with (Zhao & Smillie, 2015), and compassionate towards their partner, providing a buffer to them from stress (e.g., Matos et al., 2022; Saarinen et al., 2021) which may result in calmer physiological responses to stressful situations, helping to explain the strong link seen between high agreeableness and low hostility. Tov et al. (2016) found that higher agreeableness correlated with higher relationship satisfaction mediated by less negativity, criticism, anger, and partner neglect. Interestingly, both agreeableness and conscientiousness have neurobiological links to dopamine (associated with compassion (DeYoung, 2013)) and serotonin (associated with politeness and decreased aggression (Wright et al., 2019; Young & Leyton, 2002)).

3.2.8 Neuroticism

While agreeableness positively predicts couple relationship well-being, neuroticism (or emotional instability) is a robust predictor of lower individual well-being (Winzer et al., 2021), as well as dyadic maladjustment and relationship failure (e.g., Amani et al., 2019; Cano-Prous et al., 2013; Cao et al., 2018; Caughlin et al., 2000; Chopik & Lucas, 2019; Fisher & McNulty, 2008; Gattis et al., 2004; Kardum et al., 2020; Kreuzer & Gollwitzer, 2021; Kroener et al., 2023; Malouff et al., 2010; Weidmann, Purol, et al., 2023), accounting for 10% of relationship dissatisfaction in Karney and Bradbury (1995)'s review.

Neurotic individuals tend to be more vulnerable to stress (e.g., Jonason & Sherman, 2020; McNulty et al., 2021; Woszidlo & Segrin, 2013a), feel more negative emotions when stressed (Estlein & Lavee, 2021), are more likely to feel out of control when

⁵³ Closely followed by conscientiousness e.g., Abe & Oshio, 2016.

faced with stress, and less likely to perceive their capacity to cope, tending to view “everyday situations as relatively demanding and, at the same time, feeling less capable of dealing with them” (Tomaka & Magoc, 2021, p. 688). Neuroticism is subsequently associated with heightened anxiety and depression (e.g., Kandler & Ostendorf, 2016; Nordahl et al., 2022; A. Williams et al., 2021) which have also been shown to negatively influence relationship satisfaction (Turliuc et al., 2021).

While neurotic individuals may show an increased sense of empathy, neuroticism is also associated with increased perceptions of the negative emotions of anger, sadness, fear, and guilt (e.g., Decuyper et al., 2018; Tong, 2010; Zhang & Zheng, 2019), and increased negative self and partner appraisal (Finn et al., 2013; McNulty, 2008), meaning that empathy expression may become self-focused and self-protective for these individuals, especially when combined with narcissism (Simard et al., 2023). As such, neuroticism has many factors in common with anxious attachment (Crawford et al., 2007), for example, a tendency to negative thinking (Nordahl et al., 2021), low self-esteem (Marrero-Quevedo et al., 2018), and a confrontational or aggressive attitude (Chester & West, 2020; Puchalska-Wasyl, 2017). Interestingly, neuroticism was shown in Donnellan et al. (2008)’s study to have “shared genetic variance with trait attachment anxiety” (p. 1127).

3.2.9 Mental Health

Personality traits are a significant predictor of mental health (Etkin et al., 2022; Waszczuk et al., 2021). “Personality and psychopathology share common aetiologies” (Perlstein & Waller, 2022, p. 47) and “there is accumulating evidence that personality and psychopathology share the same temperamental origins in fundamental brain systems for emotion and motivation” (Slobodskaya, 2016, p. 1068), with personality and psychopathology sharing reward and punishment sensitivities. Vukasović Hlupić et al. (2022)’s meta-analysis (N = 10,500) found that the basic psychological needs of autonomy, competence, and relatedness (Deci & Ryan, 2008; Ryan & Deci, 2000) had significant negative correlations with neuroticism, and positive correlations with extraversion, openness, agreeableness, and conscientiousness. Frustration of these basic needs was viewed as a mediator between personality and psychopathology in Vandenkerckhove et al. (2019)’s study.

Some researchers believe neuroticism lies at the core of psychopathology (Mann et al., 2020; Tackett et al., 2013) given its correlation with the majority of Axis I and II

disorders (e.g., Bucher et al., 2019; Kotov et al., 2010). A Norwegian study (N=503, 76% female) found a high correlation between the DSM-5 (PID-5) negative affectivity and neuroticism ($r=0.77$) (Thimm et al., 2016), and Suzuki et al. (2015)'s study (N=3,517) also supported these correlations. Nestor et al. (2021)'s study (N = 100) found a personality profile of mental health consisting of low neuroticism and high extraversion and conscientiousness, which were also linked to specific alleles. In Kotov et al. (2010)'s meta-analysis (80 studies, 63,074 participants), neuroticism was the Big Five personality trait most strongly correlated with internalising psychopathology (mental health factors including depression and anxiety), whereas antagonism (low agreeableness) was most strongly correlated with externalising psychopathology (including hostility, aggression and anti-social behaviour).

Mental health, particularly depression, has a well-studied influence on social dysfunction (e.g., Karukivi et al., 2017) and relationship well-being outcomes, (e.g., Breslau et al., 2011; Busby, Leavitt, et al., 2021; Downward et al., 2022; Pietromonaco et al., 2021). Wilson et al. (2018)'s twin study (N=284) causally linked negative affectivity, detachment, disinhibition, and psychoticism with reduced couple relationship well-being. Decuyper et al. (2018)'s study showed that "among the maladaptive traits, negative affect and detachment were most consistently negatively associated with relationship satisfaction" (p. 81). Individuals with depression or anxiety, are more likely to experience emotion-dysregulation (e.g., Beauchaine & Cicchetti, 2019; Coifman & Summers, 2019; Donahue et al., 2014; Nigg, 2017; Sloan et al., 2017), relationship distress and lower levels of relationship satisfaction (e.g., Whisman, du Pont, et al., 2018), potentially mediated by lowered partner support and soothing (e.g., Desrosiers et al., 2014; Sandberg et al., 2016).

This relationship may also be reciprocal in that lower relationship quality has also been found to correlate with poorer mental health (Biesen & Smith, 2022; Yan et al., 2020). Stress-related disorders are "the most prevalent mental health diagnoses, associated with significant disability globally" (Helpman, 2023, p. 1), and this includes the stress of relationship difficulties (e.g., Campbell & Renshaw, 2018). For example, in Nordahl et al. (2021)'s (N=296, 77% female), interpersonal problems were significantly correlated with anxiety and depression (23.6% of the variance), while being in an antagonistic relationship was associated with depression, anxiety, and stress symptoms in Mehulic and Kamenov (2021)'s Croatian study (N=727).

3.2.10 Personality Disorders

Personality disorders cluster with *genetic factors* in the personality network model while linking most strongly with the facet of *neuroticism* (the opposite of emotional stability) and *antagonism* (the opposite of agreeableness) (Vize et al., 2021). Personality disorders, like personality traits, are characterised by enduring patterns of thought, affect, and behaviour and are therefore related to maladaptive versions of what are normally healthy personality traits (Morey et al., 2022; Sanchez-Roige et al., 2018), with some researchers speculating that personality and personality disorders lie on the same continuum (Bagby & Widiger, 2018; Oltmanns et al., 2018) for example, agreeableness compared to antagonism (Crespi, 2014).

Personality disorders cause dysfunction along the two domains of self (identity and self-direction), and interpersonal relations (empathy and intimacy) (American Psychiatric Association, 2013) and are marked by inter-personal difficulties (e.g., Gunderson et al., 2011; Hopwood et al., 2013; Najarian & Abdi, 2017; Tyrer et al., 2015), predicting enduring relationship distress (Gleason et al., 2014). Personality disorders are commonly viewed as a subcategory of mental health disorders (Kendell, 2002), which are also linked to personality traits and to relationship outcomes. For example, ADHD (attention-deficit hyperactivity disorder) has been linked with short-lived and discordant relationships (Bruner et al., 2015; Eakin et al., 2004; Huynh-Hohnbaum & Benowitz, 2023; Kahveci & Tutarel, 2022; Wymbys et al., 2021), and borderline personality disorder predicts lower marital satisfaction and increased relational problems (Lavner et al., 2015).

3.2.11 The Dark Triad

The ethically and socially aversive personality traits have a uniquely detrimental impact upon couple relationship outcomes (Balzen et al., 2022; Day et al., 2022), being correlated with low agreeableness, and high neuroticism (e.g., J. Miller et al., 2017), argumentativeness (Clemente & Espinosa, 2021; Webster et al., 2016), contempt, criticism, defensiveness, and stonewalling (Horan et al., 2015), higher incidents of infidelity and pornography use (both of which impact on relationship satisfaction) (Ferreiros & Clemente, 2022), and dishonesty (Martskvishvili et al., 2022). The Dark Triad personality disorders of narcissism, Machiavellianism, and psychopathy (Paulhus & Williams, 2002) seem particularly toxic in couple relationships (Wetzel et al., 2020). Spouses' psychopathic traits, including aggressiveness, callousness, manipulativeness, self-centredness, anti-sociality,

impulsivity, and irresponsibility, predict declines in marital satisfaction and commitment over time (Ingram & South, 2021; Jonason et al., 2020; Weiss et al., 2018), and husbands' psychopathic traits predict elevated 10-year divorce rates (Weiss et al., 2018).

Narcissists exhibit high levels of antagonism (e.g., Aslinger et al., 2022; e.g., Dinić, Sokolovska, et al., 2021), and neuroticism (e.g., Crowe et al., 2019). They are prone to engage in transactional behaviours, viewing social interactions and relationships as opportunities for personal gain rather than as mutually rewarding experiences (Burgmer et al., 2019) and are often preoccupied with their own needs, desires, and accomplishments – prioritising these over the needs and desires of their partner (e.g., Jones, 2013; Mota et al., 2022; Seidman et al., 2023). They are typically manipulative (Casale et al., 2019), self-protecting (Peterson & DeHart, 2014) and self-promoting (Day et al., 2020), which can lead to infidelity (e.g., Altinok & Kilic, 2020; Jones & Weiser, 2014) and other forms of relationship betrayal (e.g., Brewer et al., 2020; Kardum et al., 2022; Warach et al., 2019), including dishonesty (e.g., Jones & Paulhus, 2017; Özkul, 2020).

Narcissists tend to perceive others' perspectives and experiences as inferior to their own (Bodecka-Zych et al., 2022; Lisá & Valachová, 2021). Their self-reflection, self-appraisal, and other-appraisal are often distorted and lacking in accuracy (Čekrlja et al., 2023; Loeffler et al., 2020). This can make it difficult for them to form healthy relationships and work collaboratively with others (Mota et al., 2022). Additionally, narcissists lack outward looking empathy and sensitivity to their partners' emotions (e.g., Simard et al., 2023), but may consider themselves to be highly empathetic (Eddy, 2021), which can lead to misunderstandings, conflict, and dissatisfaction in a relationship (Brewer et al., 2023). Consequently they may have difficulty recognising and addressing areas for self-improvement (Biberdzic et al., 2023), and as they are often high functioning individuals they may be difficult for a therapist to identify as problematic in a couple relationship (Di Sarno et al., 2023).

Antagonism, the defining characteristic of narcissism, is described in the Alternative DSM-5 Model for Personality Disorders (American Psychiatric Association, 2013) as exhibiting behaviours “that put the individual at odds with other people, including an exaggerated sense of self-importance and a concomitant expectation of special treatment, as well as a callous antipathy toward others, encompassing both an unawareness of others' needs and feelings and a readiness to use others in the

service of self enhancement” (p. 780). Antagonists are notably critical, sceptical, hostile, condescending, mistrusting, impulsive, and manipulative (e.g., Calabrese et al., 2023; Graziano & Tobin, 2017; Vize & Lynam, 2021), exhibiting a sense of superiority and entitlement (Baumeister et al., 2003), and a strong need for admiration (Miller et al., 2022; Simard et al., 2023), making it unlikely there will be mutual satisfaction in their relationships.

3.2.11.1 Attachment and Personality Disorders

Narcissism, and antagonism, have some similar characteristics to those seen in the avoidantly attached (Biberdzic et al., 2023; Day et al., 2022; Reis et al., 2021; Walters, 2019), and Richardson et al. (2022) state that “it is conceivable that the positive self-model of attachment-avoidance is actually a reflection of vulnerable narcissism” (p. 12). As with the avoidantly attached, narcissists are also unlikely to accept that they are responsible for relationship break down or to seek out or desire therapy (Chen et al., 2022; Janusz et al., 2020).

Other personality disorders have also been shown to correlate with attachment styles, and “virtually all personality disorders—except obsessive—compulsive—have a relationship with insecure attachment styles” (Pad et al., 2022, p. 164), and “adult attachment and personality pathology may indeed be iterations of the same underlying dysfunction” (Smith & South, 2021, p. 1). The aetiology of both personality pathology and adult attachment is complex and involves a combination of genetic, environmental, and interpersonal factors. Childhood developmental factors, such as parental care and early attachment experiences can play a significant role in the development of both constructs (Lorenzini & Fonagy, 2013; X. Zhang, J. Li, et al., 2022), and “personality pathology and adult attachment... share crucial phenomenological features, aetiologies, and genetic bases” (Smith & South, 2021). Additionally, trauma, abuse, neglect, and other stressful experiences in childhood and adulthood can contribute to the development of both personality pathology and insecure attachment (e.g., Fuchshuber et al., 2019; Hogg et al., 2023; Hoppen & Chalder, 2018).

3.2.12 Personality Summary

Partners' individual personality traits play a significant role in determining the overall quality and trajectory of their relationship. Personality traits such as agreeableness, conscientiousness, and emotional stability contribute to the establishment of

effective communication patterns, conflict resolution strategies, and emotional bonding. Agreeableness, characterised by traits such as empathy, cooperation, and a proclivity for harmonious interactions, plays a pivotal role in fostering positive relationship dynamics. Conscientious partners are often dependable, fostering an environment of mutual respect and shared responsibilities. On the other hand, neuroticism, typified by emotional instability and heightened reactivity to stressors, can contribute to negative relationship outcomes. Individuals high in neuroticism may struggle with negativity and poor emotional regulation, leading to heightened conflict frequency and lower relationship satisfaction. Individuals with personality disorders and psychopathological conditions also often encounter challenges in establishing and maintaining healthy relationships.

3.3 Sex Differences

3.3.1 Sex Differences in the Network Models

Sex differences were highly researched in the Endnote library collection. Sex differences are strongly linked with all the other top nine factors, especially *attachment*, and also closely linked with *violence*, *depression*, *age and stage*, *developmental factors*, *threat appraisal*, *empathy*, *support*, and *stress buffering*.

3.3.2 Biological Sex Differences

While sex differences are defined here as biological in nature the factors that contribute to sex differences are multifaceted, involving a complex interplay between biological, psychological, and social factors. It is important to note that sex differences are based on averages and there is considerable individual variation. In their recent article on sex differences in the human brain, DeCasien et al. (2022) advise that “care in interpretation is important for all domains of science, but especially so for research on sex differences in the human brain, given the existence of broad societal gender-biases and a history of biological data being used to justify sexist ideas” (p. 1). Bearing this in mind, anatomical sex differences are clearly apparent⁵⁴ from childhood (e.g., Kurth et al., 2021; Slotnick, 2021; Snell & Turner, 2018), and “affect nearly every biological process” (Arbeitman et al., 2014, p. 979).

Biological sex differences include physical characteristics such as differences in height, weight, and muscle mass, as well as differences in brain structure and function (e.g., DeCasien et al., 2022; Koolschijn & Crone, 2013; Lenroot & Giedd, 2010; MacMaster et al., 2007; Nunez et al., 2018; Rice et al., 2023; Roberts et al., 2021; C. Williams et al., 2021), and neurological processes (Gao et al., 2022). Lopes-Ramos et al. (2020) found sex-differences in gene expression and regulatory networks across twenty-nine different human tissue samples. As Cahill (2021) state, “in 2020 it is abundantly clear to all who both know the literature, and who are honest about it, that the mammalian brain is chock-full of sex influences of all sizes and kinds at literally all levels of its function, down to the genetic level” (p. 174). Affirming this statement, Wapeesittipan and Joshi (2023, p. 16) “identified robust sex differences across human brain regions” from 16,000 individual samples of

⁵⁴ For most individuals, however, 1/5,000 babies are born with ambiguous genitalia (Sax, 2002; Thyen et al., 2006).

gene expression in the brain, and Anderson et al. (2019)'s large (N=1,300) study of brain grey matter volume showed that adult male and female brains could be differentiated 93% of the time, making them reliably and "highly distinguishable" (p. 1496). Liang et al. (2021)'s study (N=782) found sex differences in brain lateralisation⁵⁵, and Logan et al. (2022) found sex differences in molecular rhythms in the cortex. These sex differences in the brain are evident from birth (Benavides et al., 2019), and increase throughout childhood (Kurth et al., 2021).

Men typically have larger brains (Kaczurkin et al., 2019; Kaufmann, 2009; Pangelinan et al., 2011; Ruigrok et al., 2014; Sowell et al., 2007), larger amygdalae, pallidums, and putamens, more grey matter, cortical surface area, and white matter than women (Lotze et al., 2019; Ritchie et al., 2018), while women have larger nucleus accumbens and more volume in the Brodmann areas 44 and 45 (Kurth et al., 2016), significantly greater cortical thickness than men (Luders et al., 2006; Sowell et al., 2007), and stronger inter-hemispheric brain connectivity than men (e.g., Ardekani et al., 2013; Bonelli et al., 2022; Bruner et al., 2012; Ingahalikar et al., 2014; Jung et al., 2022; Kanaan, 2012; Liang et al., 2021; Logan et al., 2022; Luders et al., 2014; Ramos-Loyo et al., 2022; Schmied, 2020; Shiino, 2017; Sneider & Silveri, 2021). Neurological sex differences have also been noted at the molecular level (Karp et al., 2017) including differences in brain synaptic plasticity and dendritic spines (Musazzi & Marrocco, 2021), and in gene expression (Lopes-Ramos et al., 2020).

3.3.3 How Neurological Sex Differences Alter Behaviour

Neurological sex-differences may help to explain sex-differences in relationship-impacting perceptions, emotions, and behaviours. Ingahalikar et al. (2014)'s study (N=949) of sex differences in brain connectivity found that "male brains are structured to facilitate connectivity between perception and coordinated action, whereas female brains are designed to facilitate communication between analytical and intuitive processing modes" (p. 823). Long et al. (2022)'s study found that sex differences in the structure of the insula subregions correlated with aggression and anger differences. Men are typically more likely to display hostility than women

⁵⁵"The left and right sides of the brain are specialised to attend to different information, to process sensory inputs in different ways and to control different types of motor behaviour. This is referred to as hemispheric specialisation or simply as brain lateralisation" (Rogers, 2021, p. 1).

(Staniloiu & Markowitsch, 2012), perhaps also due to emotion regulation differences, which are moderated by sex differentiated amygdala volume or cortico-limbic circuitry (Eliot, 2021; Fassett-Carman et al., 2022). Differences in amygdala and hippocampal volume (e.g., Jamieson et al., 2022) and nucleus accumbens volume (e.g., Chahal et al., 2021) are also associated with reward and punishment/threat sensitivity.

Women have also been shown to have increased brain activation when processing emotion, and recognise facial emotion faster than men do (Navarra-Ventura, 2018). The findings from Derntl et al. (2010)'s fMRI neurological study showed that "females and males rely on divergent processing strategies when solving emotional tasks: while females seem to recruit more emotion and self-related regions, males activate more cortical, rather cognitive-related areas" (p. 67). Women have more hippocampal and frontal cortex interactions than men, potentially outworking in a greater mental flexibility in their social relationships (Morton et al., 2017). Interestingly, in Flores-Torres et al. (2022) study it was found that positive reappraisal helped both men and women to reduce negative emotion, but this only benefited women in their subsequent decision-making, and seemed to have the opposite effect for men.

For females, early trauma exposure may invoke an overactive and enlarged amygdala, as well as decreased connectivity of salience hubs such as the dACC" (p. 1). This may partially explain why women are twice as likely as men to develop stress-related disorders (e.g., Bekker & van Mens-Verhulst, 2007; Koo et al., 2015; Matin et al., 2017; Meng & D'Arcy, 2016). Women's response to negative socioemotional stimuli in Altavilla et al. (2021)'s study correlated with increased brain activity compared to men. Qiu et al. (2022)'s study showed that under stress, women showed stronger left amygdala and left hippocampus activation than men did. On another note, in Berchicci et al. (2021)'s study, females paid more attention to auditory stimuli than men and this showed up in different levels of brain activation. In Ruytjens et al. (2007)'s study on sex differences in the auditory cortex it was found that when listening to noise, men's right prefrontal cortex was deactivated while women's was not. The right prefrontal cortex is involved in verbal suppression (Hornberger & Bertoux, 2015). In other words, listening might potentially be a more difficult neurological task for men than women.

3.3.4 How Hormonal Sex Differences Alter Behaviour

While most research on biological sex differences focuses on the brain or sex organs, all bodily “organs are sexually differentiated, and sex differences in peripheral organs affect the brain” (de Vries & Forger, 2015, p. 1). Additionally, sex differences in hormones significantly impact upon brain function (e.g., Gegenhuber et al., 2022; Henze et al., 2021), and social behaviour and outcomes (de Vries et al., 2022). A critical cause of hormonal sex differences are the differences in the X and Y sex chromosomes (Raznahan & Disteche, 2021). These sex chromosomes carry genes that influence the development of primary and secondary sexual characteristics⁵⁶ (Lentini et al., 2013; Spiller et al., 2017). The Y chromosome, found exclusively in males, contains genes responsible for initiating the development of male gonads (testes) during embryonic development. The testes, in turn, secrete the testosterone hormone. Conversely, women develop ovaries instead of testes, and ovaries produce oestrogen and progesterone hormones (Mitchell & Sharma, 2009).

Testosterone and Oestrogen in particular shape the organisation and function of the brain, including brain structure, neuroplasticity, connectivity, verbal and spatial abilities, aggression, empathy, theory of mind, and emotion processing (e.g., Ball & Balthazart, 2020; Been et al., 2022; Denson et al., 2018; Eliot, 2021; Gegenhuber et al., 2022; Joue et al., 2022; Klein et al., 2019; Makhanova et al., 2018; Ogawa et al., 2020; H. Wang et al., 2022; Wuying et al., 2018; Zhuo et al., 2022; Zuloaga et al., 2020). Testosterone also influences sexual behaviour (Macdowall et al., 2022), as well as competitiveness (Knight et al., 2022), and oestrogen plays a key role in stress responses and HPA activity (Zuloaga et al., 2020).

Oxytocin is another important hormone in regards relationship-related affect and behaviour (e.g., Algoe et al., 2017; Carter, 2022; De Dreu & Kret, 2016; Han et al., 2021; Ma et al., 2016; Rilling & Young, 2014; van Anders et al., 2011; Zietlow et al., 2019). Women release higher levels of oxytocin than men and this is believed to

⁵⁶ *It is important to note that while the presence of XY chromosomes usually corresponds to male sex and XX chromosomes to female sex, there are exceptions and variations in the biological spectrum of sex. Intersex individuals (born with both male and female biological traits), for instance, may possess atypical combinations of sex chromosomes, reproductive organs, or hormonal profiles, highlighting the complexity of biological sex determination.*

mediate the ‘tend and befriend’ response⁵⁷ (Cardoso, Ellenbogen, Serravalle, et al., 2013), where under stress females demonstrate cooperative, supportive behaviours (e.g., Randall, Tao, et al., 2021; Youssef et al., 2018), and cope by seeking social support (e.g., Tamres et al., 2002). Carter and Keverne (2002) found that oxytocin was critical to attachment and social bonding experiences, shaping maternal nurture (Bosch, 2011; Feldman et al., 2010), and the development of prosocial skills such as empathy, altruism, trust, and emotion recognition (Kucerova et al., 2023).

Female oestrogen and male testosterone interact differentially with oxytocin (and other hormones) in response to stressors (Babkova Durdiakova et al., 2017; Ditzen et al., 2012). Berchicci et al. (2021) state that “females experience more detriments from stress than males” (p. 109), perhaps due to their stronger general physiological arousal (Deak et al., 2015), which may be related to differences in oxytocin response (e.g., Love, 2018; von Dawans et al., 2019) and which may contribute to a greater tendency to seek social support during times of stress. On the other hand, while men also exhibit tend and befriend responses to stress (von Dawans et al., 2012), this affiliative response may be influenced by cortisol, rather than oxytocin activation – for example, in Berger et al. (2016)’s study, men’s higher cortisol levels predicted affiliative stress-buffering responses. Curiously, in Prasad et al. (2017)’s study, cortisol increased under high-stress conditions, and this moderated the effects of testosterone on retaliation behaviours. However, in this study, women reduced retaliation in high stress situations whereas men increased it.

Females more robust cortisol response to stress may be influenced by age and stage factors such as menstrual cycle phase (e.g., Duchesne & Pruessner, 2013; Kim et al., 2021; J. Liu et al., 2017). Women showed smaller cortisol response to psychosocial stress than men in Nitschke, Pruessner, et al. (2022)’s study, and this seems to be alterable via oral contraception use. Males tend to exhibit higher levels of cortisol and sympathetic nervous system activation under stress, while females have greater activation of the parasympathetic nervous system under stress (Kupper et al., 2021).

⁵⁷ Interestingly, this sex difference was not noticed in early stress research as studies typically only included males (usually rats) which led to the assumption that responses of fight or flight were generic. However, when females were added into studies it was found that they were more likely to respond with ‘tend and befriend’ responses (Taylor et al., 2000).

Other hormones also influence couple relationship well-being outcomes. Men have 50% more cerebral serotonin than women – a hormone which is important for mood, aggression, alertness, and pain experience (Goldstein et al., 2001). Dopamine, a hormone which facilitates reward and pleasure seeking (Edwards & Self, 2006), and coordinates with oxytocin and cortisol in producing the beneficial physiological effects of a partners' comfort, soothing, and stress buffering (Gilbert et al., 2008; Lieberwirth & Wang, 2016) is also sexually dimorphic (Joue et al., 2022; O. Williams et al., 2021). Vasopressin is a hormone that mediates pair bonding and cooperative behaviours (Dumais & Veenema, 2016; Rybicka et al., 2021). Interestingly, in Taylor et al. (2010)'s study, women in distressed relationships had elevated oxytocin levels, while men in distressed relationships had elevated vasopressin levels.

3.3.5 Sex Differences in Psychosocial Development and Attachment

Adverse childhood experiences (ACEs) appear to have a sex differentiated effect on brain development (e.g., Chang et al., 2019; Colich et al., 2017; Cracco et al., 2020; Dragan et al., 2019; Kim et al., 2019; McEwen, 2017a; J. White et al., 2020). For example, females who experience physical abuse during childhood tend to have reduced cortical thickness while males who experienced physical abuse do not show this same pattern (Teicher et al., 2004). Childhood abuse or poverty has been correlated with altered brain structure and connectivity, which may then impact on attachment outcomes (e.g., Calem et al., 2017; Javanbakht et al., 2016; Tiwari & Gonzalez, 2018; Yan et al., 2022), which may subsequently be sexually dimorphic.

Women tend to exhibit greater attachment anxiety than men (e.g., Bleske-Rechek et al., 2021; Brennan, Clark, et al., 1998; Kanemasa & Daibo, 2003; Kirkpatrick, 1998; Mickelson et al., 1997; Ross et al., 2006; Scharfe & Bartholomew, 1994; Schmitt et al., 2003), along with the indications of anxious attachment such as rejection sensitivity, emotional reactivity, and lowered self-esteem (Maiolatesi et al., 2022). Attachment anxiety in women is associated with a more emotional and reactive communication style (Fišerová et al., 2021), and higher reassurance and validation seeking from their partners through frequent and, at times, assertive communication (Mikulincer & Shaver, 2016a), emotional expression, and disclosure of personal thoughts and feelings (B. Feeney & C. Noller, 1990). In males, however, attachment anxiety may be associated with a tendency to withdraw or avoid communication, particularly when they fear rejection or criticism (Bonache et al., 2017). In Barbaro et al. (2019)'s study, women who were anxiously attached were likely to respond to

relationship threats (e.g., threats of their partner being attracted to another) by increasing 'benefit-provisioning behaviours', for example, increasing resources, time, and effort towards the partner. Conversely, anxiously attached men respond in similar situations with 'cost-inflicting behaviours', for example, reducing their partners' access to their resources, time, and effort (Barbaro et al., 2016).

Men tend to have higher attachment avoidance than women (e.g., Del Giudice, 2011; Gray & Dunlop, 2019; Roels & Janssen, 2022; Schmitt et al., 2003; Vaillancourt-Morel et al., 2021) meaning they may withdraw or avoid communication of emotional support or validation (e.g., Brock & Lawrence, 2014; Vaillancourt-Morel et al., 2021), may avoid emotional communication or seek to minimise emotional expressions (Ferraro & Taylor, 2021; Park & Harris, 2022; Walker et al., 2022; Winterheld, 2016), avoid disclosing personal information to their partners (Barry & Lawrence, 2013), have more difficulty in problem-solving communication (Muetzelfeld et al., 2020; Overall & Sibley, 2009a), and may also be more likely to avoid communication altogether, particularly in response to perceived threats or conflicts in the relationship (Constant et al., 2018; Mikulincer & Shaver, 2012). Avoidantly attached men (but not women) also have higher levels of self-reliance (Del Giudice, 2016), and more avoidant responses to being hurt by their partners' behaviours – distancing themselves from both their partner and the problem, and enacting more vengeful reactions to their female partner's transgressions (Martin et al., 2018).

Men's attachment style shows more influence on relationship intimacy and satisfaction than women's (Schudlich, 2013). In Wendolowska, Stec, et al. (2022)'s study it was only men's secure attachment that predicted their female partners' relationship satisfaction but not visa-versa. In Sandberg et al. (2017)'s study, attachment styles impacted upon relationship happiness outcomes for both partners, but only husbands' attachment behaviours correlated with wives' relationship quality, and not vice versa. In Givertz et al. (2013)'s study similar results were found, with husbands' avoidant attachment having the greatest impact on both partners' relationship satisfaction, perhaps because the avoidant husbands were emotionally suppressed (see also Beck et al., 2013).

3.3.6 Sex Differences in Personality

There are notable sex differences in personality traits (e.g., Borghuis et al., 2017;

Schmitt et al., 2017; South et al., 2018), psychopathology, and personality disorders (e.g., Hyatt et al., 2022). These sex differences have been shown to be small but significant (e.g., Costa et al., 2001; Kajonius & Johnson, 2018; Schmitt et al., 2008; Vianello et al., 2013). In Costa et al. (2001)'s cross-cultural study women showed higher agreeableness, and men showed higher emotional stability (lower neuroticism) and assertiveness. It must be noted that this study is now more than 30 years old and cultural and social gender norms have shifted over this time. In looking to more recent studies, however, the findings still seem to hold. Del Giudice (2015)'s review indicated that even across different nations women typically have higher agreeableness and neuroticism than men.

In Weisberg et al. (2011)'s study (N=2,643; 892 male, 1,751 female) women scored higher in neuroticism, agreeableness (compassion, warmth, cooperation and politeness), orderliness (conscientiousness), and the enthusiasm (gregarious) facet of extraversion, while men score higher in the assertiveness facet of extraversion. In Akyunus et al. (2019)'s Turkish study (N=514), women scored higher on measures of neuroticism, agreeableness, nurturance, and empathy while men scored higher on measures of extraversion, openness to experience, and dominance. In Fisher et al. (2015)'s temperament study with 39,913 participants from seven countries, males were significantly more likely to score as analytic/tough-minded whereas women were significantly more likely to score as prosocial/empathetic. Using the 16PF interpersonal circumplex questionnaire Del Giudice et al. (2012) found "extremely large" (p. 1) sex differences in a USA sample (N=10,261), with men scoring higher in dominance and lower in nurturance than women. In Bleske-Rechek et al. (2021)'s study, women scored higher in attachment anxiety and this correlated with higher neuroticism and lower agreeableness, extraversion, and conscientiousness.

3.3.6.1 Sex Differences in Personality Disorders and Mental Health

There is also substantial evidence to suggest that males are more likely to experience externalizing personality disorders, such as extreme aggression and delinquency, whereas females are more likely to experience internalizing problems, such as anxiety and depression (e.g., Lima et al., 2022; Mir & Rivarola, 2022). Males are more likely to engage in physical aggression or violence in conflicts (e.g., D. Kim et al., 2022), and are more prone to dark personality traits (e.g., Ferreiros & Clemente, 2022), including narcissism (Weidmann, Chopik, et al., 2023).

The male versus female differences in negative emotionality (e.g., depression, anxiety, rumination, neuroticism) have been repeatedly documented (Costa et al., 2001; De Bolle et al., 2015; Ellis, 2011; Lippa, 2010). There are noted sex-specific genetic risk factors for depression and anxiety disorders (e.g., Diehl, 2018; Issler & Nestler, 2018; Van den Hove et al., 2013), potentially moderated by neurobiological sex differences (Rubinow & Schmidt, 2019). Individuals with higher levels of neuroticism (typically females) are at greater risk for developing depression (Yoon et al., 2013). Hormonal differences between males and females may play a role in the development of depression and neuroticism, with oestrogen levels in females being associated with increased vulnerability to these conditions. Hyatt et al. (2022)'s study indicated that differences in the right superior frontal gyrus region may also influence sex differences in neuroticism.

3.3.7 Sex Differences in Emotion, Perception, Communication, and Stress

Women typically score better at verbal and nonverbal emotion perception than men (Lin et al., 2021), and are more likely than men to use self-reflection to understand their emotional state (Rosso, 2022). There are also neurobiological sex differences in human empathy expression (Christov-Moore et al., 2014). Women tend to score more highly than men on measures of empathy making them potentially more aware of the emotional needs of their partner, and better informed to provide emotional support to them (Raine et al., 2022). Husain et al. (2022)'s Pakistani study (N=1,894) found men to score more highly on emotional intelligence scales than women, however, Jie et al. (2019)'s study found that "females' empathic responses are more likely to be elicited automatically by the perception of others' emotional states. In contrast, males' empathic responses are more likely to be mediated by self-interest, which subsequently reduces their empathic responses".

Men and women may also experience and respond to stress differently (Hodes & Epperson, 2019). When stressed, women tend to use more social support coping strategies, seeking support from others to manage stress (Matud et al., 2014), and provide support to their partner (Bodenmann et al., 2015; Cutrona et al., 2007; Horne & Johnson, 2018). Men, on the other hand, may be more likely to use problem-focused coping strategies, such as problem-solving or distraction techniques, to manage stress (Bodenmann et al., 2015; Tamres et al., 2002). Women are more likely to report higher levels of stress, and they may also experience more negative physical and emotional symptoms in response to stress

(Chung & Stecker, 2013). Givon et al. (2023)'s study showed women as being more attuned to negative (stress-related) emotions than men, and Min et al. (2023)'s study showed greater amygdala activity in females for negative emotion. Some genetic variations, such as the COMT gene (Fakira et al., 2019; Schluter et al., 2019), which is involved in the breakdown of dopamine, have been associated with sex differences in the stress response (Chen et al., 2004).

3.3.8 Socialised Sex Differences

Social and cultural contextual factors also play a role in shaping gender differences (Eagly, 1987). While biological sex differences and socially determined gender differences have very different aetiologies (Torgrimson & Minson, 2005), they are networked in their influence and often so closely aligned in societal and individual perception that they can be difficult to separate. For example, sexist perceptions may influence the outcomes of biologically informed tendencies, such as aggression. While testosterone has been shown to stimulate assertiveness in males (Stover et al., 2022), aggression is also seen as more societally acceptable when emanating from men than from women (e.g., Stanaland & Gaither, 2021).

Sexist attitudes have been shown to impact significantly on couple relationship well-being (e.g., Cole et al., 2020; Croft et al., 2021; Cross & Overall, 2019; Fisher et al., 2021; Hammond et al., 2020; Harrington et al., 2021; Lachance-Grzela et al., 2021; Overall et al., 2021; Ruiz, 2019; Stanaland & Gaither, 2021). One gender-relevant factor that influences couple relationship well-being outcomes was the finding that women do significantly more housework and domestic labour than men do, even when they also do the same work hours as men (Dominguez-Folgueras, 2022; Ryjova et al., 2022). When sexist social norms impinge upon a sense of equity and mutual empowerment in a relationship it can significantly lower couple relationship well-being outcomes (e.g., Charbonneau et al., 2020; Cross & Overall, 2019; Hammond & Overall, 2017; Lachance-Grzela et al., 2021).

3.3.9 Sex Difference Summary

Sex differences are correlated with hormonal differences, neurological differences, genetic differences, and mental health differences, all of which have been verified in recent studies. However, it is also clear that there is significant overlap between the sexes and therefore caution in interpreting results is warranted. While biological sex differences exist, they are not absolute or deterministic, and there is considerable

variability within each sex. Nonetheless, biological sex differences exert a notable influence on the outcomes of couple relationships, underscoring the significance of considering these factors within the broader context of relationship dynamics. Neurological dissimilarities, stemming from sex-related brain structural variations, play a role in shaping communication patterns, emotional expression, and conflict resolution strategies within couples. Hormonal disparities contribute to distinct emotional and behavioural responses in partners. Moreover, the interplay between biological sex and psychological attributes such as attachment styles can lead to variations in how individuals seek and provide emotional support, contributing to the overall quality and stability of couple relationships. Societal and cultural norms further amplify the influence of biological sex differences, shaping perceptions of gender roles, expectations, and relationship ideals. Consequently, comprehending the intricate interplay of biological sex differences and their multidimensional impact on cognitive, emotional, and social aspects is crucial for a comprehensive understanding of couple relationship outcomes.

3.4 Stress

3.4.1 Stress in the Network Models

Stress was highly researched in the Endnote library collection, although in the whole Endnote library network model, stress is shown as peripheral indicating that it is well-researched but less cross-disciplinary in its research. Stress was, however, still strongly linked with the other top ten factors, and also closely linked with *developmental factors, age and stage, sociodemographic factors, environmental factors, financial stress, adverse childhood experiences, psychological maladjustment, and cortisol*.

3.4.2 Current Stress Factors

Stress (both external pressures or demands, and internal strains resulting from these) is a common denominator of the human experience. Stress is defined by Randall and Bodenmann (2009) as a “stimulus (critical life event) that triggers psychological or physical stress reactions”, and also as a “specific psychological and physical reaction to acute or enduring demands”, and as “a process between a person and their environment” (p. 106). In other words, stress is both an external (stressors) and an internal (stressed) experience⁵⁸. Stressors may come in the form of hardships, traumas, and threats to safety, well-being, comfort, or connectedness with others (Fink, 2009), while being stressed describes a physiological and psychological response to stressors that affects the way people cognitively process social information and make relational decisions (e.g., Felt et al., 2020; Kapsaridi & Charvoz, 2021; Ogan et al., 2021; Vine et al., 2019).

Levels of current stress are negatively correlated with relationship satisfaction and sense of closeness (Falconier & Jackson, 2020; Hilpert et al., 2018; Neff & Karney, 2017; Randall & Bodenmann, 2017; Salo et al., 2022). Bodenmann, Charvoz, et al. (2016)’s study (N = 662) showed that divorced individuals felt that “the accumulation of everyday stresses” was a central trigger for divorce (p. 707). In McNulty et al. (2021)’s investigation of ten longitudinal studies (N=1,104 couples), current stress moderated the influence of individual differences on changes in relationship satisfaction. Karakose et al. (2023)’s study found that feeling stressed was

⁵⁸ Of note – most studies group stressors and the experience of being stressed under the one term ‘stress’, and this differentiation has therefore not been well-delineated in this section.

associated with reduced sexual satisfaction, and Keilholtz et al. (2022)'s study showed that the experience of stress may be a significant precursor to interpersonal violence.

In Birditt et al. (2012)'s study, of marital trajectories over a 16-year period, the low-happiness group of couples was more likely to report lower income and education, both of which are associated with increased stress. Financial strain has been clearly correlated with stress responses. Persistent financial stressors correspond with physiological dysregulation, tension, and disagreements between partners (e.g., Conger et al., 2010; Dew et al., 2020; Falconier & Jackson, 2020; Lee et al., 2022; Schünke et al., 2022), reduced quality time together (Williamson & Schouweiler, 2023), and lower relationship satisfaction (e.g., Abdel-Sater, 2022; Archuleta et al., 2011; Gajos et al., 2022; Jachimowicz et al., 2022; Jackson et al., 2023; Johnson et al., 2022; Karney, 2020; Wickrama et al., 2022; Williamson & Lavner, 2020).

Work stressors correlated with decreased marital satisfaction in Woszidlo and Segrin (2013a)'s study, and a lack of work significantly impacted relationship satisfaction in H. Zhang et al. (2016)'s Hong Kong study. Domestic work – especially the division of housework and childcare – is another common and often significant stressor producing conflict between couples (Rodriguez-Stanley et al., 2020; Ryjova et al., 2022), especially when this division is perceived by at least one of the partners as being unfair (Trübner, 2022). Unfairness infers disempowerment which is a significant stressful experience in and of itself (Fishbane, 2023). In Thielemans et al. (2020)'s Danish study (N=3,434 couples) women performed the larger share of household tasks than men, and the more unequal a couple's division of housework, the more likely that couple was to later separate.

The birth of a baby presents a major stressor that typically correlates with lowered financial resources (Conger et al., 2010), lowered communication quality (Abe & Nakashima, 2020) and lowered relationship satisfaction (e.g., Abreu-Afonso et al., 2021; Delicate et al., 2018; Glenn, 1990; O'Reilly Treter et al., 2020; Twenge et al., 2003), although this seems to depend on the psychosocial resources a couple has when they initially enter the relationship. For example, Doss and Rhoades (2017)'s showed that “couples with higher levels of pre-birth relationship problems, insecurely attached parents, temperamentally difficult infants” (p. 25) had greater distress after the birth of a baby. In Helland et al. (2014)'s Norwegian longitudinal (17 years) study (N=500) sociodemographic pressures predicted early divorce, and

child-related strains predicted later divorce. However, superseding these stressors, a lack of partner support, affirmation, emotional stability, and positivity predicted divorce. While most couples encounter some type of external stress during their relationship, how they cope with that stress dyadically seems to be critical to their relational happiness and longevity.

Stressors may also be present in the form of environmental strains such as living in chaotic (Shaked et al., 2019), crowded (Altwaijri et al., 2023), or polluted neighbourhoods, which may negatively influence mental health or prosocial behaviours (Feng et al., 2023; Mayagoitia-Novales et al., 2023). Cultural pressures, such as financial decision-making expectations (Gladstone et al., 2022), family role and responsibility expectations (Halford et al., 2022), affection and social support expectations (Paterson et al., 2016; Pourmand et al., 2021; Sorokowska et al., 2021; Xu et al., 2020), religious expectations (Leonhardt et al., 2022; Olson et al., 2015), acculturative stress (Cheung et al., 2020; Hou et al., 2018), and intercultural relationships (Mayer, 2023), may all strain or support relationships in various ways.

3.4.3 Historic Stress Factors and Attachment

Levels of chronic childhood stress, such as early life harshness, unpredictability, or negative parental care, or childhood maltreatment are correlated with poorer adult couple relationship well-being (e.g., Baller & Lewis, 2021; Brown et al., 2009; Eyisoğlu & Erdem, 2023; Khalifian et al., 2022; Labella et al., 2018; Lassri et al., 2023; Li & Zheng, 2020; Pflieger et al., 2021; Szepsenwol et al., 2022; Upenieks & Liu, 2022; Zamir, 2022). Childhood maltreatment contributes to reduced adult empathy accuracy (X. Zhang, M. Zhang, et al., 2022), prosocial behaviour (J. Wu et al., 2020), and provision of emotional support in adult relationships (Fitzgerald et al., 2020). Childhood maltreatment also correlates with problematic relationship power and control dynamics, and violent behaviour in adulthood (Bradbury & Shaffer, 2012; Figueredo et al., 2021; Gunnthorsdottir et al., 2021; Wheeler et al., 2021).

The mechanisms linking poor parental care to later outcomes “involve impaired regulation of the infant stress system” (Packard et al., 2021, p. 3). Unsafe and stressful social connection with others influences childhood social development in enduring and maladaptive ways and is a known risk factor for poor adult psychosocial outcomes (McLaughlin & Lambert, 2017). Chronic stress during childhood may correlate with the insecurely attacheds’ social management

strategies of hyper- or hypo-activation of personal safety systems (e.g., Kazmierski et al., 2020; Packard et al., 2021; Robles & Kane, 2014; Simpson & Rholes, 2017; Yirmiya et al., 2020). Groh and Narayan (2019, p. 679) write that “Bowlby conceptualised the attachment system as an interpersonal biobehavioural stress regulatory system” with individual differences in attachment “thought to reflect distinctive strategies for responding to and coping with interpersonal challenge”. L. White et al. (2020) further explain attachment styles as biobehavioural strategies to manage threat. Beckes et al. (2015) contend that attachment is a ‘radically embodied’ homeostasis system that regulates our metabolic resources in the face of threat, and that attachment styles “can be thought of as response tendencies that emerge out the person’s unique biological makeup and their learning history” (p. 14).

In Groh and Narayan (2019, p. 687)’s meta-analytic review of attachment insecurity and physiological reactivity to interpersonal stress they state that “early insecurity is tied to specific patterns of heightened physiological reactivity to interpersonal stress reflective of less effective coping, which ultimately might undermine children’s ability to cope with stress in future interpersonal contexts”. Stress buffering is a key function of attachment (Yirmiya et al., 2020), particularly the stress buffering provided by social support (e.g., Azzi et al., 2022; Wendolowska, Stec, et al., 2022). In an early attachment study, it was found that parental presence moderated physiological stress arousal for securely attached children, but not so much for the insecurely attached (Sroufe & Waters, 1977). Securely attached children rely on their parental bond to attenuate their stress when in threatening situations (Ainsworth et al., 1978; Bowlby, 1978). This links to a child’s biology through caregiver buffering of HPA-axis stress reactions (Gunnar et al., 1996), and neuroendocrinal responses (Gunnar & Sullivan, 2017; Hostinar et al., 2015), and these physiological stress buffering patterns are evident similarly in adult couple relationships.

In addition to parenting factors, the development of insecure attachment in childhood often correlates with chronic stressors such as trauma (e.g., Cohen et al., 2017; Fitzgerald & Shuler, 2022; Knox et al., 2022; Liddell et al., 2021; Snyder et al., 2023; Van Assche et al., 2020), abuse (Han, 2019), emotional neglect (Muller et al., 2019), social lack (Shallcross et al., 2014), lack of resources (Szepsenwol et al., 2022), and societal adversity (Kaiser et al., 2018). Widom et al. (2018)’s study found that childhood neglect and physical abuse have enduring effects on adult anxious

and avoidant attachment styles. Trauma and violence (current or historical) are notably connected to insecure attachment (e.g., Fitzgerald & Shuler, 2022; Knox et al., 2022).

In Karatzias et al. (2021)'s study avoidant attachment style was uniquely associated with PTSD (post-traumatic stress disorder), indicating a key role for severe stress in the development of avoidant attachment styles. One of the prevailing repercussions of PTSD is the hindrance it imposes on emotion regulation, as well as the subsequent strain it inflicts on relationships (Creasey, 2014; Godfrey et al., 2022). The emotional turmoil experienced by individuals grappling with PTSD can render them ill-equipped to effectively regulate their emotions, consequently rendering them more vulnerable to relationship challenges (Godfrey et al., 2022; Ouhmad et al., 2023), and Fitzgerald and Shuler (2022)'s study found that early life stress predicted adult couple relationship quality through "greater attachment avoidance and lower levels dyadic coping" (p. 1).

3.4.4 How Stress Affects Bio-Psycho-Social Development

Multiple studies have found correlations between childhood trauma, psychological flexibility, negative beliefs, and emotional distress in adulthood (e.g., Danese & McEwen, 2012; Gunnar & Donzella, 2001; Gunnar & Quevedo, 2007; Kızıltepe et al., 2023; Miller et al., 2011; Nelson et al., 2020; Perry et al., 2017; Rudd et al., 2021; Stevenson et al., 2018; Tasoren, 2022; Zhang et al., 2023). Aloia and Solomon (2016) found that "exposure to family verbal aggression affects cognitive and physiological systems in ways that leave people less sensitive to negative conflict behaviours" in adulthood (p. 9), in other words, less able to pick up on their partner's frustration cues, and therefore less able to effectively respond to them. Experiences of distress and adversity in childhood can lead to higher sensitivity to adverse situations in adult relationships (Chun et al., 2015), influencing how individuals perceive and respond to stress (Skinner & Zimmer-Gembeck, 2016a) and making couple relationship communication more complicated to navigate due to the covert and historic nature of this sensitivity (Cassidy & Shaver, 2016).

Individuals who experience trauma or abuse in childhood may be more likely to develop personality traits associated with anxiety, depression, and impulsivity (Bach et al., 2022; Hawes & Allen, 2023; Humphreys et al., 2020; Jaffee, 2017; Nelson, 2020; Smith & Pollak, 2020; Struck et al., 2020; Wang et al., 2023). Crede et al.

(2023)'s meta-analysis (N=48,125) found that ACEs (Adverse Childhood Experiences) strongly correlated with emotional stability (neuroticism), and as much as 30% of adult mental illness (Green et al., 2010), and mental illness has a significant impact on couple relationship well-being outcomes. When early life stress has been traumatic, post-traumatic stress symptoms (PTSS) can develop and impact perceptions of others' trustworthiness leading to relationship distress (Barden et al., 2020; Fitzgerald et al., 2023).

Perception of stress has been shown to be influenced by genetically informed traits (Luo et al., 2017). Even in the womb a child's neurological structure and hormonal processes can be altered by a mother's prenatal stress (stress during pregnancy), leading to future potential behavioural disorders (Hassanshahi et al., 2023). A parent's own childhood trauma can also be passed down to their children, influencing their adult relationship outcomes in an even more distal manner. For example, the intergenerational 'cycle of abuse' has been evidenced in meta-analyses (e.g., Schofield et al., 2013), with around 30% of maltreated parents repeating maladaptive parenting behaviour with their own children (Ben-David et al., 2015; Widom et al., 2015). Even when a child has not personally experienced the stress that their parent has, it may be impacting their genetically informed stress responses through biological inheritance (e.g., Blaze & Roth, 2015; Plank et al., 2021; van Steenwyk et al., 2018).

Childhood trauma is associated with structural and functional brain abnormalities (Cassiers et al., 2018). In their review of the impacts of early life adversity on the brain, Short and Baram (2019) state that "aberrant signals from the parent or environment represent a potential pathway or mechanism through which numerous aspects of early- life adversity modulate the maturation of structural and functional brain circuits that underlie cognition and complex behaviours" (p. 659). In adulthood, these entrenched patterns repeat despite, or because of, the need to maintain a sense of belonging, safety, and autonomy in the current context (Abtahi Mahsa & K., 2017; Feeney & Fitzgerald, 2021; Ke & Barlas, 2020). Hyper- or hypo-activated reactions to stress negatively impact neuroendocrinal processes leading to epigenetic amygdala and hippocampal variations (Bainomugisa & Mehta, 2022; Cui et al., 2018). These altered biological states, especially when chronic, can result in altered psychosocial traits that lead to impoverished relationship skills development and expression (e.g., Opendak et al., 2017; Packard et al., 2021; Raine et al., 2019; Story et al., 2004; Sullivan & Opendak, 2020; Umberson et al., 2005) and

resultant problematic relationship behaviours (e.g., Barnhart et al., 2022; D'Amico et al., 2022; de Maat et al., 2022; Fitzgerald, 2022; Hu et al., 2021; Huang et al., 2022; Lecarie et al., 2022; Packard et al., 2021; Tasoren, 2022; Vanuk et al., 2019; X. Wang et al., 2022; Womersley et al., 2022; Xia, 2022).

Early life stress may therefore increase vulnerability to being stressed in adulthood (e.g., Finlay et al., 2022; Spry et al., 2022; Winzeler et al., 2017; Zamir, 2022), hyper-vigilance towards stressors (e.g., Girod et al., 2023; Neta et al., 2017), and reduced adult emotional control (e.g., Feiler et al., 2023; Horton et al., 2022; Szepesenwol et al., 2022) which then impacts on the emotional climate of the relationship (Weber et al., 2021) resulting in poorer interpersonal relations in adulthood (Fares-Otero et al., 2023). Stressed individuals, especially those with a history of ACEs, may become less agreeable and conscientious (Blackie & Hudson, 2023) and react negatively to perceived criticism (e.g., Chun et al., 2015; Tang et al., 2021; X. Zhang, L. Luo, et al., 2022; Zheng et al., 2015), be less likely to be empathetic (Crenshaw et al., 2019), and more likely to withdraw or attack, and this can affect their ability to respond effectively to social cues and interpersonal dynamics (Jayamaha et al., 2021)⁵⁹.

3.4.5 The Impacts of Stress on Adult Relationship Behaviours

Current perceived stress also impacts upon couple relationship satisfaction (Zhao et al., 2023). Chronic stressors that seem unchangeable may undermine one's sense of safety and control – depleting self-regulation and increasing negative interactions between couples (Buck & Neff, 2012). According to Weinstein (2014), when a person's basic psychological needs for safety and personal control are chronically not met “a defensive, contingent, suboptimal sense of self-esteem evolves” (p.146). A meta-analysis of the effects of early life stress on rodents in the form of maternal separation showed correlations with increased defensive behaviour “consistent with the anxiogenic effect of early adversity reported in humans” (D. Wang et al., 2020,

⁵⁹ Of note, the relationships between factors are networked – influencing one another over the course of a lifetime (Seay et al., 2023) – and not necessarily resolvable within the time needed for a relationship to become safe for both partners (Katerndahl et al., 2019). Additionally, hostile and aggressive behaviours are themselves stress-creating (Keilholtz et al., 2023) and to reduce the stressful context/stressors a couple may need to remove themselves from their partnership. Where there is abuse and/or violence in a relationship each partners safety must be considered as paramount in treatment (Keilholtz & Spencer, 2022).

p. 1), and also consistent with the increased defensive behaviour seen in insecurely attached individuals (e.g., Bartholomew, 1990; Beck & Clark, 2010; Bekes et al., 2021; Fowler & Dillow, 2011; Karantzas & Kambouropoulos, 2019; Klohnen & Bera, 1998; Laczkovics et al., 2018; Lindblom et al., 2016; Marks & Vicary, 2015; Nevarez et al., 2018; Overall et al., 2015; Porcerelli et al., 2016; Richardson et al., 2022; Schumann & Orehek, 2019).

Stressful experiences at any time of life correlate with increased emotionality and decreased agreeableness (e.g., Carver et al., 2014; Rakhshani & Furr, 2021; Weinberg et al., 2021; Wrzus et al., 2021), leading to irritability, short-temperedness, and agitation, making it more difficult to resolve conflicts in a productive and respectful manner (McCormick et al., 2017). Defensiveness or negative reactions to feedback from a partner can impair the individual's learning and adaptive abilities (Afifi, 2018), making it difficult to think creatively or find solutions to problems (e.g., McDonald & Verona, 2023; Wolff et al., 2021). Coping with stressful situations can lead to negative perceptions and attitudes towards people, situations, and events, making it harder to cope with stress effectively (e.g., Bodenmann, Randall, et al., 2016). Therefore, when individuals are under stress, they may have reduced romantic feelings (Donato et al., 2018), be less able to offer emotional support (Jayamaha et al., 2021) and more likely to perceive situations as threatening or dangerous, even when there is no actual threat (e.g., Lis et al., 2020; McDonald & Verona, 2023).

Chronic (ongoing and repeated) stress, for example when a couple is in daily conflict, imposes a mental, emotional, and physical load on a person (Lazarus & Folkman, 1984). Some people adapt to this load, while others become sensitised to it (Szepeswöl et al., 2022), potentially leading to neuronal dysregulation when faced with what would normally be manageable stress (Lupien et al., 2009; McEwen, 2017b). Stress can also affect attention, memory, and cognitive processes, making it harder for individuals to express themselves clearly or understand the messages of others (e.g., D'Amico et al., 2022; Garrison & Schmeichel, 2020; Quaedflieg et al., 2022), leading to misunderstandings (Meier et al., 2019), and increased hostility and aggression (S. Brown et al., 2017; Keilholtz et al., 2022; Marshall et al., 2018; Winiarski et al., 2018), further exacerbating conflict.

When stressed, securely attached adults report more positive dyadic coping than insecurely attached (Gagliardi et al., 2013), and tend to use adaptive coping

strategies, such as seeking social support, problem-solving, and positive reappraisal (Gardner et al., 2020). Additionally, individuals with a secure attachment style tend to have a more positive outlook on stress and may see it as an opportunity for growth and learning, and perceive their partner's support during stress to be helpful and positive (e.g., Gosnell & Gable, 2013; Obeldobel & Kerns, 2019). In contrast, individuals with insecure attachment styles may use less effective coping strategies, perceive stress as more threatening, and have a more negative outlook, which can lead to maladaptive coping strategies such as avoidance, substance use, or disengagement (Mikulincer & Shaver, 2019a). To compensate for their insecurity the anxiously attached tend to monitor their partners' relational behaviours, especially their negative behaviours (e.g., Overall & Hammond, 2013; Sadikaj et al., 2017), and excessively seek reassurance from their partner (e.g., Mikulincer & Shaver, 2016a; Pistole, 1994), which also may lead to increased verbal aggressiveness (e.g., Aloia & Solomon, 2015a), and its associated stress, while in Knox et al. (2022)'s study, those exhibiting avoidant attachment tendencies, when exposed to ongoing stressors, display an increased likelihood of engaging in maltreatment of their partners.

3.4.6 Stress and the Biological Impacts

When stressors have been chronically present during childhood these effects can become biologically embedded (e.g., McEwen, 2010; Pollok et al., 2022; Youssef et al., 2019; Zender & Olshansky, 2012), and difficult to recognise as dysregulated once they have become habituated. They may also increase over the life course (e.g., Chiang et al., 2022; Ortiz et al., 2022), meaning that childhood stress can create inter-personally relevant traits in adulthood that can be difficult to manage (e.g., Overall, Pietromonaco, et al., 2022) or change (e.g., Hepp et al., 2021; Whittaker et al., 2021).

Stress is strongly linked with biological responses in the network model, and in the literature (e.g., Agorastos & Chrousos, 2022; Finlay et al., 2022; McCormack et al., 2022; Rawn & Keller, 2022; Wesarg et al., 2022). The physiologically triggered stress responses of fight, flight, freeze (FFF) are innate to all functional humans and serve to protect us by rapidly energising our body in the presence of threat (Cannon, 1932)⁶⁰. FFF responses are activated by the sympathetic nervous system

⁶⁰ As noted earlier, 'tend and befriend' responses have now been added to this list.

(SNS) and autonomic nervous system (ANS)⁶¹ (e.g., Blascovich, 2013; Blascovich & Tomaka, 1996; Wormwood et al., 2019) which alert the body for immediate action through a release of catecholamines⁶² (Tank & Wong, 2015) leading to an increase in heart rate, blood pressure, and other bodily responses (Russell & Lightman, 2019), which contribute to feelings of anxiety and fear (Critchley & Garfinkel, 2017).

The hypothalamic-pituitary-adrenal axis (HPA)⁶³ is also activated during a stressful event causing cortisol to rise and peak between 20-40 minutes later (Joels & Baram, 2009), and mobilising energy in the body to actively respond to stressors (Bateup et al., 2002). As such, stress can trigger the physiological responses associated with emotional dysregulation, including increased heart rate, muscle tension, and blood pressure (Pulopulos et al., 2020) which can in turn increase negative emotional states, and contribute to anger and irritability (Honeycutt, 2019). Interestingly, when under threat certain regions of the brain are also highly activated (Jimenez et al., 2022) indicating that a lot of energy is being used by the brain to process that threat (Bobba-Alves et al., 2022). Oxytocin is also released during stressful experiences (e.g., de Jong et al., 2015; Zheng et al., 2016), and organises social approach perceptions (e.g., Kemp & Guastella, 2011; Shamay-Tsoory & Abu-Akel, 2016), potentially by down-regulating HPA-axis reactions to stress (Ditzen et al., 2009) and attenuating stress-related cortisol rises (Cardoso, Ellenbogen, Orlando, et al., 2013).

⁶¹ *The Autonomic Nervous System (ANS) is part of the peripheral nervous system that unconsciously regulates physiological processes in the body, including heart rate, blood pressure, breathing, body temperature regulation, digestion, and sexual arousal. The hypothalamus is the part of the brain responsible for controlling the ANS Waxenbaum, Reddy, & Varacallo, 2022). The ANS works to both activate the body to respond to stressors (sympathetic) and helps the body to conserve and restore energy and function normally during everyday life (parasympathetic) (McCorry, 2007).*

⁶² *Hormones produced in the brain, nerve tissues, and adrenal glands in response to stress, including dopamine, adrenaline, and noradrenaline.*

⁶³ *The Hypothalamic-Pituitary-Adrenal (HPA) axis is a critical neuroendocrine system that regulates the body's response to stress and helps maintain homeostasis. It involves a sequence of interactions between three key components: the hypothalamus, the pituitary gland, and the adrenal glands. When the body perceives stress, the hypothalamus releases corticotropin-releasing hormone (CRH), which signals the pituitary gland to secrete adrenocorticotropic hormone (ACTH). ACTH then stimulates the adrenal glands to produce cortisol, a primary stress hormone. This cortisol release affects numerous bodily functions, including immune response, metabolism, and mood regulation. The axis also incorporates feedback mechanisms, where increased cortisol levels eventually inhibit further release of CRH and ACTH, ensuring the system does not overreact and maintains balance within the body.*

3.4.7 Coping

Safe social connection to others is a very effective and efficient means of regulating these psychological and physiological reactions to stress and threat (Eisenberger & Cole, 2012; Hostinar et al., 2014; Shrout et al., 2023). Dyadic coping is “mutual, interpersonal stress regulation and the dyadic capacity to deal with couple external stressors” (Zietlow et al., 2019, p. 2). Dyadic coping has a positive correlation with marital satisfaction (e.g., Falconier et al., 2015; Herzberg, 2013; Wang & Umberson, 2022), and in Bodenmann (2005)’s meta-analysis this accounted for between 30-40% of reported marital satisfaction. Dyadic coping behaviours, including the communication of support and comfort, have been shown to increase oxytocin and reduce cortisol responses during conflict scenarios (Zietlow et al., 2019), buffering the negative biological impacts of stress while promoting emotional understanding, trust, and intimacy in the relationship (Landis et al., 2013).

Stress responses may be ameliorated by affectionate touch which facilitates a release of oxytocin (Fotopoulou et al., 2022; Kreuder et al., 2019; Walum & Young, 2018), facilitating a sense of safety and trust (Eckstein et al., 2019), and increasing empathy responses between partners (Barchi-Ferreira & Osorio, 2021). In rodent and vole studies, while early maternal separation led to adulthood social deficits, these were able to be ameliorated by supplemental touch (e.g., Barrett et al., 2015; Rilling & Young, 2014). Even non-tangible affection, such as the memory of affection, can buffer the experience of stress. The mere reminder of a loved one alters and improves a person’s experience of pain, as well as their related neural activity (Eisenberger et al., 2011). Viewing images of one’s partner activates brain regions which are implicated with emotion regulation (Acevedo et al., 2012b), and thinking positively about one’s romantic partner increases blood glucose levels, boosting energy levels (Stanton et al., 2014).

Emotion regulation is a key factor in managing stress as it allows individuals to modulate their emotional responses and resilience (e.g., Birditt et al., 2020; Randall, Tao, et al., 2021), helping reduce the impact of stress on their relationship communication (e.g., Fink & Gehrke, 2019; Lazarus, 2019), and increasing their relationship satisfaction (Hilpert et al., 2013). Individuals who use avoidant, emotionally suppressive coping strategies, such as denial, substance use, or disengagement, tend to experience higher levels of stress and poorer relationship outcomes (e.g., Molla et al., 2018) whereas individuals who use active coping

strategies, such as problem-solving, seeking social support, and positive reframing, tend to experience better conflict resolution (e.g., Roloff & Reznik, 2008).

People who perceive higher levels of social support tend to perceive less stress and have better relationship outcomes (e.g., Cox et al., 2015; Falconier & Kuhn, 2019; Rosand et al., 2012; Salo et al., 2022), and those who have supportive relationships tend to use more emotionally regulated coping strategies, such as seeking social support, and positive reframing. A partner's responsiveness has an important function in soothing stress, potentially reducing the destructiveness of couple conflict and simultaneously increasing relationship satisfaction (e.g., Pietromonaco et al., 2021; J. Zhou et al., 2020). Responsiveness shown in listening to partner's stressful expression is correlated with more effective dyadic coping (Kuhn et al., 2018). In Levesque et al. (2014)'s study (187 heterosexual couples) partner's empathy and perspective-taking – i.e. positive responsiveness to their partner – significantly predicted improved dyadic coping ability, resulting in improved relationship satisfaction.

3.4.8 Stress Summary

The influence of stress factors on couple relationship outcomes constitute a significant area of inquiry within the domain of interpersonal relationships. Stressors, both external (such as work demands, financial pressures, and family conflicts) and internal stress (such as personal worries, can exert significant effects on the quality and stability of romantic partnerships. The stress-coping process adopted by couples plays a pivotal role in mediating these effects. Partners who collaborate effectively in managing stress, providing emotional support, and jointly problem-solving, tend to experience enhanced relationship satisfaction and resilience in the face of adversity. However, chronic stress or discordant coping strategies can lead to heightened interpersonal tension, decreased emotional intimacy, and an elevated likelihood of conflicts within the relationship. Notably, stressors' impact can be reciprocal, as relationship difficulties can contribute to individual stress levels, creating a feedback loop that further strains the partnership. Additionally, the presence of strong social support networks can help mitigate the negative impact of stressors on relationships, highlighting the contextual nuances in stress-couple relationship dynamics. In sum, stress factors and the strategies employed to navigate them represent a complex interplay that significantly shapes the trajectory and outcomes of couple relationships.

3.5 Brain

3.5.1 Brain in the Network Models

Brain was highly researched in the Endnote library collection and sits on the perimeter of the network model and is linked distally with the other top ten factors in the research (i.e., the factors found in the 'brain' literature are not typically also found in the rest of the literature). *Brain* is linked closely with *oxytocin*, *amygdala*, *prefrontal cortex*, *hippocampus*, *genetic factors*, *psychopathology*, and *dopamine*. In the brain network model, the *amygdala* is closely aligned with *empathy* and its associated factors: *prosociality*, *theory of mind*, *cognitive processing*, and *behavioural synchrony*. The *prefrontal cortex* is aligned with *emotions* and *emotional arousal*, *motivation*, and *emotion regulation*.

3.5.2 Brain Structure and Systems

The brain is a networked system that acts as part of the much larger and more complex nervous and endocrine system. The nervous system coordinates the brain's messages to the body. The endocrine system releases hormones to regulate bodily processes, and these hormones are responsive to the social environment (Wingfield et al., 1990). In other words, the brain is highly and intrinsically coordinated with the whole of the human body, and with the outputs of the body including emotion and thought. According to Social Baseline Theory (Beckes & Coan, 2011), proximity to others is the baseline environment for humans, and therefore the brain operates optimally within a social framework (Coan & Maresh, 2014; Ochsner & Gross, 2013). Two people in a closely connected relationship are acutely neurobiologically intertwined (e.g., Clark & Mills, 2011). As Siegel (2012) states "relationships and the embodied brain are really part of one larger system... and our social experiences can directly shape our neural architecture" (p. 15).

Researchers have proposed a prefrontal cortex-amygdala connection as a key neural pathway involved in the generation of negative emotional responses to threat (Pessoa, 2023; Wager et al., 2008; Wager et al., 2009), and social decision-making (Arioli & Canessa, 2019; Arioli et al., 2021; Gangopadhyay et al., 2021; Zoh et al., 2022). The prefrontal cortex, amygdala, hippocampus, and insula are all regions of the brain involved in processing emotional information, regulating emotional responses, and integrating emotional and sensory experiences (Banks et al., 2007; Fruhholz et al., 2017). As such, they are important in processing social information

(e.g., Atzil et al., 2023; Fossati, 2012; L. Zhang, P. Chen, et al., 2022). These regions are typically activated when a person feels threatened and less active when a loved one is present (e.g., Coan et al., 2017; Connor et al., 2012; Johnson et al., 2013).

The prefrontal cortex plays a critical role in executive function, perception, decision-making, and cognitive emotion regulation (Ochsner et al., 2012), and can modulate the activity of the amygdala to regulate emotional responses and attentional bias (Buhle et al., 2014; Sokolowski et al., 2022). Prefrontal cortex interconnectedness with the amygdala allows it to have a significant impact on fear processing, including the acquisition of fears and the development of strategies to regulate or diminish fear responses (Kredlow et al., 2022). This intricate interplay between the prefrontal cortex and other brain regions underscores its central role in shaping our cognitive and emotional experiences, which in turn shape our relationship experiences.

The amygdala processes threat, fear, and anxiety, and this processing is moderated by early life experiences of threat, fear, and anxiety (Di Iorio et al., 2017), via the encoding and retrieval of emotional memories, including those related to social interactions and communication (e.g., Admon et al., 2018; Murty et al., 2010; Vaish et al., 2008). This suggests that the amygdala plays an important role in the formation and retrieval of social scripts, which are the learned patterns of communication and behaviour that guide social interactions (Stafford et al., 2013), and plays a critical role in social emotion processing (e.g., Mulej Bratec et al., 2020; Sander et al., 2003; Vuilleumier & Sander, 2008), including deciding who to trust (Sladky et al., 2021). In Taylor et al. (2008)'s MRI⁶⁴ study, individuals with psychosocial resources available to them, compared to those without, displayed lower cortisol reactivity to threat which was mediated by lower amygdala activity. In other words, having access to people who care about you changes a person's amygdala response to threatening situations. The amygdala is also involved in the recognition and processing of emotional facial expressions and vocalizations (e.g., M. Liu et al., 2021; Preckel et al., 2019), and emotional contagion (e.g., Penagos-Corzo et al., 2022; Schore, 2021), which is the tendency for individuals to mimic and synchronise their emotional expressions with those of others (Schmidt et al., 2021).

⁶⁴ *Magnetic resonance imaging (MRI) is a medical imaging technique that using a magnetic field and computer-generated radio waves to create detailed images of the brain.*

The hippocampus plays a role in conflict and emotion regulation by storing memories of past conflicts and emotional experiences (Hannula & Duff, 2017). “The hippocampus with its high input convergence and output divergence represents a computational hub, ideally positioned in the brain (1) to detect cues and contexts linked to past, current and predicted stressful experiences, and (2) to supervise the expression of the stress response at the cognitive, affective, behavioural, and physiological levels” (Surget & Belzung, 2022, p. 403). The insula, located deep within the cerebral cortex, helps to integrate and process emotional and physiological information, supporting the social processes of self-expression, self-awareness, and subsequent communication (Pintos Lobo et al., 2023).

3.5.3 Other Physiological Factors Related to Brain Factors

A couple’s relationship distress correlates with their physiological arousal across multiple studies (Timmons et al., 2015). Zender and Olshansky (2012) note in their thesis on ‘the biology of caring’ that oxytocin, oestrogens, steroids and other hormones, genes, blood pressure, heart rate, plasticity of the brain, and vagal tone, all contribute to personal resilience under stress. Oxytocin, vasopressin, dopamine, and testosterone all play a role in attachment, pair-bonding, and monogamy (de Boer et al., 2012) and these were all factors present in the brain network model.

Oxytocin is a hormone involved in social bonding and attachment (Zhang et al., 2021) that modulates the activity of the amygdala (Han et al., 2021; Maroun & Wagner, 2016). Oxytocin is released during positive social interactions, such as touch and eye contact, and promotes feelings of trust and closeness (e.g., Aguilar-Raab et al., 2019; Kosfeld et al., 2005; Vargas-Martínez et al., 2014). Oxytocin can enhance the salience of social cues (Zhuang et al., 2021), making them more easily perceivable and memorable (Gangopadhyay et al., 2021). It has also been linked to increased empathy (Trofimova & Gaykalova, 2021), and perspective-taking (Comes-Fayos et al., 2022), which can further shape our perceptions of others (e.g., Aguilar-Raab et al., 2019; Ide et al., 2018), and reduce self-centred perceptions and behaviours (Zhao et al., 2016).

Vasopressin is a hormone that is involved in social behaviour and facilitates pair bonding and sexual activity and aggression (Insel, 2010). Serotonin is a neurotransmitter that regulates mood, emotion, and social behaviour, modulating the activity of the amygdala and the HPA axis (Deza-Araujo et al., 2021; Walsh et

al., 2023). Dopamine is a neurotransmitter that is involved in motivation, reward, and pleasure (Corral-Frías et al., 2016), and is therefore important in establishing long-lasting inter-personal bonds (Geißert et al., 2022; Young et al., 2011), and is thought to play a role in the experience of positive emotions such as happiness and joy (Nguyen et al., 2021). Dysregulation of dopamine signalling has been implicated in a range of psychiatric disorders (Pantic, 2019) and mood dysregulation.

Testosterone is a steroid hormone that has been linked to social dominance, competition, and relational outcomes (Carre & Olmstead, 2015; Dhillon et al., 2020; Edelstein et al., 2014; Peters et al., 2016; Roney & Gettler, 2015), with prenatal exposure to testosterone negatively associated with agreeableness (Luxen & Buunk, 2005).

The vagus nerve is involved in the fight or flight response, as well as maternal nurture, implicating it in the development of social emotion and behaviours (Petrocchi & Cheli, 2019). Poor vagal tone (referring to the function of the vagus nerve which regulates the heart and other organs) contributes to emotion dysregulation (Porges, 1997), and correlates negatively with secure attachment (Congia, 2020), self-awareness, and self-esteem (Schwerdtfeger et al., 2019), and other socially relevant traits such as empathy, compassion, and sharing behaviour (Di Bello et al., 2020; Zhang & Wang, 2019). Vagal tone impacts upon blood pressure (Clement et al., 1984), and in Collins et al. (2014)'s study of support-giving between couples, increased blood pressure served "as a physiological signature of empathy and emotional concern" (p. 621), and correlated with increased emotional concern and support provision – in other words, with increased perception of a partners' needs.

Recently there has been increased research into the gut microbiome-brain interaction, including the pivotal role the microbiota (found in the digestive system) play in influencing brain development (Mady et al., 2023), personality (Sumich et al., 2022), mental health, (Chen et al., 2021; Hayes et al., 2020; Jarbrink-Sehgal & Andreasson, 2020; S. Kim et al., 2022; Nota et al., 2023; Suda & Matsuda, 2022; van de Wouw et al., 2022), stress levels (Coley et al., 2021), cortisol levels (Barrio et al., 2022), and memory (Kraimi et al., 2022), all of which have a flow on effect on social behaviours (Ignatow, 2021), and couple relationship outcomes.

3.5.4 The Brain and Stress

The brain plays a critical role in threat appraisal, including the evaluation of potential threats and the initiation of appropriate responses. Stressful experiences have been shown to activate the thalamus (Buhle et al., 2014), nucleus accumbens, and insula (Qiu et al., 2022). Early stress or trauma can lead to changes in brain structure and function (Gunnar, 2020; Jeong et al., 2021; Vannucci et al., 2023; Zuo et al., 2019), including dysregulation of the hippocampus, amygdala, and prefrontal cortex (Kim & Kim, 2023; Malave et al., 2022), resulting in increased attentional bias towards threatening stimuli and heightened emotional reactivity (Dutcher et al., 2023; Picci, Taylor, et al., 2022), altered theory of mind (Pang et al., 2022), and increased risk for psychopathology (Puetz et al., 2017).

Lenart-Bugla et al. (2022)'s study showed that chronic stress, and allostatic load (the cumulative physiological system effects of chronic stress on the body and brain (Lenart-Bugla et al., 2022)) actually alter the structure of the brain, especially the hippocampus. In Helpman et al. (2017)'s review of neuroimaging literature, early trauma exposure was also implicated with "a loss of gray matter in the limbic system, including the prefrontal cortex (PFC), amygdala, and hippocampus, and an over-activity and increased connectivity of salience hubs, and particularly dorsal anterior cingulate cortex (dACC)".

Reduced frontal grey matter may contribute to difficulties in managing emotions and behaviour (Begemann et al., 2023), and reduced cortical thickness has been shown to correlate with neuroticism, negative affect, and subsequent aggressive behaviour (X. Zhu et al., 2020). Reduced hippocampal volume and impaired prefrontal cortex function may contribute to memory problems and difficulties in processing and regulating emotions (e.g., Dutcher et al., 2023; Uhlig et al., 2023), and has been associated with depression and anxiety (e.g., Hei et al., 2019; Kumar et al., 2013). In Packard et al. (2021)'s rodent study, chronic social stress in infancy produced amygdala deficits that led to dysfunctional social behaviour. Other rodent studies (e.g., Lim & Young, 2006; Veenema, 2012) have shown social stress to predict neurobiological alternations that lead to "prolonged anxiety, social withdrawal, and cognitive impairment" (Biltz et al., 2022, p. 1527). In Vyas et al. (2002)'s human study, early stress caused dendritic growth in the amygdala, which is associated with increased anxiety and aggression, and Picci, Christopher-Hayes, et al. (2022)'s study showed that deficits in amygdala, as well as hippocampus development, may

make children particularly vulnerable to later social maladaptation

Chronic stress can also lead to dysregulation of the stress-response HPA axis (Feldman, 2015; Sun et al., 2023), resulting in increased cortisol levels and decreased cortisol sensitivity (e.g., DeVries et al., 2003; Lenart-Bugla et al., 2022). Pagliaccio (2015)'s thesis found that early life stress, in combination with genetic profile, predicted cortisol levels which in turn predicted alterations in amygdala and hippocampus functional connectivity. Early life stress and current stress also modify the oxytocinergic system (Krause et al., 2018; Young Kuchenbecker et al., 2021), which is an important regulator of social behaviour (e.g., Raam et al., 2017; Veenema, 2012), including couple relationship behaviour (e.g., Holt-Lunstad, Birmingham, et al., 2015; Monin et al., 2019; Zietlow et al., 2019).

3.5.5 Brain Development

From conception through to death, humans socially nurture and guide one another. In the process our neurobiology is developed and restructured (e.g., Alexander et al., 2021; Arnett et al., 2019; Behen & Chugani, 2020; Djalovski et al., 2021; Glozman & Krukow, 2013; Gunnar, 2020; Hambrick et al., 2019; Kayhan et al., 2019; Lapp et al., 2020; Lauharatanahirun et al., 2018; Laurita et al., 2019; Nathanielsz, 2020; O'Donnell & Meaney, 2020; Raymond et al., 2020; Smith & Hart, 2022; Ulmer-Yaniv et al., 2021; Van den Bergh et al., 2020; van Goozen et al., 2022). As such, our social inputs impact upon the way our brain and its networked physiological systems develop, and how we subsequently think, feel, and behave. While genes play a significant role in brain development (Bohlken et al., 2014), they are not completely determinant, and social environment also plays a role. Interestingly, Dobewall et al. (2021) found that the development of compassion was influenced by parental warmth, but only in interaction with genetic alleles associated with low dopamine expression. In other words, it was a result of nurture, but the outcome was dependent upon nature.

Healthy brain development occurs partly as a consequence of exposure to positive social learning experiences (e.g., Tremblay et al., 2017) which in turn impact upon social skills development. A child's social environment impacts brain development (e.g., Barch & Luby, 2023; Sheridan et al., 2022), and subsequent social behaviour (e.g., Ulmer Yaniv et al., 2021) partially through variations in the oxytocin and vasopressin systems (e.g., Hiraoka et al., 2021; Opacka-Juffry & Mohiyeddini, 2012;

Pierrehumbert et al., 2012; Seltzer et al., 2014; Veenema, 2012; Yirmiya et al., 2020). Yirmiya et al. (2020)'s study showed that childhood nurturant maternal parenting correlated over time with increases in oxytocin reactivity and decreases in cortisol reactivity. This gave these children an advantage in coping with stress – bolstering their ability to “alter their stress neurobiology in response to real-life experiences” (p. 78). Sensitive and responsive parenting causes the developing brain to encode emotional signals in ways that are helpful for future physiological regulation (Taylor-Colls & Fearon, 2015), whereas negative parental behaviour may have the opposite result (Richmond et al., 2021). Maternal empathy directly influences oxytocin expression and subsequent development of the neural structures required for later life prosocial cognitions (e.g., Hiraoka et al., 2021).

van Goozen et al. (2022, p. 356) state that “the relationship between neurobiological functioning on the one hand and cognitive and emotional functioning on the other is represented as reciprocal in nature, in the sense that initial disruptions in neurobiological functioning facilitate disruptions in cognitive and emotional functioning, which in turn affect further disruption at a neurobiological level”. Early experiences with caregivers can also impact the development of the brain's stress response system, such as the hypothalamic-pituitary-adrenal (HPA) axis (e.g., Kazmierski et al., 2020; McCormack et al., 2022; Nofech-Mozes et al., 2019; Shakiba & Raby, 2021). The amygdala develops early and is altered by environmental stress and adversity (Tottenham et al., 2009), and early insensitive maternal care has been shown to correlate with larger amygdala in childhood (Rifkin-Graboi et al., 2015), and potentially also with behavioural disorders and later life stress vulnerability (Dutcher et al., 2023; Jones et al., 2019) which impact upon social outcomes.

Gong et al. (2021)'s study (N=8,756 children) showed that high family conflict and neglect correlated with alterations in cortical volume. Our early experiences of stress and threat, and of the regulation of that threat through the responsive care of those close to us, shapes our brain (Gupta et al., 2017), our subsequent adult responses to threat, and our expectations of others' responsive care towards us. Subsequently, children with adverse or traumatised histories may show sub-normal emotion regulation in adulthood (e.g., Bourne et al., 2022; Feiler et al., 2023; Rompilla et al., 2021).

3.5.6 The Brain and Attachment

Several studies have shown attachment style related differences in neuronal structure, particularly in the prefrontal cortex, temporal lobe, precuneus, and total grey matter volume (e.g., Perlini et al., 2019; Puhlmann et al., 2021; White et al., 2023). These indicate that the attachment system is regulated by the prefrontal cortex, amygdala, hypothalamus, hippocampus, insula, and striatum (e.g., Djalovski et al., 2021; Eisenberger et al., 2011; Long et al., 2021; Schoett et al., 2021; Ulmer-Yaniv et al., 2021; Vrtička & Vuilleumier, 2012; Yan et al., 2022; Zhang, Deng, et al., 2018), and although in the early stages of research, this relationship appears to be bi-directional (Ilyka et al., 2021). In other words, social development critically involves both nature and nurture influences which interact co-dependently.

Attachment style modulates neural responses to threat (Jeffrey J. Kim et al., 2020). X. Li et al. (2022)'s study found that secure "attachment in toddlerhood may be associated with greater capacity for, or openness to, processing potentially negative social information at both the behavioural and neural levels" (p.821). In other words, the securely attached use negative or frightening emotions to guide their decisions and behaviours, compared with the insecurely attached who deactivate these emotions, and the difference is shown in increased activation in the bilateral amygdala for the securely attached (Li, 2022). Amygdala activation has been shown to have a neurobiological correlation with nurturing childhood maternal behaviours and with attachment style in adulthood (e.g., Antonucci et al., 2018; Barrett & Fleming, 2011), and, as already noted, with threat response processing. Individuals who have secure attachment also tend to have higher levels of oxytocin, which modulates inhibitory circuits in the amygdala – promoting positive social behaviours and reducing stress and threat appraisals (Buchheim et al., 2017).

The avoidantly attached have been shown to have significantly larger amygdala (Barry et al., 2017), perhaps explaining their elevated competence at regulating negative emotions, while being less able to recognise or experience positive emotions (e.g., Moutsiana et al., 2014). In Y. Liu et al. (2017)'s study, avoidantly attached adults were slower than the securely attached at responding to emotion and simultaneously had increased activation of the gyrus neural area. Additionally, avoidant attachment correlates with increased activation in the cingulate and prefrontal regions (Altavilla et al., 2021; Kungl et al., 2016).

Other attachment-related neural differences have been noted, for example, Jeffrey J. Kim et al. (2020) found that securely-attached and avoidantly-attached adults exhibit opposite neural responses during self-criticism, and when experiencing social rejection the avoidantly attached show decreased anterior insula and dorsal anterior cingulate cortex activation, whereas the anxiously attached show heightened activation (DeWall et al., 2012). In Zhang, Deng, et al. (2018)'s study, the avoidantly attached had smaller than average left middle temporal gyrus and right parahippocampal gyrus and the anxiously attached had smaller right ventral anterior cingulate. In this study, the right middle occipital gyrus was smaller than average for avoidantly attached women, but for avoidantly attached men it was larger than average, suggesting that the sex differences found in attachment styles may in part be associated with sex-based neurological differences (e.g., Altavilla et al., 2021).

When children develop within low-stress social environments, their attachment working models are typically internalised, along with maturation of the prefrontal cortex circuitry, toward the end of their first year. This enables their stress responses to start to be maintained by higher-order neural mechanisms. However, “early trauma may not allow attachment security to consolidate into representations, possibly due to abnormalities in frontal cortex maturation” (Yirmiya et al., 2020, p. 78), including reduced size of the corpus callosum (connecting the left and right hemispheres), and attenuated development of the left neocortex, hippocampus, and amygdala (Teicher et al., 2003). Early life stress clearly impacts upon brain development and subsequent psychosocial development and future relationship capabilities (e.g., Agorastos et al., 2019; Agorastos et al., 2018; Dye, 2018; Eslinger et al., 2021; Jeong et al., 2021; Levy et al., 2019; Picci, Taylor, et al., 2022; Schore, 2017; Smith & Pollak, 2020; Teicher et al., 2022).

3.5.7 The Brain and Personality

Personality traits have strong genetically informed origins, so it makes sense that brain differences would impact upon personality differences. Xu and Potenza (2012)'s study (N=51) found that neuroticism was associated with “worse integrity of WM (white matter) interconnecting extensive cortical and subcortical structures including the PFC (prefrontal cortex) and amygdala” (p. 800). In other words, there was a concrete neurological substrate to the neuroticism personality trait. Lin et al. (2023, p. 7) found that “there were significant positive correlations between

neuroticism and brain activity in the left MTG, left striatum and right hippocampus gyrus; in contrast, activity in the left STG and right SMG was negatively associated with neuroticism”⁶⁵. In Castagna (2019)’s study (N = 1,106) cortical surface area moderated the relationship between amygdala volume and trait neuroticism. Lahey et al. (2021)’s longitudinal twin study (N=866) found that negative emotionality in early life predicted bilateral amygdala volumes and thicker left caudal/dorsal anterior cingulate cortex in adulthood. As they state, “dispositions assessed at 10–17 years of age were predictive of grey matter volumes measured 12–13 years later in adulthood” (p. 1275).

In Bray et al. (2022)’s study (N = 125 children) cortical thickness correlated with empathic concern. Zeng et al. (2022)’s study found that the cortical-midline structures were involved in personal self-worth processing, and the temporoparietal-junction was involved in relational self-worth processing, while Jiang et al. (2017)’s studies found that those individuals with antisocial personality disorder (ASPD) were more likely to have reduced white matter integrity, and those with callous unemotional traits have been found to have lower hippocampal volume (Jiang et al., 2023), and atypical modulation of amygdala response (Sebastian et al., 2021). Pan et al. (2023)’s study found that higher self-control individuals had larger gray matter volumes. Interestingly, Sumich et al. (2022)’s study showed an additional connection between gut microbiome, brain function, and personality traits.

⁶⁵ **Left Middle Temporal Gyrus (MTG):** This region of the brain is located in the temporal lobe and is involved in processing language and semantic memory, which includes understanding and producing meaningful speech. The left MTG plays a critical role in the comprehension of words and the integration of information from different sensory modalities. **Left Striatum:** The striatum is a key component of the basal ganglia, located deep within the brain, and is split into two parts: the caudate nucleus and the putamen. The left striatum is particularly involved in the control of movement as well as various aspects of cognition including learning, memory, and reward processing. Its function is often discussed in the context of motor control and the regulation of dopamine, a neurotransmitter crucial for pleasure and motivation.

Right Hippocampus: The hippocampus, located in the medial temporal lobe, plays essential roles in the formation of new memories and is also associated with learning and emotions. The right hippocampus is often linked specifically to spatial memory, which includes the ability to navigate environments.

Left Superior Temporal Gyrus (STG): This region is also located in the temporal lobe and is active in auditory processing and language. The left STG includes areas such as Wernicke’s area, which is crucial for language comprehension. This region helps in the processing of sounds and contributes to aspects of speech perception.

Right Supramarginal Gyrus (SMG): Part of the parietal lobe, the right SMG is involved in a variety of cognitive functions including language perception and processing, spatial orientation, and the management of sensory information. It plays a role in empathy and the interpretation of emotions and sensations that are critical to social interactions.

3.5.8 Brain Summary

In summation, brain differences in structure and function impact upon personality traits and attachment strategies, which then impact upon relationship-related behaviour in significant ways. The amygdala and cortical areas have been shown to modulate emotional reactivity and regulatory processes, consequently effecting the ability to manage conflicts and emotional exchanges effectively. The cortical-midline structures and temporoparietal junction, implicated in self-worth processing, help to organise self- and other-perception within a relationship. The hippocampus is involved in emotion processing and memory consolidation. Empathy, a vital component of successful relationships, has been associated with cortical thickness, suggesting a neurological basis for understanding and responding to a partner's emotional needs. Furthermore, neurological factors extend to self-regulation and self-control capacities, potentially influencing impulse management and decision-making in relationship contexts. Thus, the individualised function of the brain underpins the intricate dynamics of couple relationship behaviours – thereby shaping relationship outcomes.

3.6 Emotion Regulation

Emotion regulation was highly researched in the Endnote library collection. In the whole Endnote library factor network model, *emotion regulation* is shown as centrally located and co-occurring very regularly with *personality* and *emotions*, as well as with all the other top ten factors. It is also closely linked with *empathy*, *neuroticism*, *hostility*, *anxiety*, *self-control*, *physiological arousal*, *emotional intelligence*, *emotional arousal*, *reappraisal*, *negativity*, *distraction*, *memory*, and *heart rate*.

3.6.1 The Process and Outcomes of Emotion Regulation

Baumeister and Vohs (2004) state that “nearly every major personal and social problem affecting large numbers of modern citizens involves some kind of failure of self-regulation” (p. 3). Unsurprisingly, self-regulation, which is the personal management of one’s own thoughts, emotions, and behaviours (Baumeister & Vohs, 2007b), and specifically emotion regulation (Čikeš et al., 2018), correlates with relationship quality (e.g., Boiman-Meshita & Littman-Ovadia, 2021; Righetti et al., 2022). Emotion regulation is the aspect of self-regulation that involves modifying one’s emotional state in response to a given situation (Gross, 1999) and “refers to the goal-directed processes through which individuals attempt to elicit, change, or maintain emotional states” (Hughes et al., 2020, p. 63).

When a person is able to emotion regulate, they are more likely to respond thoughtfully rather than react impulsively in stressful situations, and thereby maintain emotional connection with their partner (Thompson, 1994), leading to increased harmony and happiness in a relationship (Brock et al., 2016). Individuals who struggle to regulate their emotions may be more likely to be emotionally reactive (e.g., Gil et al., 2022), to blame-shift (e.g., Kaufmann et al., 2022), to experience and express negativity (e.g., Boemo et al., 2022), and show less empathy (e.g., George-Levi et al., 2022), or support (J. Zhou et al., 2020), all of which can impact their ability to form and maintain close relationships (e.g., Casini et al., 2021; Frye-Cox et al., 2021). Unsurprisingly then, Bloch et al. (2014)’s study of emotion regulation during couple conflict from data covering a 13-year period (N=312) found that higher levels of emotion regulation predicted higher levels of down-regulation of negative emotion, resulting in higher levels of relationship satisfaction.

There are various techniques noted in the research for regulating emotions (e.g., Aldao et al., 2010; Ayduk & Kross, 2010; Gross, 1998; Hofmann et al., 2009; McRae et al., 2010; Morawetz, Alexandrowicz, et al., 2017; Ochsner et al., 2012), including;

- Reappraisal (changing emotions by changing one's perceptions and interpretations of them).
- Problem-solving (planning to change or control a situation).
- Acceptance (having a non-judgmental view of emotional response).
- Distraction (diverting attention away from emotions).
- Rumination (re-living emotions without bringing resolution to them).
- Avoidance (removing oneself from the emotion-provoking situation or using distress-minimising strategies).
- Suppression (inhibiting outward expression of emotions and blocking out unpleasant emotions).
- Defensiveness is also seen by some as a component of emotion regulation (e.g., Nevarez et al., 2018).
- Humour has also been noted as an emotional regulation technique (Garofalo et al., 2017; Horn et al., 2018).

These emotion regulation strategies bear resemblance to the face (reappraisal, problem-solving), flight (avoidance, distraction), freeze (suppression), fight (defensiveness, rumination), and tend and befriend (acceptance) stress responses (e.g., Lebel, 2017).

The benefits of emotion regulation techniques vary – with reappraisal, problem-solving, and acceptance generally beneficial, and distraction, avoidance, suppression, rumination, and defensiveness tending to exacerbate negative relational outcomes over time (e.g., Ben-Naim et al., 2013; Butler et al., 2003; Impett et al., 2012; Impett et al., 2013; Kalokerinos et al., 2015; Thomson et al., 2018). Davila, Mattanah, et al. (2017) determined that couple relationship well-being arises from mutual responsiveness and respect. It requires self-regulation to pay attention to, and respect one's own perceptions as well as others (e.g., Aktar et al., 2021; Plenty et al., 2015; Shi et al., 2020; Yang & McGinley, 2022). It requires self-control, to regulate one's emotions in response to these perceptions, and to respond appropriately (Wenzel et al., 2021).

3.6.2 Mindfulness

To intentionally manage emotions, one first needs to be aware or mindful of them

(e.g., Omid & Talighi, 2017; Shahar et al., 2018). Mindfulness is a concept that has received extensive research in recent years. It is a self-awareness technique involving paying attention to the present moment without judgment, and having an accepting and responsible attitude towards the current situation, oneself, and one's partner (Bishop, 2004; Galovan, Zuluaga Osorio, et al., 2022; Zhang et al., 2020). Mindfulness has been shown to improve prosociality and the quality of interpersonal interactions (Khoury et al., 2023), emotion regulation (e.g., Brockman et al., 2017; Fisher et al., 2022; Guendelman et al., 2017; Wenzel et al., 2020; Zangri et al., 2022), and self-awareness. Self-awareness in turn enhances other-awareness (Davila, Mattanah, et al., 2017; Stewart et al., 2017), empathy and compassion (Donald et al., 2019; Jones et al., 2016), emotional connection with others (Don et al., 2022; Schans et al., 2020), and constructive communication patterns such as listening, taking influence, and perspective-taking (Jones & Hansen, 2015). Together, these factors enhance coping with relationship stress (Barnes et al., 2007), and relationship satisfaction (e.g., Lane & Smith, 2021; Lea et al., 2023; Malouff et al., 2014; Schröder-Abé & Schütz, 2011; Smith et al., 2008; Zamir et al., 2017; L. Zhou et al., 2020).

3.6.3 The Development of Emotion Regulation

Emotion regulation develops during childhood, impacted by both nature and nurture (Barthel et al., 2018; Davis et al., 2020; Diaz & Eisenberg, 2015; Myruski & Dennis-Tiway, 2021). Lindblom et al. (2016)'s longitudinal study (N=703) found that "functional early family relationships predicted children's efficient emotion regulation, whereas dysfunctional relationships predicted reliance on defense mechanisms" (p. 1). Parenting presence and practices are involved in the modelling and training of emotion regulation (Carrère & Bowie, 2012; Fosco & Grych, 2012; Myruski et al., 2019). Parents' happiness, warmth, and emotion-regulation mediate their child's emotion regulation (e.g., Daniel et al., 2016; Dragan et al., 2021; Guo et al., 2020; N. Richter et al., 2022), and prosocial behaviour (e.g., Massey-Abernathy, 2022; Quan et al., 2021) in part by calming fear and reducing perceptions of threat (Hornstein & Eisenberger, 2018).

Conversely, unsupportive parenting during childhood predicts dysregulated emotions and behaviours, mediated by increases in the child's fearful distress and concurrent reductions in attention to their parent's negative facial expressions and emotion (Davies, Thompson, Coe, et al., 2021). In other words, a child's fear of their

parents' negativity may cause them to suppress their emotional experience of it, and this emotional suppression contributes to them acting in less socially considerate ways.

An important aspect of both attachment security and emotional intelligence is the co-experience (S. Wang et al., 2020; Wells et al., 2022) and synchronisation of emotions (Sebanz & Knoblich, 2021). Developmentally, child-caregiver bio-behavioural synchrony enables maturation of emotion systems (Feldman, 2012). This social allostasis (Saxbe et al., 2020) is "essential to the co-construction of positive emotions and the fortification of biobehavioral ties" (p. 470). Emotion synchronisation promotes social learning and self-regulation (e.g., Feldman, 2012, 2014; Kragness & Cirelli, 2021; Ulmer Yaniv et al., 2021).

In Altan-Atalay (2019)'s study (N=433, with 318 women), interpersonal emotion regulation was shown to be moderated by attachment style and reinforcement sensitivity (how likely behavioural activation (BAS) or inhibition (BIS) systems are to be activated⁶⁶). It makes sense theoretically that secure attachment would be strongly linked to emotion regulation as attachment security is developed through successful transmission of self-regulation via early maternal (or primary caregiver) regulation, and multiple studies have affirmed this connection (e.g., Brennan & Shaver, 1995; Cooper et al., 1998; Feeney, 1999; Fuendeling, 1998; Mikulincer & Shaver, 2007a; Sousa-Gomes et al., 2022; Zimmermann, 1999).

Tammilehto et al. (2022, p. 1109) state that in adulthood "how (in)secure – in terms of being loved and cared for – someone feels at a certain moment can influence how one regulates one's emotions". Securely attached individuals tend to have better emotion regulation compared to those with insecure attachment styles (Constant et al., 2018), and are more likely to be self-regulated in how they respond to their partner (Brennan & Bosson, 1998; Mikulincer & Shaver, 2019b; Young et al., 2019). They are more likely than the insecurely attached to use reappraisal rather

⁶⁶ The BIS is responsible for detecting and responding to potential threats and punishment cues in the environment. When the BIS is activated, it leads to feelings of anxiety and inhibits behaviour to avoid potential negative outcomes. The BAS, on the other hand, is associated with the pursuit of rewards and positive outcomes. It motivates individuals to approach and engage with opportunities, seek rewards, and experience positive emotions. These systems are part of Gray's Reinforcement Sensitivity Theory (RST) (1987), which provides a framework for understanding how individual differences in these systems contribute to variations in personality and behaviour.

than rumination or suppression to regulate their emotions (Karreman & Vingerhoets, 2012; Troyer & Greitemeyer, 2018). In Troyer and Greitemeyer (2018)'s study, the securely attached were shown to be "able to experience greater levels of cognitive empathy due to reappraising their emotions, rather than suppressing or ruminating on them" (p. 198). Conversely, attachment avoidance and anxiety have been linked to emotion dysregulation (Mikulincer & Shaver, 2019a), negative co-regulation (Knapp, Norton, et al., 2015), and negative dyadic coping (Fuenfhausen & Cashwell, 2013). In Springstein et al. (2022)'s study, attachment avoidance correlated with poorer inter-personal support and co-regulation outcomes. On the other hand, the anxiously attached are typically emotionally hyper-activated when experiencing other's negative emotions, resulting in their own poorer emotional regulation (Gardner et al., 2020; Henschel et al., 2020; Obeldobel et al., 2022).

The avoidantly attached are likely to distance themselves from stressful relational experiences through distraction, denial, deflection or degradation of the threat (Karreman & Vingerhoets, 2012). The emotionally dysregulated may numb their own emotional experience, and, in the process, they become numb to other's emotional experience, leading to a lack of empathy and responsiveness in adulthood (Arnett et al., 2019), as is typical of the avoidantly attached. The avoidantly attached both suppress their emotions (Brandao et al., 2023), and underutilise positive emotion regulation behaviours (Sutton, 2019), as well as negative emotions – including potentially avoiding responsibility for their partners' negative feelings (e.g., Altan-Atalay, 2019; Girmé et al., 2020). In Andriopoulos and Kafetsios (2015)'s study the avoidantly attached cognitively avoided attachment or emotion related activities. However, when their attachment system was threatened, they had to work harder to suppress emotions, and this over-taxed their cognitive processing.

Stressful early life experiences, including maltreatment, poverty, and chaos in a household may also contribute to impaired emotion regulation development (Kao et al., 2020; Kim et al., 2023; Milojevich et al., 2020; Warmingham et al., 2023). Alcohol and drug use are also renowned for causing emotion dysregulation in adulthood, with studies showing that intoxication mediates emotion regulation and interpersonal aggression and violence (Grigorian et al., 2020; Leone et al., 2021). Additionally, mental and physical health indices may impact upon emotion regulation capability (Carl et al., 2013; Grownéy et al., 2023; Tuck et al., 2017), along with diet and exercise (Nota et al., 2023).

3.6.4 Emotion Regulation and Self-Control

Emotion regulation requires self-control (e.g., Wyczesany et al., 2020), which was a factor also found to be frequently researched (17th most commonly occurring factor in the Endnote library). Individuals with high levels of self-control tend to be disciplined, responsible, and able to resist temptation, which can help them to manage relationship threats more effectively (Armstrong et al., 2011).

Attachment style influences the development of self-control by altering the goals of self-control (e.g., Orehek et al., 2017; Pallini et al., 2018). For the securely attached, self-control allows the maintenance of trusting relationships, but for the anxiously attached, self-control is used to maintain closeness to relationships that aren't always trustworthy, while for the avoidantly attached, self-control is used to maintain autonomy from others whether they are genuinely trustworthy or not. These varying self-control goals alter the way individuals regulate their emotions (e.g., Brandao et al., 2022; Brumariu, 2015; Lemay & Ryan, 2018; Pallini et al., 2018; Springstein et al., 2022), and subsequently alter the nature of the couple relationship, with the anxiously attached potentially being overbearingly controlling (Gilbert & Blakey, 2021; Orehek et al., 2017; Overall & Sibley, 2009a) but emotionally escalated and dysregulated (Cheche Hoover & Jackson, 2021; Gardner et al., 2020; Stevens, 2014), and the avoidantly attached being emotionally disconnected and abandoning (Kaurin et al., 2022; Overall, Pietromonaco, et al., 2022).

3.6.5 Personality Factors Influencing Emotional Regulation

Personality also influences self-control and emotion regulation capabilities, but personality may itself be influenced by emotion regulation capabilities (Xia et al., 2014). Neuroticism is a personality trait specifically characterised by emotion dysregulation, emotional instability, and mood swings (Carver & Connor-Smith, 2010; Chirico et al., 2021). Consequently, individuals high in neuroticism may be more prone to emotion regulation disorders such as depression and anxiety (Yoon et al., 2013). Conversely, individuals higher in agreeableness may be more skilled at regulating their emotions and less prone to negative emotional experiences such as anger and frustration, and individuals high in conscientiousness tend to be more self-disciplined and better at regulating their emotions (Hughes et al., 2020).

3.6.6 Biological Factors Influencing Emotion Regulation

The prefrontal cortex, insula and the amygdala in particular, broadly support emotion regulation processes (e.g., Davis et al., 2019; Goldin et al., 2019; Morawetz, Alexandrowicz, et al., 2017; Morawetz, Bode, et al., 2017; Morawetz et al., 2016; Morawetz et al., 2020; Yu et al., 2023), and subsequent relationship maintenance behaviours (Karremans et al., 2015). When individuals encounter a potentially threatening situation, the amygdala sends signals to the rest of the brain to activate the FFF response, which leads to increased physiological arousal (Zhang, Bachmann, et al., 2018) and influences the intensity and duration of emotional responses (Sacrey et al., 2021). Sarkheil et al. (2019)'s study found a reduction in the regulatory relationship between the prefrontal cortex and amygdala "upon repeated exposure to negative stimuli" (p. 804), and Sato et al. (2019)'s study found that amygdala connectivity with the right precuneus moderated feelings of happiness which was "associated with a reduction in self-referential mental processes, which are well integrated with emotional processing" (p. 1).

Interestingly, Robles et al. (2014)'s meta-analysis found cardiovascular reactivity during conflict corresponded with relationship satisfaction outcomes. Negative interactions correlate with increased heart rate and cortisol levels (Coutinho et al., 2017). When individuals experience this kind of physiological arousal they may be more prone to emotional reactivity and dysregulated emotions (e.g., Deutz et al., 2019; Jauniaux et al., 2020; Osnes et al., 2022; Steinfurth et al., 2018). However, with effective emotion regulation strategies, individuals can modulate their physiological responses to stress and manage their relationship behaviours more effectively (e.g., Eldesouky & English, 2022; English & Eldesouky, 2020).

3.6.7 Emotion Regulation and Emotional Intelligence

Emotion regulation and emotional intelligence are related constructs, with emotional intelligence being a set of personal abilities, and emotion regulation being a set of behaviours reflecting those abilities. Emotional intelligence is the ability to recognise, understand, and appropriately manage one's own emotions and the emotions of others (MacCann, Jiang, et al., 2020; Mayer, 2008; Mayer et al., 2016; Salovey & Mayer, 1990), and the emotionally intelligent are therefore likely to utilise emotion regulation behaviours (e.g., Double et al., 2022; MacCann, Erbas, et al., 2020; Pena-Sarrionandia et al., 2015). As they are able to consider other's feelings (e.g., Fernandez-Abascal & Martin-Diaz, 2019; Schröder-Abé & Schütz, 2011), they

are more likely to communicate with others in a constructive way (Walker et al., 2022; Zeidner & Kloda, 2013). Consequently, emotional intelligence is a factor typically producing positive couple relationship well-being outcomes (Jardine et al., 2022), as shown in Zarch et al. (2014)'s longitudinal Iranian study (N = 159 couples) where emotional intelligence accounted for 40.8% of relationship satisfaction.

Emotional intelligence shows a positive correlation with secure attachment, and a negative correlation with anxious or avoidant attachment. For example, in Walker et al. (2022)'s meta-analysis (N=6,914) emotional intelligence was significantly negatively correlated with attachment anxiety and avoidance. It requires emotional intelligence to pay attention to, and attend to one's own attachment needs as well as another person's (e.g., Aktar et al., 2021; Plenty et al., 2015; Shi et al., 2020; Yang & McGinley, 2022). Consequently, the lower emotion regulation capabilities of the insecurely attached may impact on their relationship well-being outcomes. In Rosso (2022)'s study (N=93) the securely attached were found to have more emotional intelligence capability, while the anxiously attached had less. Rosso summarised this study by stating that "derogation of attachment needs correlated with impairment in emotional intelligence" (p. 1).

3.6.8 Emotion Contagion and Co-Regulation

Empathy as an experience involves the co-activation of the insula and the anterior cingulate cortex regions of the brain in both the empathiser and the one experiencing distress (Denworth & Corte, 2017; Yoder et al., 2016). This kind of co-experience of emotion (literally being on the same neural wavelength (Schore, 2021)) has significantly more impact on relationship satisfaction than individual emotion alone (Fredrickson, 2016). For example, the congruity between partners' positive affect correlates with improved relationship functioning (Velotti et al., 2015), and reduced conflict (Chow & Ruhl, 2018). Interestingly, inter-brain synchronisation (when couple's brainwaves synchronise during interaction) was reduced under threat of punishment in J. Li et al. (2022)' study. In other words, couples in a threatening situation are less likely to 'be on the same wavelength' cognitively and emotionally.

Emotion contagion – the catching of emotions off the other person – is an aspect of emotion synchrony. Negative emotions such as emotional distress or anger may be transferred between partners, which tends to have negative relationship well-being

outcomes (Chow et al., 2014; Liu et al., 2018). Levenson and Gottman (1983) termed this emotion contagion between couples 'negative affect reciprocity'. This is where a couple gets stuck in a downward spiral of negativity, unable to de-escalate conflict through co-regulation (soothing, comfort, calming) of unpleasant emotions (e.g., Liu et al., 2018). Failing to regulate in moments of emotional intensity can lead to further distrust for future communication, leading to couples feeling trapped in a hopeless cycle of distress (Gottman et al., 2005).

Couples don't just self-regulate, they co-regulate, with partner-support being a form of inter-personal emotion regulation (e.g., Hofmann et al., 2015; D. Liu et al., 2021; Randall, Tao, et al., 2021; Zee & Bolger, 2022), conceptualised by Hofmann et al. (2016) as composed of: soothing, enhancing positive affect, perspective taking, and social modelling. Co-regulation, in the form of perspective taking and cognitive empathy, was shown to be even more effective than self-emotion-regulation in reducing partner distress in Levy-Gigi and Shamay-Tsoory (2017)'s study, and responsive reappraisal has been found to be equally useful when used interpersonally, as when used personally (Jurkiewicz et al., 2023).

Physical affection from a spouse (caressing, hand holding, hugging etc.) has also been shown to neuronally communicate emotional support (Kirsch et al., 2018; von Mohr et al., 2018), and interpersonally regulate one another's psychological, physiological, and biological processes (Feldman Barrett, 2020; Floyd et al., 2010). This subsequently lowers the cortisol levels of both partners (Ditzen et al., 2019; Ditzen et al., 2007), lowers alpha amylase (which indicates lowering of HPA-axis activation), lowers blood pressure in men and increases oxytocin (Holt-Lunstad, Birmingham, et al., 2008). Simply the presence of a romantic loved one reduces a person's experience of pain (Coan et al., 2006; Tamam et al., 2019), dampening threat-related neural activation, physiological arousal (Graff et al., 2019), and hypothalamic activity (C. Brown et al., 2017). In sharing an appropriate level of emotional support each partner's well-being outcomes are bolstered (Cacioppo & Cacioppo, 2014; Hostinar et al., 2014).

3.6.9 Emotion Regulation Summary

Emotion regulation is a critical determinant in shaping the outcomes of couple relationships. Adequate emotion regulation fosters an environment conducive to empathy, understanding, and conflict resolution by facilitating the negotiation of

differing perspectives and emotional states. Couples who demonstrate adeptness in recognising, expressing, and controlling their emotions are better equipped to handle stressors and disagreements without escalating conflicts, thus promoting a sense of emotional safety and security within the partnership. On the other hand, deficient emotion regulation skills can lead to heightened emotional reactivity, disproportionate responses, and persistent negative affect, undermining the harmony and stability of the relationship.

3.7 Communication

3.7.1 Communication in the Network Models

Communication was highly researched in the Endnote library collection. In the whole Endnote library factor network model, *communication* is shown as co-occurring very regularly with *perceptions* and *conflict*. In other words, studies of communication also often include these as variables. Communication is linked with all the other top ten factors along with *support*, *connectedness*, *power*, *self-esteem*, *self-appraisal*, *responsiveness*, *coping*, *culture*, and *negativity*.

3.7.2 Communication Components and Benefits

In this modern era there is a general expectation that couples will lean on each other for support, assistance, advice, and friendship (Finkel, Hui, et al., 2014; Fitzsimons et al., 2015), and this is conferred between partners through mutual and responsive communication (e.g., Clark & Mills, 2011; Clark & Reis, 1988; D. Wu et al., 2021). Responsive communication involves active listening, empathy, and validation, which can reduce defensiveness and promote a collaborative and supportive dynamic in the relationship (e.g., Floyd, 2014). Couples with high relationship well-being tend to have communication with low levels of negativity, avoidance, offense, and violence, and concomitantly high levels of positivity, negotiation, self-disclosure, collaboration, and compromise (e.g., Bertoni & Bodenmann, 2010; Gottman & Notarius, 2000; Karakose & Ledermann, 2023; Ünal & Akgün, 2020).

Positive communication attends to the basic human need to belong. DeMaris and Oates (2022) found in their recent study (N=1.135) that “enhanced interpersonal trust, greater sociability, and less of a sense of loneliness and isolation” (p. 1650), as well as financial stability, appear to be responsible for two fifths of the couple relationship well-being advantage. Conversely, unhappy couples display more negative reciprocity in their communication than happier couples do (Gottman & Levenson, 2000), and have less success in resolving their negative interactions (Markman, 1981). However, being able to talk through issues, and gain perspective and advice from another person, especially a close person such as a spouse, has significant well-being effects, including increased lifespan (Delaney et al., 2018). Those people who have someone to confide in, or to emotionally support them, exhibit reduced stress and blood pressure (Birditt et al., 2014; Cornelius et al.,

2019) and attenuated cardiovascular and neuroendocrine strain (Hostinar & Gunnar, 2015), and hypothalamic reactivity (C. Brown et al., 2017).

3.7.3 Dyadic Responsiveness

Responsiveness has been proposed as a central defining factor in relationship function and well-being (Theiss & Nagy, 2013), and in the development and maintenance of secure attachment in relationships (Alonso-Ferres et al., 2021; Bosisio et al., 2022; Bosmans et al., 2020; Candel & Turliuc, 2021; Crasta et al., 2021; Fisher et al., 2022; Itzhakov & Reis, 2021; Pagani et al., 2019; Reis, 2018; Shoikhedbrod et al., 2022; Smallen et al., 2021). Consequently, dyadic responsiveness is deemed to be a key factor in communication quality and relationship satisfaction outcomes (Balzarini et al., 2022; Maisel & Gable, 2009; Reis, 2018). This was affirmed in Bookwala and Selcuk et al. (2016)'s decade-long study of over 4,000 individuals which found a significant correlation between positive partner responsiveness and individual emotional well-being.

Responsiveness is shown in understanding, validating, and caring responses to other's needs, requests, or 'bids for affection' (Reis, 2018). Conversely, when partners are not responsive, disconnection can happen, and relationship well-being suffers (Bühler et al., 2020; Gottman & Driver, 2005; Hooper et al., 2017). Sandra Murray (2023) states that:

"People are fundamentally motivated to be included in safe relationships – relationships where they are consistently cared for and protected... feeling more versus less safe ... contingently motivates partners to increase connection versus protect themselves against being hurt".

A partner's consistent perceived positive responsiveness (e.g., showing affection, gratitude, acceptance, investing into the partner, and sharing of power) creates safety in the relationship (Murray, 2023), allows trust to flourish (Bar-Shachar & Bar-Kalifa, 2021; Jolink et al., 2022; Krueger & Forest, 2022; Visserman et al., 2021), communicates that power is shared, and that needs will be valued and met (Knudson-Martin, 2013) and thereby leads to increased relationship satisfaction (Finkel et al., 2017).

Responsiveness is related to a sense of relational power (Keltner et al., 2003; Rusbult & Van Lange, 2003). Ward and Knudson-Martin (2012) define relational power as the ability to influence one's intimate partner. Shared relational power is

vital to building a sense of safety and trust in a couple relationship given that:

“Social environments are more threatening for people who lack power because they are relatively unable to influence others in order to control any negative outcomes that arise within social interactions” (Overall, Maner, et al., 2022, p. 3).

Influence happens through mutually responsive, and also supportive and caring, self-disclosure and listening. Afifi et al. (2016) proposed that when people receive communication from their partner that expresses shared giving and receiving of influence it validates their personal value and the relationship's value, and in doing so it builds emotional capital in the relationship. This emotional capital then resources them to cope more effectively with threatening situations, including conflict with their partner (Walsh & Neff, 2019). A habit of being responsive towards one's partner builds an expectation of future trustworthiness (Krueger & Forest, 2022), tending to result in an upward spiral of positive responsiveness (Schauf et al., 2023).

3.7.4 Self-Disclosure and Vulnerability

An important component of responsive relational communication is self-disclosure – the communicating of thoughts, feelings, and experiences with others (Bar-Shachar & Bar-Kalifa, 2021; Harvey & Boynton, 2021; Winczewski et al., 2016).

Self-disclosure aids the communication process by allowing for understanding of partners' needs, and hence the opportunity to be responsive to those needs (Arroyo et al., 2021). Feeling understood and having needs met reduces conflict and increases relationship satisfaction (e.g., Debrot et al., 2012; Gordon et al., 2013; Reis & Gable, 2015). Couples who vulnerably self-disclose and who are mutually and positively responsive to those disclosures build intimacy in their relationship (Rauers & Riediger, 2022), and this intimacy correlates with increased relationship satisfaction (e.g., Cordova et al., 2005; Greeff & Malherbe, 2001; Laurenceau et al., 1998; Rubin & Campbell, 2011; Yelsma & Marrow, 2003).

Mutual disclosure indicates trust in the one being disclosed to (Sprecher et al., 2013). People frequently disclose both negative and positive experiences, thoughts, and feelings so self-disclosure may involve a sense of risk – will the disclosure be received positively or negatively, and will this have acceptable consequences? Responsive, safe, and warm communication is preferred for these sorts of expressions (e.g., Clark, Armentano, et al., 2017; Reis & Clark, 2013; von Culin et

al., 2018). Positive perceptions about relationships enhance the use of positivity and assurances in communications (Knee et al., 2003), and when a partner is perceived as being sensitive to a partner's needs and disclosures this leads to increased positivity expressed to them in return (Pauw et al., 2021). Conversely, Poucher et al. (2022)'s study showed that self-disclosure can have negative consequences when it is met with indifference or contempt. A lack of responsiveness to a partner's self-disclosure, or negative responsiveness, may yield negative outcomes (Overall & Sibley, 2009a; Poucher et al., 2022).

3.7.5 Listening

Listening was strongly linked to *empathy*, *disclosure*, *responsiveness*, and *support* in the communication network model and is an important component of responsive communication. Disclosure invites listening, and listening invites disclosure – the to-and-fro of verbal interaction (Weinstein et al., 2022). Active listening involves being present and attentive to the other person's message, without judgment or interruption (Manusov et al., 2018), and empathetic listening involves understanding and validating the other person's emotions and perspective (e.g., Lafontaine et al., 2009), even if you don't agree with them (Floyd, 2014). Non-judgemental listening to another's personal disclosure can reduce the threat of being emotionally vulnerable, and lessen stress in communication (Kuhn et al., 2018). As Floyd (2014) states, "empathic listening, when done in an open, nonjudgmental manner, can convey unconditional positive regard, thus implying to the recipient that he or she is loved and cared for irrespective of the content of his or her message" (p. 7).

When people feel listened to, their trust in and liking of the listener grows, and alongside that the listener's influence with them grows (Ames et al., 2012; Crasta et al., 2021; Gunaydin et al., 2020). Brown et al. (2021)'s study showed that being paired with a compassionate, empathetic listener during an emotional disclosure discussion reduced negative affect in the one being listened to. When a person believes that their attempts to communicate with their partner will be listened to calmly, and be heard and responded to, they are generally happier in the relationship (Leahy et al., 2022; Vanderbilt & Solomon, 2021; Walker et al., 2023). Open expression of feelings increases the potential for the kind of mutual self-disclosure that will generate effective problem-solving and conflict resolution (Low et al., 2018). Listening contributes to perspective-taking and other-awareness (Verhofstadt et al., 2016), and perspective-taking has been shown to correlate with

increased relationship quality (Cahill et al., 2020; Chan & Rawana, 2021; Edwards, 2020).

3.7.6 Positivity and Negativity

Positivity and negativity stood out as highly researched and correlated in the communication network model. Thibault and Kelley's (1959) behavioural theory posits that the ways spouses interact determines the quality of their relationships. These interactions, whether positive, negative, or mixed, have been shown to influence spouses' global judgments of relationship quality (Gottman, 1999; Donato, Pagani, et al., 2014). From behavioural theory, we would therefore expect that happier, more stable relationships are those characterised by a higher proportion of positive to negative communication (Gottman, Coan, Carrere, & Swanson, 1998). In fact, one of the most cited difference between couples with happy and unhappy marriages is that satisfied couples utilise more positivity (e.g., laughing, affection) and less negativity (e.g., anger, withdrawing) during conflict communication (Bertoni & Bodenmann, 2010; Cazzell, Rivers, et al., 2022; Kanter, Lavner, et al., 2021; Rauer & Volling, 2013; S. Wang et al., 2020).

Gottman and Levenson (1992)'s research showed this ratio to be 5:1 positive to negative behaviours in satisfying and lasting marriages, whereas marriages heading for divorce had ratios of approximately 1:1. Snyder et al. (2005, p. 289) state that:

"Distressed couples are distinguished from non-distressed couples by... (a) higher rates of negative verbal and nonverbal exchanges (e.g., disagreements, criticism, hostility); (b) higher levels of reciprocity in negative behaviour (i.e., the tendency for negativity in Partner A to be followed by negativity in Partner B); (c) lengthier chains of negative behaviour once initiated; (d) higher ratios of negative to positive behaviours, independent of their separate rates; and (e) lower rates of positive verbal and nonverbal behaviours, for example, approval, empathy, smiling, positive touch".

Communicating positive affect and soothing one another with positive emotional expressions led to marital satisfaction in Gottman et al. (1998)'s study (N=130 couples). In Jolin et al. (2022)'s study (N=311 heterosexual couples), negative communication patterns predicted relationship satisfaction longitudinally. In Williamson (2020)'s longitudinal study of newly-weds (N=431), effective communication was characterised by its high positivity and low negativity and the

most effective communicators had much lower rates of divorce.

Active, constructive, positive feedback (Barasch, 2020), and the general expression of warmth between partners (Bliton et al., 2021) are especially beneficial to couple relationship well-being. Simply sharing positive memories provides benefits to the sharer beyond the actual event benefit (Borelli et al., 2020) and has been correlated with improved relationship satisfaction (e.g., Gable et al., 2004; Hovasapian & Levine, 2018; Lambert, Gwinn, et al., 2013; Reis et al., 2010; Verduyn et al., 2011). Disclosing about happy events, thoughts, and feelings can strengthen a sense of rapport and closeness, and in Thorson et al. (2021)'s study, self-disclosure correlated with a physiological synchrony between dyads HPA-axis activity and cortisol response. Responding positively to self-disclosures leads to positive emotions that help regulate and transform stress responses (e.g., Fredrickson, 2004; Tugade et al., 2004).

For positive statements to increase relationship satisfaction, they also need to be matched with positive emotional tone and body language (Davila, Wodarczyk, et al., 2017), denoting genuineness of the positivity. Communication is an expression of feelings and perceptions and is therefore an observable expression of our unobservable cognitions and emotions, hence the importance of congruency of body language with verbal language in building trust between partners (Helgeson et al., 2017). Language use also matters as it can reflect intrinsic motivation (Abreu-Afonso et al., 2021). Karan et al. (2018)'s meta-analysis of thirty studies indicated that couples high use of *we*, *us* and *our* (verbalising a perception of partnership) in their communication correlated with improved mental and physical well-being outcomes.

While authentic support-giving, positivity, self-disclosure, and even venting, and confession of secrets can have positive effects (Brans et al., 2013; Slepian et al., 2017), verbalising negativity typically has negative effects (Curci & Rime, 2012; Rimé, 2009). However, communicating negative emotions is sometimes necessary, and sometimes leads to positive relationship outcomes (Overall, 2018). When communication of negative emotions coalesces with responsiveness to partners' communication, relationship satisfaction may improve (Emerman, 2018). Overall and McNulty (2017, p. 1) state that:

“Direct opposition is beneficial when serious problems need to be addressed and partners are able to change but can be harmful when partners are not

confident or secure enough to be responsive. In contrast, cooperative communication involving affection and validation can be harmful when serious problems need to change, but may be beneficial when problems are minor, cannot be changed, or involve partners whose defensiveness curtails problem solving”.

3.7.7 Gratitude

Expressions of gratitude are also important to couple relationship satisfaction (Chang et al., 2021; Joel et al., 2020; Kayabol & Sümer, 2020; Woods et al., 2015), with John and Julia Gottman (2023) stating that “an enthusiastic culture of appreciation” (p. 1) is an important aspect of a satisfying relationship. Gratitude has been shown to increase positive affect (L. Zhang, N. Zhu, et al., 2022) and mutual prosocial behaviour (e.g., Algoe, 2012; Gordon et al., 2012; Grant & Gino, 2010; Kindt et al., 2017), and lead to favourable appraisals of the grateful one, which increases commitment to them (Baker, 2020). “Gratitude motivates people to express sensitivity and concern for others and stimulates prosocial behaviour” (DeWall et al., 2011, p. 232).

Reciprocity of gratitude is a key determinant of this gratitude benefit. Partner responsiveness makes relational sacrifices seem worthwhile and increases positivity (Visserman et al., 2021). In contrast, when relational sacrifices are overlooked or ignored by a partner, relationship satisfaction drops (Visserman, Impett, et al., 2018). In other words, it is mutually responsive gratitude, that is appropriate to the support given and received, that provides benefits to the couple relationship (Cazzell, Tsang, et al., 2022; Joel et al., 2013).

3.7.8 Support

Highly supportive relationships tend to be correlated with higher relationship satisfaction (Cao et al., 2015), while a perception of being under-supported by one’s partner lowers satisfaction (Bar-Kalifa & Rafaeli, 2013; Cutrona et al., 2007; Lorenzo et al., 2018), and higher likelihood of relationship dissolution over the long-term (Helland et al., 2014). Tangible support where couples share responsibilities both practically and emotionally increases gratitude, decreases stress (Wood et al., 2023), and correlates with greater relationship satisfaction (Cutrona & Russell, 2017).

Supportive communication builds relationship resilience for coping with stressors which could otherwise undermine relationship satisfaction (Merolla, 2017; Ogolsky & Bowers, 2013). Partner support helps individuals to co-regulate their thoughts and emotions in an adaptive fashion (Lakey & Orehek, 2011; Teoh & Hilmert, 2018). Facing a stressful or difficult situation knowing that there are people close by who can help you, or even simply offer their concern, reduces the threat of that situation. This allows emotional resources to be directed towards managing the situation and creates opportunity for positive and beneficial stress adaptation (Coan & Sbarra, 2015; Pressman et al., 2019). Support also acts as a buffer against internalising disorders (Feder et al., 2019). In other words, the tangible presence of a known, safe, and loving partner correlates with a more beneficial, and efficient, neurophysiological emotion regulation.

John Gottman states: “Most relationship problems don’t get solved, they get coped with” (Young, 2016, p. 223), making supportive communication that increases coping capacity an even more important communication skill than problem-solving, and helps to explain why emotionally sensitive support is potentially more effective than instrumental support (e.g., Priem & Solomon, 2014; Schmiedl et al., 2022; Verhofstadt et al., 2016), and why validating, encouraging support that respects the partner’s autonomy is generally preferred over directive, problem-solving support (Carbonneau et al., 2019; Jensen et al., 2013; D. Liu et al., 2021; Rusu et al., 2019).

It seems to be the responsive nature of support, rather than the type of support, that is critical to the value it provides (Maisel & Gable, 2009). Cutrona et al. (1990)’s ‘Optimal Matching Theory of Social Support’ assumes that matching support behaviours with partners’ needs should be most ideal for relationship satisfaction. This is generally the case (Bar-Kalifa et al., 2016; Brock & Lawrence, 2010; McNulty, 2016), however, both under-provision and over-provision of support can lead to increased relationship dissatisfaction, particularly over-provision of advice giving (Brock & Lawrence, 2009). Over-provision of insensitive support may create a threat to autonomy which may provoke a defensive response aimed at restoring personal control and freedom (Rosenberg & Siegel, 2018).

When support-giving is not reciprocated, it can lead to a sense of inequity that disrupts peoples happiness in a relationship (DeMaris, 2010), particularly for women (Frisco & Williams, 2003; Grote & Clark, 2001), who consistently contribute more to household and childcare needs (Chao, 2021). Under-provision of support was

shown in Tougas et al. (2016)'s study to correlate with increased psychological aggression (belittling, isolating, controlling, or manipulating (Lawrence et al., 2009)), perhaps as a means of being heard, or of gaining a sense of power.

Support is generally most needed in threatening situations, however, when individuals are under stress, they may instead withdraw from social interactions or become defensive, making it harder to receive support (e.g., Cohen & Ashby Wills, 1985), and where support appears lacking or is inappropriate, stress can also be exacerbated (e.g., Breitenstein et al., 2018). Self-awareness (Teng et al., 2022), and other-awareness can also be lessened under stress, including empathising with others. This can impair sensitivity to partners' needs (Crenshaw et al., 2019), and reduce inter-personal responsiveness and support, particularly for men (Bodenmann et al., 2015; Neff et al., 2021).

3.7.9 Sexual Affection

Affection is notably central and prominent in the communication network model. Linked to *affection* in the communication network model are *sexual communication*, and *sexual behaviour*, with *sexual satisfaction* and *communication* notably linked with *happiness*. Lack of affection is associated with lowered relationship satisfaction (Hesse & Tian, 2019). Horan (2012) states that "affectionate communication remains a main indicator of relational climate, and ultimately, a lack of affectionate communication from one's partner may be a warning sign of decreased investment and future turbulence" (p. 123).

Physical and sexual affection and intimacy are important components of most couple relationships (Burke & Young, 2012; Busby, Hanna-Walker, et al., 2021; Træen & Kvaem, 2022), with sexual satisfaction and affection identified as a key factor in couple relationship satisfaction in multiple studies (e.g., Boisvert et al., 2011; Frederick et al., 2017; Impett et al., 2014; Joel et al., 2020; McNulty et al., 2016; Vowels & Mark, 2018; Wlodarski & Dunbar, 2015; Yeh et al., 2006). Interestingly, couples have reported that their sexual relationship accounts for 15-20% of their relationship satisfaction but 50-70% of their relationship distress (McCarthy & McCarthy, 2003). In other words, its powerful effects on relationship well-being go relatively unnoticed until things aren't going well.

Sexual satisfaction is an outcome of sexual desire and arousal, sexual frequency, and orgasm consistency (Velten & Margraf, 2017). However, the physical aspects

are just one component of sexual satisfaction. The quality of a couple's emotional connection, affection, and care is also important in determining sexual satisfaction (e.g., Debrot et al., 2017; Schoenfeld et al., 2017; Štulhofer et al., 2013; Urbano-Contreras et al., 2019).

Sexual satisfaction and relationship satisfaction are bidirectionally influential (McNulty et al., 2016) with relationship quality predicting sexual satisfaction, and vice versa (Wiebe et al., 2019; Yoo et al., 2014). Partner responsiveness is an important factor in sexual satisfaction (Birnbbaum et al., 2016), associated with increased sexual desire, especially for women. Birnbbaum et al., (2016) describe responsiveness as conveying to a partner "not only intimate knowledge of one's needs, emotions, and thoughts, but also appreciation for the value of these attributes and concern for one's welfare" (p 542). Husbands report greater marital happiness when their wives report greater sexual satisfaction (Yoo et al., 2014), although typically, women are less satisfied with their sexual relationship than men (Mark et al., 2015), and have more trouble reaching orgasm (Frederick et al., 2018). As sexual desire tends to diminish over time (Birnbbaum et al., 2007), responsiveness may be a key element in keeping sexual satisfaction high.

In Vance et al. (2022)'s study, men who showed more concern for their partners' sexual satisfaction not only increased their wife's relationship satisfaction, they also increased their own satisfaction. Higher sexual satisfaction also correlated with more active and constructive responsiveness during discussions in Bosisio et al. (2022)'s study. On the other hand, self-focused and uninterested responses to a partners' positive event disclosure correlated with that partners' sexual dissatisfaction. Interestingly, gender inequities in housework (Waddell et al., 2021), contribute to less sexual frequency and satisfaction (Johnson et al., 2016) and lower sexual desire for the partner who does the least (Barrett & Raphael, 2018; Harris et al., 2022), perhaps explained by the perceived unfairness of housework distribution altering the sense of reciprocity between partners, thereby leading to a withdrawing of generosity in other areas of the relationship (Barrett & Raphael, 2018).

Infidelity (breaking a commitment or promise to a partner by engaging in romantic or sexual relations with another person) is the 76th most commonly studied factor in the Endnote library, and a commonly mentioned reason for relationship dissolution. However, while infidelity is the perceived betrayal that typically brings closure to a relationship, Stavrova, Pronk, et al. (2023)'s study indicated that relationships

deterioration leads to infidelity rather than the other way around. Men are more likely than women to have favourable views on infidelity (Isma & Turnip, 2019), and to engage in it, although this gender difference is reducing (Fincham & May, 2017).

3.7.10 Physical and Verbal Affection

Another way of communicating care and responsiveness to a partner is through non-sexual physical affection. Physical and verbal affection show a positive correlation with stress regulation (Floyd, Mikkelsen, Tafoya, Farinelli, La Valley, Judd, Davis, et al., 2007; Floyd, Mikkelsen, Tafoya, Farinelli, La Valley, Judd, Haynes, et al., 2007; Kidd et al., 2023), conflict resolution capabilities (e.g., Allsop et al., 2021; Pauley et al., 2014), trust and inter-personal closeness (e.g., Debrot et al., 2013; Van Raalte & Floyd, 2021), and relationship satisfaction (e.g., Van Raalte et al., 2019), co-regulating each partner's emotions (Debrot et al., 2014; Debrot et al., 2013), and producing beneficial physiological outcomes (e.g., Floyd et al., 2022; Goldstein et al., 2018; Triscoli, Croy, Olausson, et al., 2017; Triscoli, Croy, Steudte-Schmiedgen, et al., 2017). Pleasurable and affectionate physical touch causes a release of endorphins in the body which increase feelings of happiness (Jakubiak & Feeney, 2017; Morrison, 2016), aiding recipients of affectionate touch to feel closer to their partner (Carmichael et al., 2020; Debrot et al., 2021), and safer in the relationship (Jolink et al., 2022).

Females tend to place a greater emphasis on affectionate behaviour, emotional closeness, warmth, and intimacy in relationships compared to males (e.g., Floyd et al., 2021; Floyd et al., 2020; Gardner et al., 2020; Lambert & Hopwood, 2016), and are therefore more likely to engage in verbal expressions of affection and emotional support (Burlison et al., 2011), while males may be more likely to express intimacy through sexual behaviour and also think about and desire sex more often (Dewitte, 2015; Frankenbach et al., 2022) and have stronger daily sexual desire than women, which in French et al. (2022)'s study was linked to the sex-difference in circulating testosterone.

3.7.11 Affectionate Communication and Attachment

Physical affection is associated with partner proximity and literal warmth – key elements of attachment style development (Ainsworth & Bell, 1970), and it is therefore no surprise that attachment style has been shown to correlate with sexual behaviour and satisfaction, and vice versa (S. Johnson et al., 2015; Stefanou &

McCabe, 2012). In Jakubiak and Feeney (2016)'s study affectionate touch was shown to promote secure attachment in adults. While the anxiously attached are reassured by affectionate touch, the avoidantly attached seem to enjoy it less (while still benefiting from giving and receiving it) (Allsop et al., 2021; Carmichael et al., 2020), and in S. Wagner et al. (2020)'s study, attachment had a negative correlation with satisfaction with the physical affection shown in a relationship.

While the securely attached have been shown to use sexual behaviour as a means of expressing their vulnerable emotions (Stefanou & McCabe, 2012), the insecurely attached are more likely to feel apprehensive about their sexual performance (Birnbaum et al., 2006). An avoidant attachment may lead to reduced caregiving motivation in sexual intimacy, and subsequent reduced positive emotional experience (Beaulieu et al., 2022). In Debrot et al. (2021)'s studies the avoidantly attached exhibit less affectionate touching. In Chopik et al. (2014)'s study, the avoidantly attached felt less positive about affectionate cuddling. They are more likely to rely on independent self-pleasuring, and to be less interested in interactive affection such as kissing and cuddling (Brennan, Wu, et al., 1998). It seems that this lack of warm affectionate interaction inhibits sexual desire (Birnbaum et al., 2011), and sexual behaviour (Birnbaum, 2014) for both partners.

3.7.12 Verbal Communication and Attachment

Attachment style also impacts upon verbal communication style (Domingue & Mollen, 2009; McNelis & Segrin, 2019) and importantly, upon the motivation underlying communication (Bodie et al., 2011; Dillow et al., 2014). Securely attached individuals have positive self-appraisals and other-appraisals (Fraley & Shaver, 2021), so their relationship communication strategies involve cooperation and reciprocity (Young et al., 2019). Finzi-Dottan and Schiff (2021)'s study (N=288 couples) found recollection of maternal acceptance in childhood was associated with increased responsiveness in the adult couple relationship. When attachment is secure, a person seeks closeness and support from their partner when faced with threats (Collins et al., 2006). Their relationships are likely to be trusting, supportive, empathetic, honest, and deeply emotionally vulnerable (Çolakkadioglu et al., 2017; Hazan & Shaver, 1987; Mikulincer & Florian, 1999). They are accessible and engaged, and generally prosocial in behaviour (Deneault et al., 2022), and these qualities are reflected in their open, self-disclosing, and positive communication (Domingue & Mollen, 2009) and subsequently correlate with higher relationship

satisfaction (e.g., Banse, 2016; Collins & Feeney, 2000; Feeney, 2016; Malinen et al., 2012; Park & Harris, 2022; Sandberg et al., 2012; Simpson, 1990).

In Tan et al. (2012)'s investigation of the impact of attachment style on communication disclosure, attachment anxiety correlated with increased relationship-focused disclosure, whereas attachment avoidance had the opposite correlation. The anxiously attached tend to perceive more conflict in their relationships, and react to this perception with escalated emotional communication (Cooper et al., 2018). They are also more likely to engage in destructive communication, including higher levels of disconfirmation of their partner (i.e., less recognition, acceptance, and value shown) (Weger & Tang, 2021), and higher levels of demand/withdraw behaviours (Fowler & Dillow, 2011; Millwood & Waltz, 2008). Interestingly, Vedelago et al. (2022)'s study of couple coping during the COVID-19 pandemic showed that the anxiously attached found emotion-focused communication of support helpful, and problem-focused/instrumental communication of support unhelpful, but this pattern was reversed for the avoidantly attached.

Unlike the anxiously attached who attempt to remedy their attachment deficit by escalating emotion to demand attention, the avoidantly attached seem to have lost hope (Birnie et al., 2009) and desire for this kind of closeness and instead distance themselves from it to avoid the distress of their significant other not meeting their basic needs (Akbarian et al., 2020; Collins, 1996; Lavy et al., 2010; Santascioy et al., 2018). This might be evidenced in defensively bolstering their self-esteem and self-reliance (Bartholomew, 1990), disengaging from vulnerable or emotional communication (Brandao et al., 2023; Yan et al., 2022), expressing contempt (Crowley, 2013), and suppressing their attachment related needs, thoughts, emotions, and behaviours (Mikulincer & Shaver, 2016a).

The avoidantly attached may, confusingly, use positivity (and humour) as a means for avoiding negative emotional interaction (Altan-Atalay, 2019). They seem to have learnt in childhood that distraction, (i.e., avoiding taking an interest in a significant other) is a means of controlling their anxiety (Consedine & Magai, 2003). While they can appear to be emotionally secure and aware on a cognitive level, this may not translate to personal self-awareness, emotion recognition, or emotion management (Fonagy et al., 2017; Luyten et al., 2019). Their suppression of attachment needs results in increased self-dependence, and reduced interdependence in

relationships, and they often fail to show empathy (Simpson et al., 2011), caregiving (Carnelley et al., 1996), support (Vowels & Carnelley, 2021), or positive responsiveness to their partners' bids for connection (Feeney & Collins, 2001).

Self-disclosure can be risky for the avoidantly attached because they are balancing their need for connection with their need for independence from connection, and their need to feel in control of that connection (Beck & Clark, 2009; Feeney, 1999; Simpson et al., 2007; Simpson et al., 1992). Therefore they maintain their sense of safety through self-protection rather than self-disclosure (Bar-Shachar & Bar-Kalifa, 2021). Zhang (2012)'s study showed that the more avoidantly attached an individual was, the less likely they were to take influence from others regarding self-improvement recommendations. This makes sense given the likely fear of losing their sense of independence (Gillath et al., 2009). In a close relationship, this lack of 'taking influence', or being open to their partner's advice (Sarmiento-Lawrence & van Swol, 2022) along with a lack of consideration, collaboration, gratitude and other positive emotions and behaviours can be toxic to the sense of interpersonal regulation between partners' (Ruvolo & Ruvolo, 2000).

Gratitude is an expression of dependency or mutuality, and the avoidantly attached seek to avoid showing their need for their partners contributions (Vollmann et al., 2019). Unfortunately, their partners' may perceive this self-interest and therefore be less likely to respond with gratitude to their avoidantly attached partners' contributions (Visserman, Righetti, et al., 2018). People appreciate and want to have their genuine acts of benevolent connection acknowledged and responded to in kind (Newman & Cain, 2014). These acts of distancing may be intolerable for their partner and additionally, separation – the ultimate act of distancing – may be a strategy that easily resolves the avoidantly attacheds' need to avoid intimacy (Fagundes, 2012).

3.7.13 Communication and Personality

People with different personality traits may communicate differently in relationships, and those with certain personality disorders may struggle with communication. In Vater and Schröder-Abé (2015)'s study, higher extraversion was correlated with higher emotion expression, higher neuroticism was correlated with more negative, aggressive, and uncontrolled communication, both higher openness and agreeableness correlated with higher perspective-taking, and higher

conscientiousness correlated with lower aggression. Agreeable people tend to self-disclose more, particularly vulnerable emotions (McCarthy et al., 2017).

Agreeableness has also been shown to correlate with less use of demand-withdraw communication, while neuroticism correlates with more (Caughlin & Vangelisti, 2000). Generally, expressions of extraversion, agreeableness, openness, and conscientiousness have been correlated with higher relationship satisfaction while neuroticism has been negatively correlated (Claxton et al., 2012; Roberts et al., 2007; Weidmann et al., 2017; Woszidlo & Segrin, 2013a; Y. Zhou et al., 2017), partly as a result of negative communication patterns (Caughlin et al., 2000), with individuals high in neuroticism more likely to express negative emotions such as anger, anxiety, and frustration towards others (Caughlin & Huston, 2006; Taggart et al., 2019).

Personality traits can also influence how individuals seek and provide support from others. For example, individuals high in neuroticism may be more likely to seek emotional support from others while individuals high in extraversion may seek more instrumental or practical support (Bolger & Amarel, 2007). Individuals high in agreeableness tend to be motivated to be more empathetic and supportive in their communication, and more cooperative and willing to compromise, while individuals low in agreeableness may be less motivated to offer support to others and more competitive and confrontational (Costa & McCrae, 1992; Hilbig et al., 2016; Melchers et al., 2016). Additionally, individuals high in antagonism may be more likely to express hostility and negativity towards others, while individuals high in agreeableness may be more likely to suppress negative emotions to maintain positive and harmonious social relationships (Hepp et al., 2022; Vater & Schröder-Abé, 2015; Weiss et al., 2018).

Personality disorders also impact upon communication style. For example, rejection sensitivity is highly prevalent in borderline personality disorder (Poggi et al., 2019), and neuroticism (Bayer et al., 2021), and can influence various aspects of interpersonal communication, such as influence taking, threat appraisal, disagreement, demand/withdraw, defensiveness, power, control, expectations, responsiveness, self-control, and negativity (e.g., Barrientos & Samp, 2008; Sreehari & Natarajan, 2014; Worley & Samp, 2018). Individuals with high levels of rejection sensitivity may perceive disagreement or criticism as a threat, leading to increased defensiveness and negative emotional reactions (e.g., Kang et al., 2009; Overall & Sibley, 2009b). They may also have a tendency to demand compliance

from others or withdraw from communication altogether (e.g., Cain et al., 2017), ultimately resulting in lowered relationship satisfaction and closeness (Mishra & Allen, 2023).

3.7.14 Sex Differences in Social Interactions

Sex differences in socioemotional processing and perception have shown up in numerous studies (e.g., Collignon et al., 2010; Kret & De Gelder, 2012). Even in the first few days after birth, female babies have been shown to be more interested in social stimuli than male babies (Geary, 2002), and throughout childhood girls tend to be more socially interactive and boys more socially assertive (Benenson, 2019). As young monkeys exhibit the same pattern (Hassett et al., 2008) it is likely that this has a biological origin, potentially influenced by biological differences (Berenbaum & Beltz, 2016)⁶⁷.

The way that males behave in a relationship has been shown to make a more significant contribution to relationship well-being outcomes than their female partner's behaviours. For example, men's support provision, emotion regulation, and impulse control are more important to their female partner's relationship satisfaction than vice versa (Frye et al., 2020; Jensen et al., 2013; Velotti et al., 2015).

Interestingly, in Ma et al. (2022)'s study of brain functional connectivity (FC) during couple interaction they were able to predict "marital quality" longitudinally by the male partners large-scale neural network connectivity (particularly related to emotion processing). To interpret their findings, they suggest that:

"Husbands may detach themselves from their wives' influences and promote their marital well-being by minimising cognitive control processing related to spousal evaluations (e.g. by stopping their thinking about criticism)" (p. 1063), "emotional suppression may not only lead couples to ignore conflicts and problems and hinder them from resolving conflicts or disagreements but also lead to perceptions of hostility by their partner, and this may aggravate

⁶⁷ Of note, there are numerous instances of socially reinforced gender differences that are apparent in the differences between male and female communication tendencies, and as these evolve over the life-course, they are often difficult to discern from biologically-based sex differences (e.g., Prentice et al., 2022). Suffice to say that both nature and nurture contribute to these differences.

discordant interactions” (p. 1063), therefore “husbands who may better perceive and respond to their wives’ interactions may experience greater benefits in marriage” (p. 1062).

In Booker and Graci (2021)’s study women showed higher levels of social, care-oriented goals than men, and this was evidenced in their communication. Females tend to be more emotionally responsive when interacting than men (Wiggert et al., 2015), and exhibit more self-disclosure (e.g., Monteoliva et al., 2012), relationship maintenance behaviours (i.e., openness, positivity, assurances, social support, task sharing (e.g., Stafford & Canary, 1991), advice giving and conflict management (e.g., Stafford et al., 2000), than men do (e.g., Malinen et al., 2012). Interestingly, in Goldring et al. (2022)’s studies, sharing a stressor with someone else who felt the same way about the experience reduced anxiety for 99% of females but only 42% of males.

Males tend to use more assertive language when communicating, and females more affiliative (Leaper & Ayres, 2007). Studies indicate that women tend to employ a communication style that is more expressive, often displaying heightened levels of distress, intimacy, and hostility in conflict situations compared to men. In contrast, men tend to adopt a more instrumental communication style, frequently resorting to withdrawal and problem-solving when faced with conflict, as opposed to women. (MacDonald et al., 2019; Stockdale et al., 2013).

In Weber and Hulur (2021)’s study, positive emotions were contagious for both men and women, but women were significantly more likely to catch their male partners’ negative emotions than vice versa. Kopystynska et al. (2023) found wives were more impacted by their husbands’ negativity (criticism, impatience) than vice versa. Women typically have greater sensitivity to facial expressions and body language than men (Connolly et al., 2019; Olderbak et al., 2019; Polackova Solcova & Lacev, 2017; Probst et al., 2017; Sommer et al., 2013; Spies & Sevincer, 2018; Wiggert et al., 2015) and show more competence at reading body language (Wojciechowski et al., 2014), assessing verbal tone (Kret & De Gelder, 2012; Stevens & Hamann, 2012), detecting deception, and decoding complex and subtle emotion (Sokolov et al., 2011).

Males habitual use of emotional suppression in relationship communication was linked to lowered relationship satisfaction for both partners in Velotti et al. (2015)’s

study, where the avoidantly attached were also more likely to emotionally suppress (creating a withdraw/demand pattern), and men's emotional suppression escalated women's demanding communication. In the unusual cases where females withdrew, lower relationship satisfaction consistently resulted.

Demand/withdraw is a relationship pattern where one partner (usually the woman) demands, and the other partner withdraws (Christensen & Heavey, 1990; Eldridge et al., 2002). In the classic pattern of demand/withdraw the more a woman's vocalisation intensity increases, the more her male partner withdraws, and subsequently the more her emotional arousal increases (e.g., B. Baucom, J. Dickenson, et al., 2015). Typically, the woman is demanding because she wants her partner to engage in some kind of change behaviour, in other words, she wants to influence him. When men withdraw from this demand the woman perceives that her needs will not be met, and she has no influence (or relational power), causing her to become more emotionally aroused.

While the demand/withdraw pattern shows that women typically start and escalate conflict-creating conversations (i.e., discussions about something they are unhappy with or desiring change regarding) (e.g., Carrère & Gottman, 1999; Winstok et al., 2018), this start up can be predicted by the responsiveness and influence happening in a relationship prior to conflictual conflict (e.g., Gottman & Levenson, 1999a). Gottman (1999) notes that "sharing power, in terms of... 'acceptance of influence' (particularly the husband's acceptance of his wife's influence), is critically important for the stability of marriages" (p. 15), and Heatherington et al. (2005)'s study found that in happy couples, male dominance was rare (and female domineering had an insignificant effect on relationship happiness).

3.7.15 Communication Summary

The manner in which partners exchange thoughts, emotions, and information significantly influences the quality and stability of their relationship. Effective communication is responsive, takes influence from the other, shares power, has an openness to the other's perspective, fosters understanding and empathy, thereby enhancing relationship satisfaction and overall well-being. Couples who engage in open and honest communication tend to establish a sense of emotional intimacy and trust, enabling them to navigate challenges and share their needs and desires more readily. Conversely, poor communication marked by defensiveness, and lack

of active listening can lead to misinterpretations and emotional distance between partners. Communication therefore exerts a profound influence on overall couple relationship well-being outcomes.

3.8 Conflict

3.8.1 Conflict in the Network Models

Conflict was highly researched in the Endnote library collection. In the whole Endnote library factor network model, *conflict* is shown as co-occurring very regularly with *perceptions* and *communication*. In other words, studies of conflict also often include these as variables. Conflict is linked with all the other top ten factors along with *support*, *connectedness*, *power*, *self-esteem*, *self-appraisal*, *responsiveness*, *coping*, *culture*, and *negativity*.

3.8.2 Patterns of Conflict

Most couples experience conflict with one another (Oka et al., 2014; Roloff & Chiles, 2011), most commonly in the form of attack, but also disagreement, or withdrawal (e.g., Batista da Costa & Pereira Mosmann, 2021; Delatorre & Wagner, 2018). Disagreements happen in every relationship, but a large degree of hostile disagreement wears a couple down. Chronic conflict is emotionally and physically exhausting (e.g., Afifi et al., 2020; Bodie et al., 2015), and correlates with poor individual and relationship functioning (e.g., Yarrington et al., 2021), lower relationship satisfaction (Clymer et al., 2006; George-Levi & Laslo-Roth, 2021), and greater likelihood of divorce (e.g., Birditt et al., 2017). Aversive conflict has significant repercussions on couple relationship well-being, and on the well-being of each individual in the couple relationship. Baumeister and Leary (1995, p. 497) write that couples need “frequent, non-aversive interactions within an ongoing relational bond”. However, around 30% of married couples are ‘severely discordant’ in their relationships – enduring very poor-quality relationships in terms of stressful conflict (Whisman et al., 2008).

Conflict topics in couple relationships are contextually relevant. Couples argue about things that are directly impacting upon their lives, for example, parenting style, personal habits, household chores, the division of labour and childcare, finances, sexual activity, role expectations, decision-making, screen time, and time management (Hill et al., 2023; Meyer & Sledge, 2021; Wong et al., 2020). Contextual factors, such as cultural background, may also influence how conflict is expressed and perceived. For example, individuals from collectivist cultures may be inclined to prioritise harmony and avoid conflict, whereas those from individualistic cultures may be more comfortable with disagreement and debate (e.g., Deng et al.,

2021; Gunsoy et al., 2020; Quek & Fitzpatrick, 2013; Sandhya, 2009; D. Wu et al., 2021). Other contextual factors, such as external stressors (e.g., financial hardship, illness, work strains) may also alter a person's capacity to engage appropriately in difficult or conflictual interactions (e.g., Hill et al., 2017; Pluut et al., 2021; Timmons, Arbel, et al., 2017; Witzel et al., 2022; Woodall et al., 2020).

The content of conflict is important but appears to be less relevant to couple well-being outcomes than the process of the conflict (Hinneken et al., 2020). Conflict styles have been defined as avoidant (withdrawing from, or sidestepping conflict), accommodating (appeasing the other party), compromising (mutually satisfying resolution), or dominating (disregarding the other party) (De Dreu et al., 2001; Putnam & Wilson, 1982). Negative or hostile conflict approaches that attack the partner are typically detrimental (e.g., Haydon et al., 2020; Marchand & Hock, 2000), escalating conflict (Papp et al., 2009; Wubben et al., 2009), and resulting in impasses (Yip & Schweinsberg, 2017). "The expression of disapproval of someone or something on the basis of perceived faults or mistakes" (Oxford Languages Online, 2023) is difficult for most people to receive (Gottman & Levenson, 2000; Rogge et al., 2006).

Aggressive, dominating, manipulative, inflexible, degrading, and contemptuous conflict tends to have a negative outcome (e.g., Gottman, 2014; Greeff & de Bruyne, 2000; Marchand & Hock, 2000), lowering both parties mental well-being (Aloia & High, 2020). Disagreeableness creates a barrier to taking another's perspective and communicates that their way of perceiving the world is invalid, thereby undermining collaboration and partnership (Koenig et al., 2013), and the possibility of the shared reality needed for emotional inter-dependence (Kinkead & Salas Riquelme, 2022; Sels et al., 2020).

In John Gottman (1993d)'s 'Horsemen of the Apocalypse' model, conflict begins with criticism, followed by contempt, defensiveness, and stonewalling (withdrawal and disengagement). Criticism, (pointing out a partner's flaws, inconsistencies, or perceived failures) tends to lead to defensive, self-protective communication that undermines relational connection (Becker et al., 2008; Stamp et al., 1992).

Generally speaking it is difficult and uncomfortable for most people to receive negative feedback, criticism or complaints (Zhang, 2009) and high levels of criticism in a marriage predict early divorce (Helland et al., 2014). Negative feedback triggers the same regions of the brain that also respond to the aversive experiences of pain

or rejection (Klein & Robinson, 2019).

Conflict is often a wrestle over having ones perceived basic needs met (Yamanaka, 2019), and pivots around perceptions of compromised autonomy, personal control, or sense of safe belonging (Yamanaka, 2019). Negative, critical interference from others may be associated with a sense of limitation of these needs. Criticisms may therefore be responded to with reactive blame, denial, deflection, deception, or justification, as a means of maintaining ones sense of autonomy and power by minimising responsibility and thereby avoiding facing the consequences of that interference (Gottman, 2011; Smoliak et al., 2021; Whiting & Cravens, 2016). Unfortunately, this pattern typically leads to increased distress, anger, escalated negative emotion, and negative rumination in the complainant (Liu & Roloff, 2015), but rarely lead to resolution of the criticism, indeed, Carrère and Gottman (1999)'s study of the degree of negativity in the first three minutes of a couple conflict showed that it predicted future divorce.

Defensiveness is a common response to feeling attacked or criticised, but it can be a significant barrier to effective communication in a relationship. In Becker et al. (2008)'s 'Theoretical Model of Defensive Communication' defensiveness is seen to be triggered by communication coldness, disengagement, and unresponsiveness. When a partner becomes defensive, they may shut down or become combative, which can make it challenging to address problems or work towards a solution (Gottman, 1999; Gottman et al., 2015). Defensiveness begets defensiveness so that in partnerships this can lead to a destructive self-perpetuating downward cycle (Baker, 1980; Gottman, 1993c).

According to Gottman's model, withdrawal (or stonewalling) often follows defensiveness. Withdrawal is an opposite pattern to responsiveness, or the taking of influence. Withdrawal communicates disinterest in resolving a partner's concerns, and therefore, disinterest in what is important to that partner (Eldridge & Baucom, 2012). When one partner in a couple is perceived as not likely to be positively responsive in conflict, the other partner is more likely to suppress their emotions to avoid their negative responses (Murray & Holmes, 2008). This may work to alleviate conflict in the short-term, and for otherwise happy couples this may be an effective strategy (Cameron & Overall, 2018; Low et al., 2018). However, when positive responsiveness is already lacking in the relationship, this strategy has longer term negative consequences, reducing relationship satisfaction (Gottman, 1993a, 1993b;

Hee et al., 2019). Withdrawal and emotion suppression divert attention and personal resources to self-protection and away from problem-solving capability (e.g., Low et al., 2017; Thomson et al., 2018), and genuine relationship concerns may remain unaddressed, and the suppressor's needs remain unexpressed and therefore unattended to (Overall, Sibley, et al., 2010), leading to deterioration of intimacy and relationship quality.

The demand-withdraw pattern in conflict, where one partner makes demanding requests and the other partner withdraws from this engagement (Christensen, 1988; Eldridge et al., 2002), is associated with couples' overall relationship distress (Donato, Parise, et al., 2014; Falconier & Epstein, 2011; Haydon et al., 2017; Kramer et al., 2021). When one partner demands or criticises, and the other withdraws, they tend to withdraw into negative rumination about their partner's intentions (Zhang et al., 2013). Rumination ("repetitive, passive, self-focused cognition about the causes and consequences of emotional distress" (Caldwell et al., 2019, p. 640)) is an emotion regulation strategy that tends to have negative relational outcomes (Wylie et al., 2022).

While conflict suppression may be an attempt at reducing rejection likelihood, it also seems to reduce positivity about the relationship, and chronic suppression of emotion may actually increase the likelihood of a future eruption of verbal aggression (Johnson & Samp, 2022; Overall et al., 2009). However, conflict avoidance may not necessarily be detrimental, but rather is dependent upon individual characteristics, motivations, and circumstances (Caughlin et al., 2010; Caughlin & Huston, 2002). An alternative to suppression or withdrawal is assertive attempts at partner regulation. Partner regulation (Overall & McNulty, 2017) may include cooperative and prosocial attempts at influencing one's partner (e.g., encouraging, advising, validating) or controlling and oppositional attempts (e.g., demanding, criticising, insulting) (McNulty & Russell, 2010; Overall et al., 2009). Controlling and oppositional partner regulation are likely to lower positive affect in the receiving partner, and increase negative affect, while also reducing motivation to take influence from the partner (e.g., Gottman, 1998; Gottman & Levenson, 1999c), whereas cooperative and prosocial partner regulation may have more positive outcomes (Overall & Fletcher, 2010), with Walker et al. (2023)'s study showing that partner regulation through expressions of valuing, humour, and receptive listening predicted higher relationship satisfaction.

An interesting finding in McNulty and Russell (2010)'s longitudinal studies was that blame, command, and rejection patterns in couple partnerships predicted lowered relationship satisfaction when minor problems were being addressed, but this reversed when major problems were being addressed. In other words, directly addressing relationship problems could be helpful when the problems were severe, "partly because those processes helped spouses acknowledge, address, and resolve those problems" (McNulty, 2010, p. 167). Thus, negative conflict interactions can be functional and beneficial in the long-term when there is a need to resolve severe relationship problems (Overall & McNulty, 2017).

3.8.3 The Biological Effects of Conflict

While being in a couple relationship can provide a stress-buffer, it may also aggravate stress – sometimes simultaneously. Whether conflict is open or covert, a conflict laden relationship leads to adverse physiological reactions (Birmingham & Holt-Lunstad, 2018), with Gottman and Levenson's studies (1992; 1999c; 1985) showing that the strength of physiological reaction to relationship conflict or distress was the single most accurate predictor of eventual relationship dissolution.

Conflict is usually an uncomfortable experience (e.g., Gordon & Chen, 2016; Scheeren et al., 2014) that is generally perceived as stressful, and increases heart rate (Puhalla et al., 2019), blood pressure, (Holt-Lunstad, Smith, et al., 2008; Yarrington et al., 2021), systemic inflammation (Fagundes et al., 2011; Wilson et al., 2021; Yang et al., 2014) and other stress related physiological reactions by upregulating the sympathetic nervous system and the hypothalamic–pituitary–adrenal (HPA) axis and suppressing the immune system (Shrout et al., 2022; Woods, 2019), leading to negative downstream effects on health outcomes (Slavich & Irwin, 2014; Uchino et al., 2018; Wheeler et al., 2019). It is not surprising, therefore, that a chronically conflictual couple relationship significantly increases one's likelihood of becoming sick or depressed (Choi & Marks, 2013; Jaremka, Lindgren, et al., 2013).

Negativity in conflict communication such as criticism, denials of responsibility, loudness (increased volume), sarcasm, and interrupting, correlate with elevated cortisol production and blood pressure (Aloia & Solomon, 2015c; Gottman et al., 2015). The wife demand/husband withdraw conflict pattern correlates with increased cortisol release in women (Heffner et al., 2006). In Aloia and Solomon (2015b)'s

study conflict intensity also correlated with increased cortisol reactivity and the size of the cortisol reactivity depended upon the amount of childhood exposure to family verbal aggression.

Bookwala and Gaugler (2020)'s investigation of data drawn from two waves of the 'National Social Life, Health, and Aging Project' (N=1,734) showed a relationship between couple negativity, particularly spousal criticism, and increased likelihood of death five years later. A Danish study (Cipric et al., 2022) (N=1,856) found that higher levels of conflict among divorcing couples correlated with worse health outcomes 12 months later. In other studies increased relationship negativity and decreased relationship positivity correlate with incidences of significantly increased blood pressure (Birditt et al., 2014), coronary artery disease (Smith et al., 2012; Uchino et al., 2014), cardiovascular disease (Joseph et al., 2014; Tulloch & Greenman, 2018), cardiac arrest (Isiozor et al., 2019), fibromyalgia (Huang et al., 2018; Milrad et al., 2019), diabetes (Whisman et al., 2014), leaky gut (Kiecolt-Glaser et al., 2018), inflammation burden (Yang et al., 2014), impaired cellular immune function and weakened immune systems (Haase et al., 2016; Jaremka, Glaser, et al., 2013), chronic fatigue syndrome (Band et al., 2015; Blazquez et al., 2012), abdominal obesity (Birditt et al., 2019; Kiecolt-Glaser et al., 2015), overall obesity (Jaremka, Lindgren, et al., 2013; Kouvonen et al., 2011; Skoyen et al., 2018), reduction in general well-being (Birditt et al., 2018), and also mortality (Shen et al., 2017; Stanton et al., 2019).

Mental health also suffers in low-quality, fractious relationships (Aguilar-Raab et al., 2022). A 20-year-long study of 1,208 American adults indicated that negative partner responsiveness correlated with depression as well as earlier mortality (Stanton et al., 2019). Conflict can contribute to brain inflammation (Jaremka, Lindgren, et al., 2013; Lee & Giuliani, 2019), which in turn has been shown to increase depression (Du et al., 2016). Couples in regularly hostile and negative relationships also demonstrate an increased likelihood of suicidal thoughts or attempts (Blow et al., 2019; Love et al., 2018; McNulty et al., 2019). It is apparent that the effects of couple relationship conflict on individual well-being are substantial, making knowing how to effectively resolve conflict, and soften its harmful effects imperative.

3.8.4 Conflict Resolution

Vowels, Carnelley, et al. (2022)'s qualitative study indicated that people attempt to resolve conflict through conflict avoidance, concessions, compromise, integration of goals, consideration of partners' needs, and creating workable solutions.

Cooperative conflict resolution strategies are associated with higher relationship satisfaction, while competitive or avoidant conflict resolution strategies are associated with lower relationship satisfaction (e.g., Gottman, 2014; Guerrero, 2019; Noller & Feeney, 1998). Apology and forgiveness are also used for conflict repair and have been shown to increase empathy and calm physiological responses to stressful conflict (Witvliet et al., 2020). In Ünal and Akgün (2020)'s study of conflict resolution styles they concluded that reducing the other partner's stress levels during conflict was a vital goal for conflict resolution.

Conflict intrinsically involves two people – self and other. Blake and Mouton (1964) delineated two dimensions undergirding conflict management: 1. Concern for others, 2. Concern for self. When the focus is on self and not the other, dominating or avoiding tactics may be used to ameliorate conflict, neither of which show long-term effectiveness in resolving conflict (Cann et al., 2008). On the other hand, a focus on the other person (integrating or obliging tactics) shows more promise for conflict resolution (Ricco & Sierra, 2017). Kilmann and Thomas (1975) adapted the self/other quadrant into four conflict styles. 'Integrators' have concern for self and others and are cooperative in finding mutually pleasing solutions. 'Competitors' have concern for self but not for others and are assertive in defending their own position. 'Accommodators' have concern for others but not for self and are sacrificial and submissive. 'Avoiders' are not particularly concerned for self or for others, instead choosing a process of withdrawing completely. Integrative conflict resolution tactics tend to produce the most relational happiness (Canary & Cupach, 1988; Canary & Spitzberg, 1990), and across cultures, competitive styles the least (Cai & Fink, 2002; Kim & Leung, 2000).

Constructive handling of conflict where partners mutually validate each other's feelings and thoughts despite disagreeing with them can have a positive outcome (Wheeler et al., 2010), creating an environment of trust and equal power where self-disclosure is non-threatening, and this cycles upwards to more confidence and effort in constructively handling future conflict (Cordova & Dorian, 2004) and problem-solving (Friedlander et al., 2019; Gottman et al., 2015). Power in a relationship

relates to the degree of influence a person has over the other person's life outcomes (Kelley & Thibaut, 1978; Keltner et al., 2003; Simpson et al., 2015). In Alonso-Ferres et al. (2021)'s study a sense of equitable power in the relationship aided in conflict resolution but a sense of powerlessness correlated with emotional suppression during conflict (although only when their partner was perceived as unresponsive). Partners who feel they have less power in the relationship may be hesitant to express their emotional vulnerabilities for fear that these will be exploited (Barasch, 2020; Barasch et al., 2016).

People adjust their emotional expression depending upon how they believe their partner will respond (Murray et al., 2006). When their partner is perceived as caring and responsive, they are more likely to be emotionally expressive (and visa-versa) (Ruan et al., 2019; Thomson et al., 2018; von Culin et al., 2018). Constructive conflict where partners validate each other's feelings and thoughts despite disagreeing with them can have a positive outcome (e.g., Wheeler et al., 2010). Mutual use of positive behaviours during conflict reduces the heightening of discord (Chow & Ruhl, 2018). Conversely, when partners feel a lack of positive regard from their partner during conflict, they are more likely to suppress their thoughts and feelings, which is then correlated with lower conflict resolution (Thomson et al., 2018). Unhappy couples display more negative reciprocity in their conflict communication than happier couples do (Gottman & Levenson, 2000), and have less success in resolving this negative conflictual to-and-fro (Markman, 1981).

While negative conflict communication may cause lowered relationship satisfaction in the short term (e.g., Woodin, 2011b) it can contribute to increased relationship satisfaction over the long term (e.g., Leuchtmann, Milek, et al., 2018; McNulty & Russell, 2010; Overall et al., 2009). Conflict outcomes are not necessarily negative and can be positive (e.g., Gordon & Chen, 2016; Hee et al., 2019), and likewise, anger is not always detrimental to healthy communication and sometimes contributes to increased provision of support (Yoo et al., 2011). For example, in Gottman and Krokoff (1989)'s early work, wives' angry confrontation with their husbands was shown to correlate with positive longitudinal changes in marital relationship satisfaction. In other words, difficult conversations may be temporarily painful but necessary for creating healthy shifts in relationally problematic behaviours.

3.8.5 The Development of Conflict Patterns

In the *conflict network model*, *attachment* is central, and closely linked with *attachment avoidance*, *rejection sensitivity*, *hostility*, *violence*, *self-control*, *criticism*, *contempt*, *withdrawal*, and *empathy*. This indicates that early life sociopsychological experiences have been correlated with adult conflict experiences in multiple studies.

A Chinese study (M. D. Johnson et al., 2015) (N=200 couples) found that negative communication in adulthood was related to childhood family dysfunction. Witnessing or experiencing verbal aggression in childhood can cause psychological, physiological, and social dysregulation in response to conflict experiences at later life stages (Davies, Cicchetti, et al., 2020; Patrick Davies et al., 2012; Davies, Parry, et al., 2020). People who grow up with anger verbalised towards them or around them are significantly more likely to lack anger control in their own adult relationships (Aloia, 2016; Aloia & Solomon, 2016) and take conflict more personally (Aloia & Worley, 2018). Early negative conflict experiences may also cause desensitisation to a partner's needs or distress (e.g., Aloia & Solomon, 2013; Aloia & Solomon, 2015b; Samp, 2016). In other words, early life experiences influence adult expectations, beliefs, and perceptions about conflict (Hample, 2016).

Conflict activates the attachment system (Feeney & Fitzgerald, 2019; Feeney & Karantzas, 2017), and therefore attachment style can impact conflict resolution strategies, with secure attachment associated with constructive approaches, and insecure attachment associated with avoidance, defensiveness, and escalation (e.g., Bretaña et al., 2020; Gonzalez-Ortega et al., 2021; Scheeren et al., 2014). Insecure attachment is associated with negative self-appraisal, which escalates self-protective behaviours during conflict, making emotional and safe closeness less likely (Mikulincer, 1998a). Subsequently, the insecurely attached exhibit less adaptive or supportive conflict tactics in their close relationships (Cohn, Silver, Cowan, Cowan, & Pearson, 1992; Cowan, Cohn, Cowan, & Pearson, 1996; Guerrero, Farinelli, & McEwan, 2009; Kobak & Hazan, 1991; Sierau & Herzberg 2012; Simpson et al., 1996).

The anxiously attached may find conflict to be especially threatening, leading to disproportionate emotional reactions that then escalate the conflict (Murphy, 2012). They report higher levels of personal and partner conflict engagement, and more likelihood of pathological defensiveness (Richardson et al., 2022), coercive control

(Arseneault et al., 2023), violent interactions, and sexual or psychological abuse towards their partners (Bonache et al., 2019). The anxiously attached are prone to destructive conflict behaviours (Li & Chan, 2012), likely raising anxiety for their partner when expressing concerns (Pietromonaco et al., 2004). Attachment anxiety is a significant predictor of trait anger and aggressive responding (Brodie et al., 2022). Negative emotions, such as jealousy, anxiety, and anger, are prevalent in the anxiously attached (M. Richter et al., 2022), and these emotions are complicit in negative conflict patterns (MacDonald et al., 2019).

The anxiously attached may use controlling guilt tactics to induce responsiveness from their partner (Overall et al., 2014), particularly when paired with an avoidantly attached partner who is more likely to be resistant to their influence attempts (Jayamaha et al., 2016). The pairing of an anxiously attached person with an avoidantly attached person seems to produce particularly detrimental relationship patterns (Dumas et al., 2008), closely resembling the negative demand/withdraw communication pattern (Christensen & Heavey, 1990; Levine & Heller, 2010; Millwood & Waltz, 2008; Schrodt et al., 2014). Beeney et al. (2019)'s study showed that when one partner had high attachment anxiety, their partner was more likely to withdraw from conflict. On the other hand, when anxiously attached individuals were married to avoidantly attached partners, they were more likely to suppress their emotions and thoughts in Winterheld (2016)'s study. Anxiously attached wives paired with avoidantly attached husbands show conflict anticipatory cortisol reactivity, as well as steep rises and then drops in cortisol during conflict (Beck et al., 2013), along with other indications of increased physiological arousal (Taylor et al., 2018).

The avoidantly attached may find conflict equally as threatening as the anxiously attached, but react either with overt hostility or with withdrawal from the conflict (Overall, Pietromonaco, et al., 2022), typically disengaging from conflict resolution attempts (Barry, 2010; Bretana et al., 2021; Fowler & Dillow, 2011), potentially resulting in covertly hostile negativity (Winterheld, 2017). Ricco and Sierra (2017, p. 157) state that "avoidant attachment and, less consistently, anxious attachment are positively associated with the tendency to avoid conflict and with the use of dominating tactics." The avoidantly attached also exhibit higher overt frequency of anger, disgust, and contempt (especially males) (Consedine & Fiori, 2009), and report less emotional reaction to distressing events (Collins, 1996).

When avoidantly attached individuals experience conflict with their partner they typically become ‘boundaried’ and resistant (Bretana et al., 2021). They are prone to perceiving other’s motivations for disagreement as negative, meaning they are less open to relational situations where trust in another’s motivations is required (Bartz & Lydon, 2006). The lower trust that characterises the avoidantly attached potentially exacerbates conflict and harms relationship satisfaction through the sabotaging of intimacy development via lowered emotional disclosure (Candel & Turluc, 2019), and mutual responsiveness. Without trust, the avoidantly attached are unlikely to consider their partner’s perspective or needs in resolving conflict, and this may cause conflict to linger unresolved and festering (e.g., Bolt, 2015; Bretana et al., 2021; Gonzalez-Ortega et al., 2021; Schumann & Orehek, 2019; Shi, 2003).

3.8.6 Conflict and Personality

There is a significant alignment between social skills and personality factors.

Bleidorn et al. (2020, p. 1209) notes:

“An individual who is even-tempered (low neuroticism), sociable (high extraversion), curious and reflective (high openness), cooperative and warm (high agreeableness), and responsible and goal-oriented (high conscientiousness) offers an intuitive profile of the psychologically healthy person”.

This psychologically healthy person seems well equipped to have constructive conflict. Agreeable personality traits play a positive role in conflict resolution. The trait facets of self-efficacy, altruism, assertiveness, sympathy, achievement striving, dutifulness, and cheerfulness seem to have particular influence on conflict styles (Espinoza et al., 2023). Individuals high in agreeableness tend to be accommodating and cooperative, and avoid arguments and confrontation, which can help prevent conflicts from escalating (e.g., McCrae, 2009; Wood & Bell, 2008). Agreeable individuals are also likely to provide committed, affectionate support to their partner (Nottle & Shaver, 2006), and approach disagreement with a collaborative mindset, seeking mutually beneficial solutions (Noller & Feeney, 2014), and with a willingness to resolve conflicts (Delatorre et al., 2021; Vater & Schröder-Abé, 2015).

Agreeableness (which typically exhibits in high inter-relational positivity) and neuroticism (which typically exhibits in high inter-relational negativity, and sensitivity to conflict (e.g., Deventer et al., 2019; Mikulincer & Shaver, 2005), were both

correlated with avoidance of conflict in Tehrani and Yamini (2020)'s meta-analysis (N=5,337). However, only agreeableness (the opposite of antagonism) correlated with a compromising style which considered the interests of others, and this other-interest, compared to self-interest, was what produced positive relationship outcomes from the normally negative act of conflict avoidance.

Individuals high in neuroticism have been shown to exhibit higher likelihood of experiencing negative emotions, rumination on these negative emotions, perceptions of more conflict and less intimacy (Solomon & Jackson, 2014), and elevated hostility and aggression (Bettencourt et al., 2006), especially males (Dam et al., 2021). The British Health and Lifestyle Survey (N=5,352) showed that, longitudinally, mood instability (closely related to neuroticism) was predictive of the development of interpersonal problems (Bowen et al., 2017). It is generally unpleasant for a partner to be subject to a neurotic person's negative moods and interactions, naturally leading to relationship dissatisfaction (Abbasi et al., 2018; Amiri et al., 2011; Kreuzer & Gollwitzer, 2021; McNulty et al., 2021). Habitual negative interactions may cause the neurotic person's partner to suppress self-disclosure or responsiveness in order to limit the unpleasantness of these interactions (Baucom & Epstein, 1990).

Neuroticism and emotion regulation are typically elements of psychopathology and personality disorders. Couples where one or both individuals have a personality disorder have an increased likelihood of higher discord between them and elevated levels of hostility and violence (Collison & Lynam, 2022; Dunne et al., 2018). Antagonistic, and narcissistic individuals are prone to self-protective behaviours including rigid or dysregulated self-regulation, perhaps reflected in their commensurate lack of conflict resolution capability or willingness (e.g., Bretana et al., 2021; Chandler & Lawrence, 2021; Fatfouta et al., 2022; Henschel et al., 2020; Sessa et al., 2020; Simard et al., 2023; Walker et al., 2022). These self-protective behaviours may be reflected in neuroendocrinal differences (e.g., Jeffrey J. Kim et al., 2020; McDonald & Verona, 2019; Ten Velden et al., 2014) making these patterns of behaviour more complex to alter therapeutically.

3.8.7 Conflict and Emotion Regulation

Emotion regulation is a key factor in the management and resolution of conflict in interpersonal relationships (e.g., Shrout et al., 2023). Effective emotion regulation

can help individuals to manage their own emotions during conflict and to respond in a constructive and respectful way to the emotions of others (e.g., Bloch et al., 2014; Low et al., 2018). If an individual is able to regulate their own emotions during conflict, they may be better able to see the situation from their partner's perspective and to recognise the validity of their partner's emotions, and therefore respond in a less reactive or hostile manner (e.g., Rodriguez, Lee, et al., 2020). The emotionally dysregulated are more likely to experience intense emotional reactions to stimuli, which can lead to mood swings, impulsivity, and emotional reactivity (e.g., Duijndam et al., 2020). Individuals who struggle with emotion regulation may be more prone to misinterpreting the emotions of their partners or reacting in an overly defensive way to perceived emotional threats (e.g., Frye et al., 2020; Gregory et al., 2020; Hawkins et al., 2002; Klein et al., 2016). Hostility, or the tendency to be aggressive or confrontational towards others, is also often linked to difficulties with emotion regulation (e.g., Slep et al., 2021; Tiberio & Capaldi, 2019).

3.8.8 Conflict and Violence

Conflict leading to violence is a potential stressor that has tremendous impact upon couple relationship dynamics (Shechory Bitton, 2023) and dissolution (Gravningen et al., 2017). Around the world nearly one third of women have been physically or sexually abused by their partner (World Health Organization, 2021), and much of the research shows that men are typically more likely to commit physical abuse than women (e.g., Barros & Schraiber, 2017; Cho et al., 2020; Karim et al., 2021). In Shorey et al. (2023)'s review they note that "women bear the burden of domestic violence and most of their perpetrators are male spouses" (p. 1), although this has been questioned (Brzozowski et al., 2021). In Einiö et al. (2022)'s large Finnish study (N=356,010) women also committed assaults on men but these were almost always when they themselves were being violently victimised (Hamberger & Larsen, 2015). As men's abuse of women is more likely to be physically damaging (Araujo et al., 2023) it is therefore a factor that has particularly salient repercussions (Keilholtz & Spencer, 2022).

3.8.9 Conflict and Sex Differences

In Woodin (2011a)'s meta-analysis of conflict behaviours in close relationships (64 studies), while the effect sizes were small, "women were somewhat more likely to display the higher intensity behaviours of hostility, distress, and intimacy, whereas men displayed slightly more low-intensity withdrawal and problem solving" (p. 331).

While women do typically start conflict, they are more likely than men to dislike and avoid conflictual interaction (e.g., Witzel et al., 2022). Men show a more competitive conflict style, and women a more collaborative one (e.g., Dildar & Amjad, 2017). On the other hand, once in conflict, females tend to escalate and persist more than males (e.g., Winstok et al., 2018), and males tend to react to conflict with avoidance (Gottman, 2014; e.g., Gottman et al., 1998). Men exhibit more physiological reactivity during conflict than women do (e.g., Gottman & Levenson, 1988), and perhaps as a result have more trouble sustaining positive communication (e.g., Heavey & Layne, 1993).

Li et al. (2018)'s longitudinal study of Chinese couples (N=268 newly-wed couples) found a unidirectional association between daily relationship communication quality and couple relationship well-being, and for men only, this was mediated by conflict resolution efforts. Hee et al. (2019)'s study found women were also more likely than men to use attachment behaviours (engagement, responsiveness, warmth, resolution/reconnection attempts) in conflict resolution than men were. Men, on the other hand, may be more inclined to use problem-solving activity, coercion, and sexual activity to resolve and maintain their relationship well-being (Greenman et al., 2012; A. Rogers et al., 2020). Schudlich (2013, p. 39) states that:

“Men’s ability to comfortably express and receive thoughts and ideas seems to enhance couples’ abilities to work through problems in healthy ways and to minimise destructive behaviours. On the other hand, how emotionally connected women feel towards their partner supports more constructive conflict.”

3.8.10 Conflict Summary

There is a substantial impact of interpersonal discordance on the overall well-being of romantic partnerships. Conflict, as an inevitable aspect of human interaction, encompasses a range of disagreements, disputes, and differences in opinions that emerge within the relationship context. How partners manage, negotiate, and resolve conflicts has far-reaching implications. Constructive conflict resolution strategies, such as active listening, empathy, and compromise, have been associated with enhanced relationship satisfaction and intimacy. Conversely, maladaptive conflict patterns characterised by defensiveness, criticism, and withdrawal can erode trust, emotional connection, and relationship stability.

3.9 Perceptions

3.9.1 Perceptions in the Network Models

Perception was highly researched in the Endnote library collection. In the whole Endnote library factor network model, *perception* is shown as co-occurring very regularly with *conflict* and *communication*. Perception is also linked with all the other top ten factors and is closely linked with *support*, *power*, *personal goals*, *culture*, *expectations*, *self-appraisal*, *negativity*, *responsiveness*, *autonomy*, and *self-esteem*.

3.9.2 The Social Value of Perceptions

Our perceptions shape our understanding of ourselves and the world, inform our judgments and evaluations, and influence our emotional responses to different situations (Gilbert, 1998). A positive perception of ourself and of those we rely on results in improved relationship well-being outcomes (Gable & Anderson, 2016), especially perceptions that our partner is safe, responsive, and caring (Oved, 2017). Joel et al. (2020)'s state in their large-scale study (using 43 longitudinal datasets, N=11,196) that:

“Experiencing negative affect, depression, or insecure attachment are surely relationship risk factors. But if people nevertheless manage to establish a relationship characterised by appreciation, sexual satisfaction, and a lack of conflict—and they perceive their partner to be committed and responsive—those individual risk factors may matter little. That is, relationship quality is predictable from a variety of constructs, but some matter more than others, and the most proximal predictors are features that characterise a person’s perception of the relationship itself” (p. 19070).

Similarly, Machia and Ogolsky (2021)'s investigations (N=993) into the reasons people would leave a relationship found the most important factor for staying or leaving was the nature of their attributions about the partner and the relationship.

As Sandra Murray (2023) states, “people are fundamentally motivated to be included in safe relationships - relationships where they are consistently cared for and protected” (p. 1). These are relationships where affectionate touch, gratitude, acceptance, investments, and power are generously shared in a responsive manner between partners. “Feeling more versus less safe in response to these cues contingently motivates partners to increase connection versus protect themselves

against being hurt” (Murray, 2023, p. 1). People in satisfying relationships tend to have positively biased perceptions of their partners’ intentions (e.g., Lackenbauer et al., 2010), and therefore their assured safety in the relationship – even during destructive conflict or relational experiences (Venaglia & Lemay, 2018). Conversely, negative perceptions of a partner have a significant detrimental impact upon relational and personal well-being (Shrout et al., 2022).

In Nordahl et al. (2021)’s study of the impact of various factors on relationship well-being (N=296, 77% female), interpersonal problems were significantly correlated with negative thinking, rejection appraisals, perception of lack of control, lack of cognitive control, negative rumination, and lack of trust. Conversely, optimism – perceiving things in a positive light – correlated with relationship satisfaction in Srivastava et al. (2006)’s study, and was mediated by optimistically believing that partners were being supportive in the relationship. Support of one’s partner is an important relationship behaviour that predicts and maintains couple relationship well-being outcomes (e.g., Afifi et al., 2016; Hill et al., 2017; Overall, Fletcher, et al., 2010; Sullivan et al., 2010). Wood et al. (2023, p. 199) found that “when an individual perceives that their partner responds to their need (stress) by providing support (listening, understanding, and/or providing concrete aid), gratitude is increased, stress is decreased, and intimacy is strengthened”. Multiple studies affirm that couples are happier when they perceive their partner to be aware of, and making an effort to meet, their emotional, sexual, and practical needs (e.g., Girme et al., 2014; Muise et al., 2019; Newkirk et al., 2017).

Having positive perceptions about a partner’s commitment to a relationship also predicts relationship satisfaction (Rigby & Cobb, 2022). Joel et al. (2020)’s findings showed that perceiving one’s partner to be less committed prior to the marriage was one of the strongest predictors of relationship unhappiness. Commitment is a perception of psychological attachment to a relationship and persistence in that relationship (e.g., Rusbult, 1983; Rusbult & Buunk, 1993) and is strongly correlated with relationship satisfaction (e.g., Nascimento & Little, 2020; Willoughby, 2015), and vice versa (e.g., Le & Agnew, 2003; Saeed Abbasi & Alghamdi, 2021; Tran et al., 2019). Perceiving that one’s partner is investing into the relationship promotes a sense of security and gratitude in the relationship (e.g., Afifi et al., 2021).

In Sasaki and Overall (2020)’s study, felt security in the couple relationship increased commitment to the relationship. When a partner feels secure regarding

their partners' responsiveness, this creates an emotional resource for them (e.g., Krueger & Forest, 2022), leading to increased likelihood that they will deal with negative and stressful relationship events in more constructive and positive ways (e.g., Feeney & Collins, 2001; Simpson et al., 2002). However, when a partner is perceived as uncommitted and uninvested in the relationship, insecurity results. Viewing one's partner as untrustworthy and self-focused can lead to threat-based appraisals of their behaviour and intention (Fredrickson, 2001; Kelley & Thibaut, 1978; Rusbult, 1983; Schiffrin, 2014). These perceptions can be more influential on relationship well-being outcomes than reality, with Schreiber and Veilleux (2022) stating that "how people perceive others to respond to their emotions contributes to distress more so than simply how people respond to or regulate their own emotions" (p. 1).

3.9.3 The Development of Perceptions

Understanding the reality of a perception is subject to multiple influencing factors. As we can't concretely determine another person's intentions, we have to make assumptions about them (e.g., Kouros & Papp, 2019). These assumptions are based in our past experiences. As Lisa Feldman-Barrett (2018) states in her TedTalk, "Your brain doesn't react; it uses past experiences to predict and construct your experience of the world. The way we see emotions in others is deeply rooted in predictions". These predictions, feelings, perceptions, and behaviours are a result of "real-time sensory stimulation, and acquired biases and variations in neural structures owing to past experience" (Marsh & Boag, 2014, p. 51), and they result in what attachment theory terms "internal working models" or "mental representations" that influence how people automatically interact with one another based on their expectations of relationships (Bowlby, 1969).

Janovsky et al. (2020)'s meta-analysis (N=14,932 across 48 studies) found a correlation between early maladaptive schemas and interpersonal problems. For example, childhood relational trauma is associated with fearful misattributions of adult relational partners' intentions and behaviours (Chiu et al., 2019). These misattributions may trigger aggressive reactions (W. Zhu et al., 2020), and reduce relationship intimacy and satisfaction (e.g., Vaillancourt-Morel et al., 2019). Ahmadi Forooshani et al. (2021)'s Australian study of the role of early trauma in social adjustment found that traumatic experiences can lead to chronic thought suppression and generalised (not detailed or clear) autobiographical memory

(memory of personal life events) which then shapes perception, which then shapes relational behaviours. Ability to accurately perceive a partner's feelings and thoughts during conflict is critical for problem-solving and conflict resolution (e.g., Berlamont et al., 2022; Sened et al., 2020), and this kind of accuracy of perception develops through positive shared emotional experiences within the couple (LaBuda et al., 2020), but is also influenced by the expectations and mental representations each individual has entered the couple relationship with (e.g., Miano et al., 2018).

Our adult relationship experiences may also shape our perceptions. Perceptions of love, value, and acceptance in a couple relationship develop through two avenues: 1. being shown acts of love, value, and acceptance, (positive shared emotional experience) (Shallcross & Simpson, 2012), and 2. interpreting these acts through one's representational lens (Kane et al., 2012; Murray et al., 2006). Receiving positive support from one's partner naturally leads to feeling that the reality is your partner loves, values, and accepts you. In other words, positive perceptions arise from positive experiences.

Acts of support, reassurance, affection, positivity, thoughtfulness, and sharing of tasks and responsibilities build up 'emotional capital' in a relationship (Feeney & Lemay, 2012), which Dr John Gottman (1998) described as the relational 'bank account'. Increased emotional capital correlates with more benevolent interpretations of partners' behaviours (Walsh & Neff, 2019) and lower emotional and physiological reactivity to relationship threats (Feeney & Lemay, 2012; Walsh et al., 2017). Displays of unconditional kindness increase trustworthiness perceptions (Thielmann & Hilbig, 2015), and perceiving one's partner as available and responsive in meeting needs potentially increases relationship attachment security (Finkel et al., 2017), and this further promotes positive appraisals and expectations of future benevolent care.

People also form and maintain their perceptions about relationships within a larger societal context. Religion, spirituality, social norms and values, cultural experiences, and expectations, all influence the way partners in a relationship perceive themselves, one another, their roles, and their reasons (e.g., Ge et al., 2022; Heshmati & Oravecz, 2021; Rhoads et al., 2021; Sagiv & Schwartz, 2022; Schouten et al., 2023; Skellern et al., 2022). Having clearly defined common values means that couples have less potential conflict to negotiate to create shared meaning in their daily life (e.g., Iafrate et al., 2012; Mayer, 2023).

Relationship perceptions also form volitionally. Individuals in a couple relationship are not passive spectators in their lives, and their volitional choices also influence the outcomes of their relationships (Vansteenkiste & Ryan, 2013), including regarding how they chose to think about their partner. Nonetheless, these perceptions are not separable from a person's previous experiences and from their appraisals of those experiences (Goldkuhl, 2002, p. 3). The outcomes of past behaviours pragmatically predict the outcomes of similar behaviours in the future (Kaushik & Walsh, 2019) and these are developmentally additive throughout the lifespan (de Ribaupierre, 2015).

3.9.4 Perceptions and Attachment

Bowlby (1980) surmised that relational behaviours are influenced by perceptions which are informed by mental representations of attachment security regarding close others being available and supportive. These mental representations alter the way individuals process emotional information (Collins & Read, 1990; Walker et al., 2022) about themselves and their partner (Bretherton & Munholland, 1999), and how they cope with that information (Mikulincer & Shaver, 2019a). For example, in Wilson and Simpson (2016)'s study, securely attached mothers who were giving birth perceived reduced pain when shown support by their spouse, indicating the neural and physiological benefits of secure attachment when under duress. However, in this study the anxiously attached reported greater pain regardless of their partners' support, and the avoidantly attached actually reported increased pain when given support from their partner. In other words, attachment style altered the perception and actual effectiveness of partner's support.

Secure attachment is associated with positive perceptions of self and others, and insecure attachment associated with negative perceptions of self and others (Fraley, 2002). The securely attached report less negativity bias (L. Wu et al., 2020), less distress following negative events (Karremans et al., 2011), and show more openness to negative feedback (Kumashiro & Sedikides, 2005). They tend to have optimistic and grateful perceptions about their partner and increased relationship satisfaction (Nourialeagha et al., 2020). The high level of closeness they achieve with their partner corresponds with a sense of higher quality of life (Acharya & Gohain, 2022).

Securely attached individuals seem more capable than the insecurely attached of perceiving and responding to emotional support needs in relationships (Shaver et al., 2019) and are consequently more likely to give support as well (Davila & Kashy, 2009). The reciprocity of support builds trust and promotes increasing attachment security to their partner (Crocker & Canevello, 2008). The securely attached seem to have a realistic perception of their own positive and negative attributes (Mikulincer, 1995). They are also able to positively reappraise confusing behaviour from their partner (Winterheld, 2016). Interestingly, in Winterheld (2016)'s study the securely attached were also more likely to express their unhappiness when their partner behaved negatively towards them, potentially perceiving less risk involved with negative communication.

Avoidant attachment has been noted in meta-analyses as the most detrimental attachment style for relationship satisfaction (e.g., Candel & Turliuc, 2019; Hadden et al., 2014; Li & Chan, 2012). The avoidantly attached have a negative mental representation of others (i.e., discomfort with relational closeness) (Overall et al., 2015; Wang et al., 2017), but a positive mental representation of themselves (extreme self-reliance) (Bartholomew & Shaver, 1998). Their experience has created a perception that significant others won't be reliably or appropriately responsive to their needs and may be controlling of their autonomy (Fitzpatrick & Lafontaine, 2017; Spielmann et al., 2013), meaning they are viewed with distrust regardless of the accuracy of that perception (Bao et al., 2022).

Because the avoidantly attached perceive relational information through a lens of self-dependence, and suppress perceptions of dependency (Shallcross et al., 2011; Vrticka et al., 2012), they are more likely to use the attachment deactivating strategy of underestimating what people are thinking and feeling (Henry et al., 2022), especially when these are believed to be negative thoughts and feelings (Winterheld, 2016), and they typically perceive their partner to be more satisfied with the relationship than their partner actually is (Rodriguez et al., 2019). This may result in reduced sensitivity and responsiveness to their partners expression of need, or requests for influence (Spielmann et al., 2013).

Beck et al. (2014)'s study showed that "avoidant individuals protect themselves from relational dependence by defensively perceiving signs of their own responsiveness, whereas nonavoidant individuals promote relational interdependence by benevolently perceiving signs of their partners' responsiveness" (p. 170). In other

words – the avoidantly attached tend to have a distorted perception of their own role in relationship situations, thinking more positively about their own contributions and more negatively about their partner's contributions. While they can be insensitive to their partners' inner world, they can, however, be overly sensitive to their partners' complaint or criticism (Beck & Clark, 2009), and may consequently make negative attributions about their partner that don't align with their partner's actual motivations (Bartz & Lydon, 2006; Beck & Clark, 2010).

While the avoidantly attached deactivate their attachment system, the anxiously attached up-regulate it. In other words, they increase their emotional reaction to the threat of not being securely attached (Gardner et al., 2020), and are more likely to hyper-vigilantly attend to a stressor, drawing closer to it (BIS responses) (Karreman & Vingerhoets, 2012). However, while the anxiously attached seem highly sensitive regarding their emotions, they have difficulty recognising how to interpret them and manage them (Stevens, 2014). They tend to ruminate on negative thoughts (Brandão et al., 2023) and have wariness about their partners' good intentions (Bao et al., 2022), and lower confidence in their partners' support. They perceive their partner as being less willing to invest in the relationship than they actually are (Labonte et al., 2021), and less satisfied in the relationship than they actually are (Rodriguez et al., 2019), and they may be overbearing in their demands for their partner to act to appease their needs (Carson & Ackerman, 2018).

The anxiously and avoidantly attached also perceive other's body language and emotional facial expressions differently from the securely attached. In Meyer et al. (2004)'s study of facial expression interpretations, the avoidantly attached viewed neutral facial expressions as boring and simple-minded (a contemptuous judgment that distanced them from the neutral expression) while the anxiously attached viewed them as nervous and shy (a self-mirroring evaluation). Being able to accurately recognise facial expressions, particularly of negative emotions, is important for empathetic responding (Yoo & Noyes, 2016), therefore inaccurate interpretation has implications for relationship well-being.

3.9.5 Perceptions and Personality

Personality traits can influence the way people perceive the world. Personality is known to have a considerable influence on an individual's evaluative judgments, appraisals, or assessments regarding peoples' behaviours. Specifically, personality

traits may influence evaluations by shaping cognitive processes, motivational goals, and affective responses (Joel et al., 2022; Roefs et al., 2022). For example, individuals high in neuroticism or negative affectivity tend to experience negative emotions more frequently and intensely, which may lead to more negative evaluations of others (e.g., Chirico et al., 2021; Finn et al., 2013; Hannuschke et al., 2020; Kreuzer & Gollwitzer, 2021; Watson et al., 2000), including lower perceptions of their support (Udayar et al., 2019), whereas those high in agreeableness may be more empathetic and concerned with others' well-being, which may lead to more positive evaluations of others (e.g., Betkowska-Korpala et al., 2022; Jonason & Sherman, 2020; Morse et al., 2015).

3.9.6 Self-Esteem

Bainbridge et al. (2022)'s study correlated neuroticism negatively with self-esteem. Self-esteem is a perception about oneself. It is defined by Rosenberg (1985) as personal acceptance, tolerance, respect, and humble contentment. In Bélanger, Di Schiavi, et al. (2014)'s study, high self-esteem correlated with effective problem-solving strategies, and specifically for women – low self-blame, and for men – positive reappraisal of difficulties. Both partners in a relationship seem to benefit from their own and their partner's high self-esteem (Erol & Orth, 2016; Ghafaryan Shirazi et al., 2022; Harris & Orth, 2019). Self-esteem about one's relationship competency also impacts relationship behaviours. In Weiser and Weigel (2016)'s study, those individuals who believed they were relationally competent were more active in relationship promoting behaviours.

Lower self-esteem individuals have conversely been shown to use self-protective strategies to minimise their risk of rejection in a relationship (Cavallo et al., 2013). Individuals with low self-esteem exhibit higher self-protection (Zeigler-Hill et al., 2014) and men with low self-esteem show higher dominance and hostility and less nurturance than men with high self-esteem (Zeigler-Hill et al., 2011). Jaremka et al. (2011)'s study showed that individuals with low-self-esteem used distancing from their partner as a strategy for avoiding relationship-based self-threatening situations. In wanting to maintain their sense of self-worth, they may downplay the threat of rejection by minimising it and distancing themselves from it, hindering the development of intimacy (Forest et al., 2023).

Cortes and Wood (2018) found that one partner's low-self-esteem correlated with less frank solicitation of support, less acceptance of the support that is given, and less responsiveness from their partner. This self-protective behaviour might give short term relief from the threat of rejection, but the partners of people with low-self-esteem quickly become dissatisfied with the resultant lack of positivity and closeness (Bellavia & Murray, 2003; Murray & Rose, 2003).

3.9.7 Perceptions and Stress

In the perceptions network model *stress* is linked with *attachment*, *threat appraisal*, and *negativity*. Stress can influence how individuals perceive their environment and the people around them, and the physiological impact of stress of a person can contribute to mis-perceiving a situation (e.g., Caldwell et al., 2023; Eckland et al., 2019; Lea et al., 2023; Pulopulos et al., 2021). In some cases, stress can lead to perceptive biases, such as the tendency to interpret ambiguous situations in a negative way or to attribute negative intentions to others (Solomon et al., 2016), which leads to reduced empathy and responsiveness, and increased misunderstandings, and conflicts in communication (Crenshaw et al., 2019).

Perception also plays a significant role in how stressful conflicts are interpreted (e.g., Columbus & Molho, 2021; George-Levi & Laslo-Roth, 2021; Hinnekens et al., 2019; Lemay & Spongberg, 2015). If conflict is perceived to be a threat, defensive or aggressive responses may follow, but if conflict is perceived as a safe opportunity for growth and understanding, open and constructive responses may follow (e.g., Sanford, 2010).

Perceptions alter the benefit of stress-buffering support provision in relationships (e.g., Bar-Kalifa et al., 2016). If support is perceived as genuine and helpful, it can lead to positive feelings about the relationship (e.g., Overall & Fletcher, 2010; Priem & Solomon, 2014; Sheldon et al., 2021), but if support is perceived as insincere or inadequate it can lead to confusion, hurt, and difficulty maintaining the relationship (Clark, Von Culin, et al., 2017; Don & Hammond, 2017; Lemay & Clark, 2008; Wickham et al., 2018).

Rumination is a cognitive aspect of perception that involves repeatedly thinking about negative experiences or emotions (Nolen-Hoeksema et al., 1994). When individuals are under stress, they may be more likely to engage in rumination as a

way of trying to make sense of the situation or find a solution (Skinner & Zimmer-Gembeck, 2016b). However, excessive rumination, including co-rumination, can actually increase stress and make it more difficult to cope with difficult situations (Tudder et al., 2022).

3.9.8 Perceptions and Sex Differences

Sex differences are also evident in relationship perceptions. For example, women tend to perceive their relationship to be of lower quality than men do (Daire et al., 2020; Jackson et al., 2014; Williamson, Nguyen, et al., 2016; Y. Zhou et al., 2017), and Novak et al. (2017) state that “a woman’s satisfaction in the relationship may serve as a barometer of both partners’ level of happiness” (p. 360). Women who have pre-marital doubts about a relationship have less satisfying relationship trajectories, as well as being more than twice as likely to divorce than those without doubts. Interestingly, men were actually more likely than women to have pre-marital doubts, but this did not equate with more likelihood of divorce (Lavner et al., 2012). This finding aligns with other studies showing that the relationship satisfaction of both partners has been tied specifically to the wife’s perceptions of relationship quality (Carr et al., 2014) with women more accurately attuned to the state of the relationship (e.g., Rubin et al., 1981).

In Y. Zhou et al. (2017)’s study, women evaluated the quality of their relationship as lower when partnered with someone low in conscientiousness, whereas in Goddard et al. (2016)’s study, wives who perceived their husbands as humble, compassionate, and positive, had significantly increased relationship satisfaction. Cohen et al. (2012)’s study (N=156 heterosexual couples) found that women’s relationship satisfaction corresponded with their partner’s ability to perceive their negative emotions accurately, while men’s relationship satisfaction corresponded with their own ability to perceive their partner’s positive emotions. Interestingly, another sex difference in perception in Zhang (2009)’s study was that men perceived women’s complaining or feedback as having more negative intent than women did, but they perceived their own complaint or feedback as having less negative intent.

3.9.9 Perceptions Summary

The role of perceptual factors in shaping couple relationship outcomes is a salient area of investigation that underscores the profound influence of cognitive processes

on the dynamics and trajectories of romantic partnerships. Perception, as a cognitive construct, involves the interpretation and attribution of meaning to various cues and behaviours within the relationship context. The way partners perceive each other's intentions, emotions, and behaviours significantly influences the establishment of mutual understanding, effective communication, and the sharing of affection. Positive perceptions, characterised by attributing benevolent motives to a partner's actions, contribute to feelings of trust and security, ultimately fostering relationship satisfaction. Conversely, negative perceptions, including misattributions of intentions, can engender mistrust, conflict, and emotional distance. The cognitive biases and schema through which partners perceive their relationship can also be influenced by early experiences, cultural norms, and personal expectations, further shaping relationship dynamics.

3.10 Emotion

3.10.1 Emotion in the Network Models

Emotion was highly researched in the Endnote library collection. In the whole Endnote library factor network model, *emotion* is shown as co-occurring very regularly with *personality* and *emotion regulation*. In other words, studies of emotion also often include these as variables. Emotion is linked with all the other top ten factors and also closely linked with *anxiety*, *positivity*, *anger*, *appraisals*, *emotion expression*, *emotional intelligence*, *decision making*, *anxiety*, *hostility*, *neuroticism*, *memory*, and *cognitive processing*.

3.10.2 How Emotions Affect Couple Relationship Outcomes

Emotions are a “primary motivational system” (Izard, 1977, p. 1) that informs us about the importance of an event or experience to our well-being (Gross, 2002). Emotions aid in detection of threatening stimuli (Ohman et al., 2001), and readying responses to that threat (Roseman et al., 1994). Emanuel and Eldar (2023) state that emotions are “integral to how we evaluate outcomes (pleasure & pain), learn to predict them (happiness & sadness), use them to inform our (frustration & content) and others’ (anger & gratitude) actions, and plan in order to realise (desire & hope) or avoid (fear & anxiety) uncertain outcomes” (p. 1).

Emotions can impact a wide range of interpersonal interactions and behaviours. For example, emotions can influence how individuals decide to disclose or withhold personal feelings (e.g., Brown et al., 2021; Kane et al., 2019), take into account other people's opinions and feelings in decision-making (e.g., Caballero & Menez Díaz, 2019), listen effectively (e.g., Pauw et al., 2021), and consider other people's perspectives (e.g., Berndsen et al., 2018). They are intrinsic to social cognition (Hiser & Koenigs, 2018), motivation (Baumeister et al., 2007), and decision-making (Higgs et al., 2020; Lerner et al., 2015). Ability to accurately perceive one's partners feelings contributes to more effective relational problem-solving (e.g., Berlamont et al., 2022; Sened et al., 2020), and responsiveness (e.g., Luginbuehl & Schoebi, 2020). Communicating, understanding, and interpreting emotions is therefore an important set of relationship skills.

Negative emotions such as defensiveness, anger, and contempt can hinder responsive communication and lead to negative social interactions (Luginbuehl &

Schoebi, 2020). Conversely, positive emotions such as love, kindness, and compassion can foster positive social interactions and contribute to feelings of affection and support (e.g., Ramsey & Gentzler, 2015). Receiving support from one's partner decreases negative emotions (e.g., fear, anxiety, doubt, sadness, humiliation, embarrassment, guilt, shame, anger, discouragement, grief, hurt, loneliness, despair, resentment, jealousy, and envy (Collins et al., 2014)), and increases positive emotions (e.g., "love, hope, gratitude, forgiveness, serenity/peace, calm, relief, and felt security" (Feeney & Collins, 2015a, p. 122). Schoebi and Randall (2018) note that:

"How we experience the availability and reliability of our intimate partner is immediately relevant to our well-being. In this way, intimate relationships shape our emotional dynamics, providing us not only with plenty of opportunities to experience positive and negative emotions, but also with important means to regulate emotions emerging from sources internal and external to the relationship" (p. 1).

3.10.3 Positivity and Negativity

Positivity and negativity are frequently occurring factors in the whole Endnote library and have been common in the published record since the 1970's (Gottman et al., 1977). The most cited difference between couples with happy and unhappy relationships is that satisfied couples express more positivity and less negativity in their interactions (Gottman & Levenson, 1992; Rauer & Volling, 2013; Yuan et al., 2021). Positive emotions include optimism, joy, cheerfulness, amusement, awe, inspiration, excitement, enthusiasm, delight, astonishment, curiosity, interest, kindness, tenderness, graciousness, humility, serenity, calmness, relaxation, pleasure, trust, affection, and love. These sorts of positive emotions happen frequently in high quality relationships (e.g., Algoe et al., 2013; Bertoni & Bodenmann, 2010; Driver & Gottman, 2004; Gordon et al., 2012; Gottman & Gottman, 2015; Graber et al., 2011; Joel et al., 2013; Kubacka et al., 2011; Kurtz & Algoe, 2015; Leahy et al., 2022; Reis et al., 2010; Waldinger et al., 2004).

In Schutte and Malouff (2018)'s study, having the basic psychological needs for autonomy, competence, and relatedness met was associated with increased positive and decreased negative affect. Positive emotions predict individual well-being (including autonomy, mastery, purpose in life) and self-esteem (Dogan et al., 2013; Gomez-Baya et al., 2018), self-compassion (e.g., Alirezaee et al., 2021; Hall

et al., 2013; Pandey et al., 2021; Saricaoglu & Arslan, 2013), mindfulness (Tran et al., 2022; Zhu et al., 2019), supportiveness (Iida et al., 2008), and also predict positive relational behaviours such as positive reappraisal, problem-solving, and appreciation (Pavani et al., 2016).

Negative emotions can manifest in a variety of behaviours in relationships, such as criticism, contempt, defensiveness, and stonewalling (Gottman & Silver, 1994). These behaviours can erode positive feelings and lead to a cycle of negativity in the relationship (Gill et al., 1999; Noller et al., 1994). Fear has been shown to promote anger and aggression (Zhan et al., 2015), and emotional negativity was correlated with lower couple problem-solving capacity, and lower marital satisfaction in Woszidlo and Segrin (2013b)'s study, as well as with relationship dysfunction and dissolution in Gottman and his colleagues' studies (e.g., Carstensen et al., 1995; Gottman & Levenson, 1986, 1992; Levenson & Gottman, 1985), and in numerous other studies (e.g., Hanzal & Segrin, 2009; Heller et al., 2004; Rivers & Sanford, 2018).

van Kleef and Lelieveld (2021)'s study of the emotional underpinnings of prosocial behaviour outlines the unique ways positive and negative emotions influence our relational behaviours. Happiness, contentment, hope, gratitude, and compassion stand out as positively influencing affiliation, while anger, disgust, contempt, envy, and pride correlate with non-affiliative behaviours. When one partner is invalidating of the other partner's distressing emotions, these emotions are intensified (Schreiber & Veilleux, 2022). Negativity leads to negativity, and individuals are likely to weight negative emotions more strongly (Givon et al., 2020), and perceive them more accurately, than positive emotions (Alves et al., 2018; Zheng et al., 2015). Positivity, on the other hand, (showing affection, expressing gratitude, and being supportive and understanding towards one's partner) can help to counteract the effects of negativity and promote relationship satisfaction (e.g., Algoe, 2012, 2019; Barrett-Cheetham et al., 2016; Cazzell, Rivers, et al., 2022; Layous et al., 2022; Lin, 2015; Lyubomirsky & Layous, 2013; Parker et al., 2017; Quoidbach et al., 2010).

Positivity may also moderate stress reactivity to others (Ong et al., 2006). Studies have shown reciprocal associations between positive emotions and coping with stress (Cho et al., 2021; Hubbs et al., 2012; Puig-Perez et al., 2015). In Yuan et al. (2010)'s study 149 couples were asked to engage in a 15 minute conflict conversation while having their physiological reactions recorded. Positive emotional

behaviour correlated with down-regulation of physiological arousal, suggesting that positive affect has an ‘undoing effect’ on physiological stress responses.

3.10.4 Empathy

Empathy, emotion expression, and emotional intelligence (the ability to understand and share the emotions of others) are closely linked in the whole Endnote network model. Empathy is the 16th most occurring factor in the dataset and is apparent as a significant factor in the literature review summaries of each of the top ten factors.

“Empathy is the capacity to comprehend the minds of others, to feel emotions outside our own, and to respond with concern, kindness, and care to others’ suffering. It is a relational construct” (Stern & Cassidy, 2018, p. 1). Decety (2015) viewed empathy as; (a) sharing of emotion, (b) perspective taking, and (c) concern for other’s well-being, and as an important driver of prosocial behaviours (Decety et al., 2016).

Empathetically supporting a partner involves underlying consideration of their emotional experience (Pauw et al., 2021; Selke, 2019) and correlates with increased feelings of closeness (Hinneken et al., 2018). It is a show of support that helps buffer the physiological effects of distressing or stressful events (e.g., Brown & Coan, 2016; E. Chen et al., 2017; Decety, 2015; Decety et al., 2014; Smith & Weihs, 2019; Yu & Liu, 2021). Being shown empathy increases positive affect, and reduces negative affect, thereby moderating (Sbarra & Coan, 2018) and co-regulating physiological stress responses (Helm et al., 2014; Kalmijn, 2017; Sbarra & Hazan, 2008). In Waldinger et al. (2004)’s study men’s expression of greater empathy predicted marital stability (still married) five years later.

3.10.5 Contempt

Absence of empathy is a feature of psychopathic traits (e.g., Brazil et al., 2022; Garofalo et al., 2019; Simard et al., 2023), and psychopathic traits, including narcissism, are correlated with a lack of empathic responsiveness in couple relationships (e.g., Costello et al., 2019; Takamatsu, 2019; Weiss et al., 2018), and also with higher levels of antagonism (e.g., Dinić, Wertag, et al., 2021; Jordan et al., 2021; Van Til et al., 2022; Vize et al., 2020). Gottman identified contempt, which is a derivative of an antagonistic personality style, as the single most corrosive emotion in relationship (Gottman, 2016). Contempt (disdain, scorn, haughtiness) is the “tendency to look down on, distance, and derogate others who violate our

standards” (Schriber et al., 2017, p. 1). Contempt is therefore a negative perception or mental representation of one’s partner, as well as a feeling. The feeling of contempt motivates the actions of avoidance or dismissiveness, and endorses belittling, hurtful interactions, provoking feelings of shame and rejection in the recipient (Blackhart et al., 2007), leading to disconnection and hurt, and ultimately predicting relationship failure (Gottman, 1993a).

It is important to note that contempt for a partner can develop because of repeated efforts to unsuccessfully alert them to the destructiveness of their negative relationship behaviours. If anger is ignored it may evolve into contempt over time (Fischer & Roseman, 2007). As emotions provide evaluative feedback on behaviours, contempt may act as a overlooked regulatory emotion (Webb et al., 2012). Given the importance placed on contempt in early studies, this factor and its nuances seem under-studied in more recent decades.

3.10.6 How Attachment Affects Emotion

An individual’s attachment style is an “affect-laden mental representation” (Andriopoulos & Kafetsios, 2015, p. 1), and therefore impacts upon emotion recognition, and expression (Vrtička & Vuilleumier, 2012). Secure attachment is associated with feeling and expressing positive emotions (Mikulincer & Shaver, 2019a), including happiness, joy, and contentment (e.g., Fraley & Bonanno, 2004; Obeldobel & Kerns, 2019; Schiffrin, 2014; Simpson et al., 2007), and lower levels of fear and negativity (e.g., Peltola et al., 2015).

Negative emotions, such as anger, jealousy, fear, and anxiety, are more prevalent in the anxiously attached (e.g., Araci-Iyaydin et al., 2022; Clear et al., 2019; Wright, 2017). Anxiously attached individuals tend to be overly sensitive to emotional cues and may interpret neutral or ambiguous interactions as rejection or disapproval, which can exacerbate their emotional responses (Sheinbaum et al., 2015), and lead to a heightened threat appraisal of their situation (Guerrero, 1996; Sheng et al., 2022; e.g., Vrtička et al., 2012). Individuals with an anxious attachment style also tend to have difficulty with controlling their emotions (e.g., Sadikaj et al., 2011; Simpson, 1990; Simpson et al., 2011), and have a more negative experience of their relationship events than the securely attached (Collins, 1996). On the other hand, the avoidantly attached often lack positive emotions (Kwon & Choi, 2022), or empathetic emotions (e.g., Chung, 2014; George-Levi et al., 2022; Kazmierczak,

2015; Li et al., 2021; Maranges et al., 2022), and were less happy to hear their partner say “I love you” in Watkins et al. (2022)’s study.

Avoidant attachment is associated with emotional detachment, emotional numbing, and dissociation (e.g., Kaurin et al., 2022; Stevens, 2014), and individuals with an avoidant attachment style tend to suppress their own emotions, particularly negative ones like sadness and fear (Cao et al., 2020; Collins, 1996) and avoid vulnerable emotion expressivity (Clear & Zimmer-Gembeck, 2016; Garrison et al., 2014; Resnick, 2022; Simpson & Rholes, 2017; Troyer & Greitemeyer, 2018). The avoidantly attached seem to lack self-awareness about how their emotions can be used intelligently to inform their responses (Stevens, 2014). Their tendency to downplay the significance of their own emotions may contribute to a limited capacity to recognise or respond to the emotions of others (e.g., Hadden et al., 2015; Rigby & Cobb, 2022; Sadikaj et al., 2018), leading to absence of empathy (Troyer & Greitemeyer, 2018), and reduced ability to provide appropriate support (Leuchtmann, Kuhn, et al., 2018). This in turn may generate hostility in the couple dynamic and lead to breaches in emotional closeness, particularly through impeded relational responsiveness (Millings et al., 2013; Tan et al., 2012).

3.10.7 How Personality Affects Emotion

Personality traits can influence the intensity and frequency of emotional experiences, as well as how individuals regulate and express their emotions in social situations (e.g., Biberdzic et al., 2023; Chirico et al., 2021; Klaiber et al., 2022). For example, people high in neuroticism tend to experience more intense negative emotions and have difficulty appropriately expressing these emotions, whereas people high in extraversion tend to experience more positive emotions and express their emotions more openly with others (Tomaka & Magoc, 2021; Walton et al., 2021). Indeed, Wilson et al. (2017) found that neuroticism (negatively) and extraversion (positively) were strongly related to affect. Vukasović Hlupić et al. (2022)’s meta-analysis (N = 10,500) found that people who experience higher levels of positive emotions as a structural part of their personality (extraversion), who experience more positive interactions in interpersonal relationships (extraversion, agreeableness), and who are more conscientiousness, “are also more likely to satisfy their needs for autonomy, competence, and relatedness to a higher degree” (p. 16).

Neuroticism is highly correlated in the emotion network model, and in the literature, with *positivity* and *negativity*, and also with *anxiety* and *hostility* (West & Chester, 2022). In Malouff et al. (2010)'s meta-analysis (N=3,838), emotional stability (the opposite of neuroticism) was the strongest predictor of partners' relationship satisfaction. People high in neuroticism may be more emotionally reactive to stressful situations (Joshani, 2022), which could lead to a more pessimistic outlook on life, and reduced couple relationship stability (Solomon & Jackson, 2014). Individuals who score high in agreeableness show greater empathy and more positive emotions (e.g., An et al., 2022; Melchers et al., 2016; Sims, 2017). Conversely, hostility, anger, and aggression are negatively correlated with agreeableness (e.g., Van Til et al., 2022), and with relationship satisfaction (Slep et al., 2021). Low neuroticism and high extraversion have also been correlated with higher emotional intelligence (Olderbak et al., 2018; van der Linden et al., 2017) which also correlates with higher relationship well-being (e.g., Cahill et al., 2020; Jardine et al., 2022; Malouff et al., 2014; Wollny et al., 2020), and in fact, van der Linden et al. (2018)'s study showed emotional intelligence and the General Factor of Personality to be "virtually identical constructs" (p. 147), with a strong genetic correlation.

3.10.8 Emotion Summary

The role of emotion factors in shaping couple relationship outcomes is a subject of substantial scholarly interest, underscoring the profound impact of emotional experiences on the dynamics and stability of couple relationships. Emotions, as integral components of human interaction, serve as a fundamental vehicle for the expression of affection, empathy, and understanding between partners. The ability to effectively identify, interpret, and regulate emotions plays a crucial role in determining the success of conflict resolution, communication patterns, and overall relationship satisfaction, facilitating the establishment of emotional intimacy, and fostering a sense of connection and security within the relationship.

4. Phase Four Summary

The findings from the literature review converged to describe positive couple relationship well-being developing and occurring in nurturing environments (Overall, Fletcher, et al., 2010), where stress is buffered (Overall, Pietromonaco, et al., 2022), support is provided (Brunstein et al., 1996), positivity is preferred (Cazzell, Rivers, et al., 2022), there are high levels of sensitive and vulnerable personal disclosure (Knobloch et al., 2022) and warm and understanding responsiveness to that disclosure (Finkenauer & Righetti, 2011), attachment and autonomy/power needs are met (Overall, 2019), and conflict is repaired collaboratively (Gottman, 2011). This reflects (Biglan et al., 2020)'s conclusion that "humans are most likely to thrive when they live in ... nurturing environments" (p. 2), and pre-empt the conclusion that couple relationship well-being is an outcome of: 1. The minimisation or management of stress and threat (including unresolved conflict), 2. The minimisation of non-collaborative and non-nurturing relationship behaviours; 3. The reinforcement of positive nurturing behaviours, 4. The reinforcement of open and responsive communication, and 5. The reinforcement of collaborative partnership that values individual responsibility and freedom alongside consideration and care for one's partner.

Similar to the findings in Gaines (2016)'s review of the personality and close relationships literature, these relationship behaviours were found to arise from pro-social personalities, described as high in agreeableness, conscientiousness, emotional stability, secure attachment style, and self-regulation, and low in antagonism, contempt, arrogance, carelessness, neuroticism, anxious attachment style, avoidant attachment style, and self-dysregulation. The development of pro-social personalities is influenced by nature (biology) and nurture (social factors) (Lerner, 2018; Serpell, 2013), as well as by broader contextual factors, especially those that create stressful environments and events for that individual (Luecken et al., 2013).

In summary, all of the top ten factors found in the scientific literature in this study (personality, attachment, sex differences, stress, brain, emotion regulation, communication, conflict, perception, and emotions) are networked together – not only in regard to their co-occurrence in the research literature, but congruently, in regard to their co-occurrence in the real-world where they interact to contribute to and maintain couple relationship well-being. This is a complex inter-relationship with

multiple feedback loops and there is currently blurriness regarding which factors moderate or mediate⁶⁸ outcomes and in which contexts. While this study has not delved into the strength or nature of these effects in depth, it has highlighted which of these factor inter-relationships have been repeatedly examined.

⁶⁸ **Moderating Factors** influence how strong or what kind of effect one factor has on another. For example, stress is a factor effecting relationship satisfaction, but the strength of this fact may be moderated by support given by a partner. **Mediating Factors** describe how or why there is an effect between two factors, serving as the connecting link or pathway that explains why or how an effect occurs –the intermediary step that explains the relationship between the independent and dependent variables. For example, a mediating factor could be emotional closeness. The hypothesis might be that shared activities lead to greater emotional closeness, which in turn leads to higher relationship satisfaction. In this scenario, emotional closeness mediates the relationship between shared hobbies and relationship satisfaction. It explains the process through which shared activities contribute to greater satisfaction in relationships.

CHAPTER THREE PHASE FIVE: CREATING A CATEGORICAL STRUCTURE

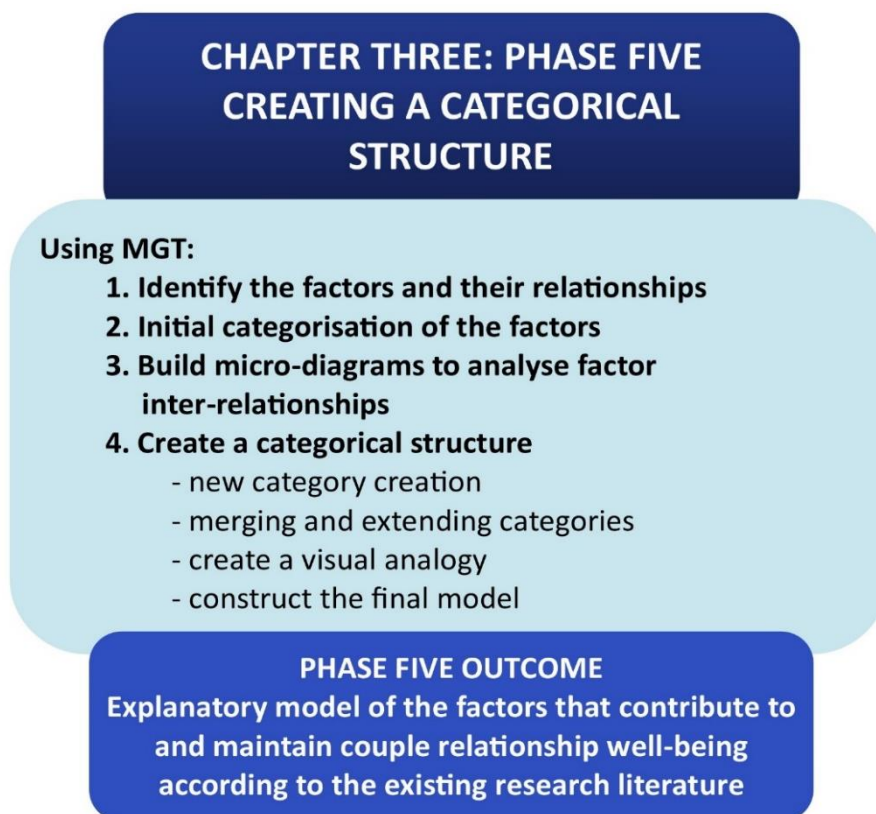
“The aim of inquiry, simply, is to unify all that we have before us into a coherent whole such that we reach a ‘warranted assertion’ – an understanding or solution that works – and which can then form the basis of future actions”.

Steve Hothersall (2016, p. 21)

Overview

The final phase of this study was the development and simplification of an explanatory model of the factors. The whole dataset of factors was grouped into homogenous categories and structured into a graphic representation. The resulting model serves as a concise and comprehensive representation of the myriad of factors and their intricate interplay, as evidenced by an extensive body of research, all contributing to the well-being of couple relationships. Chapter Three: Phase Five is outlined in Figure 57.

Figure 57 Chapter Three: Phase Five Creating a Categorical Structure



Using MGT to Create the Explanatory Model

In this study, an explanatory model of the factors contributing to couple relationship well-being was the end goal. Model creation typically involves identifying the key factors that make up the model and then categorising them, before arranging these categories in a logical fashion showing the relationships between them (Morgan, 2018). Using a MGT framework (Cronholm, 2004), the already identified key factors were grouped as categories, diagrammatically micro-modelled to reveal theoretically informed mechanistic relationships, and then structured into an explanatory model. This phase of the study used subjective decision-making processes. Rigour was enhanced by closely following the Multi-Grounded Theory (MGT) guidelines⁶⁹.

The MGT Model Creation Steps

MGT's (Cronholm, 2004) process for building a categorical structure was followed to create the final model, including:

1. **Identify the key factors and their inter-relationships:**
 - a. These had already been identified and coded in phase one and two and their inter-relationships had been identified and analysed in phase three and four.
2. **Categorise the factors:**
 - a. Assign the factors to categories and sub-categories and define outlying factors needing new categories.
3. **Build micro-diagrams to analyse factor inter-relationships:**
 - a. Diagram (micro-model) the factor relationships as found in the literature to discern 'chains of influence' (logically affirming the nature of the inter-relationships).
4. **Create an explanatory model: *Theory condensation*.**
 - a. Condense and summarise the categories:
 - i. New category creation.
 - ii. Merging and extending categories.
 - b. Create a visual analogy.
 - c. Construct the final model.

⁶⁹ Of note, these guidelines are not clearly outlined in the MGT published materials. The MGT developers were contacted for assistance with this but were not available to help. Therefore, these guidelines may not represent an exact MGT process, and the language has been changed from that used by the developers to add clarity.

1. Identify the Key Factors and their Inter-Relationships

The codes (factors) had already been identified during Phase One and Two of this study. These factors had been ‘inducted’ directly from the texts. The dictionary-codebook creation in Phase Two had provided a ‘descriptive validity’ to the factors (as described by Wiltshire and Ronkainen (2021)). In Phase Three the most frequently occurring factors and their inter-connections had further been identified by network modelling their use and co-use in the research literature. The literature review affirmed the factors’ importance to the development and maintenance of couple relationship well-being, causal relationships between factors had been explained, and now the modelling of the prominent reviewed factors found in the scientific literature could be carried out.

2. Categorise the Factors

To begin building a final explanatory model of the factors, the factors needed to be categorised. By categorising all the factors identified in the literature, the entire factor set could then be summarised and made readily accessible in graphic form. A couple relationship has an extremely complex array of potential factors contributing to relationship well-being and therefore the categorisation of these factors has clear advantages for therapists, allowing them to quickly ascertain areas to target therapeutically, as well as for researchers and other stake-holders in couple relationship well-being. Since the most prominent factors identified in the network models had been analysed and confirmed during the literature review regarding their relevance to the research question, they were initially chosen as the category headings. All the factors used in the network models were then organised into these categories, taking into account the existing theoretical understanding of their relationships.

2.1 Assign all the Factors to Categories

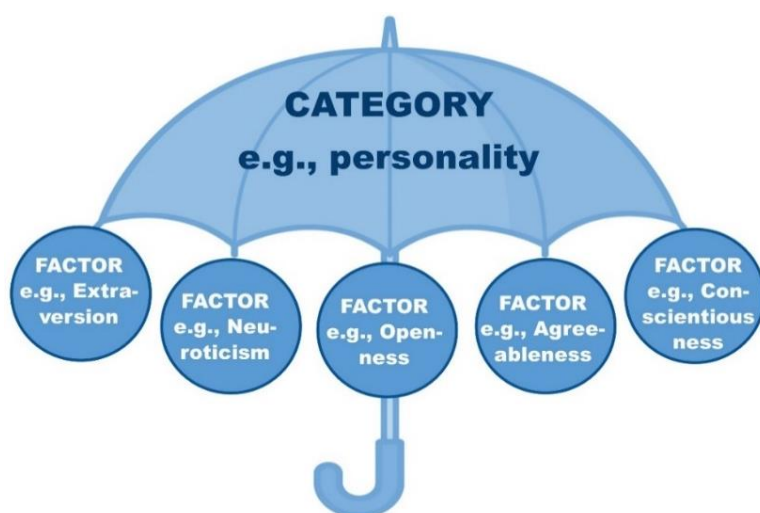
Categories are groups of factors with common characteristics, relating to one another closely, which describe and represent many factors in a succinct manner. Categorisation has obvious functions for organising and storing knowledge. As the pragmatist Charles Peirce (1878c, p. 470) wrote: “The chief business of the logician is to classify arguments; for all testing clearly depends on classification”.

Classification (or categorisation) in this study meant collating the factors that have attributes or characteristics in common into ‘familial’ groups (APA Dictionary of

Psychology).

Having identified the top ten factors – those most occurring and co-occurring in the literature – and having affirmed their significance and relevance in the development and maintenance of couple relationship well-being – they were now used as the initial category group headings. The top ten factors in the cross-disciplinary academic research were: attachment, personality, stress, sex differences, brain, emotion regulation, communication, conflict, perceptions, emotion. The remaining 990 factors found in the whole Endnote library and used in the network modelling were all individually assigned to these category domains based on their common characteristics. An example of this grouping of factors into categories is illustrated in Figure 58.

Figure 58 *Categorising the Factors Example: Personality*



To organise such a large number of factors (N=1,000) into categories required downloading the whole dataset of factors from VOSviewer into an Excel file and grouping them into columns under the top ten factor headings. All the factors were assigned to these top ten categories, according to their common characteristics and presumed natural relationships (as recommended by Mirman et al., 2017). To determine what factors should belong in what categories, Spradley (1979)'s semantic relationship questions were considered: "Is it a kind of...? Is it a part of...? It is a stage of...? Is it a result or cause of...? Is it a characteristic of...?" This is a 'rough and ready' way of grouping multiple factors because "categories are fuzzy and category membership is a matter of degree" (Dey, 2011, p. 4). As Bailey (1994)

notes, when grouping factors taxonomically:

“we generally seek to minimise within-group variance, while maximising between-group variance. This means that we arrange a set of entities into groups, so that each group is as different as possible from all other groups, but each group is internally as homogeneous as possible” (p. 1).

Factors were therefore moved around under the top ten categories until they seemed arranged in a position that represented their characteristics most completely.

2.2 Create Sub-Categories

Within each of the categories, subcategories were identified reflecting logical groupings of factors based on natural relationship to one another, which helped to add detail and specificity to each category. For example, under communication, body language formed a sub-category, and grouped under body language was body posture, and eye gaze. Sub-categories were helpful in simplifying the process of organising the factors under the umbrella category headings and could later be used to summarise the contents of each category. The categories, their sub-categories, and the factors therein, are individually tabled in Appendix 11. An example of this categorisation, using the emotion regulation category, is shown in Table 40.

Table 40 Category Example: Emotion-regulation

GROUPS	EMOTION REGULATION FACTORS
Emotion regulation	emotional intelligence emotion recognition emotion awareness emotion understanding empathic accuracy emotional availability emotion de-escalation physiological soothing emotion suppression emotion reactivity
Behaviour regulation	self-control self-management self-responsibility
Cognitive regulation	attentional control emotion reappraisal cognition reappraisal theory of mind

GROUPS	EMOTION REGULATION FACTORS
	intelligence life wisdom problem solving skills
Co-regulation	social regulation being present ability to read body language support seeking support giving collaborative life organisation emotion contagion comfort

2.3 Define Outliers

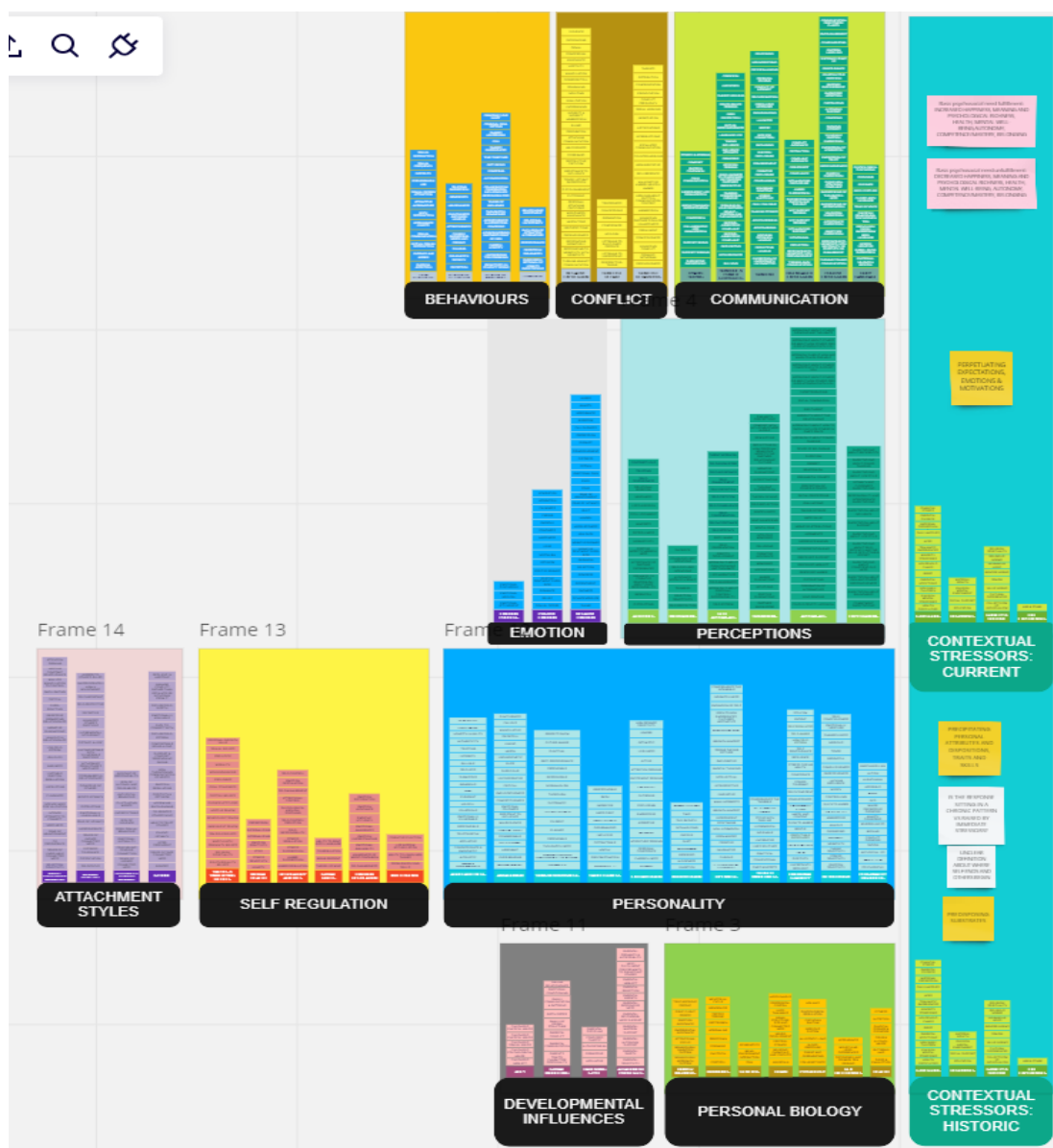
A key benefit of the MGT categorisation process was to ascertain if the top ten categories were comprehensive and exhaustive – in other words – all the other factors could be categorised under them. If factors could not be categorised in this way (i.e., were ‘outliers’) this could indicate that new categories were needed (Patton, 2015). One approach to achieving this was to consider outliers – factors that did not fit neatly into the existing categories. Any outlying factors would indicate that other category domains may be needed. This was an important quality check in this study. The dictionary-codebook had added rigour by merging common factors and thereby reducing conceptual double-ups, but there was still risk that significant factors had been missed or overlooked. Only using those factors most commonly occurring in the literature does not necessarily represent those most critical to couple well-being outcomes. Outlying factors, in other words those factors that lacked clear common characteristics with the top ten factor groupings, helped to reveal categories that may not yet have been well-researched, or that represented sharply differentiated factors, that were nonetheless potentially relevant to the final explanatory model.

Outlying factors are to be expected as this is a complicated and complex area of research and researchers have limited research agendas. As noted in the historical account of relationship science (Appendix 3), the path of research is winding and dependent upon researchers’ own interests, and therefore the corpus of researched factors does not necessarily reflect all the factors apparent in real life relationships, and similarly their numerical count in the literature may not reflect their relevance to the research question. By categorising all the factors, a type of audit was performed to help counter these potential oversights.

2.4 Use Miro Software to Group the Factors

As there were 1,000 factors to group and sub-group the excel file became unruly, and the factors were transferred onto a “Miro” whiteboard (<https://www.miro.com>). Miro is a software app that allowed the factors to be easily manoeuvred on-screen, and to be added to indefinitely. An example of the grouping of factors in Miro is shown in Figure 59. Due to the large size of this model, and wanting to show the whole model in process, the writing is too small to read, however this illustrates the use of the Miro software.

Figure 59 Using Miro to Group the Factors



3. Build Micro-Diagrams to Analyse Factor Inter-Relationships

Once the factors from the whole Endnote library dataset had been condensed into familial categories these categories now needed to be structured into an explanatory model used to make sense of and explain their inter-relationships. The model would provide a visual interpretation of a very complex system. The network modelling had shown the top ten factors to be highly networked with one another in the research literature. The literature review had also affirmed each of the factors to have inter-relationships which were sometimes bi-directional (influences in both directions), for example, communication had a bi-directional relationship with conflict in that tone of communication caused an effect on the tone of conflict, and vice-versa. These relationships were complex and therefore to simplify these in a manner that accurately represented this complexity required further investigation into the links between categories.

Multi-Grounded Theory (MGT) recommends micro-modelling, or diagramming, as an exploratory method for structuring concepts and their relationships during model development (Axelsson & Goldkuhl, 2004; Urquhart, 2013). A diagram is a simple drawing made up of a set of factors linked together in a logical way to create a systematic explanation of their relationships and outcomes (Axelsson & Goldkuhl, 2004; Fried, 2021). These may be simple associations or correlations, symmetrical (two variables fluctuate at the same time but because of an additional factor) or asymmetrical (causative) in nature (Maxwell, 2012).

Diagramming includes the factors or categories, their links, their sequence, and the direction and flow of that sequence. In MGT, diagrams are typically structured in action chains by considering the conditions (external circumstances, context or background or internal strategies, motives, experiences and knowledge) that lead to behaviours, which lead to results or effects (Axelsson & Goldkuhl, 2004; Goldkuhl, 2002). By creating diagrams with varying factors or categories, links, sequence, and direction, the fit of each can be evaluated and contemplated. Factors/categories can be moved around and re-arranged leading to new ways of viewing their position and influence and stimulating the breaking down of larger definitions into smaller refinements and the building up of small refinements into larger classifications related to one another through distinctive mechanisms. In this way, the conditions (including external conditions and context, intervening conditions and internal motivations), their consequent actions and interactions, and consequent results or

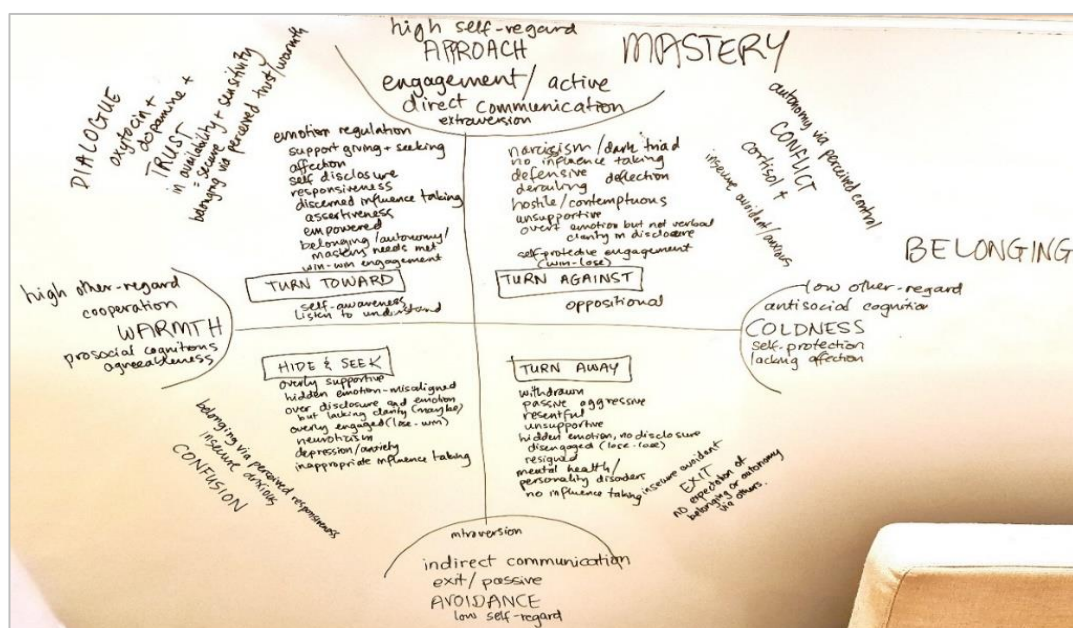
effects can be explored (Goldkuhl, 2002).

In MGT, diagramming is an important element of model development (Cronholm, 2004; Rivard, 2020), internally grounding the final model by ensuring “consistency and congruency between the elements of the theory” (Axelsson & Goldkuhl, 2004, p. 10). The diagrams were useful for clarifying the micro-structures within the final model, and in this way, they added conceptual rigour to the creation of the final model, internally grounding it in the process. Diagramming affirmed relationships between factors. Axelsson and Goldkuhl (2004, p. 10) state that “the theory diagram makes it possible to distinguish between different kinds of preconditions or effects, for example, that otherwise maybe would have been viewed as similar or exchangeable” and this provided a critical evaluation of the factors being summarised in the final model (Freeman, 2018) and an additional form of cross checking of the data.

3.1 Creating Micro-Diagrams

In various iterations, 171 experimental diagrams were hand-drawn throughout this phase. An example of a hand drawn quadrant micro-diagram considering the inter-relationships of communication styles and their underlying features is shown in Figure 60.

Figure 60 Whiteboard Model Example



The diagrams were exploratory so do not necessarily relate directly to the final model, but during this process the final model also began to evolve iteratively as concepts were contrasted and compared. Other examples of the micro-diagrams are shown in Appendix 13. Appendix 14 additionally provides an example of multiple diagrammatic explorations of the *responsiveness* factor and its role in the development and maintenance of couple relationship well-being.

4. Create a Categorical Structure

The final goal of the MGT process is creating a categorical structure. Having explored the way that categories and their factors inter-relate by micro-diagramming them, a final over-arching model of the factor categories began to form. The original top ten factors were: attachment, personality, stress, sex differences, brain, emotion regulation, communication, conflict, perceptions, emotion. All of the factors used in the network modelling (N=1,000) had already been grouped under these top ten factors as categories. The categorising of the factors had exposed some potential outlying factors that did not fit into the existing categories and further investigation was now required to assess whether a new conceptualisation of these categories could represent a more comprehensive summary of all the factors. This involved re-considering the category labels and descriptions of their components, and exploring whether categories should be merged or new categories should be created.

4.1 New Category Creation

A new category of *social development factors* was created by splitting the developmental substrates of attachment off from attachment styles and traits and adding in other non-attachment related social development factors. Stress was split among categories and a new group *labelled contextual factors, especially stressors*, was created. There was a merging of (biological) sex differences and brain into one category labelled *human biology*. Personality, attachment, and emotion regulation were merged into one category labelled *individual differences*. Perceptions and emotions were merged. Communication and conflict were also merged and a group of outlying factors that were relabelled relationship behaviours was added to the category, which was renamed *actions and interactions*. An explanation for these changes is presented below.

4.1.1 Social Development Factors: Nurture

Developmental factors were the 24th most occurring factor in the whole Endnote library. In this study the most researched social development theory was attachment theory. As noted in the historical account of the factors, attachment theory initially investigated children's social development, but it was eventually observed that childhood attachment styles typically maintain over the life-course. In other words, the adult attachment styles pertinent to this study have historical developmental substrates. For example, maternal warmth and availability during childhood perform an essential role in shaping adult attachment styles and traits (e.g., Dinero et al., 2008; Stern et al., 2015), but they are substrates to these, linking sensory information with reward (Loth & Donaldson, 2021). By adding a social developmental factors category, attachment could be separated into current adult attachment styles and traits and their historic substrates.

Additionally, while attachment theory has significant implications for couples' relational outcomes it is not the only social developmental factor that shapes social behaviour and relationship functioning and it was important to distinguish that care-giver factors were also not the only potential contributors to attachment style outcomes or traits in adulthood (Khan et al., 2020). While the correlation between childhood attachment experiences and adult attachment traits is well-researched and significant, adult attachment may develop through alternative routes, and children who have grown up in families where they should theoretically be securely attached may not be and vice versa. Therefore, the aetiology of these traits must be considered when conceptualising the therapy process for couples exhibiting insecure attachment traits in order for therapy to effectively treat causative factors.

To summarise this new social development category, the list of the whole Endnote library dataset of factors was re-examined and the factors occurring most frequently (in the top 200) influencing social development were found to be: parenting (39th), age and stage (41st), family of origin (176th), inter-generational factors (192nd), childhood experiences (194th). The term "nature versus nurture" is a commonly used and understood colloquialism (McLeod, 2023), which had not been used as a factor in the study due to its relative absence in the research literature, so nurture was added to this category to aid in rapid comprehension of the content. This final grouping as shown in the explanatory model is shown in Figure 61.

Figure 61 *The Social Development Factors Category***social development factors: nurture***early life experiences, social environment, social learning, parenting style***4.2 Merging and Extending Categories**

To simplify the final model, it was helpful to merge some of the already defined categories. In MGT, this is a way to condense the theory and create an “intelligible and harmonious whole” (Goldkuhl & Karlsson, 2020).

4.2.1 Contextual Factors, Especially Stressors

In the network modelling stress, and analogously stressful situations stood out as highly relevant to couple relationship well-being outcomes. Stress featured strongly in every category. Couple relationships occur between two individuals with intrapersonal differences that are influenced by stress, interpersonal patterns that are also liable to stress related factors, and external, contextually situated pressures. Stress was therefore separated out into the internal experience of stress – ‘being stressed’ (within the individual and the couple relationship), and the external experience of ‘stressors’ (external to the couple relationship and therefore shown in the context within which the individuals and couple relationship exist). Furthermore, external stressors are recognised as being relevant to relationship outcomes both historically, and in the present. Therefore, it was decided to incorporate stressors into the contextual factors category as an external influence that was relevant across time. The internal experience of stress is recognised in the emotions and perceptions categories.

Contextual factors include external influences on couple relationship well-being outcomes such as education, learning environments, and life experiences and events, including adverse experiences, such as abuse, neglect, or poverty (e.g., Chimed-Ochir et al., 2022; Fair et al., 2018; Griffin et al., 2015; Gulseven et al., 2021; Jones & Mize, 2022; Leve et al., 2022; Sameroff, 2010). Culture and societal influences, referring to the factors that shape the beliefs, values, attitudes, behaviours, and norms of a culture or society (Shteynberg et al., 2020), are also recognised as contextual factors that may or may not impact as stressors but are

external to the couple relationship in their influence. Culture featured as the 25th most occurring factor in the whole dataset. Joel et al. (2020) note that factors are culturally and socially embedded, and the literature review also affirmed that cultural and social context influence couple relationship well-being.

As stressors and culture/societal influences are conceptually different this grouping may need adjusting in future investigations, however, while stressors and culture/societal influences are not necessarily similar in characteristics, they are analogous in being external to the individual and to the couple relationship, and additionally, it is the stressful aspects of cultural and societal influences that seem most pertinent in the literature to their impact upon relationship well-being outcomes. For example, poverty and financial resource (e.g., Gajos et al., 2022; Jachimowicz et al., 2022; Williamson & Schouweiler, 2023), racism (e.g., Kerr et al., 2018), sexism and sex role identity (e.g., Harrington et al., 2021; Seiter et al., 2022), cultural norms and expectations (e.g., Mayer, 2023), global uncertainty (e.g., Randall, Leon, et al., 2021), quality of neighbourhood (e.g., Bae & Kogan, 2020; Hostetler et al., 2011), socio-economic disadvantage (e.g., Williamson & Lavner, 2020), available help and resources (e.g., Barton et al., 2014; Gable & Bedrov, 2022), are potential stressors impacting upon couple relationship well-being outcomes.

Cultural/societal factors and stressors (now *contextual factors*) could have been grouped under developmental factors, which would have recognised their historical influence but not their current influence on relationships. For example, children who grow up in low-income neighbourhoods may experience a range of social and economic disadvantages, such as limited access to quality education, healthcare, and employment opportunities, as well as exposure to violence and other environmental stressors. These experiences can impact their social and emotional development, including their ability to form and maintain healthy relationships in adulthood, higher rates of divorce, lower levels of relationship satisfaction, and greater likelihood of experiencing intimate partner violence (Sharkey, 2018). However, these contextual factors may also be causing difficulties in a couple's current adult relationship circumstance, not simply their historic developmental circumstance. Therefore, they were grouped together under one new umbrella category of *contextual factors*.

Adverse childhood experiences (ACEs) could have been included in the social development category, particularly given that childhood abuse typically occurs within the child's social environment, but as ACEs are not always relationally determined it was decided to place ACEs in the contextual factors category: especially stressors. To summarise this new *contextual factors* category, the list of the whole Endnote library dataset of factors was re-examined and the factors occurring most frequently (in the top 200) pertaining to contextual factors, especially stressors, were found to be: culture (25th), adverse childhood experiences (47th), sociodemographic factors (64th), financial resources (71st), trauma (78th), childhood abuse (81st), environmental factors (82nd), work factors (96th), social context (116th), and financial stressors (117th). This final category was further divided into historical and current. These are shown in the explanatory model as in Figure 62.

Figure 62 *The Contextual Factors Category*

contextual factors

especially stressors, adverse childhood experiences (ACEs), also financial resources, cultural, societal, and environmental factors

4.2.2 Human Biology: Nature

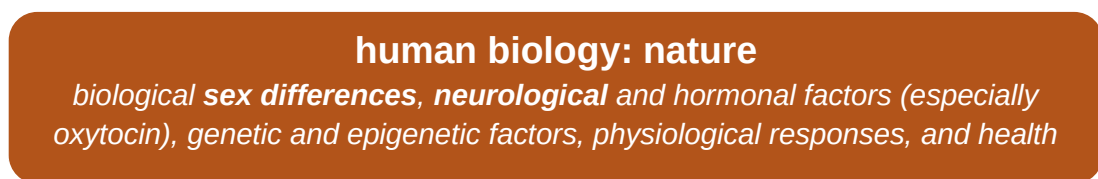
Sex differences in this study referred specifically to biological sex differences. *Brain* referred to neurological factors (brain was used in the network models because it was shorter and therefore less obscuring). Neurological factors included brain structure and chemistry. Due to the biologically-based origins of both sex differences factors and neurological factors these were merged into one category. As the term “nature versus nurture” is a commonly used and understood colloquialism, nature was added to this category to aid in rapid comprehension of the content.

The field of human biology deals with the study of the human body and its functions, including anatomy (the structure and organisation of the human body), physiology (the mechanisms and processes of the human body), genetics, evolutionary biology, developmental biology, endocrinology (hormones), neurobiology (nervous system and brain), cell and molecular biology, biochemistry (chemical processes), health, nutrition, and exercise, and reproduction life stages (Mader & Windelspecht, 2023). These biological factors were so closely linked with both neurological factors and

biological sex differences in the network models, and therefore in the literature, that they had been grouped in subsets in both these categories, and therefore the two categories were merged into one category which recognised the holistically networked nature of personal human biology.

To summarise this new category, the list of the whole Endnote library dataset of factors was re-examined and the factors occurring most frequently (in the top 200) relating to biological sex differences and brain were found to be: genetic factors (29th), oxytocin (34th), cortisol (47th), amygdala (59th), heart rate (66th), physiological arousal (86th), testosterone (114th), HPA axis (115th), health (119th), pre-frontal cortex (122nd), hippocampus (163rd), inflammation (170th), blood pressure (177th), dopamine (184th). The *human biology: nature* category is presented in the final explanatory model as shown in Figure 63.

Figure 63 *Human Biology Category*



4.2.3 Individual Differences

Individual differences are broadly and vaguely the variations and distinctions in individual psychological, physiological, and behavioural characteristics (APA Dictionary of Psychology, 2023). They arise from a complex interplay of genetic factors, environmental influences, parenting styles, life experiences, and personal choices. Personality and attachment style are both individual differences that play important networked roles in understanding why people behave the way they do in relationships. Personality traits and attachment styles shape individuals' tendencies for relational connection and care, and influence how people approach relationships, and seek support. These two factors were the most researched in the literature, and while being theoretically different, many of their traits overlap in real life. Therefore, it was decided to group them under the one category of individual differences (which was the 36th most occurring factor in the whole Endnote dataset).

Personality disorders and psychopathology (features of mental health) had been included in the literature review on personality. Broadly, mental health includes personality disorders, but refers more commonly to a person's overall psychological well-being, particularly regarding coping with life stressors (World Health Organization, 2022). Mental health factors such as depression and anxiety are commonly understood as emotional states that differ from personality disorders in that they can be transitional in nature (i.e., are not stable or fixed traits, but rather are states that fluctuate over time and can be influenced by a variety of environmental and psychological factors). Personality disorders, on the other hand, are characterised by enduring patterns of behaviour and thought that are stable over time.

In this study, mental health was not a commonly used term in the literature and did not show up in the 1,000 factors used in the network modelling, however, negative affect (15th), anxiety (34th), and depression (13th) were highly ranked in the whole Endnote library. These were difficult factors to categorise under the top ten factors. Did they belong in the emotion group, or the personality group? Both negativity and depression could be sub-grouped under neuroticism, or under each other. It was decided to add mental health factors into the individual differences category, recognising that there are strong networked inter-relationships between each of the factors in this category. It is also noted that researchers tend to consider mental health status as an individual difference that is seen as being on a continuum, and influenced by nature, nurture, and contextual factors (Stein et al., 2020).

Emotion regulation was also placed within the individual differences category, and deemed to be a subset of 'self-regulation' which encompasses emotion regulation, as well as cognitive and behavioural regulation (Andersen & Chen, 2002). Emotion regulation is the most researched of these factors, but behavioural regulation includes self-control which was the 19th most occurring factor in the whole dataset. While emotion regulation is a component of self-control, and vice versa, both seemed to be more suitably situated under the umbrella term self-regulation ("the alteration of thoughts, feelings, and behaviours to bring them into closer alignment with a specific standard, or goal" (Righetti et al., 2022, p. 2).

Emotion regulation is also generally considered to be an individual difference (Baumeister & Vohs, 2023) although it is also evident that other individual difference factors such as attachment style and personality traits influence emotion regulation

capabilities (Gross & John, 2003). This placement of emotion regulation seemed appropriate, nonetheless, when keeping in mind that all the individual factors listed in this category were networked in their influence.

To summarise this new *individual differences* category the list of the whole Endnote library dataset of factors was re-examined and the factors occurring most frequently (in the top 110⁷⁰) pertaining to *individual differences* were found to be: depression (15th), self-control (19th), neuroticism (21st), agreeableness (26th), psychological maladjustment (28th), anxiety (35th), extraversion (37th), coping (38th), conscientiousness (46th), attachment avoidance (48th), attachment anxiety (58th), psychopathology (60th), emotional intelligence (63rd), temperament (94th), personality disorder (109th). The *individual differences* category is presented in the final explanatory model as in Figure 64.

Figure 64 *Individual Differences Category*

individual differences:
***attachment** style, (secure, anxious, or avoidant attachment); **personality**, (agreeableness, emotional stability/neuroticism, conscientiousness); **personality disorders**, (antagonism, narcissism); **mental health** (depression, anxiety); **self-regulation**, and coping ability*

4.2.4 Perceptions and Emotions

Perceptions and emotions were grouped together due to their highly correlated factors. Yip (2021) theorised that emotion is actually high-level perception. To summarise the *perceptions and emotions* category, the list of the whole Endnote library dataset of factors was re-examined and the factors occurring most frequently (in the top 110) pertaining to *perceptions and emotions* were found to be: empathy (16th), negativity (18th), motivation (20th), positivity (21st), happiness (31st), trust (43rd), anger (34th), appraisals (67th), expectations (71st), reappraisal (77th), memory (79th), avoidance-approach goals (83rd), personal goals (88th), rumination (90th), cognitive processing (93rd), emotional arousal (95th), self-awareness (97th), optimism (99th), compassion (104th), attributions (105th), beliefs (107th). The *perceptions and emotions* category is presented in the final explanatory model as in Figure 65.

⁷⁰ As this category included a larger set of factors only the top 110 were included.

Figure 65 *Perceptions and Emotions Category***perceptions and emotions:**

perceptions, expectations, cognitions, motivations, attitudes, self-appraisals, self-esteem, self-awareness and emotions, negativity, positivity, empathy, trust, contempt, feeling stressed

4.2.5 Actions and Interactions

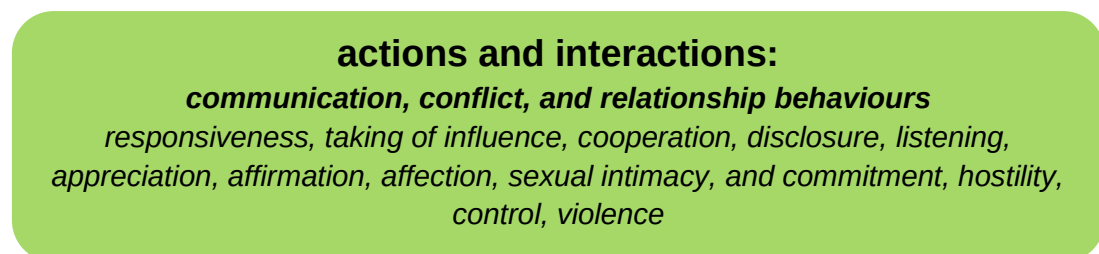
shared many overlapping factors in their categories and were therefore grouped together. Another group of outlying factors that had been difficult to assign earlier were sexual behaviours and displays of affection which, in the literature review, were assigned under communication, noting they are acts of personal expression. However, communication seemed to inadequately describe sexual behaviour, along with a group of other extraneous relationship behaviours, and so a new group was created: *relationship behaviours*, or the more general actions and interactions exhibited by individuals towards their partner.

The term ‘relationship behaviours’ wasn’t included in the list of factors that had been network modelled, but it was an appropriate ‘catch-all’ term for those factors that have been noted in the literature as significant contributors to couple relationship well-being, yet, on their own, had not made it to the top ten factor status in the network modelling phase, as well as encompassing communication and conflict factors. The category was further re-labelled as actions and inter-actions to highlight both the individual and dyadic behavioural aspects.

As an affirmation of this new category, Joel et al. (2020)’s extensive investigation into “the constructs that reliably predict relationship quality” (p. 19061) considered the impact of individual constructs and relationship constructs on relationship satisfaction. The measured factors that predicted relationship satisfaction most reliably in their study included: commitment, intimacy, appreciation for one’s partner, love, sexual satisfaction, perceived partner satisfaction, conflict, and responsiveness. These are some of the factors that made up the new category of relationship behaviours, and their findings lent support to the relevance of this new category in the final model.

To summarise this *actions and interactions* category the list of the whole Endnote library dataset of factors was re-examined and the factors occurring most frequently (in the top 110) pertaining to *actions and interactions* were found to be: support (13th), hostility (14th), sexual behaviour (18th), violence (30th), commitment (32nd), responsiveness (40th), facial expressions (51st), cooperation (57th), problem-solving (62nd), affection (65th), rejection (73rd), sexual desire (74th), infidelity (76th), forgiveness (84th), disclosure (85th), defensiveness (91st), caring (98th), relationship maintenance (100th), controlling (101st), decision-making (103rd), gratitude (108th), withdrawal (110th). The *actions and interactions* category is presented in the final explanatory model as in Figure 66.

Figure 66 *Actions and Interactions Category*



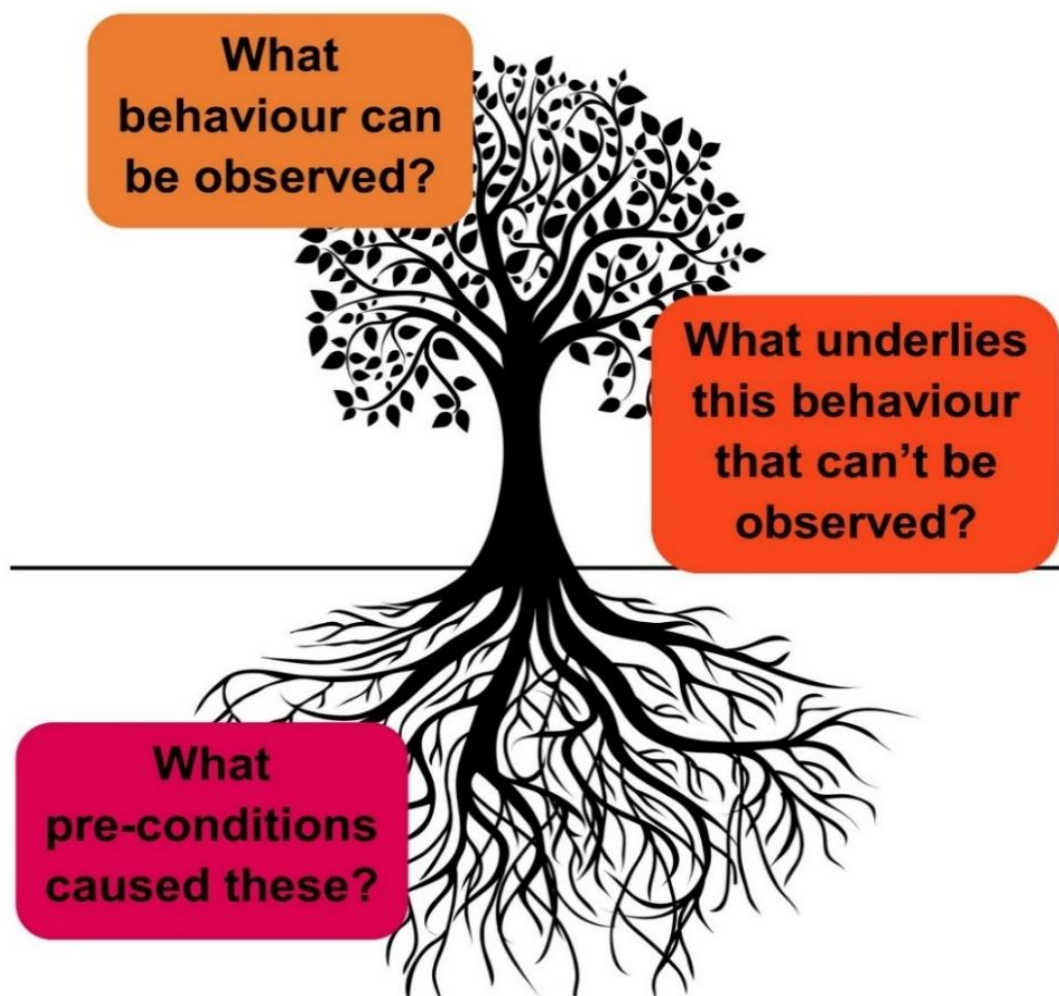
4.3 Create a Visual Analogy

To consolidate the categories into a final explanatory model, a fitting analogy was sought. This analogy needed to encompass networked, systemic, biopsychosocial, and developmental factors across time and within contexts. It also had to encapsulate both the latent and manifest aspects of individual and dyadic behaviours, as well as their relational outcomes. Various common objects were considered to help visually present the model within a broadly familiar form, and a tree was decided upon. A tree embodies a wealth of symbolism and practical parallels which are commonly understood and recognised across most cultures.

A tree's systemic biological nature lends itself well to comparisons with human biological nature and systems and includes inference to developmental processes and mechanisms. A tree develops over time, and like humans, its growth is epigenetically and environmentally informed. A tree has hidden roots paralleling the historic, foundational, latent elements of individual and dyadic behaviours. Trees also have observable fruit/leaves paralleling the current, manifest relational actions and interactions. The trunk acts as a bridge between the roots and the fruits – and

this interaction is both manifest (the outside can be easily seen) but latent (the inner workings and processes of the trunk are hidden). The roots of a tree are also mechanistic in nature – in that the roots supply the trunk and leaf canopy with the necessary nutrition. This process is hidden within the trunk and roots and made evident in its leaves and fruit. The historic biological and developmental processes underlying current individual differences, and emotions and perceptions, are likewise hidden and only known by the actions and interactions (leaves and fruit) observed in couple relationships. The leaves also feedback into the tree's network system by providing nutrition to the tree through photosynthesis and leaf litter. Similarly, relationship behaviours provide feedback to the systems they have derived from. The first draft of the tree model concept is shown in Figure 67. This draft was an attempt to explore the placement of categories into the tree analogy using the concepts of latent (hidden) and manifest (observable) factors, and their mechanisms.

Figure 67 *The Initial Tree Illustration Development*



The analogy of a tree also corresponds well to the multifaceted nature of case conceptualisation. Just as a botanist examines a tree holistically to grasp its vitality, therapists employ case conceptualisation to illuminate the nuanced interplay of preconditions, precursors, and perpetuating factors. By unravelling this intricate network of factors, therapists gain insight into the couple's unique story, offering a roadmap to effective interventions that address the root causes and lead to meaningful therapy strategies. In this parallel, the intricate interplay of preconditions, precursors, and perpetuating factors all collectively underpin the understanding of the foundational origins of a couple's situation much like the interconnected roots, trunk, and branches of a tree. Preconditions are akin to the unseen soil and roots that condition the tree's growth, representing the underlying context, life histories, and personal biology that set the stage for the individual differences brought into the couple relationship. Precursors might include the historical triggers, individual vulnerabilities, and relational dynamics that have culminated in the present circumstances, mirroring the trunk of the tree. The perpetuating factors, such as the patterns of emotion, perception, communication, coping strategies, and mutual interactions that exacerbate the couple's challenges, as well as the stressful situations they are in, could be viewed as the air and surrounding environment. So, the tree analogy is an easily understood simple illustration of several very complex concepts related to couple relationship well-being outcomes.

4.4 Construct the Final Model: Theory Condensation

Once the tree analogy had been decided upon, the categories needed to be 'categorically structured' – i.e. placed in logical relationship with one another within the analogy (Cronholm, 2004). An important consideration in creating the final explanatory model was incorporating biopsychosocial factors and mixing different levels of explanation for couple relationship well-being outcomes in a multi-layered model (as noted by other recent model developers e.g., Borsboom, 2017; Roefs et al., 2022).

In this study the bi-directional influence of nature and nurture (Gaysina, 2022), over time and in context (de Ribaupierre, 2015), are seen to shape the complex biopsychosocial interactions found in couple relationships. Factors interact systemically to influence an individual's relationship well-being outcomes. Relationship outcomes are, therefore, theorised to emerge from this complex network of biopsychosocial/environmental factors and their interactions (as also

theorised by Castro et al., 2019; Costantini et al., 2019; Gusenbauer & Haddaway, 2020; Hofmann & Doan, 2018; Van Lange & Zvolensky, 2015; von Bertalanffy, 1967; Witherington & Heying, 2015), and couple relationships are positioned as occurring between reflexive human beings who dwell in shifting social contexts, where inner and outer realities exist and are all relevant factors regarding the well-being outcomes of these relationships.

Researchers have viewed couple relationship well-being as dependent upon effective communication skills, particularly conflict communication skills, as well as the use of relationship maintenance behaviours. These actions and interactions are influenced by perceptions (how people perceive themselves, their partner, and their relationship) and emotions. Perceptions and emotions are influenced by individual differences such as personality, attachment styles, and self-regulation capability, and these evolve out of a combination of biological and social development factors, as well as being influenced by contextual factors – both historic and current – with stress being a key mediating variable between context and well-being outcomes.

These categories had already been grouped as:

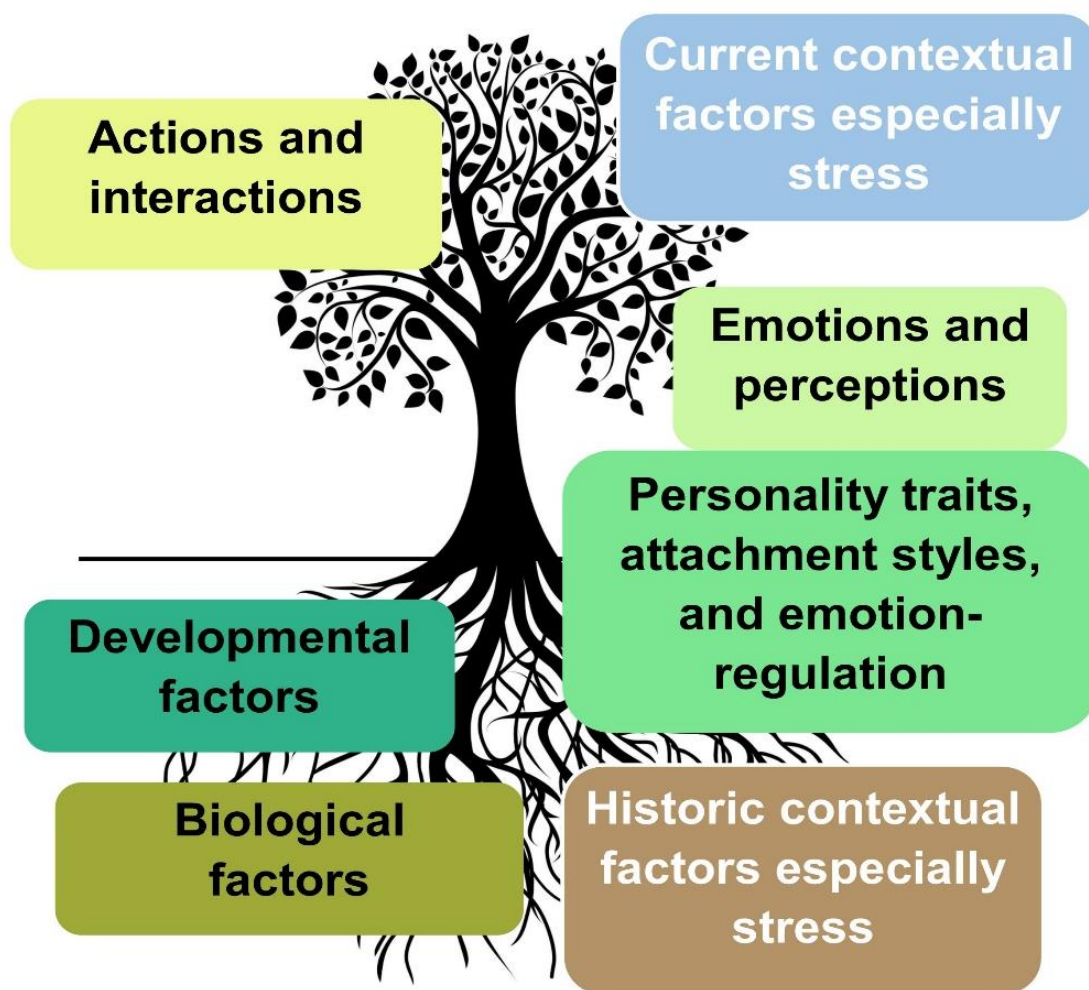
- Historic and current contextual factors (especially stressors)
- Social developmental factors (nurture)
- Biology (nature)
- Individual differences
- Perceptions and emotions
- Actions and interactions

These findings now needed to be summarised in the final model, so they were arranged in order of their influence (action) on couple relationship well-being, beginning with those least proximal (historical, developmental factors) in the hidden roots, to those most proximal (current behaviours, perceptions, and emotions) in the observable fruit and leaves.

In the bottom tier of the model (the roots and ground) are two groups: **biological** and **developmental** factors. These roots are grounded in the soil of **historical contextual (especially stress-related)** factors. The trunk of the tree evolves out of the roots into individual differences that are displayed in **personality style**, **attachment style**, and **self-regulation abilities**. These then branch into underlying **perceptions** and **emotions**, leading to **relationship behaviours** including

communication, and **conflict** in the canopy of the tree. All of these are situated in the **current context**, which includes current stressors and cultural influences. This stage of the model development is shown in Figure 68.

Figure 68 *Evolving Tree Model*



4.4.1 The Final Explanatory Model of the Factors Contributing to and Maintaining Couple Relationship Well-Being According to Extant Research

The founders of MGT suggest that models should consist of conditions that point to actions that point to results/effects (Axelsson & Goldkuhl, 2004). As the aim of the final model was to produce useable and accessible knowledge, the model is a simplified representation of a complex host of factors (Eykelbosh & Fong, 2017). It was decided that directional arrows would be added to depict the movement from

distal, latent factors towards proximate, manifest factors in human relational processes, keeping in mind that the research has demonstrated that the factors are networked in complex and reciprocal ways, and the arrows are included only to simplify understanding of the most obvious processes noted in the research⁷¹.

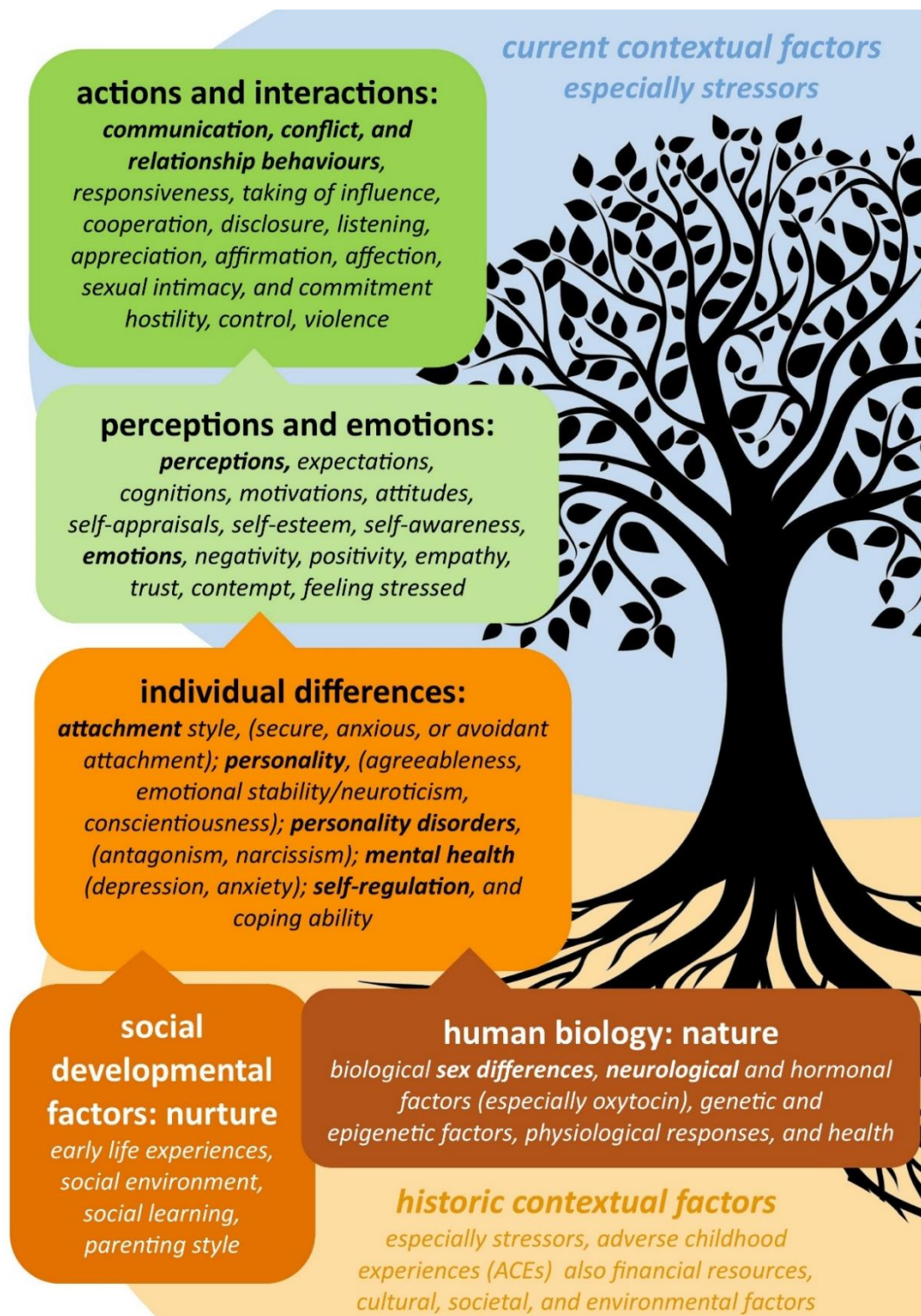
The final model highlights those factors shown as being most significant to couple relationship well-being outcomes according to, and as found in, the current research corpus. The final representation of this tree model is shown in Figure 69.

5. Phase Five Summary

Using Multi-Grounded Theory (MGT) a version of meta-synthesis occurred in Phase Five as findings were broken down examined, categorised, and recombined into a transformed whole. By breaking down the researchers' own texts into the descriptive factors contributing to and maintaining couple relationship well-being, and consolidating these factors into simplified categories, the final explanatory model became a condensed version of the key findings of thousands of research studies. In finding and categorising the factors found in such a large library of literature, it then becomes possible to generalise about their significance to the broader population of couples. While the final model presents an 'approximation' of a complex reality it is a 'best guess' of the way the researchers see these factors 'working' given how thousands of researchers have connected and prioritised these factors. It is not a definitive explanation, but it is a well-researched guideline depicting our current scientific knowledge. While the 'unifying conceptual model' produced from this study was an exploratory first draft that would need testing "even rough, messy, and imprecise classification systems can be useful for quickly summarising and communicating information in a lingua franca" (Jones & Robinaugh, 2021, p. 10). It was hoped this simple and 'rough' model might spur those working in the field of relationship science, and especially those at the coalface working with couples, into a more holistic consideration of the range of factors underlying couple well-being.

⁷¹ *Cause and effect are seldom related in a strictly linear occurrence, but rather a networked experience where acknowledgement of the independent and interactive effects of multiple sources of influences on relationships is essential (McNulty et al., 2021).*

Figure 69 The Tree Model



CHAPTER FOUR: DISCUSSION

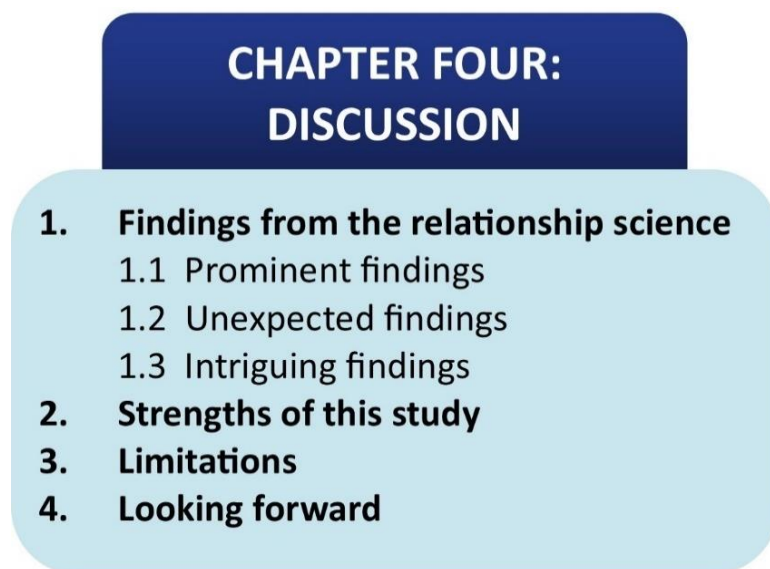
"What concrete difference will its being true make in anyone's actual life?"

- William James (James, 1907) (p. 2)

Overview

Chapter Four presents a discussion of the key results of this study. The main findings identified from a large library of publications regarding the factors contributing to and maintaining couple relationships well-being, are described and considered. Additionally, this chapter addresses the limitations of the study and proposes future research directions that build upon the current findings. The final product of this study was an explanatory model summarising the state of relationship research and delineating the emphases in the literature. The chapter outline is shown in Figure 70.

Figure 70 *Chapter Four: Discussion Overview*



1. Findings from the Research Literature

In Norval Glenn (1990)'s critical review of the relationship research in the 1980s he wrote: "The literature on marital quality published in the United States in the 1980s is immense" ... but "a review and attempted synthesis of these different literatures

would be enormously worthwhile” (p. 818). We now know that this immense corpus of literature has doubled decade by decade in the ensuing four decades (Sharkey et al., 2021), and this review and synthesis – while needed more than ever – has been daunting to achieve. Nonetheless, this study has attempted this “enormously worthwhile” task.

The extensive corpus of published research is not quickly sorted and amalgamated, and across academic fields there has been a lack of factor clarity and synthesis. This thesis therefore gave close attention to the definition and explication of couple relationship well-being factors through deconstruction and reconstruction of existing theories and findings to present a first draft of a unifying conceptual framework of these factors and their inter-relationships. To achieve this, 25,823 relationship relevant research studies or academic publications were collated, their key factors (study variables) were defined and network modelled, the literature was reviewed to understand the nature of the prominent factors and their inter-relationships, and the factors were categorised and formed into a condensed explanatory model. As such, this thesis contributes a unique conceptualisation and practical knowledge synthesis to the existing relationship science base that can now be used as a directive hypothesis to enable the identification of underlying causal mechanisms of couple relationship well-being, and consequently, “make us more sensitive navigators of worldly features that had hitherto escaped our notice” (Fesmire, 2014, p. 97).

Given the scale of the task, there were no precedents in terms of method. Therefore, guided by pragmatism, this study employed an extensive and comprehensive Multi-Grounded Theory approach involving the compilation and analysis of multiple texts (primarily research articles). Codes (factors) were extracted from these texts and subsequently defined and refined into a dictionary-codebook. Due to the substantial number of texts under scrutiny a bibliometric analysis tool was utilised to expedite the prioritisation of factors. This VOSviewer quantitative analysis facilitated a rapid identification of the most prevalent factors in the extensive body of research, as well as revealing what other factors they had been repeatedly researched with. To ensure that the quantitative findings were firmly rooted in the conceptual context they originated from, a qualitative review of the factors and their relationships was conducted. This aimed to reaffirm the significance of the factors by anchoring them in the original meanings and insights presented by researchers in the source texts. Factors were categorised to

encapsulate the essence of the findings. The outcome of this process was the development of a visual model that illustrated the conceptual categories and their interconnectedness.

While the search for order in relationship theory is unlikely to ever be definitively complete this thesis aims to offer a 'useable reconstruction' (Reichert, 2011) that is easily accessible to those who can benefit from the summary of knowledge therein. The final product is intended to reduce but not eliminate uncertainty. It does, however, contribute to a broader and a more defined understanding of the factors and processes being investigated. A considerable process of 'thinking through' the factors and their interrelationships has occurred throughout this study and as the noted by the pragmatist John Dewey (1931), thought can lead to consequences that change people's worlds. Given the prevalence and primacy of couple relationships across all societies and given the individual importance and the societal impact that these partnerships have, this synthesis of knowledge has usefulness for therapists developing their case conceptualisations, for researchers developing their hypotheses, and for individuals in relationships wanting to understand quickly and simply what the research has found to be the significant factors contributing to couple relationship well-being.

1.1 Prominent Findings in the Research

The factors identified in this study expectedly reflected and related to the primary theories found in the research corpus. The most prominent ten factors found in the research literature were: attachment, personality, stress, sex differences, brain, emotion regulation, communication, conflict, perceptions, and emotions. Harry Reis (2007, p. 8) states that "when an idea appears and reappears in different theories and research programs, that indicates that something fundamental is being called forth". Network modelling the factors exposed the 'central organising principles' being studied by relationship scientists. The prominent fundamental factors being "called forth" from within the cross-disciplinary literature were ascertained (Zwick, 2014) and their prominence and inter-relationships explained with reference to the research. As the factors and their theories were woven together through reflecting on the literature from which they were drawn, a cohesive and comprehensive account (tika) of their whakapapa (their relationships on all levels) emerged.

1.1.1 The Tree Model

The final tree model was arranged into summative categories in order of their proximity to couple relationship well-being outcomes. The categories were: **historic and current contextual factors**, especially stressors, adverse childhood experiences, financial resources, and cultural/societal/physical environmental factors; **human biology (nature)** including biological sex differences, neurological and hormonal factors (especially oxytocin), genetic and epigenetic factors, physiological responses, and health; **social developmental influences (nurture)**, including early life experiences, social environment, social learning, and parenting style; **individual differences** including attachment style (especially anxious and avoidant), personality (especially agreeableness, emotional stability, and conscientiousness), personality disorders (especially antagonism and narcissism), mental health (especially depression and anxiety), self-regulation, and coping ability; **perceptions and emotions** including expectations, cognitions, motivations, attitudes (especially contempt, negativity, distrust, empathy, warmth, and positivity), self-appraisals, self-esteem, self-awareness, trust, and feeling stressed; and **actions and interactions** including communication, conflict, and relationship behaviours (especially responsiveness, taking of influence, cooperation, disclosure, listening, appreciation, affirmation, affection, sexual intimacy, commitment, hostility, control, and violence).

Based in these findings, couple relationship well-being outcomes can be considered as embodied and embedded in intrapersonal, interpersonal, and social contexts, arising from complex feedback loops among multiple factors. The final tree model is grounded in a systemic/networked, biopsychosocial/ environmental ontology. In terms of directional influences, time creates an obvious distal dimension, with historic factors showing influence on couple relationship well-being even in the form of pre-birth generational factors. These historic factors, especially regarding stressors, are found at the bottom of the tree in the surrounding soil, with stressors recognised as having impact upon developmental processes at a biological level. Our biological (neurological and sex differences, as well as other biological determinants that we are born with) remain reasonably constant throughout the lifespan and are also placed in the roots of the tree.

Biological and social development factors lead to variations in personality styles, personality disorders, mental health, attachment styles, and self-regulation styles

and therefore these are positioned further up the tree. These in turn influence the ways people feel and think about their life. Their emotions and perceptions yield varying relationship impacting behaviours, particularly communication and conflict expressions, and these are positioned in the canopy of the tree in the model, reflecting that they are the expression of individual differences. These are all positioned within, and influenced by, our current environment, particularly stressors, which are represented in the surrounding air in the tree model. As with a tree, each of these factors are networked and influencing one another, so while these are mechanistic in nature, they also give and receive feedback, creating multi-directional chains of influence.

The tree model reflects the results of multiple studies, and the factors it is made up of have been empirically endorsed in these studies as reliable contributors to couple relationship well-being outcomes. The model clarifies the ongoing research findings that affirm that couple relationships are systemic in nature. Therefore, treatment case conceptualisation should include consideration of the couple's individual biopsychosocial/environmental and historical factors. For example, early stressful contexts and social development influences may have resulted in biological dysregulations of the stress response system, contributing to the development of insecure attachment styles and maladaptive working models of relationships, and emotionally dysregulated and antagonistic personality traits, and these may have predisposed relational responses that are now biologically 'hard-wired' as adults. For example, an individual raised in an impoverished neighbourhood (**context**), by financially stressed parents who did not have time to tend to their needs in childhood (**social development**), may have reduced pre-frontal cortex and hippocampus architecture (**personal biology**), and develop an anxious **attachment**, neurotic **personality**, and poor **emotion regulation** (individual differences) resulting in reduced empathy and heightened negative **emotions**, and distrusting **perceptions**, which are likely to manifest in self-protective **relationship behaviours** including reduced responsiveness in **communication** and increased hostility or withdrawal in **conflict**. While important to recognise that these effects are not deterministic, by drawing attention to the inter-relationships between factors and their potential mechanisms, appropriate therapeutic interventions may be better defined.

1.2 Unexpected Findings and Opportunities

Some gaps were found in the research literature regarding factors that had been noted by researchers as important to relationship well-being outcomes, yet had received less attention in research studies, suggesting that they warrant further investigation to understand their own unique place in the overall model, or to clarify if they belong in the model at all. In regard to their lack of prominence in the network models, these findings were unexpected:

1. **Sex Differences:** Firstly, the occurrence of sex differences as a factor in a large number of studies, along with the lack of attention in the research given solely to this factor. This lack of attention has also been noted in the medical literature (Merone et al., 2022), and suggests there may be a need for more research specifically into the ‘why’ and ‘how’ sex differences influence couple relationship well-being. This area of research might have been obfuscated due to the split nature of sex differences, which may either be biologically or culturally informed. In this study, biological sex differences were categorised under ‘biology’, while gender differences were categorised under contextual factors (cultural and societal norms). However, the literature has only recently begun to terminologically separate out sex differences (biological) and gender differences (societally normed) (Reckelhoff, 2023), meaning that these were potentially combined under the one term in the network models. Given the prominence of sex differences in the research, and along with other researchers’ recommendations (Copping & Richardson, 2019; Gaines, 2016; McNulty, 2013), more comprehensive research into the networked impact of biological sex differences, and gender differences (including gender identity), on relationship actions and interactions is recommended.
2. **Developmental Factors:** Secondly, although developmental factors showed up in a large number of studies these were generally studies published in journals outside of the specific scope of adult couple relationship outcomes (other than attachment). This suggests there may be a need for better integration of developmental theory into relationship science. This could potentially lead to improved understanding of the way in which developmental factors, other than attachment, influence couple relationship well-being. This understanding could, in turn, influence treatment conceptualisation. For example, diet has been linked to adult relationship outcomes via its influence

on personality development. Recent evidence indicates that the “development of gut microbiome from gestation, through birth, during childhood, adulthood and into old age is associated with temperament, personality and psychological well-being, including sexual differentiation in psychological function during puberty, and vulnerability to developmental, psychiatric and neurological disorders” (Sumich et al., 2022, p. 1). As the effects of diet (and gut microbiome-brain interactions) are developmentally apparent throughout the lifespan, these might be factors influencing a couple’s current relationship difficulties. Therefore, in addition to parenting factors, many other alternate types of developmental factors (such as diet) are worthy of further investigation.

3. **Sexual Behaviour:** Thirdly, sexual behaviour and affection seem potentially under-represented in the relationship research literature given that in recent research surveys couples ranked sexual satisfaction as having high importance to their relationship well-being outcomes (e.g., Eldridge et al., 2022; Heywood et al., 2018; James J. Kim et al., 2020; McNulty et al., 2016; Peloquin et al., 2022; Schoenfeld et al., 2017; Tong et al., 2022; Yoo et al., 2014). The fact that sexual behaviour was only ranked as the 16th most occurring factor in the literature despite its perceived importance to couples indicates a possible gap in the research, as also noted by Kleinplatz et al. (2022), that could be addressed in future studies.
4. **Violence:** Fourthly, violence in relationships was notably sidelined in the network models (meaning it was somewhat disconnected from the broader field of relationship science research), although in the whole Endnote library it was the 29th most noted factor. Physical, sexual, and emotional violence represent a unique relationship dysfunction commonly recognised as illegal (e.g., New Zealand Police, 2023), and therefore somewhat problematic for therapists to treat and for researchers to investigate. Nonetheless, given that intimate partner violence is widespread (World Health Organization, 2023), with Smith et al. (2017)’s national USA survey showing 37% of women and 30% of men experience it in their lifetime, this is an important area of research which needs to be better understood.
5. **Cultural and Contextual Factors:** Fifthly, cultural and contextual factors seemed under-researched. Culture plays a role in shaping dyadic coping

(Falconier & Kuhn, 2019; Hilpert et al., 2016), emotion disclosure (Han et al., 2022), communication patterns (e.g., Ge et al., 2022; Halford et al., 2018), role expectations (Allen et al., 2020; Proudfoot & Kay, 2022), and relationship satisfaction (Dobrowolska et al., 2020). Sociodemographic factors, socioeconomic status and financial strain are also important predictors of couple relationship well-being outcomes (Falconier & Jackson, 2020; Reyes et al., 2020; Williamson & Lavner, 2020). Additionally, shared religion and values may influence couple relationship outcomes (Cassepp-Borges, 2021; Perry, 2015; Skellern et al., 2022; Wright et al., 2017), and the enduring legacy of socioeconomic inequity and the historical trauma of indigenous colonisation stressors may also impact modern-day relationship well-being (Dulin et al., 2011). These systemic disparities not only perpetuate inequalities in access to resources, education, and other opportunities that can impact upon couple relationship well-being outcomes, but they may also generate emotional and psychological burdens that can strain relationships, leading to challenges in communication, trust, and overall emotional health. The fact that these factors were rarely addressed indicates an opportunity in the research.

Other noted gaps in the research corpus include: the lack of delineation in the stress literature regarding stressors and the experience of stress in research studies and the continued confusion among researchers regarding the differentiation between personality traits, personality disorders, and mental health, particularly regarding aetiology and origins.

An area of relationship science research which was potentially under-examined specifically in this study is that of the initiation of relationships, including initial attraction and relationship formation. This was due to the focus of this study being primarily on already established couples, and time constraints involved in adding in this area. However, initial attraction and relationship formation factors also play a role in established couple outcomes, along with current attraction (Mark & Herbenick, 2014), and this presents an under-developed aspect of this current study where the factors of initial attraction and ongoing attraction are positioned under perceptions and emotions in the model, and the relationship history factor is positioned under historic contextual factors, especially stressors. Another area under-examined in this study, which is also reflected in the lack of focus in the research corpus, is love. Love is an important and commonly used lay conceptualisation that researchers have struggled to clearly define (Sasaki et al.,

2023). Future research into this area might benefit the model.

1.3 Intriguing Findings in the Research

In this study certain factors within the top ten categories stood out as having considerable influence on couple relationships. These factors were often researched together in the literature, as noted in the network models, and are also noted in the literature review as having significant correlations that determine relationship well-being outcomes. These were arranged into three groups according to their highlighted connections in the literature review:

- **Group One** includes: secure attachment, agreeableness, conscientiousness, emotion regulation, positivity, stable and resourced environment.
- **Group Two** includes: ACEs, oxytocin, amygdala, prefrontal cortex, hippocampus, female sex, anxious attachment, belongingness needs, neuroticism/emotional instability, negativity, depression, defensiveness, demand communication, conflict escalation.
- **Group Three** includes: ACEs, amygdala, prefrontal cortex, hippocampus, male sex, avoidant attachment, autonomy needs, ADHD, antagonism, narcissism, distrust/suspicion, blame-shifting, defensiveness, withdrawal communication.

1.3.1 Group One

In the academic literature, secure attachment and an agreeable and conscientious personality have been associated with multiple positive outcomes including higher levels of emotion regulation and positivity, lower levels of anxiety and depression, and better social functioning. Secure attachment, and agreeable and conscientious personality traits reflect the tendency to be warm, kind, grateful, considerate, responsive, responsible, supportive, and cooperative with one's partner, making positive relationship well-being outcomes more likely.

1.3.2 Group Two

The literature also indicates that different early stressful experiences, including social and environmental stress, and an inconsistent, anxious, unavailable, or intrusive parenting style impact upon the developing neuroendocrinological system to produce alterations in brain structure. These changes are potentially influenced by and/or influence anxious attachment, neurotic personality traits, or personality disorders, leading to a physiological and psychological hyper-activation when stressed. Associated with this hyper-activation are relationship behaviours that may undermine well-being outcomes, such as demanding communication and escalated conflict.

1.3.3 Group Three

Also noted in the literature are the associations between early social and environmental stress, (especially when chronic), and emotionally distant, disregarding, and hostile parenting style, and unique variations in brain structure and activity. These neurological variations are potentially influenced by and/or influence avoidant attachment, antagonistic personality traits, and personality disorders, leading to a hypo-active self-preservation style when stressed. This might be evidenced in the use of blame-shifting, and defensive or shut-down communication, resulting in reduction in relationship well-being.

1.3.4 Future Investigations into the Three Groups

Future investigations into similar under-pinning latent traits in the three groups could help to clarify more effective processes for helping couples to improve their relationship well-being outcomes. It could be that these three groups have under-pinning latent traits that can be used to predict couple relationship quality. Polek et al. (2018)'s investigation of the factor structure of measures of personality traits found that high scores in negative emotionality, antisocial, schizotypal, impulsivity, narcissism, and callousness traits are underpinned by a latent trait that also indexes poor-quality social functioning. While these three groups are generalised and therefore caution is needed to avoid biased norming of their characteristics, they are worthy of further investigation. By gaining a deeper understanding of these factor groupings, and how they originate, we can develop targeted therapeutic interventions, provide advice on navigating unchangeable characteristics, and guide individuals towards strategies for positive change. Thus, further research into these

groupings holds promise for advancing our knowledge in this area. As Bornstein (2019, p. 360) note regarding recent work on the Hierarchical Taxonomy of Psychopathology (HiTOP), “studies of factor structure and construct covariation must be complemented by investigations that address three issues”: (a) Are there identifiable causal links between factors in each grouping?; (b) Do salient life events, therapeutic interventions, and experimental manipulations differentially affect these groups of factors; and (c) Do the factor groupings predict different outcomes in laboratory, clinical, and field settings?

2. Strengths of this Study

This study investigated a broad corpus of empirical research literature to provide ample evidence of the most studied factors influencing couple relationship well-being.

2.1 Diversity, Size, and Integration of the Research Dataset

This study viewed the factors that contribute to couple relationship well-being from many angles – from diverse cultural perspectives and from multiple academic discipline perspectives. In their review of the current state of the science of psychology Borghi and Fini (2019) wrote: “we dream of a psychology focusing on theoretically solid, explanation-based accounts, and on the identification of key principles rather than on fashionable effects. Second, we dream of a psychology open to diversity – characterised by an interdisciplinary approach” (p. 3). This study included methodologically diverse research that comprised of randomised controlled trials (RCTs), pragmatic trials, longitudinal studies, meta-analyses, systematic and scoping reviews, and a handful of qualitative studies. The fact that the research findings of hundreds of researchers (N=2,523) from numerous academic journals were drawn on to create the final model means that individual bias is likely to be diminished. The study also includes a broad diversity of researcher collectives, institutions, academic schools, and geographical locations, again adding robustness to the findings (Vazire & Holcombe, 2021). Diversity in research creates credibility as researcher partiality is countered, and different errors in methodology or result interpretation can be diminished (Vazire & Holcombe, 2021), helping the research community as a whole to become collectively more objective (Rapport & Zurynski, 2022).

The scientific field of psychology in general has been criticised for lacking unifying underlying agreed upon core constructs (Zagaria et al., 2020), and for its lack of theoretical clarity in its therapeutic endeavours (Goldfried, 2019; Melchert, 2016). As Goldfried (2019) notes – the absence of a common language across fields is also an impediment to obtaining consensus about their core constructs. As the field of relationship science expands and diversifies, communication among researchers about factor meanings becomes increasingly important. By creating a relationship science dictionary-codebook and thesaurus, this study contributes an advancement to the field regarding the ease of this communication. This study endeavoured to integrate language use regarding these core factors, across academic fields – at least in a first draft rough form – and this can potentially be a step forward in the field of relationship science knowledge accumulation (Spike, 2008), helping to improve communication between and within academic disciplines, thereby empowering the collaboration of research efforts, and facilitating more effective transfer of information from academia to lay-use.

2.2 Accessible and Useable Final Model

The aim of developing a model of the factors contributing to couple relationship well-being was to provide socially useful knowledge primarily designed to help therapists better target their treatment of couple distress and empower couples to have confidence in evidence-based understanding of important relationship factors influencing their outcomes. The final model provides an easily accessible summary of these diverse and highly replicated research findings, fulfilling Glaser (1992)'s stipulation that models must explain factors analytically and effectively, and have relevance.

Due to the complex and diverse nature of the factors under investigation, synthesising relationship research presents significant challenges. However, this study serves as a starting point for reducing the complexity by providing a thorough understanding of the prominent factors studied in the relevant research corpus. This knowledge may now aid counselling and teaching psychologists, therapists and social workers in fulfilling their discipline's core competency briefs, which often include demonstration of a knowledge of the history, theory and research literature in their area of practice (e.g., New Zealand Psychologists Board, 2018), and understanding of evidence-based therapeutic practice (COAMFTE, 2021; Council on Social Work Education, 2015; Marlowe et al., 2020).

By drawing on the findings of thousands of research studies, this study offers a solid overview of the researched factors and can inform the formulation of solutions that pragmatically address presenting problems. As Booth et al. (2012) note, “by and large the best evidence for many decisions comes from a systematic review of all the evidence” (p. 11). This thesis provides a comprehensive overview of an extremely large body of evidence relevant to couple relationship science research from the last ten decades. Therapists can have confidence that if they are considering the top ten factors in their case conceptualisation, they are also considering the ten most researched factors in the relevant published literature. Each of these factors has a deep and historically proven theoretical rationale for integration into assessment and therapy strategies, and the model provides a simple visual prompt for reflecting on these.

2.3 Uniqueness of the Method

This study employed unique methods for finding and making sense of the data. The Endnote data management groups system, and the analytical capacity of VOSviewer software (van Eck & Waltman, 2014), were utilised as tools in this study process. Computational network modelling illustrated each factor’s reliability over time, and over repeated use, by highlighting those repeatedly researched, and therefore having ongoing relevance to researchers. The network models illustrated the strong and verified connections between the factors without prejudice for how they are directionally connected, showing the factors that are constitutive of couple relationship well-being (both positive and negative) and helping to identify both expected and unexpected connections between factors. This allowed a fresh perspective on the overall theoretical underpinnings of the field of relationship science. While the network modelling was not a method for confirming hypotheses regarding these patterns, it was a useful tool for illustrating how the researchers themselves have focused their attentions. To understand the causal mechanisms underlying each factor’s prominence and co-occurrences required careful attention to the literature to understand how researchers had theorised these. Another novel method approach –Multi-Grounded Theory (MGT) was used to categorise and model research text (rather than interview text). At the time of carrying out this study this was a novel method for discerning the factors found in a large corpus of research and developing a model presents a useful process that could be replicated in future studies.

3. Limitations

This corroboration of relationship science research findings was intended to alleviate doubt sufficiently for therapists, couples, and other stakeholders to confidently act upon it, while recognising that doubt is never truly eliminated as our knowledge of the world will never be complete (Pihlstrom, 2015). There will always be noteworthy limitations in a study such as this given that human knowledge and research methods are themselves limited. This is a reminder that the findings of this study should be interpreted with caution. While the study offers valuable contributions to the literature, there are a few limitations that should be considered.

3.1 Inclusivity: Data Collection Limitations

This study overviewed peer reviewed research that has contributed to the development of current scientific knowledge in this field which should theoretically be the straightest path to the end goal of answering the research question. Cordelia Fine (2020) writes (online), “It takes a diverse village, so to speak, to nurture scientific objectivity.” In this study a very large and ‘diverse village’ was drawn upon in investigating the findings from thousands of researchers’ work and this aided in increasing the impartiality of the investigation. While the collection of literature was extensive in this study, there will nonetheless be articles missed due to lack of capacity to gather a complete and definitive collection, and additionally articles unnecessarily gathered due to personal interpretation. While this presents a limitation, it was attempted to offset this in part by using an extremely large literature sample. Additionally, the selection of factors was limited to those that have already been identified in published literature, potentially overlooking important but less explored factors that may also influence couple relationship well-being. Due to the large size of the corpus of research literature used, a high degree of theoretical sampling with a more than sufficient density of factors was possible (Whiteside et al., 2012), meaning that the final explanatory model of these factors should represent knowledge that is widely representative of the field, and practically ‘works’, having empirical validity through its accordance with empirical observations of the world found in thousands of peer reviewed research studies.

3.2 Rigour: Body of Evidence Limitations

It is important to note that the factors included in this study were extracted from studies of varying methodological quality and sample sizes, and the findings reflect

each factor's occurrence in the literature, highlighting researchers' prioritisation of the factors, rather than the factors' inherent value to couple relationship well-being. Due to the vast volume of research publications used in this study it was not feasible to individually assess each study's research rigour, so this study relied on their peer-reviewed status to ensure the reliability and validity of the research included. The effectiveness of peer review has been called into question in recent years due to the reproducibility crisis in psychological science (Alister et al., 2021; Baker, 2016). While journal-based peer-review has been used to catch errors or flaws in methodology and interpretation of study results, this has been shown to lack adequate efficacy (Schroter et al., 2008; Suls & Martin, 2009). Peer-review is itself prone to human error and unavoidable bias (Marcoci et al., 2022)⁷². Given the extremely large data set used in this study some of these limitations may be mitigated, but it is important to note that the findings presented will not be completely free of bias or errors.

Another limitation is that the size of this study limited the ability to critically review the thousands of studies in any depth, or critically review the networked correlations between factors. Consequently, this study provides an overview of the noteworthy connections between factors but does not look in depth into contrary research findings. Unfortunately, given the time constraints, this presents a limitation regarding the final model that deserves further research attention in the future.

Article titles and abstracts may not capture all the factors researched in a study, which could lead to the omission or misrepresentation of factors. While efforts were made to select, understand, and merge factors into the dictionary-codebook, there is a possibility of human error in these selections. Additionally, merging common meaning terms was complex and time constraints limited the thoroughness of this process, which could potentially be a long-term project. The network models were also subject to variance depending on the selection and merging of factors, potentially resulting in missing or misrepresented factors.

Due to using network modelling which focused on the numerical count of research factors over the lengthy history of relationship research, more recent and emerging

⁷² *An exciting future prospect that this study alludes to is that the peer review process could be helped through automation of reference checking as well as statistical review in the future.*

factors that have not yet received much research attention may be missed. The use of enumerative induction to condense the most prominently researched factors into categories may have oversimplified or obscured the complexity of the factors and their inter-connections in real life relationships.

Knowledge discerned from repeated experimentation increases the probability of that knowledge's reusability (Miller et al., 1996). This study drew from a research base spanning several decades and, in this sense, offered a longitudinal view of the longevity of different theories. Longevity allows theories time to be scrutinised and confirmed or disconfirmed. When a theory has been confirmed repeatedly over time and in varying contexts it becomes increasingly dependable. While theories may endure over time, they may also be communicated and represented in diverse ways by researchers. By breaking the research findings down into factors, the simple composite parts of theories could be comprehended. The dictionary-codebook creation ensured that the resulting findings provided conceptual coherency and congruence regarding these composite parts (factors) (Goldkuhl & Cronholm, 2018), allowing the bibliometric network models to also have conceptual coherency and congruence with the literature. The final categories were comprehensive but may need to be regrouped and redefined in the future as new rationales become apparent regarding their familial connections, or their position in the model.

3.3 Transparency: Personal Bias Limitations

Another limitation of the study is the potential for my own researcher bias. Pragmatism recognises that "knowledge is both constructed and based on the reality of the world we experience and live in" (Leavy, 2017, p. 169). As Hall and Roussell (2016, p. 340) note, explanatory models "are produced, invented, and emerge through the evolution of our work" and depend "not only on the facts and evidence that can be observed, but also on the ingenuity of the creator in putting the facts in logical order". There are moments of subjective reflection that influence the data gathering and analysis process in any research work including quantitative network modelling (Donthu et al., 2021; Pillow, 2003). One way to lend accountability to this subjectivity is to clarify areas of personal experience and character that may have influenced decision-making processes throughout the study.

When embarking on this study, certain ‘sensitising notions’ (Bowen, 2006) potentially shaped the direction of factor analysis. These included assumptions about the role of attachment and early life experiences, personality, contextual stressors and influences, and biological factors, in shaping relationship well-being, as well as a belief that relationship well-being would involve biopsychosocial systems including embodied processes and contexts beyond the individual, and predisposing, precipitating, and perpetuating factors. While these are well-established concepts in family science research (e.g., R. Chen et al., 2017; Fiese et al., 2019), my own background in clinical psychology, my previous research on therapy efficacy and effectiveness, and my experience in counselling couples, influenced my paradigm to be biased towards the scientist-practitioner model, and therefore potentially biased to pay attention to some factors over others.

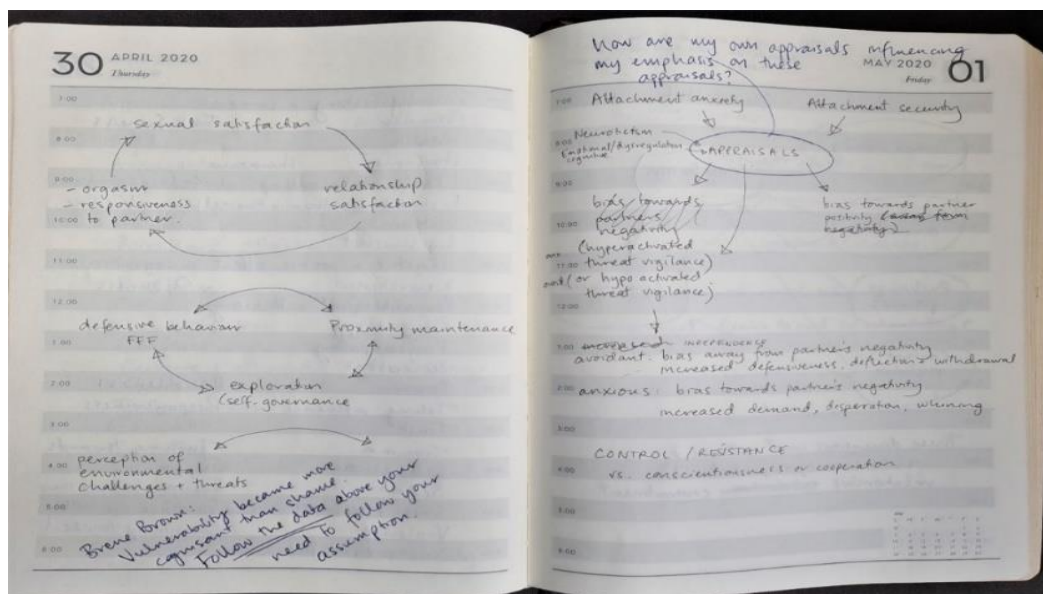
The scientist-practitioner model encourages therapists to incorporate empirical research into their therapeutic practice, while at the same time encouraging therapeutic experience to inform empirical research (Mellott, 2007). There are many criticisms of this model, particularly around the theme of therapists also being scientists and vice versa (e.g., Corrie & Lane, 2009; Malott). My personal bias is congruent with the notion that the scientist-practitioner model offers “an important framework for theory building” by using a systematic approach to enquiry (Corrie, 2009, p. 62). Not all counselling traditions value this stance (Jensen-Doss & Hawley, 2010; Milgram et al., 2022), and indeed they may have valid arguments for avoiding assessment prior to undertaking therapy as noted in the medical world (Greenhalgh et al., 2015).

These sensitising notions potentially lead to research biases in the selection of publications and the interpretation of factors and their mechanisms. However, the rigorous inclusion of publications on the basis of their relevance to the question helped to reduce selection bias (Booth, 2012). Another way to balance and pragmatically ground my own biases was to invite the perspective of others. My supervisors reviewed my research process and findings. In addition, I was fortunate to have the input of external reviewers for my research proposal presentation and for my first article published in the *Journal of Social and Personal Relationships*, which caused me to reflect on the emphases allocated to my conceptualising. Communicating with other researchers and including my supervisors in the coding process helped reduce the risk of individual bias. However, this research could be improved by incorporating multiple coders to facilitate the identification and

explication of the factors contained within each text, and to critique the inclusion of publications. Inter-coder reliability and intra-coder reliability take intense collaborative effort (Neuendorf, 2016), and this could not be fully realised within the scope of this thesis. Furthermore, the dictionary-codebook of factor definitions could be augmented and reviewed by experts in the field to promote a common consensus of meaning prior to implementation of the dictionary-codebook and the accompanying thesaurus in future research endeavours (Krippendorff, 2018).

Emergent factors and relationships between factors were traced and a progressive record was kept in a journal. This aided in the process of abstraction, analysis, and interpretation of the data (Timonen et al., 2018) and in reflecting on the process. An example of a journal page is added below in Figure 71.

Figure 71 *Journal Content Example*



Notes were also taken and logged into a Word document in an attempt at epistemological reflexivity. However, given the purview of the material being read, this document eventually grew to more than a million words long. Hence it needs to be acknowledged that for one individual to grapple with the volume of concepts and theories therein, and retain these cognitively without bias, is not humanly practicable. This circumstance flags the exciting opportunity of utilising artificial intelligence for this process in the future, and indeed an aspect of this kind of automated computational approach is used in this study.

While subjectivity is found in every qualitative study, the founder of MGT writes that, in generating data, researchers should “arrange situations that produce data that are as authentic indications as possible of the everyday life reality that they study” (Goldkuhl, 2019) p. 28. Using the research findings from thousands of quantitatively researched studies meant the data used was substantially less likely to be influenced by personal bias. While there are limitations, in accord with MGT’s perspective regarding the validation of knowledge, the findings of this study have: 1. Theoretical validity through their “accordance with other theoretical abstractions” (Goldkuhl & Cronholm, 2010, p. 197); 2. Empirical validity through their accordance with the experimental findings of thousands of peer reviewed research studies; and 3. Internal validity through the final model’s “coherent way of talking about the world” (Goldkuhl & Cronholm, 2010, p. 197).

Internal grounding also occurred through the diagramming phase of MGT – where the inter-relationships between factors were illustrated and examined visually to check that they lined up with existing theories and would pragmatically ‘work’ in real life. This activity helped to evaluate the knowledge cohesion of the final model and ensured that the final model exhibited internal conceptual coherency and congruence. Prolonged engagement in the research literature, and with other researchers’ theoretical interpretations allowed a logical triangulation of researchers’ fine-tuned observations (Lincoln & Guba, 1985; Patton, 1999), helping to keep bias in check. The final model was thus grounded in the empirical data, pre-existing theories, expert conceptualisations, and in the explicit congruence within the model itself (Goldkuhl & Lind, 2010), helping to reduce the significance of some of these limitations.

3.3.1 Other Researcher Bias Limitations

The results of this study are not only limited by my own biases, but also by the biases of all the relationship science researchers who have gone before whose work informs this study, and also by the research contextual bias of place and era in which the research occurred. Researchers chose their topics for reasons that are situated in their own interests, their own insights and experiences (R. Chen et al., 2017), building on the research and research methodology that has gone before them, and also within the context of a unique cultural epoch. There are infinite ways researchers can conceptualise the factors used in this study, but research builds upon research and therefore these conceptualisations have been limited by the

paths that the original researchers set off down, and the turns they took along the way in response to their study results (Fanelli et al., 2017).

While many of the theories cited in this study have received extensive affirmation through credible and repeated research, their authors' research paths have been influenced by their philosophical, historical, anthropological, and social surroundings, which may result in contextual preconceptions. Relationship Science has not emerged "*ex nihilo*", but builds upon a fertile field of inquiry" (Carre & Archer, 2018, p. 5). Additionally, the more well-known an expert becomes in a field, the more likely their work is to be cited, regardless of its robustness (Duyx et al., 2017; Greenberg, 2009). Dominant groups of researchers can strongly influence the legitimising of information within the couple relationship science community, leading Nakagawa et al. (2019) to state that "it is no longer sensible to produce reviews that ignore the collaborative networks that generate scientific information" (p. 230).

The last century has seen significant social, philosophical, and intellectual changes and research is produced within this intellectual culture. Positivism and empiricism have influenced the advancement of relationship science, and positivist methodologies tend to avoid consideration of the contextual biases brought to research (Creath, 2014). Randall and Curran (2023) recently expounded upon the influence of researchers' bias in their editorial synthesis which considered "from whose vantage point is research being conducted?" The authors concluded that relationship science studies are based on limited samples of the worldwide population and use predominantly quantitative, cross-sectional, self-report, and survey methods, meaning that author and method bias limit the overall sample of publications used in this study. Additionally, there was recognition in Randall and Curran (2023)'s study of researchers' preference for a bioevolutionary theoretical underpinning in their research which also typically lacked consideration of societal and cultural contextual factors.

This thesis relied heavily on research which was carried out in predominantly western, first world societies, as this is where the majority of social research currently originates from (Thalmayer et al., 2020). The largest bulk of the research findings are from the United States of America where a predominantly Judeo-Christian perspective dominates, and therefore potentially influences underlying social expectations regarding couple relationships. The birth of the relationship science movement was largely influenced by family therapy researchers from

England and the USA (Whisker, 2017). As the research has formed cumulatively across the decades it has inevitably been biased by its heteronormative and gender normative starting place, and additionally by its positivistic research paradigm. As such, the methodology employed in this study may obscure the real-world diversity of relationships and their varying eco-systems. Cultural context and epoch influence the way authors have carried out their studies and the factors that they have investigated. As a way of understanding how these influences may have biased this study, a historical review of the research literature and of the field of relationship science was carried out (Appendix 14).

The majority of journals are based in the United States of America, and those from other nations are predominantly based in western, educated, industrialized, rich, and democratic (WEIRD) nations, which comprise only about 12% of the world's population (Henrich et al., 2010). Approaching research from a "WEIRD" paradigm can bias the methodology used, as well as the results garnered, given that the populations being studied represent a particular cultural viewpoint. A recent systematic literature review investigating the samples used in the study of intimate relationships (N=771 studies) revealed that the typical study participant was white, American, middle class, and college educated (Williamson et al., 2021). Floyd et al. (2022)'s review of 86 studies of relational affection exchange (participants N=26,013) showed comparable results. To help rectify this bias, research from varying cultures and ethnicities was included in this study showing promising indications of the universality and generalisability of the findings. Nonetheless, there is a long way to go for relationship science to be considered internationally representative.

Women are under-represented in research authorship in this study. While a recent study showed that women are approaching gender parity in psychological research contribution (46.4% of APA authorships (Gonzalez-Alvarez & Sos-Pena, 2020)), the historic record remains skewed in favour of male researchers (Odic & Wojcik, 2020), as was also evidenced in Brown and Goh (2016)'s examination of authorship of the 'Journal of Personality and Social Psychology'. Additionally, despite the majority of faculty staff in Marriage and Family Therapy being women, men are 1.4 times more likely to be full professors (Edwards et al., 2022). Many of the studies in this collation note sex differences in men and women's approaches to relationship processes. Therefore, we can also expect that there will be differences in the way men and women approach researching relationship processes. This may have

created a gender bias in the literature.

Galovan, Orbuch, et al. (2022)'s recent romantic relationships literature review noted the lack of methodological variety beyond self-report in the longitudinal research base. Self-reports of a person's behaviour, thoughts, and feelings have been shown to present an initial elevation bias (Anvari et al., 2022) – in other words they are reported as being more intense in initial self-reports – creating a bias in longitudinal results (Shrout et al., 2018). Although this bias has been questioned as negligible (Cerino et al., 2022), this limitation highlights a need for the relationship science field to increase utilisation of additional methodologies including observational, physiological, neuroimaging, and content analysis (including analysis of spoken language and body language).

3.4 Accessibility: Simplification Limitations

Synthesising the factors (the basic components of the research findings) into an explanatory model provided a clear and meaningful structure for interpreting and presenting the findings, making them accessible to those in need of this knowledge. Knowledge is power (Maxwell, 2012) that has inherent value in improving people's lives (Haigh et al., 2019). Elucidating the generative factors of couple relationship well-being is intended to empower couples to produce positive outcomes in their relationships and empower therapists to help them do so. In creating the final model, as Glaser (1992) states, it must work and have relevance, and it must explain the factors analytically and effectively. Ultimately, this study's validity and effectiveness is determined by the model's usefulness and relevance in empowering people to explain, predict, and manage couple relationship well-being (Grant & Giddings, 2002), thereby enabling them to improve that well-being. It is hoped that further research will determine the model's usefulness.

Despite the limitations, the final model does not aim to provide an absolute solution, but rather a discourse that can minimise uncertainties about what contributes to and maintains couple relationship well-being. In the words of the Alfred Korzybski: "A map is not the territory" (1933, p 58). The reality of the model is much more complex and intricate. The model illuminates the factors that researchers have considered as 'acceptable truth' (Reichert, 2004; Rorty, 1991) while acknowledging that truth is always dependent on a particular objective (Barton, 1907), and therefore never completely comprehended.

4. Looking Forward

4.1 Translating the Findings to Practice

This study reviewed, synthesised, and summarised the findings from the extensive relationship science research, making it more accessible to those who need it to ensure they are following best practices. As such, this study has important clinical implications. According to the Centre for Reviews and Dissemination (Centre for Reviews and Dissemination, 2009, p. v.) it is important for practitioners and decision-makers to base their decisions on the latest research and best practices. The factors found and analysed in this study represent those most researched and validated over the last several decades, and into the 2020's, succinctly summarising the literature so that couples and couple therapists can confidently act upon this knowledge. Considering the importance of couple relationship quality to human well-being, enhancing our effectiveness in improving couple relationship quality is an important public service.

4.1.1 *Creating Case Conceptualisations in Couple Therapy*

Given the noted detriments of low-quality couple relationships, and of relationship break-down (Sbarra et al., 2019), and divorce (Mercadante et al., 2014), those couples who are seeking support from a therapist are best served when that support is matched with their needs. The tree model provides useful information for creating effective therapeutic conceptualisations. Current couple therapy models are typically built upon such conceptualisation (whether overtly or covertly). For example, EFT (Emotionally Focused Therapy) has a clear therapeutic framework (de-escalation, restructuring interactions, consolidation) for addressing attachment insecurities and is effective at improving couple relationship satisfaction (Spengler et al., 2022) through addressing a couple's current day attachment (accessibility, responsiveness, engagement) behaviours and subsequent emotions (Wiebe & Johnson, 2016). EFT conceptualisations are therefore focused on determining attachment insecurities in order to focus on and resolve these in therapy. However, as also noted by Zilberstein (2014), not all relationship difficulties spring from attachment difficulties, or are resolved through tending to them, and therefore, to only address couple relationship break-down from this lens may result in ineffective therapy for those couples who are presenting with non-attachment related issues, or issues where increasing secure attachment between partners is not possible simply through talk-therapy alone due to other extraneous circumstances.

The underlying theory of attachment is broadly about homeostasis of the human biological fear system, with evolutionary underpinnings in the primal urge for survival. Bringing biological factors, including genetic and developmentally induced neurological and endocrinal adaptations, and contextual factors (both historical and current), into case conceptualisation enlarges a therapist's perspective regarding treatment options. Addressing potential biological imbalances may also be a useful component of effective therapeutic interventions (e.g., Carrico et al., 2022; Hillerer et al., 2019; Karl et al., 2021; Kranz et al., 2021; Rehbein et al., 2021). By adopting a comprehensive approach, as indicated in the tree model, therapists may be better informed in providing their clients with the conceptualisation needed to foster effective therapeutic process.

One future focus of therapist support could be providing accurate and effective assessment of the quality of the couple relationship using the tree model. For some couples, simply gauging whether they are in a severely distressed relationship is difficult (Hawkins, Galovan, et al., 2017). It would be helpful for these couples to know what detrimental relationship factors present in their relationship are changeable or not (through the therapies and interventions currently on offer), what the likelihood of them changing is, and what their best options moving forward might therefore be. While it might be impossible for any therapy modality to meet the diverse requirements of couples in distress, refining assessment processes and aligning therapy offerings with the specific problems apparent through assessment, could help individualise treatment. Researchers have made significant inroads towards discerning the necessary factors of satisfying relationships, but there is an obvious need to bridge the gap between the 'what' identified in academic research and the 'how' which couple therapy attempts to convey. As John Gottman states it is "really important for clinicians to understand what they are doing, why they are doing it, and where they are going" (Young, 2016, p. 223).

4.1.2 Holistic Personalised Targeted Treatment

There are an overwhelming number of individual factors to consider when treating couples in distress. They arrive in therapy with different personalities, attachment styles, histories, contextual stressors and supports, mental health factors, addictions, motivations, perceptions, abilities, and readiness to change. All these factors are dyadically influential. Researchers have been carefully investigating these factors and our knowledge base regarding how they impact upon therapy

processes and outcomes continues to grow, giving us access to new ways of considering how couples can be helped. As Stanley et al. (2019, p. 1) advise, best practice “lies in making thoughtful decisions based on current knowledge, the goals of the effort, the population served, and available resources”. Taking a holistic view of couples as they enter treatment is vital moving forward (Davis et al., 2012).

Well-trained researchers can predict which couples are in trouble to a high degree of accuracy by observing their behaviours, and recording their physiological reactions, and emotional responses during conflict (Levenson & Gottman, 1985; Otero et al., 2019). However, our attempts to change these behaviours, reactions and responses have produced positive change in little more than half the couples attending the most effective therapies (Bradbury & Bodenmann, 2020), and there appears to be a vast gulf between the outcomes produced by different therapists. Relationship therapists have struggled with mis-conceptualisation of couples’ presenting problems and as of this study, there are no apparent case formulation models addressing this specific field of therapy. This study is an attempt at clarifying the ‘what’ to make the ‘how’ more apparent.

Personal biology, attachment, personality, and stressors underlie relationship relevant emotions, perceptions, and behaviours that may need adjustment so that partners can show adequate and appropriate responsiveness to their partners’ needs. The findings suggest that when planning treatment strategies, couple therapists should specifically assess attachment insecurities, neurotic personality traits, personality disorders (especially those in the ‘dark triad’), and emotion regulation inadequacies. Elevated levels of avoidant attachment, antagonism, emotion instability, and narcissism may indicate relationship perceptions, emotions, self-regulation, and communication or conflict behaviours that require strategic intervention. High levels of attachment avoidance, antagonism, and narcissism can also alert therapists that these clients may be resistant to treatment or change attempts (e.g., Dalgleish, Johnson, Burgess Moser, Wiebe, et al., 2015; Jayamaha et al., 2016; Sleep et al., 2021), and require special consideration regarding treatment implementation.

4.1.3 Targeted Therapist Training

The field of couple therapy has been recognised as a distinct area of specialisation within the larger field of psychotherapy. However, despite this recognition, there is a

general lack of comprehensive university level education specifically tailored to couple therapy. As a result, therapists may not be adequately equipped to address the unique issues and challenges that arise in the context of couple relationships. It is hoped that by clarifying the most researched factors contributing to couple relationship well-being, this might aid educators in developing more comprehensive courses of study, and guide therapists to consider the diversity of factors couples may be influenced by, and how they might assess and attend to these. While more research is needed to solidify an over-arching theoretical framework, it is also hoped that the findings in this study provide inspiration for continued work by researchers to create this theoretical framework.

Another way couples could be supported is through training therapists in suitable methods for helping people to process relationship dissolution in as constructive a manner as possible. Whether couples divorce or not, helping couples to improve the quality of their relationships is a significantly positive endeavour in terms of improving overall personal well-being. With 35-40% of couples unhappy in their relationship at any given time (Hawkins, Galovan, et al., 2017; Margelisch et al., 2017) and relationship quality outcomes having far-reaching impacts across other important life domains (e.g., household finances: Brown & Gray, 2016; health: Garris & Weber, 2018; housing: Mikolai & Kulu, 2018; and workplace creativity and productivity: Tang et al., 2017), it seems critically important that we enlarge our understanding regarding the factors contributing to, and maintaining, couple relationship well-being, to more effectively help those who wish to stay in their relationship, and to empower those who separate with accurate information about their difficult decision.

4.1.4 Targeting Malleable Traits

The development of human emotion, perceptions, and behaviours are relatively complete by adulthood, yet multiple studies have affirmed the ability of adults to change and grow even into old age (Collins et al., 2020). While personality has shown stability across the lifespan (Donnellan & Robins, 2009; Roberts et al., 2008; Soto & John, 2012; Soto et al., 2011) some variation is common (Asselmann & Specht, 2021; Larsen & Buss, 2017; Ormel et al., 2017; Specht et al., 2012; Specht et al., 2011; Specht et al., 2014). Traits may be stable, but they are not unmalleable (J. Wagner et al., 2020). For example, Mueller et al. (2021)'s study showed that neurotic partners coupled with positive partners exhibited reduced neuroticism over

time, Schumann et al. (2014)'s study showed that a growth mindset about empathy could alter subsequent empathetic effort, and Hudson and Fraley (2015)'s 16 week long studies showed that "people may be able to volitionally change their personality traits" (p. 504). So, while personality traits are robust predictors of important life outcomes they also appear to be amenable to intervention (Roberts et al., 2017, p. 132).

Attachment style also has potential for change, for example, Bayraktaroglu et al. (2022)'s study showed that the avoidantly attached could become more secure as a result of experiencing regular positive relationship events, and 'attachment priming' (activating internal representations of attachment figures) has been shown to improve self-regulation and increase inter-personal responsiveness (Gillath et al., 2022; Mikulincer et al., 2014). Similarly, neurological developments are relatively fixed by adulthood and adverse childhoods can create lasting effects on this development, but studies are showing that the brain is sufficiently plastic to "re-enter a more plastic state where such effects can be mitigated" (Karatsoreos & McEwen, 2013, p. 337). Habitual behaviours learnt in childhood can also change. In the Minnesota study of child development and adaptation (Egeland, 1991; Egeland et al., 1988) adult abusive behaviours were shown to be changeable via therapy and new experiences with supportive partners. Other studies have found that social support can interrupt the cycle of abuse, along with financial support and stability (Dixon et al., 2009). These and many other studies are pointing the way to the mechanisms of positive change in couple relationship well-being outcomes.

Following on from this thesis, these change mechanisms need further investigation and elaboration to more accurately fine tune assessments and target therapies. More work needs to be done to align relationship well-being interventions with each couple's unique presenting problems. The fact that interventions developed for specific socio-economic groups have produced improved results compared to untargeted interventions (e.g., Jennings et al., 2022; Mitchell et al., 2015; Rhoades et al., 2015; Visscher et al., 2022) gives hope for the effectiveness of this endeavour. Additionally, currently effective methods for change need more in-depth and systematic investigation regarding how and why they are working, or not working. For example, Slotter and Luchies (2020)'s extremely brief (seven minute, three times a year), emotion reappraisal intervention, where participants were asked to "reconsider an interpersonal conflict from a third party perspective" (p. 369) was shown to have a surprisingly significant impact upon couple satisfaction outcomes,

hinting at ways we can work ‘smarter not harder’ to improve our relationships. Longitudinal studies are also needed to further understand the long-term effects of the current couple therapies in use.

Network-informed diagnosis and network-based intervention, tailored to the individual/couple, might prove to be “a real game changer” (Roefs et al., 2022, p. 4). Roefs and her colleagues are carrying out studies in the field of clinical psychology to map the dynamics of complex psychological networks and relate them to existing psychopathological formulations to inform therapeutic conceptualisations. Zilcha-Mano (2021, p. 517) state that these kinds of tailored treatments “will make it possible to use this knowledge to devise treatments that include exactly the ingredients that are useful to each patient, eliminating those that are harmful, and reducing those that are indifferent and take up valuable treatment time without benefiting the patient”. It is hoped that this thesis will provide a launch platform for guiding this endeavour in the specific area of treating couple relationship well-being. This study outlays a map of the research findings that can now be built upon by designing more fine-tuned interventions that tailor to the factors that will make a difference, and actually work.

4.2 Taking the Research and Practice Forward

This study developed and used a novel method that identified and analysed key factors in the multi-disciplinary scientific research that elucidate the field’s main research focus. This research process, drawing on and adapting recently developed methods suitable for synthesising a large corpus of knowledge, could also be used by others wanting to understand key factors or concepts found in published research findings to answer their own specific research questions.

In this study, key factors from a broad multi-disciplinary research base, were investigated, interrogated, and integrated. By doing this, siloed areas of research and theorisation were able to be viewed from a broader networked perspective. The final model is a succinct tool representing this knowledge that may now be useful for assisting researchers to identify, analyse, and organise future relevant emerging research and therapy developments across disciplines. Identifying the factors and their connections that appear consistently across thousands of studies is a first step in exploring their causal nature. These causal hypotheses now need to be tested. Moving forward, future network modelling of the factors could include forces of

repulsion as well as attraction between nodes (Stadtfeld et al., 2020), and also explore directional attributions. As illustrated by Cramer et al. (2016) in their modelling of depression symptoms, refined network modelling can increase the predictive capacity of theories. Researchers can continue to move the cycle of knowledge accumulation forward by specifying the links between factors and their subsystems and building and testing mathematical or computational models.

4.2.1 Modern Technologies and Relationship Therapy and Research

Beyond expansion of this novel research technique, there are many ways the findings from this study can now be integrated into future research. A strength of this study, and a fortuitous consequence of carrying out this research over this unique period in history, is that it both used and points to the use of modern computational technologies to aid research and therapy.

4.2.1.1 Personalised Pre-Therapy Assessment

Assessment is a well-recognised and effective component of couple relationship therapy (e.g., Busby et al., 2007), but not an explicit component in every therapy modality (e.g., EFT David, 2015). Consequently, not all therapists are trained in relevant pre-therapy assessment. Accurate assessment of predisposing, precipitating, and perpetuating factors is critical to therapeutic strategy development, forming the foundation for targeted and personalised treatment. Creating an assessment protocol specifically designed to assess couple relationship well-being would be a valuable next step from this study.

The development of new rapid online assessments is now possible, making tailoring and targeting treatment a possibility for people from the comfort of their own homes, and with less effort for therapists and cost for clients. Individual and dyadic data can now be collected directly, in real time, via smartphones and wearable technology – including ecological momentary assessment (EMA), sensors, and other forms of digital capture of personal traits (e.g., social media use). Assessments can be designed to capture in-therapy facial expressions (e.g., Burgoon et al., 2021; Patterson et al., 2021; J. Wang et al., 2021), physiological reactions (e.g., Peen et al., 2021; Sigrist et al., 2021; Weiss et al., 2021), and neurological responses (e.g., Alexander et al., 2021; Frewen et al., 2020).

Although none of these assessments are very common currently, physiological assessment is already helping some therapists (Avdi et al., 2022; Gottman & Gottman, 2017b; Palmieri et al., 2019; Timmons, Chaspari, et al., 2017), and machine learning techniques are improving the prediction of couple relationship satisfaction (e.g., Joel et al., 2020; Khalil et al., 2021; Vowels, Vowels, et al., 2022), as well as therapy outcomes (Goldberg et al., 2020). Additionally, using online assessments to match clients with therapists who have been trained specifically to target their assessed needs, as is being done by Dr David Kraus at <https://www.matchedtherapists.com/>, could potentially aid in therapy effectiveness for couples in need (e.g., Constantino et al., 2021).

4.2.1.2 Aiding Therapists and Researchers with Knowledge Access and Assimilation

Modern technologies are also transforming the integration of research and practice through simplifying and speeding up the translation of information. Ten years ago the founder of Emotionally Focused Therapy (EFT) – Dr Sue Johnson – wrote that the mass of new information about relationships had instigated a “relationship revolution” (Johnson, 2013, p. 9). The exponential growth seen in the field of relationship science over the last decade concurs with her statement and researchers have a formidable task in keeping up to date with new research. The most effective way of doing this is in broad collaboration with other researchers, and by utilising technologies.

Technologies are rapidly advancing to aid in the process of knowledge assimilation with computerised data collection and modelling technologies beginning to replace the laborious and time-extensive task of synthesising existing findings. The Systematic Review Toolbox found at <http://systematicreviewtools.com> provides a catalogue of computational tools that can aid researchers in reviewing and mapping literature. Other useful tools for bibliometric analysis have been overviewed by Nakagawa et al. (2019) and Kohl et al. (2018). There are now many semi-automated review programmes available to help speed up and improve the review and mapping process including JBISUMARI, RevMan, The Systematic Review Toolbox, DistillerSR, Rayyan, ASReview, SRDR Systematic Review Data Repository, OpenMeta (Analyst), Covidence, Elicit, Research Rabbit, Connected Papers, and Litmaps.

The researcher's own Endnote library (which now contains more than 35,000 publications) can be easily searched for related articles and their abstracts providing a helpful resource that could be replicated and shared with others. It would help the whole field of relationship science move forward if research libraries like this were made more accessible to researchers and therapists. The use of Endnote and VOSviewer software in this study provided the advantage of being able to update the network models rapidly as new research was published. Tools such as these could be used in the future to create what Elliott (2014) deems "living systematic reviews" that can grow and develop as the information base expands, potentially bridging the research-to-practice gap and providing a way for researchers, therapists, and other stakeholders to easily keep up to date with the most recent research, and enable more effectively targeted treatments. The websites <https://www.connectedpapers.com/> and <https://researchrabbitapp.com/> offer a service where a publication can be searched for and a network model of its connections to other publications is created. These are helpful tools showing the potential for "living systematic reviews".

Given that our current means of theory development is largely premised on our reading and applying of others' validated experimental findings (Rivard, 2020), aides to scientific research accessibility could help theory development to advance at a more rapid pace. In other health professions scientific findings can take up to 17 years to become incorporated into clinical practice (Hanney et al., 2015; Munro & Savel, 2016; Wratschko, 2009). It is likely that relationship science follows a similar research-to-practice time-lag (Mohr et al., 2018). One way of using the findings from this study to reduce this time-lag is by presenting the final model online, with the factors and their connections hyperlinked to confirmatory publications or abstracts, providing easy access to the research base undergirding the model theory. There are already DOI links to citations in most published articles. If these links could also automatically show a summary of the cited article when they were hovered over with a mouse, it would make the task of evaluating citations faster and more effective. This could include summary points and the statistical strength of the study findings. If a process such as this was developed and used throughout the academic journal system, it would also prove helpful in the peer review process.

Artificial intelligence (AI) is already being developed to help summarise written texts (e.g., <https://bearly.ai/>, <https://quillbot.com/>, <https://elicit.org/>, <https://tldrthis.com/>, <https://donotedit.com/>), although these are in the early stages of effectiveness. The

website <https://iris.ai> offers a suite of tools that can generate summaries and extracts data from text, tables, graphs, and figures to do this. Other sites such as <https://consensus.app> find summarised conclusions from research papers, but these also are limited to public source publications and currently not very effective.

In the 'Human Behaviour Change Project' (HBCP)⁷³ in the UK, behavioural scientists have extracted information from articles and organised them by ontology (i.e., dictionary-codebook and thesaurus) in a comparable manner to the process of this thesis. The HBCP are developing machine learning algorithms (artificial intelligence) that will search their collated library for the factors that explain, predict, and recommend behaviour change interventions/processes, using an online interface to make this information available to policy makers, psychologists, and researchers. Currently they have a 'Theory and Techniques' project underway to identify links between behaviour change mechanisms and intervention techniques, and also a 'Measures Repository' for assessing these mechanisms and their effectiveness. A similar project could be carried out following on from this thesis, focused specifically on couple relationships, with this study having already provided much of the groundwork for this to happen.

4.2.1.3 ChatGPT and AI Assistance

The recent launch of Chat GPT – a chatbot that generates text in response to questions posed to it (<https://openai.com/blog/chatgpt/>) – gives a glimpse of where technology could take the 'research of research' in the future. If a curated library of research such as that collated in this study could be loaded into an artificial intelligence chatbot devised to automatically collate and summarise key researched factors, researchers and therapists could easily access synthesised information from that library. As an example of this, I asked Chat GPT (which is not currently trained on non-public research material): "what are the key factors contributing to satisfying couple relationships according to scientific research?" The answer is provided in Appendix 15 and is far less comprehensive than this thesis, being devised from only a handful of references, but nonetheless was provided in a matter of seconds and shows the power of AI for reviewing literature and rapidly summarising research findings into easily accessible language.

⁷³ <https://www.humanbehaviourchange.org>

I also asked Chat GPT to critique its answer and its response was that:

“It would be helpful to delve deeper into the specific ways in which each factor contributes to a satisfying couple relationship, and to provide more detailed examples and research to support these points by using a more diverse range of research sources, as relying on only a few sources may limit the scope and depth of analysis. Incorporating a wider range of research from different disciplines and perspectives could help to provide a more nuanced and comprehensive understanding of the topic. It would also be helpful to contextualise the research within the broader literature on couple relationships and explore how the identified factors compare to or intersect with other factors that have been identified as important for satisfying couple relationships.”

It is interesting that AI identified a gap that this thesis has endeavoured to bridge.

Chat GPT also has potential to conduct couples' therapy. I asked ChatGPT to describe this function and its reply is recorded in Appendix 16. Many of the activities of a therapist are educational in nature and repeated frequently, and therefore can be automated. Technology as a therapist is cheap, accessible, and allows couples to both assess their situation and find proven solutions. AI can be used to carry out assessments, summarise assessments, produce client-friendly personalised interpretations of assessments, provide clinical support for therapists and clients, including automated reminders, check-ups, mental health support, and wearables monitoring (Johnson et al., 2023), and as ChatGPT itself also suggests, it can analyse a couple's communication (text input) and “provide personalised suggestions for how couples can improve their communication or resolve conflicts”. However, Chat GPT or other computerised forms of therapy may be limited in mimicking human therapist characteristics, especially the important human capacity of providing tangible ‘warmth’ and ‘sense of safety’.

4.2.1.4 Making Relationship Science a Public Resource

The Covid pandemic pre-empted new public science research innovations which engaged ‘citizen scientists’ where individuals are encouraged to diagnose and treat their own maladies while also contributing to the science and enlarging the research base in the process. An example of this was Tim Spector's nationwide survey using the ‘Covid Symptom Study’ app which had more than a million users within 24 hours of its launch. This simple app allowed the public to be involved in public health

approaches using machine learning and artificial intelligence to determine with 80% accuracy what symptoms predicted Covid-19. Data from this app has now informed more than 315 scientific papers (Vella, 2021). Considering that couples' therapy is currently under-researched, and that couple relationship 'malady' is a widespread, significant concern, citizen-surveys could similarly be used to extend research in the relationship science field.

In this era of social media, we have an unprecedented opportunity to help millions of couples at low cost (and low personal bias) through utilising technology that is already freely available. Many couples in crisis seek out help via an internet search (e.g., National Divorce Decision-Making Project, 2015; Trillingsgaard et al., 2018). A simple online Google search (12 June 2022) reveals multiple different links to 'marital therapy' (N = 3,110,000). There are numerous YouTube videos and television programmes around the topic of relationship development and maintenance, and these have few accessibility barriers to the public. Additionally, couples can consider multiple therapy modalities through an online search before committing to therapy, helping alleviate the barrier of uncertainty about what is on offer and what might work for their unique problems. Television media also has tremendous potential to reach and assist millions of couples. Zurian et al. (2021)'s study of the broad transnational reach of Netflix's television series "Sex Education" is an example of this potential.

Unfortunately, popular daytime television shows such as 'Dr Phil' present conflicting advice to couples (Martinez et al., 2011). Add to this popular reality television programmes, such as 'Married at First Sight', that claim to scientifically match couples who seldom remain married, and it is easy to see why the public may be confused and wary about relationship 'science'. An American study (N=1,026) surveying the public's view of couple counselling showed only 7% of participants rated couples therapy as "very scientific" while 40% rated it as "not scientific at all" (Platt & Scheitle, 2017, p. 239). This low opinion of the science of couples' relationships has significance for both public policy and credibility, with relationship-well-being correlations currently being ignored by public stakeholders because they "are not entirely sure ... how to intervene" (Holt-Lunstad et al., 2017, p. 13). In an era of great opportunity, where the information investigated and presented in this study has the potential to enhance individual and social well-being outcomes, and where it is easier than it has ever been for the relationship science community to present credible findings that are easily accessible by couples in need, this low

opinion needs to be changed. With the exponential growth in research findings over the past decade there is an urgent need to bridge the gap between theory and practice to enhance human well-being.

While the initial focus of this thesis centred on enhancing therapeutic practices for couples, the usefulness of these findings extends beyond therapy to also aid researchers and policy makers. The Blue Zones project (www.bluezones.com) provides an illustration of how research findings can offer valuable insights that could benefit society more broadly. Dan Buettner's research on regions around the world with unusually high life expectancies has catalysed a re-evaluation of public health strategies by highlighting the importance of lifestyle factors such as diet, physical activity, and social connections in promoting longevity and well-being (Buettner & Diener, 2017; Buettner & Skemp, 2016). As noted previously in this thesis, and also in the Blue Zone findings, happy and stable couple relationships contribute significantly to overall human health, well-being, and longevity outcomes (Elena, 2018). Many of the factors that contribute to couple relationship well-being are potentially modifiable, and negative outcomes are preventable. Policymakers have started to implement policies and initiatives aimed at intentionally cultivating Blue Zone-like environments that encourage lifestyles that foster and support these significant factors (Miller, 2017). The Blue Zone model offers a framework through which policymakers can contemplate more holistic and preventative approaches to public well-being. Similarly, the conceptualisation of the factors contributing to and maintaining couple relationship well-being equips policymakers with valuable insights to address predisposing, precipitating, and perpetuating factors in their decision-making processes for the betterment of society.

This study is the first of its kind to consider the factors contributing to relationships well-being from such an extensive transdisciplinary, multilevel, multisystem, and multivariate perspective. It is hoped that this study will further stimulate the defining of common theories and facilitate interdisciplinary thinking and research, thereby encouraging more extensive synthesis among the numerous factors involved in the development and maintenance of couple relationship well-being. Modern technologies and artificial intelligence offer promising opportunities for expediting collaboration between therapists, researchers and policy-makers, to meet the needs of distressed couples and rapidly advance the effective dissemination of useful knowledge (Voit, 2019). It is hoped that this study will inspire this dissemination for the benefit of many.

5. Conclusion

In conclusion, this thesis aimed to produce an explanatory model that addresses the development and maintenance of couple relationship well-being. By exploring and integrating factors found in a large corpus of research drawn from diverse academic fields, this study produced a synthesis of the verified factors that contribute to and maintain couple relationship well-being.

The findings suggest that effective communication skills, particularly in conflict situations, are crucial for healthy relationships. These skills are heavily influenced by our emotions and perceptions, and especially how well we can regulate these. Self-regulation is shaped by our personality, attachment style, developmental factors, and neurological and biological makeup. Additionally, the context in which we grew up and currently live, especially stressful environments, can influence the outworking of each of these other factors.

The resulting model simplifies the numerous relationship factors identified across decades of research, and provides practical guidance for couples, therapists, researchers, and policy makers. This has important implications for improving our understanding of the dynamics of couple relationships, and for empowering couples to proactively manage and enhance their own well-being. For example, couples could use this model as a framework for identifying areas of their relationship that may need improvement and developing strategies to address these areas. Therapists could use this model to guide their work with couples and to develop tailored interventions based on the specific needs of each couple. Policy makers could incorporate these findings into policies aimed at supporting healthy couple relationships and reducing relationship distress. The potential applications of this model are vast and impactful and have international relevance.

While this study represents a rigorous and comprehensive synthesis of the research findings across decades, it is not without limitations. For example, the study populations and its sample populations are limited, and the study would have also benefited from involving a large team of expert co-coders and reviewers. Future research should aim to address these limitations and expand upon the findings presented in this study, particularly in exploring the nuances of these factors across diverse cultural and demographic contexts, examining the potential role of emerging technologies in promoting and supporting healthy couple relationships, testing the

findings and factor analysing them, and exploring assessments that could further aid therapists in utilising these findings.

By continuing to expand our understanding of the factors that contribute to and maintain couple relationship well-being, we can develop more effective strategies for supporting healthy relationships and reducing relationship distress, potentially leading to a snowball effect of improved well-being for individuals, families, and communities. Fostering couple relationship well-being is a public imperative that lies in taking a biopsychosocial+environmental approach. Pragmatically speaking, knowledge as power that has inherent and prospective value in improving people's lives (Haigh et al., 2019; Maxwell, 2012; Miller et al., 1996), and it is hoped that by synthesising the research in this way, this study's unique contribution to the field will provide an important foundation for future research and interventions aimed at improving the lives of couples worldwide.

6. Summary Points

1. This study presents the first attempt to define, analyse, and synthesise the factors contributing to couple relationship well-being found in a large and judiciously selected research literature library (N=25,823).
2. This study used a unique method combining a scoping review, factor extraction directly from the publications, factor description, factor network modelling using VOSviewer software, interpretation of these models and their factor inter-relationships using literature review and condensing of all the factors through a process of Multi-Grounded Theory categorisation and logical model structuring.
3. Applying this process, ten prominent and highly co-occurring factors were found: attachment, personality, stress, neurological factors, sex differences, emotion-regulation, conflict, communication, perceptions, and emotions.
4. Literature review of these categories revealed the nature of the inter-relationships between factors according to the published research findings.
5. The entire dataset of factors from the research were categorised to summarise their highly influential common characteristics. The categories were: **historic and current contextual factors**, especially stressors, adverse childhood experiences, financial resources, and cultural/societal/physical environmental factors; **human biology (nature)** including biological sex differences, neurological and hormonal factors (especially oxytocin), genetic and epigenetic factors, physiological responses, and health; **social developmental influences (nurture)**, including early life experiences, social environment, social learning, and parenting style; **individual differences** including attachment style (especially anxious and avoidant), personality (especially agreeableness, emotional stability, and conscientiousness), personality disorders (especially antagonism and narcissism), mental health (especially depression and anxiety), self-regulation, and coping ability; **perceptions and emotions** including expectations, cognitions, motivations, attitudes (especially contempt, negativity, distrust, empathy, warmth, and positivity), self-appraisals, self-esteem, self-awareness, trust, and feeling stressed; and

actions and interactions including communication, conflict, and relationship behaviours (especially responsiveness, taking of influence, cooperation, disclosure, listening, appreciation, affirmation, affection, sexual intimacy, commitment, hostility, control, and violence).

6. These categories were arranged in a comprehensive, systemic, biopsychosocial, 'tree' model of the factors contributing to and maintaining couple relationship well-being, thereby presenting the findings of thousands of research studies in summarised, accessible form.
7. This overview provides a useful summary for therapists, researchers, and policymakers looking to improve human well-being by targeting well-researched and validated factors in their endeavours.

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Appendices

Appendix 1. Study Glossary

Term	Meaning
Factor	Circumstances, facts, or influences that contribute to couple relationship well-being
Well-being	Both the positive and negative impact of factors on couple relationship function/dysfunction and satisfaction/dissatisfaction.
Couple relationships	Any sexual or romantic partnership between two adults, but typically in this study heterosexual, committed, monogamous, and legally married couples.
Extraction	The factors were extracted from author keywords, title and abstracts meaning they were copied and pasted directly from the text.
Top Ten	The 'top ten factors' refers to the ten most commonly occurring and co-occurring factors in the literature.
Nodes	The circles in the network models representing the factors. The size of the node represents the number of times the factor appears in the literature (calculated by articles, not by number of times it turns up in each article).
Links	The lines in the network models joining the nodes, reflecting co-occurrence of the factors in articles.

Appendix 2. Expanded Essay: How do Couple Relationships Confer Well-Being Benefits, is Divorce a Healthier Option, and How Children and Society are Impacted?

How Do Couple Relationships Confer Well-Being Benefits?

Researchers have offered various rationales as to how relationships confer health and well-being benefits.

Financial Factors

Some researchers have investigated financial stability and sufficiency as factors contributing to marital status well-being outcomes (e.g., van den Berg & Gupta, 2015). Those who stay married tend to accumulate significantly more wealth than the divorced or unmarried (Aloni, 2018), and this can be spent on healthcare and health maintenance (Frech et al., 2016; Lavelle et al., 2012). Divorce, on the other hand, is often accompanied by heightened financial strains (Bennett, 2017; Sharma, 2015). A Finnish study following more than 250,000 people over 13 years indicated that social and economic factors (particularly standard of housing) accounted for about half the increased mortality after divorce (Metsä-Simola & Martikainen, 2013). However, while there is a clear connection between divorce, financial strain, and lowered well-being, Choi and Mark's (2011) five-year-long study of more than 13,000 people showed that remaining continuously married increased longevity regardless of the level of financial poverty or wealth a couple was experiencing, hinting at an independent effect of the benefits of marriage aside from financial resourcing. It may be that factors such as relationship happiness help buffer the effects of poverty or financial strain on an individual's well-being (Cundiff et al., 2016).

Social Control Hypothesis

Other researchers have focused on the 'social control hypothesis', whereby couples exert a positive influence on each other to engage in health-producing behaviours (Craddock et al., 2015). Those we are closest to influence our health-related choices through their verbal commendations and behavioural role modelling (Berli et al., 2018; Jackson et al., 2015), and this influence has been affirmed in twin study findings (Osler et al., 2008). However, while there is some evidence of this, other

studies seem divided over whether couples are more likely to exercise regularly (e.g., Bourassa et al., 2019; Hammig, 2019; Hull et al., 2010; Khan et al., 2013; Pettee et al., 2006), to attend the doctor and dentist for health maintenance (e.g., Valtorta et al., 2018), to drink less alcohol or smoke cigarettes (e.g., Ask et al., 2012; Berli et al., 2018; Floud et al., 2014; Hamplová, 2018; Horn et al., 2013), or use drugs less (e.g., Keenan et al., 2017), which are all behaviours that are known to contribute to health outcomes. Married or longer-term committed couples are also more likely than their single, divorced, or widowed compatriots to put on weight (Hillebrandt, 2022; Keenan et al., 2017; Kutob et al., 2017; Mata et al., 2015; Meltzer et al., 2013) and BMI is significantly associated with multiple negative health outcomes (Dowd & Zajacova, 2014; Flegal et al., 2013). So, the idea that couples live longer, healthier lives because their partner encourages them towards a healthier lifestyle has mixed and at times confusing support.

Added to this are numerous non-human studies that have shown a correlation between animal isolation and corresponding negative health impacts (e.g., Capitanio et al., 2014; Zeytinoglu & Fox, 2022). Non-human animals are not (overtly) encouraging their partners towards healthier behaviours, and in these studies, it is the mere absence of companionship that lowers well-being. Therefore it seems unlikely that human partner exhortation towards healthier or unhealthier behaviours is the principle factor in well-being outcomes, but rather the presence of others (Cacioppo et al., 2011). The social health and well-being detriment of loneliness is easily the equivalent of, and in some cases exceeds many of our recognised health risk factors including smoking, obesity, high blood pressure, and lack of exercise (Holt-Lunstad et al., 2017). Interestingly, Holt-Lunstad et al. (2010)'s international meta-analysis showed that being optimally socially connected increased human survival likelihood by 50%, and a later meta-analysis showed mortality increased by 29% for those who were socially isolated (Holt-Lunstad, Smith, et al., 2015).

The Well-Being Effects of Couple Partnership, Marriage, and Divorce

Divorce may sometimes be a healthier and happier option than persevering in a low-quality relationship. Amato and Hohmann-Marriott (2007); Gustavson et al. (2013). Symoens et al. (2014)'s studies showed that those people in high-distress marriages reported increased happiness after divorce. However, those in low-distress marriages reported increased unhappiness after divorce. In other words, if

a marriage is very distressing there are well-being benefits attained by divorcing. However, if a marriage is low distress pre-divorce, there may be well-being detriments post-divorce (Bleidorn et al., 2021; Ye et al., 2017). As Sander et al. (2020); and Strizzi et al. (2021)'s studies indicate, a relationship needs to be seriously distressed to gain a measurable benefit from leaving it.

Gustavson et al. (2012)'s study of married heterosexual couples (N=369 couples) found that those who had severe levels of relationship problems but remained married had lowered life satisfaction fifteen years on and were also unhappier than those in the same group of highly distressed couples who had divorced. This finding reversed for the less-distressed group. An Australian study that followed 3,512 mothers over a 21-year period showed that very poor-quality relationships correlated with increasing negative affect for women over time, which only reduced once they left the marriage (Amato, 2014; Pronzato & Aassve, 2019), however, in this study those couples with less severe problems were significantly less happy after divorce than those with less severe problems who remained married. Similarly, the Family Study Centre's national survey (N=3,000) of couples' divorce decision-making found that while 53% of the 'still married participants' had felt their marriage was in serious trouble at some point in their history, 88% of these reported being happy that they had stayed married despite this distress, and a mere 1% were unhappy that they were still married (National Divorce Decision-Making Project, 2015). Of note, this was a survey of still married people, of which 57% had less severe problems.

Interestingly, in Bourassa et al. (2015)'s study of 1,639 American adults drawn from the MIDUS study (half men, half women), it was only the women who benefited from leaving very low-quality marriages. Low-quality marriages were those exhibiting low support and high strain, where the women felt poorly understood and highly criticised by their spouse. This low-quality group represented around 15% of the sample and the women in this group were consistently happier after leaving the marriage. In contrast, those women in marriages with less severe problems (around 65% of the sample) who then went on to divorce reported feeling less happiness as divorcees than as married women.

Before an unhappy relationship ends people tend to experience a drop in self-esteem which stays low after divorce (Bleidorn et al., 2021), and even when there is a lift in happiness for an individual following the breakup of an unhappy marriage,

overall life satisfaction for single divorcees is still lower on average than for those who are in happy marriages (Gustavson et al., 2012). When couples divorce they also lose the potential resource of consistent spousal support (Kansky, 2018; Z. Zhang et al., 2016), and the accompanying emotion co-regulation (Levenson et al., 2013), and they usually concurrently experience more difficult and intense emotions that need regulation. Remarriage after divorce has been shown in some studies to potentially restore levels of health and mental wellness (Zulkarnain & Korenman, 2018), and life satisfaction (Gloor et al., 2021) back to pre-divorce levels, supporting the notion that satisfying companionship in a stable relationship provides a resource for beneficial physiological regulation in people's lives.

Couple Relationships Matter for Children

It is not only the couple dyad who are distressed by relationship breakdowns, children are impacted too. The number of children now potentially experiencing parental separation has increased markedly over the last century. In the United Kingdom and New Zealand, around 33% of all children will experience a parent's separation or divorce before the age of 16 (Bailey et al., 2011; The Law Commission, 2017), and in the United States the statistics are even higher at around 45% (Fagan & Churchill, 2012). Cohabiting relationships have tended to be less stable than formal marriages (Kamp Dush et al., 2019; Musick & Michelmores, 2015), and in the United Kingdom there are currently more children experiencing the separation of cohabiting parents than married parents (Chao et al., 2020). Children whose cohabiting parents separate are also vulnerable to the same traumatic experiences as those whose married parents' divorce. Therefore, for children in many nations around the world, family instability is on the increase and may be having more impact on children's well-being than has been identified in the divorce research alone.

Childless couples who divorce, which in the United States comprise around 47% of the divorcing group (Tartari, 2015), may be able to make a clean break from each other. When children are involved, however, a true separation is usually not practicable. Relationships between parents need to continue for the sake of raising the children. Conflict between exes tends to continue after divorce (Halford & Sweeper, 2013), and therefore, children often find themselves still experiencing inter-parental conflict post-divorce (Willén, 2015). When there has been hostile or manipulative conflict in a marriage, there may be ongoing negative interactions

between ex-spouses (Crosse & Millar, 2017; Halford & Sweeper, 2013; Hardesty et al., 2019; Toews & Bermea, 2017). Children, especially dependent children, are impacted both practically and psychologically (Anderson, 2014; Elam et al., 2016; Elam et al., 2019; Harold & Sellers, 2018; Joyce, 2016; O'Hara, Sandler, Wolchik, & Tein, 2019; O'Hara, Sandler, Wolchik, Tein, et al., 2019; Orgiles et al., 2015), with parental divorce considered a potential cause of chronic toxic stress for children (Thomas et al., 2020), and has been recognised by the CDC-Kaiser Permanente Adverse Childhood Experiences (ACE) Study as an 'Adverse Childhood Experience' (ACE) (Felitti et al., 1998; Sacks et al., 2014), particularly in high conflict divorces (Lange et al., 2021).

How Inter-Parental Conflict Affects Children

The effects of inter-parental rancour, separation, and divorce, upon children of all ages are significant and distressing (Akpan & Ezeume, 2021; Davies & Martin, 2014; Misca & Smith, 2014 ; Pires & Martins, 2021; Stover et al., 2012; Weldon et al., 2019). Whether their parents are divorced or still married, inter-parental conflict and relational distress correlate negatively with children's adjustment and well-being outcomes (Brauner-Otto et al., 2020; Harold & Sellers, 2018; James et al., 2022; Mark & Pike, 2016; Nikolaou, 2017; Ratcliffe et al., 2016; Xu et al., 2022).

Interparental conflict may be experienced as threatening to a child's personal security (e.g., Cheung, 2020; Coe et al., 2017; Patrick Davies et al., 2012; Davies, Martin, Coe, et al., 2016; Davies, Martin, Sturge-Apple, et al., 2016; Hannighofer et al., 2017; Khaleque, 2017; Kopystynska et al., 2017; Lin & Yi, 2018; Lux & Walper, 2019; Meinck et al., 2015; Mills et al., 2020; Smith-Etxeberria et al., 2020; van Eldik et al., 2020).

A recent longitudinal study showed that interparental conflict predicted children's fear of abandonment three months later and in turn this predicted reported mental health problems ten months later (O'Hara et al., 2021). Their reactivity to conflict is also affected, as well as their internal representations of relationships (Cummings & Davies, 2010; Kelly & El-Sheikh, 2013). In Yang et al. (2022)'s study, parental conflict correlated longitudinally with childhood depression and this was mediated by negative thinking. When children experience inter-parental hostility, they correspondingly experience increased fear-related physiological reactivity (Marshall et al., 2019), including exaggerated HPA-axis response (Kuhlman et al., 2018), heightened cortisol response (Afifi et al., 2013; Koss et al., 2013), and compromised

vagal tone (Porter & Dyer, 2017). Perhaps consequentially (El-Sheikh & Hinnant, 2011) they are more likely to exhibit internalising or externalising dysfunctions (Bergman et al., 2014; Camisasca et al., 2016; Davies, Coe, et al., 2018; El-Sheikh et al., 2019; Hosokawa & Katsura, 2019; Jarnecke et al., 2017; Knopp et al., 2017; Kumar & Mattanah, 2018; Lamela et al., 2016; Parry et al., 2020; Pendry et al., 2013; Philbrook et al., 2018; Schermerhorn et al., 2021; Stallman & Ohan, 2016; Tavassolie et al., 2016; Theunissen et al., 2017; van Eldik et al., 2020; Warmuth et al., 2020; Westrupp et al., 2018; Xuan et al., 2018; Zemp et al., 2019).

Other downstream effects of inter-parental conflict on the child may include difficulty with positive problem-solving, with regulating emotions, and reduced self-confidence (Davies et al., 2013), potentially leading to negative behavioural outcomes (Craft et al., 2021; Giallo et al., 2021; Goldberg & Carlson, 2014; Seo, 2020), impoverished social functioning (Davies, Martin, et al., 2018; Xu et al., 2021), depressive symptoms (Fosco et al., 2016; Papp, 2012), impaired cognitive functioning (Pendry & Adam, 2013), and lowered academic achievement (Konishi et al., 2018; Lui et al., 2019). Children in conflict-laden households are more likely to have difficulties in their peer relationships (Drack & Schwarz, 2010; Hosokawa & Katsura, 2017), poorer sleep (El-Sheikh et al., 2015), disordered eating behaviours (Bi et al., 2017), and general mental health difficulties (Olatunji & Idemudia, 2021). A German study that followed 249 families over ten years revealed that children whose mothers were in unstable, low-quality marriages were 820% more likely to have emotional or behavioural problems compared to children of mothers in stable, happy marriages (Hannighofer et al., 2017).

A study of 2,931 Japanese children aged 5-6 years showed that destructive marital relationship conflict correlated with less sensitive parenting, which correlated with lower self-control in children (Hosokawa & Katsura, 2017). Hess (2021)'s German longitudinal study used data from 1,157 teenagers to show that interparental conflict correlated with parental coldness towards their children and increased negative communication with them, which in turn correlated with those teenagers having reduced prosocial behaviours and increased difficulties in their peer relationships.

Multiple studies indicate that inter-parental conflict correlates with subsequent child problem behaviour which is mediated by the parents conflict style (Elam et al., 2017; Neppl et al., 2016; Stover et al., 2012). McCoy et al. (2013)'s longitudinal study differentiated between constructive and destructive couple relationship conflict and

demonstrated the negative effects of destructive inter-parental conflict on parental discipline style and children's adjustment. In their study, constructive conflict included support, verbal and physical affection, problem solving, and conflict resolution whereas destructive conflict included verbal hostility, aggression, anger, and withdrawal. Destructive interparental conflict correlates with parental insensitivity (Du Rocher Schudlich et al., 2019; Ha et al., 2018; Trumbell et al., 2022), inconsistency (Lamela et al., 2016), and harshness (Krug et al., 2019), leading to emotional insecurity in children.

Most parents unwittingly expose their children to inter-parental conflict. Just as second-hand cigarette smoke can influence children's health, so too can 'second-hand conflict'. Parents may attempt to keep their arguing private from the children, but in highly conflictual relationships children are seldom effectively shielded from interparental hostility (Du Rocher Schudlich et al., 2014). Children may directly encounter their parents' conflict, or they may experience the effects of that conflict through being exposed to co-occurring parental irritability or depression (Coln et al., 2013), and subsequent reduced capacity to parent positively (Du Rocher Schudlich et al., 2019; Sears et al., 2016). Harsh inter-parental conflict correlates with increases in harsh father-child inter-relating (Kopystynska et al., 2019), directly impacting upon children's behaviours (Linville et al., 2010). The more severe the inter-parental conflict, especially in relation to the father's animosity towards the mother, the more a child's emotional regulation (Philbrook et al., 2018) and happy sense of self may be negatively impacted (Clements et al., 2014; Merrilees et al., 2018).

How Parental Divorce Affects Children

So, are children better off when their fighting parents' divorce? A recent meta-analysis (N=506,299 participants) showed that being a child of divorced parents correlated significantly with the likelihood of suffering from physical health and mental health (Auersperg et al., 2019). In severely conflictual divorces, children can develop PTSD symptomology (van der Wal et al., 2019). Children living in single parent households are prone to exhibit more developmental and behavioural problems (Eriksen et al., 2017; Fomby et al., 2021; Parcel et al., 2012; Robbers et al., 2011), increased aggression (Zakhour et al., 2021), depression, anxiety and suicidal ideation (Donald et al., 2006; Kawashima et al., 2012; Obeid et al., 2021; Sands et al., 2017; Tebeka et al., 2016; Yip et al., 2015), and other social-emotional

(Wang et al., 2019), and psychiatric disorders (Brown, 2010; Tebeka et al., 2016), along with increased early life deaths and homicides (Amato & Patterson, 2017b; R. Rogers et al., 2020).

A United States national longitudinal survey showed that children from single parent homes have nearly twice the likelihood of poor health and 47%-54% higher risk of death (R. Rogers et al., 2020). Children whose parents' divorce are more vulnerable to poorer health and a range of other negative outcomes, (Amato, 2014; Arkes, 2015; Buckles & Price, 2013; Krueger et al., 2015; Pronzato & Aassve, 2019; Smith-Greenaway & Clark, 2017) including educational outcomes (Bussemakers et al., 2022; Hussey et al., 2014), compared to children from homes where parents stay married. In a Finnish longitudinal (46 years) study (N=10,895), children in intact two-parent families lived significantly longer and healthier lives, leading the authors to conclude that "there is public and scientific concern about this issue, and therefore support from healthcare professionals and society is warranted" (Varis et al., 2022, p. 611).

Children with two parents in one home have some obvious welfare advantages. When parents' divorce, they tend to become less physically accessible to their children. Children's routines and sense of security are disrupted, fear is elevated (Hentges et al., 2015), and they may feel that their living situation is out of their control (Cummings & Davies, 2010; O'Hara et al., 2021), predisposing them to psychological disturbances (Bergstrom et al., 2019), especially when their separated parents continue to engage in hostile conflict (O'Hara, Sandler, Wolchik, & Tein, 2019; van Dijk et al., 2020; Yan et al., 2018).

Parenting style through the divorce process can function as either a damaging or protective factor for children (Bastais & Mortelmans, 2016), however, parenting well through a divorce is not usually easy as parents are trying to cope with their own distress and destabilisation and may have little personal resource left for helping their children (Hamermesh, 2021; Jurma, 2015; Kalil et al., 2014; Leopold & Kalmijn, 2016; Mercadante et al., 2014; Wallerstein et al., 2013). Making the divorce process less acrimonious for their children requires extensive effort from parents, and when a couple are expending energy on fighting with each other, or transitioning to the new difficulties of sole parenting, they may be less sensitive to their children's needs (Klausli & Tresch Owen, 2011; Sutherland et al., 2012), and subsequently more neglectful in their dealings with them (Schneider, 2016; Sears et al., 2016). Children

of single parents in the United States and Europe have been shown to receive up to 40% less parental care than those with partnered parents (Hamermesh, 2021), so, a child's fear of abandonment may also be their reality when their parents separate. Divorced mothers are also significantly more likely to be depressed than married mothers (Duncombe et al., 2012), which correlates negatively with children's mental health outcomes and social adjustment (Martínez-Pampliega et al., 2019; Obeid et al., 2021).

Long-Term Effects of Parental Divorce

Unfortunately, studies have shown other future penalties for the children of divorced parents, including increased internalising and externalising disorders that persist into adulthood (Alves et al., 2019; Leys et al., 2019; Tullius et al., 2022). The results of a Danish longitudinal study tracking 605,344 adult individuals showed that childhood parental divorce increased the risk of adult mental disorder diagnosis, criminal offending, lower education and unemployment (Andersen, 2021; Zill & Wilcox, 2022), and a Swedish study (N=6,638) showed poorer self-rated health for adult children of divorce/separation (Palmtag, 2022), as well as somatic symptoms (Lin et al., 2019), and psychopathology symptoms (Hayatbakhsh et al., 2013).

Adult children of divorce have also been shown to exhibit higher levels of conflict and violence in their own relationships (Riggio & Weiser, 2008), particularly when their parents continued to have conflict post-divorce (Avci et al., 2021; Fergusson et al., 2014). They are often less satisfied in their own romantic relationships (Mustonen et al., 2011; Rhoades et al., 2012; Roper et al., 2019; Zhang, 2022), more likely to have low expectations for the success of their own marriage (Lachance-Grzela & Bouchard, 2016), have a greater risk of their own divorce (Amato & Patterson, 2017a; Gager et al., 2015; Kippen et al., 2013), and more likelihood of multiple partners across their lifespan (Amato & Patterson, 2017a; Feldhaus & Heintz-Martin, 2015). An abandonment mental schema may moderate these outcomes (D'Rozario & Pilkington, 2022) and sadly, the disadvantaging effects of the divorce experience can be enduring and accumulative (e.g., Graf et al., 2021; Lersch et al., 2021; Obeid et al., 2021; Tullius et al., 2022; Varis et al., 2022; Zhang, 2022).

Those children whose parents have chronic conflict but remain married, and those children whose parents divorce and still have ongoing conflict, are both vulnerable

to maladjustment (e.g., Elam et al., 2016; Elam et al., 2019; Harold & Sellers, 2018; O'Hara, Sandler, Wolchik, & Tein, 2019; Radetzki et al., 2021). On a positive note, research indicates that, depending on the quality of their household environment, extended family support (e.g., grandparents Sorek, 2020), and of their parents' communication quality, some children may be minimally impacted by parental divorce (Afifi et al., 2013; Amato & Anthony, 2014; Bastaits & Mortelmans, 2016; Knopp et al., 2017; Sandler et al., 2012; Velez et al., 2011). Some may even do better in relation to life satisfaction (Maleck & Papp, 2015; Til Ogut et al., 2021), have better relationships with their fathers (Kalmijn, 2015), and have improved self-esteem and life purpose outcomes when hostile parents do divorce (Chui & Wong, 2016).

The way parents process through their conflict with each other, and then with their children, seems to determine its impact upon them (Braithwaite et al., 2016; Di Stefano & Cyr, 2014; Gähler & Garriga, 2012; Ha et al., 2018; Swerbenski et al., 2023; Weaver & Schofield, 2015). Co-parental cooperation and positivity have also been shown to greatly reduce these negative effects of post-separation co-parental negativity and hostility on children's well-being outcomes (e.g., Bell et al., 2021; Camisasca et al., 2019; Cao et al., 2022; Lau, 2017; Martinez-Pampliega et al., 2021; Parkes et al., 2019; Régnier-Loilier, 2013; Sandler et al., 2012). A German study following 809 families over five years found that constructive parental conflict with a high ratio of positive interaction significantly reduced internalising symptoms in children (Zemp et al., 2019), indicating that parental conflict is not necessarily harmful to children when the overall family culture is positive. Couples who divorce amicably, and who cooperate to make the family culture positive can benefit their children's emotion regulation and well-being (e.g., Baptista et al., 2018; Elam et al., 2019; Herrero et al., 2020; Le et al., 2019; Zhou & Buehler, 2017).

Cooperative inter-parental conflict and warm parental sensitivity have been shown to act as a protective buffer to children's maladjustment (e.g., Baptista et al., 2018; DeBoard-Lucas et al., 2010; Gao et al., 2021; J. Lee et al., 2021; McGregor et al., 2012; Ying et al., 2018; Zhou & Buehler, 2019), potentially through the stabilising effect this has on a child's self-construal (e.g., Gao et al., 2017; Mahrer et al., 2018; Weaver & Schofield, 2015; N. Zhou et al., 2017). Knowing that a hostile, conflictual, and negative family culture negatively impacts upon children's adjustment in significant ways makes enriching parents' relationship quality, even after divorce, of critical importance for children's well-being (van Eldik et al., 2020). If at least one

parent is able to give high-quality care to their children even in the middle of a conflictual relationship with their spouse, the children generally fare better in mental well-being outcomes (Miller-Graff et al., 2016; Sandler et al., 2013).

Do children do better in the long run if parents stay married or divorce? It depends. Studies generally agree that poor quality inter-parental relationships have adverse long-term outcomes for children (Akpan & Ezeume, 2021) and when parents have had high-conflict relationships, children may potentially adjust better over the long term into adulthood when those parents separate (Yu et al., 2010). In general though, children living with both their parents do better on a variety of well-being factors compared to those with separated parents (Poortman, 2018). Among 184,496 children from 36 industrialised nations, children living with both their biological parents had significantly higher life satisfaction (Bjarnason et al., 2012).

Separated parents often re-partner or re-marry. While remarriage may restore to children many of the well-being benefits lost through divorce, step-parenting creates its own unique stressors, and these have both positive and negative links to well-being (e.g., Amato et al., 2016; Hilton et al., 2015; Schrodt, 2020; Shafer et al., 2017; Ward et al., 2019). Within step-families, it is once again the quality of the adult relationships that seem to be the determining factor in children's adjustment (Amato et al., 2016; Berger & McLanahan, 2015; Fomby et al., 2021; Jensen & Ganong, 2019; Jensen et al., 2015; Lardier et al., 2017). John Bowlby wrote: "If a community values its children it must cherish their parents" (Bowlby, 1951, p. 84). Whether parents stay married or end up divorcing, the most positive outcomes are seen when parents work out how to create a positive family environment for everyone either way. Decreasing parents' hostile conflict and increasing the quality of their interactions is ideal for either outcome (Amato, 2014; Amato et al., 2011; Zemp et al., 2015).

Couple Relationships Matter for Society

High-quality relationships offer highly rewarding health, wealth, and well-being outcomes. "The existence of significant close relationships across the life span, and the quality of these relationships, are arguably the most important factors for understanding individuals' health and happiness throughout their lives" (Campbell & Surra, 2012, p. 4). Conversely, low-quality relationships and divorce remove this benefit and often cause additional harm for families and their communities

(Bourreau-Dubois & Doriat-Duban, 2016).

Divorce Impacts on Parents' Financial Resource

Staying married has a clear financial benefit for both partners in a marriage (Boertien & Lersch, 2020; Bourreau-Dubois & Doriat-Duban, 2016; Zissimopoulos et al., 2015), including having significantly more individual wealth than the unmarried or divorced (Lersch, 2017; Ruel & Hauser, 2013). With divorce comes increased expenses and decreased shared income and resources (Couch et al., 2013; Fletcher et al., 2017), an often unrecoverable housing wealth loss (Kappelle & Baxter, 2020), and increased risk of falling below the poverty line (Heintz-Martin & Langmeyer, 2019). This seems to be particularly financially devastating for women (Bayaz-Öztürk et al., 2018; de Vaus et al., 2017; Hogendoorn et al., 2019; Horgan, 2020; Leopold, 2018; Schneebaum et al., 2018; Sharma, 2015; Wolfe & Thomeer, 2020; Zagorsky, 2016), who are often also the assigned primary care-giver of the children and therefore have less opportunity to advance their careers and consequently increase their income. Additionally, those already less privileged in society – the poor, uneducated, and minority groups – tend to have less resources available to help them develop high-quality relationships, and their marriages are more likely to end in divorce (Cherlin, 2009), often leading to greater socioeconomic deprivation (Amato, 2010), and creating a generational downward spiral.

A 25-year-long American study (Wallerstein et al., 2013) found that post-divorce, half of all divorced mothers felt they were significantly less available and responsive to their children with increased pressures to provide financially. Children growing up in single-parent families in the United States are often significantly financially disadvantaged (Roach, 2017), and in the United Kingdom they have twice the chance of living in poverty as children from intact two-parent families (Department for Work and Pensions (DWP), 2017). A Harvard study highlighted that the most significant factor for children staying in poverty was living in a single-parent household (Chetty et al., 2014), and the long-term negative impacts of poverty are known to be substantial and multi-faceted (e.g., van IJzendoorn et al., 2019). A 17-year-long American study of 353,418 children (R. Rogers et al., 2020) showed a 47% increased risk of death for children who lived with solo fathers and 54% increased risk of death for children living with solo parents in multigenerational households. This was surmised to be due largely to the socioeconomic disadvantages of single-parent households.

Parental Divorce Impacts Adult Childrens' Wealth

Corresponding to this, children who grow up with both parents present in the home have been shown to earn significantly more money in adulthood than those raised in single-parent families (Lerman et al., 2017). As adult children of divorce are less likely to achieve higher education qualifications (Bernardi & Radl, 2014; Brand et al., 2019; Brauner-Otto et al., 2020), this may be a factor in their reduced wealth generation in adulthood (Bernardi et al., 2019). A longitudinal study of 7,066 Americans showed that children whose parents did not live continuously with them throughout childhood experienced a median wealth penalty of more than USD\$61,600 when they themselves were adults aged 47-55 years (Bernardi et al., 2019). Gähler and Garriga (2012) analysed the 1968 and 2000 data from a Swedish population study to see if, with changing societal perceptions of divorce, there may have been improvements in these wealth outcomes. However, they found that across the decades there were no significant changes to the negative wealth outcomes of divorce upon children.

Stable Relationships Benefit Society Through Reduced Costs and Improved Well-Being

Gary Becker (1992) the Nobel laureate in economics, argued that stable couple relationships were good for the economy in that stable marriages given that they correlated, among other financial benefits, with higher incomes and lower living expenses. The stress engendered by relationship difficulties and separation can impair work productivity (costing employers) (e.g., Tang et al., 2017), increase work absences (Dahl et al., 2015) and increase medical service needs for physical and mental health (Arving et al., 2014; Couch et al., 2015). When a divorce occurs, costs to a nation are also incurred through temporary financial assistance (Bradbury & Zhu, 2018), accommodation assistance, and child support enforcement as well as indirect costs that arise through increased cost-creating behaviours such as additional housing needs (Schramm, 2006), crime, abuse, addictions, and mental health disruptions. With more divorce now happening in the 55+ age group, more people are also taking mortgages into their later years, and subsequently having more financial stress in old age, adding to societal costs for their care (Wind & Dewilde, 2016).

A United Kingdom study showed that children with parents in happy and stable marriages had reduced cognitive, emotional and social problems and this produced

a national cost saving of £38,000 per year per household (Nikolaou, 2017). Conversely, cost to household income of divorce via the impact of children's subsequent problematic behaviour, was £51,000. Add parental violence into the mix and the average lifetime costs of divorce in a 2016 American sample were estimated in one study to be more than USD\$50,000 per person (Holmes et al., 2018). In the mid-1990s the direct costs of divorce to the Australian economy was calculated at \$3 billion per annum (Canberra House of Representatives Committees, 1998)⁷⁴. Another American study estimated the cost of a single divorce to the taxpayer to be conservatively USD\$30,000 (Schramm, 2006) and 12% of the total budget for the state of Texas in 2008 was spent directly on divorce costs (Schramm et al., 2013). In Scafidi (2008)'s study of the costs of divorce in America, an increase in marital stability by 1% would lead to an annual saving of USD\$27 million in the state of Texas alone. In Baranowski and Sztaudynger (2019)'s more recent survey of 15 European Union countries, a national 10% increase in divorce rate was calculated as lowering overall economic growth by approximately 0.8%. This is only taking into consideration the direct costs; indirect costs of divorce may be equal to or even greater than these.

Clawson et al. (2018)'s study showed that providing relationship therapy for couples resulted in a gain of USD\$1.48 to every USD\$1.00 spent by insurers due to the benefits of stable marriage off-setting insurance claim costs. Caldwell et al. (2007)'s study calculated that if the American government paid for empirically supported couple therapy for 50,000 randomly selected couples, even despite the low success rates of such treatments, the financial benefits it would bring to the nation by reducing further divorces would potentially save USD\$2.50 for every USD\$1 spent. A more recent American study looked at the EV-ROI (expected value-return on investment) of the "Supporting Healthy Marriage" programme (Shamblen et al., 2018). Even though the programme had minimal success, the small amount of relationship improvement resulted in savings of USD\$202,519 tax-payer dollars over a 30-month period. Going by these figures, and other similarly positive outcomes from other studies (e.g., Alcaniz et al., 2022; Crane & Christenson, 2012), the prevention of couple relationship breakdown through effective treatment could have significant economic benefits, and this is not even taking into consideration the multiplier effects where treatment of parents directly benefits their children, thereby reducing their costs to society over the long term. In line with the World Health

⁷⁴ *More recent estimates are hard to come by.*

Organisation (WHO)'s 'Health Impact Assessment' criteria (WHO, 2020), there is sufficient evidence that enhancing the quality of couple relationships is both a private and a public health issue that deserves immediate attention and action. An enhanced understanding of the factors to target in treatment is therefore urgently needed.

Appendix 3. Expanded Essay: A History of Relationship Science Research: Network Modelling the Prominent Research Factors

Decade by Decade Review of the Relationship Science Literature

This study section network modelled the prominent relationship well-being factors researched decade by decade. 29,122 eligible articles from the 1930s to 2022 were used, from 1,687 different academic journals. The database was scrutinized to determine the most cited articles in this collection, their topics of interest, and the highest publishing universities.

This side-study found that in the early 20th century researchers began to investigate how people socially interact, and how these interactions influence their behaviour. This led to the development of theories such as social exchange theory, which proposed that the gaining of rewards, and the avoidance of penalty, motivate engagement in social interactions. By the mid-20th century, relationship factors including attraction, and love, became popular targets of research. Robert Sternberg and Ellen Berscheid developed important and enduring theories around these factors. John Gottman and Howard Markman researched couples' communication patterns and their effect on relationship satisfaction and endurance.

The main factors investigated over time by the most prolific relationship researchers included intrapersonal and interpersonal processes. Conflict and personality influences were enduring topics through the decades. Communication patterns in relationships, relationship perceptions and appraisals, theories of emotion appraisal and individual differences, emotional regulation, dyadic coping and stress, social support, approach-avoidance motivation in close relationships, interpersonal attraction, personality and attachment styles, commitment, cross-cultural and lifespan factors in relationships, and sexual satisfaction, were all studied broadly.

More emphasis has been placed in recent years on the nature of not only the interpersonal interactions but also their underlying psychophysiological dimensions that determine well-being outcomes. The advancements in neuroscience in the late 20th century and the recent impact of new technologies have been important factors in directing relationship science research into the 21st century.

This article examines and illustrates how relationship science has evolved over the last century by network modelling the prominent relationship well-being factors researched decade by decade. In this way, it provides an analysis of the developmental journey researchers have taken leading the field of relationship science to its current era. A scoping review was used to gather research articles pertaining to the study of couple relationship well-being from the 1930s to 2022. This yielded 29,122 eligible articles from 1,687 different academic journals. The database was scrutinized to determine the most cited articles in this collection, their topics of interest, and the highest publishing universities. The factors (variables) being researched were manually extracted from each article abstract. The factors were then grouped into decades and network modelled using VOSviewer to determine the most prominent and co-occurring factors researchers investigated in each decade. The results showed that conflict and personality influences were enduring topics over the ninety years. Communication patterns in relationships, relationship perceptions and appraisals, emotion regulation, dyadic coping and stress, attachment styles, commitment, lifespan factors, physiological factors, and sexual satisfaction, were all studied broadly. Affective neuroscience has a significant ascent in the last decade. Results provide a visual insight decade by decade into the development of scientific knowledge and theory in the field of relationship science.

Relationship Science: Looking Backward to Look Forward

The academic study of human relationships is less than a century old (Finkel et al., 2017) but its published research corpus has grown exponentially, approximately doubling almost every decade (Sharkey et al., 2021). Likewise, the focus of relationship scientists has evolved. Melchert (p. 468) wrote in his appraisal of the psychology profession, “So much has been learned about human psychology recently that current explanations of many psychological mechanisms and processes are markedly different from those considered current just a generation ago”.

Research builds upon research. Newer academic studies build upon the success of older studies. Relationship science theories have developed accumulatively in stages, and each stage prescribes proceeding stages. Theories need time to be scrutinised and confirmed or disconfirmed. Time may strengthen the credibility and dependability of a theory when it is confirmed repeatedly and in varying contexts.

On the other hand, over time new findings may lead to new adaptations or discarding of theories. This is important information for researchers wanting to build upon the already accumulated abundant relationship science knowledge base. The factors that have been previously researched relating to the development and maintenance of couple relationship well-being are intrinsically tied to those currently being researched.

The most cited articles potentially influence the course of future research. Repeated reciting promotes the theories therein, elevating them for further use in later research. “Citations are a main vehicle through which research lives on—an important vehicle through which scientific work has heuristic value for future generations of scientists” (Sternberg, 2018, p. 265). However, highly cited studies may also represent historic trends that are not necessarily the most useful for the science to pursue. Citation bias may occur due to factors external to the scientific value of the actual content of the publication. Researchers chose their topics for reasons that are situated in their own interests, their own insights and experiences (R. Chen et al., 2017), building on the research and research methodology that has gone before them, and also within the context of a unique cultural epoch. Additionally, the more well-known an expert becomes in a field, the more likely their work is to be cited, regardless of its robustness (Duyx et al., 2017; Greenberg, 2009). Dominant groups of researchers can strongly influence the legitimising of information within the relationship science community, leading Nakagawa et al. (2019) to state that “it is no longer sensible to produce reviews that ignore the collaborative networks that generate scientific information” (p. 230).

In the *Handbook of the History of Social Psychology* Jill Morawski writes: “Fuller historical understanding is important for all social psychologists, whether they want greater accuracy in their ongoing research programs or seek innovative, interdisciplinary models... In this sense, appealing for greater awareness of the field’s history is analogous to calls for representative sampling of research participants” (Morawski, 2011, p. 20). This awareness is difficult due to the vast size of the relationship science corpus. To understand how researchers have studied couple relationships over the last ninety years, an examination was needed of their research output, and in particular the factors (or variables) they investigated. To overview the thousands of published articles, computational methods were used to provide a fast and effective means of analysis. This study set about investigating the relationship science research with a view to finding the prominent and influential

factors related to couple relationship well-being and which were rising to the fore in research across the decades.

Method

There were three steps taken to achieve a broad overview of the most salient factors studied throughout the decades. Firstly, a wide-ranging scoping review was utilized to gather research articles from multiple databases. Secondly, a focused investigation was made of the most cited articles, the key topics of study through the decades, and the highest contributing universities in Web of Science. Thirdly, the factors researchers had studied pertinent to couple relationship well-being outcomes were manually extracted from the article abstracts. These were uploaded to VOSviewer and network modelled decade by decade to determine the most frequently investigated factors and their co-occurrence with other factors in the literature. For each step the method is outlined along with the results.

Step One: Scoping Review

Scoping reviews are sweeping in nature and therefore a method suited to exploring the especially broad multi-disciplinary research domain of relationship science (Munn et al., 2018). Arksey & O'Malley's (Arksey & O'Malley, 2005) scoping review framework and their eligibility criteria were used as a guideline. An extensive search was made of academic literature, relevant articles were collected into Endnote and then edited, reviewed, organized, and analysed.

Identifying Relevant Studies

Relevant studies were identified following a search process similar to that outlined by Petticrew and Roberts (Petticrew & Roberts, 2006). Key words, key journals, key researchers, and key theories were methodically and heuristically searched. A variety of biopsychosocial factors from micro to macro, temporal, embodied, contextual, individual, and dyadic are recognized as relevant to the development and maintenance of adult couple relationship well-being outcomes. Studies identifying these factors were used to direct initial keyword searches.

Key Word Search Method

Keywords (and their truncated variants) describing the population and phenomena of interest were investigated using this initial search syntax: ("couple relationship*"

OR marital OR "marital relation*" OR marriage OR "close relationship*" OR "romantic relationship*") AND (satisfaction OR function* OR conflict OR happiness OR well-being). This syntax was applied to the electronic databases EBSCO, OVID, PubMed, PsycINFO, SAGE, Scopus, MEDLINE, Web of Science, and Wiley. This search showed up 1,860,662 articles. These were limited to 'interpersonal relations' in the topic screen (N=39,005), and these were screened for applicability to the research question by reading the titles and those that seemed applicable (related to romantic relationship processes and mechanisms) were retained. Further extensive searches of relationship science journals, authors, and key theories were carried out and articles were loaded and edited in Endnote – a software tool commonly used for managing academic references (Peters, 2017).

Eligibility Criteria

Studies were included if they: a) involved peer-reviewed research; and b) illuminated an aspect of the adult romantic relationship factors (developmental factors and maintenance factors). No restrictions were imposed on the language (where translatable into English), or country of origin. No restrictions were placed on year of publication, resulting in a date range of 1922 to 2020. Duplicate records were removed. At the end of this stage of research, 30,783 articles had been added into the Endnote database of which 29,122 were deemed relevant for use in this study.

Step Two: Investigating Influential Studies, Universities, and Authors

Highly Cited Studies

To find the most highly cited studies a search was made in Web of Science of "(marriage OR marital OR couple) AND (relationship)" - limiting the results to those in the category *Family Studies*. Using Web of Science's bibliometric search tools, the top 20 most cited articles relating specifically to couple relationships were found and are listed in Table 1., along with the prominent factors being investigated in the study.

Table 1. Top twenty most cited “(marriage OR marital OR couple) AND (relationship)” articles limited to family studies in Web of Science

Author	Title	Cite Count	Key Factors
Straus et al. (1996)	The revised Conflict Tactics Scales (CTS2) - development and preliminary psychometric data	4,371	<i>Conflict tactics</i>
Rusbult et al. (1998)	The Investment Model Scale: Measuring commitment level, satisfaction level, quality of alternatives, and investment size	1,200	<i>Investment, Commitment, Attractive alternatives, Relationship satisfaction</i>
Hendrick (1988)	A generic measure of relationship satisfaction	1,109	<i>Relationship satisfaction</i>
Funk and Rogge (2007)	Testing the ruler with item response theory: Increasing precision of measurement for relationship satisfaction with the couples satisfaction index	839	<i>Relationship satisfaction</i>
Conger et al. (2010)	Socioeconomic status, family processes, and individual development	827	<i>Socioeconomic status, Family processes, Developmental factors</i>
Johnson and Ferraro (2000)	Research on domestic violence in the 1990s: Making distinctions	635	<i>Violence</i>
Larzelere and Huston (1980)	The Dyadic Trust Scale - toward understanding interpersonal-trust in close relationships	566	<i>Trust, Reciprocity of trust</i>
Bradbury et al. (2000)	Research on the nature and determinants of marital satisfaction: A decade in review	550	<i>Relationship satisfaction</i>
Ambika and Buehler (2000)	Interparental conflict and parenting behaviours: A meta-analytic review	492	<i>Interparental conflict, Parenting</i>
Basson (2000)	The female sexual response: A different model	463	<i>Sex differences, Sexual response</i>

Kenny and Cook (1999)	Partner effects in relationship research: Conceptual issues, analytic difficulties, and illustrations	429	<i>Partner effects</i>
Fraley and Davis (1997)	Attachment formation and transfer in young adults' close friendships and romantic relationships	416	<i>Attachment formation, Attachment transfer</i>
Stith et al. (2000)	The intergenerational transmission of spouse abuse: A meta-analysis	415	<i>Abuse, Intergenerational transmission</i>
Stafford and Canary (1991)	Maintenance strategies and romantic relationship type, gender, and relational characteristics	415	<i>Relationship maintenance, sex differences</i>
Stanley and Markman (1992)	Assessing commitment in personal relationships	406	<i>Commitment</i>
Voydanoff (2004)	The effect of work demands and resources on work-to-family conflict and facilitation	400	<i>Work-to-family conflict, Resources</i>
Lawrance and Byers (1995)	Sexual satisfaction in long-term heterosexual relationships: The interpersonal exchange model of sexual satisfaction	391	<i>Sexual satisfaction</i>
Le and Agnew (2003)	Commitment and its theorized determinants: A meta-analysis of the Investment Model	371	<i>Commitment, Investment</i>
Greenstein (2000)	Economic dependence, gender, and the division of labor in the home: A replication and extension	352	<i>Economic dependence, Sex differences, Domestic labour</i>
Coleman et al. (2000)	Reinvestigating remarriage: Another decade of progress	345	<i>Family dynamics</i>

Seven of the twenty most cited articles tabled above were written in the 1990s and eleven in the 2000s with the most recent article written in 2010. Only two articles

were published prior to the 1990s – which may partly reflect a slow response to moving articles from hard copy or micro-fiche to the online record. None are later than 2010. From this search it becomes apparent that certain couple relationship well-being factors were being studied and re-cited through the decades. Conflict, violence, and abuse stand out, along with commitment, sex differences, sexual behaviour, and family processes.

Determining Prominent Factors, Authors, and Publishers Decade by Decade

In Web of Science, using the same search process the most cited journals, university affiliations, authors, and their topics of interest were determined decade by decade. The results also highlight some of the emphases through the decades of relationship science formulation and are noted in Table 2.

Table 2. Prominent themes, authors, and publishers: Decade by decade

Decade	Total no. articles	Prominent Journals (no. of articles)	Prominent Universities (total no. of articles)	Prominent Authors (no. of articles)	Key Factors (as noted in cited articles)
1951-1960	10	Marriage and Family Living (3)	None	Luckey, Eleanore (2)	<i>Need satisfaction</i>
1961-1970	67	Journal of Marriage and the Family (19)	University of Connecticut (3)	Luckey, Eleanore (6)	<i>Marital conflict</i>
1971-1980	147	Journal of Marriage and the Family (31)	University of Tennessee System (17)	Weiss, Robert (4)	<i>Conflict, attributions, commitment, and personality</i>
1981-1990	325	Journal of Marriage and the Family (52); Psychological Reports (22)	Kansas State University (19); University of Georgia (17); University of California (16)	Schumm, Walter (19)	<i>Conflict, context, support, attitudes, communication styles</i>
1991-2000	4,552	Journal of Social and Personal Relationships (146); Journal of Marriage and the Family (137);	University of California System (240); State University of New York (131); University	Fincham, Frank (33); Kurdek, L. (28); Gottman, John (27); Bradbury, Thomas (24)	<i>Relationship maintenance, conflict, personality, communication, attributions, coping, commitment,</i>

		Psychological Reports (126); Journal of Personality and Social Psychology (114)	System of Georgia (127)		<i>physiology</i>
2001-2010	8,695	Journal of Family Psychology (278); Journal of Applied Psychology (194); Journal of Social and Personal Relationships (189); Journal of Marriage and the Family (184)	University of California System (443); State University System Florida (380); Pennsylvania Commonwealth System (317); University of North Carolina (253)	Cummings, E. Mark (75); Davies, Patrick (42); Fincham, Frank (31); Bodenmann, Guy (27)	<i>Aggression, affect, support, communication, personality, attachment style, attributions, religion, forgiveness, commitment, sexual behaviour, culture</i>
2011-2020	22,608	Frontiers in Psychology (704); Journal of Family Psychology (467); Journal of Social and Personal Relationships (395); Personality and Individual Differences (391)	University of California System (780); State University System Florida (690); Pennsylvania Commonwealth System (596); University of North Carolina (521)	Bodenmann, Guy (72); Fincham, Frank (66); Cummings, E. Mark (64); Davies, Patrick (61); Impett, Emily (55)	<i>Conflict, stressors, dyadic coping, attachment style, relationship maintenance, emotional intelligence, personality, expectations, attributions, emotion regulation, sexual behaviour, resilience</i>

Once again, conflict stands out as a key factor being researched consistently through the decades. Commitment is picked up in the 1970s but drops off in the 2010s. Communication is featured from the 1980s to the 2010s. Attributions are highlighted in the 1990s through to 2020. Attachment seems to gain its greatest traction from 2000s to 2020, and personality, emotional intelligence, emotion regulation, and stress and coping are prominent in the 2010s.

Highly Contributing Publishing Universities

To further investigate those academic institutions who were contributing most prolifically to the research of relationship science a search was made in Web of Science using the original syntax: ("couple relationship*" OR marital OR "marital relation*" OR marriage OR "close relationship*" OR "romantic relationship*") AND (satisfaction OR function* OR conflict OR happiness OR well-being). These were refined to the Web of Science category 'Family Studies'. The results were then analysed in Web of Science to determine the highest contributing academic institutions.

The 20 universities producing the highest proportion of this published work were all in the United States of America, and included: University of California System (N=1,174), Pennsylvania Commonwealth System of Higher Education (N=843), University of North Carolina (N=824), University of Texas System (N=740), State University System of Florida (N=685), Pennsylvania State University (N=622), Pennsylvania State University Park (N=513), University of Michigan System (N=513), University of Michigan (N=509), University System of Georgia (N=501), University of North Carolina Chapel Hill (N=495), State University of New York Suny System (N=444), University of Minnesota Twin Cities (N=414), Brigham Young University (N=410), University of Illinois System (N=400), University of California Los Angeles (N=397), University of Texas Austin (N=396), University of Washington (N=392), University System of Maryland (N=380). It seems therefore that these are the universities with the most productive Family Studies departments as published in Web of Science.

Step Three: Finding and Network Modelling the Factors

To determine the key factors in the research contributing to couple relationship well-being the abstracts of each article were read and the factors under investigation were manually extracted and added into Endnote. Factors are those circumstances, facts, or influences that contribute to a result (Oxford Online Dictionary, 2022) – in this case, couple relationship well-being. Factors were able to be exported as a txt.file from Endnote and uploaded into VOSviewer. VOSviewer is a free network modelling bibliometric analysis software programme developed by Nees Jan van Eck and Ludo Waltman (VOSviewer.com, 2022) which is particularly suited for large datasets (van Eck & Waltman, 2014). The size of the node in the network model (the factor) indicates its numerical occurrence in the literature, and the thickness of

the link is commensurate with the strength of the connection between the nodes. The more publications in which factors co-occur, the thicker the line between them. Closely linked nodes indicate a clustering of terms in the literature – in other words, these factors come up together in article abstracts.

1,810 individual factors were uploaded into Endnote from 29,122 articles. VOSviewer only used the 1,000 highest occurring factors in its calculations. VOSviewer calculated the 30 most occurring factors in each model, in other words, the factors that turned up in the most articles as research variables, and these were then network modelled. The overlay visualisation tool in VOSviewer was used so that the average dates for the publication of the articles are also shown in the visualisation. The results of this network modelling are shown for each decade, along with a brief description of research that was occurring in that decade. This description was drawn from various sources, as referenced.

Network Models Decade by Decade

1930s

The network model of the key factors being studied in the 1930s is shown in Figure 1.

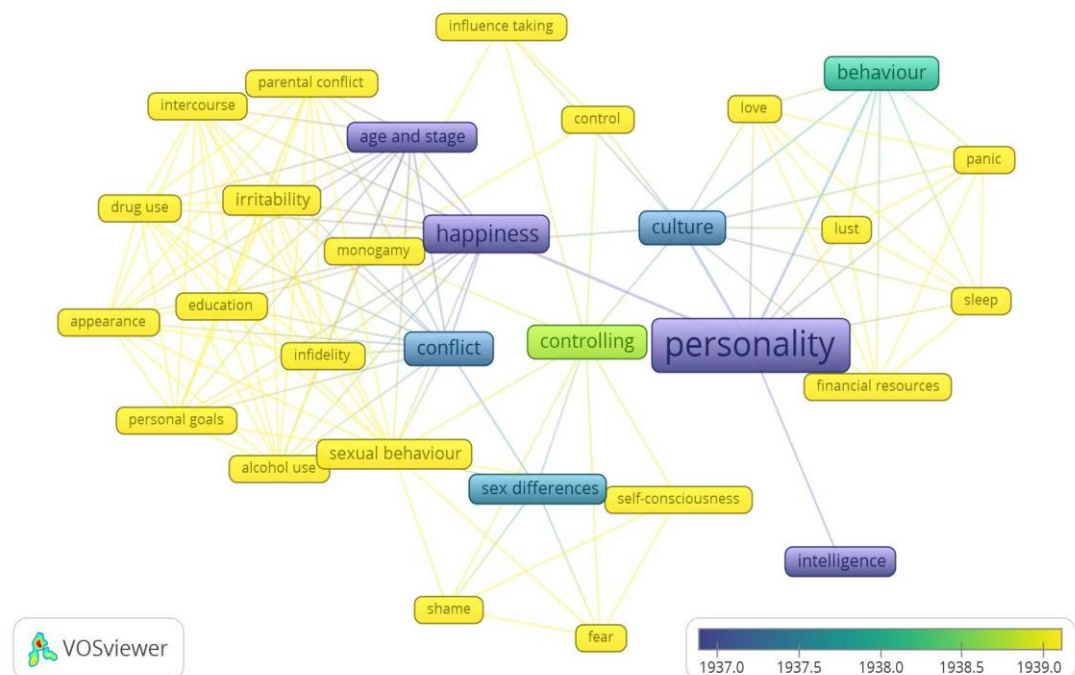


Figure 1. Factors from the 1930s publications

The 1930s witnessed the rise of **personality theory** which was also the most prominent factor being researched in this corpus of publications. Building on Francis Galton's work on behaviour genetics and the inheritance of abilities, Gordon Allport and Henry Odbert collated a compendium of adjectives from the dictionary that described observable behaviour markers denoting personality traits (Allport & Odbert, 1936). Henry Murray (1938) later published 'Explorations in Personality' explicating his system of human needs. In coming decades this early work would further evolve into new personality theories that would inform individual differences research.

Happiness also featured prominently in this decade. Lewis Terman presented his "Scale for the prediction of marital happiness" in 1938 (Terman, 1938). Terman's work was built upon a 25-year longitudinal study of the life outcomes of gifted children as they transitioned into adulthood (Johnson & Terman, 1935). Given the results of this study he proposed that family background, social status and personality factors contributed to static adult characteristics that dictated relationship aptitude. His work, which focused predominantly on these individual differences, informed much of the direction taken by relationship researchers for decades to come (for a review see Wamboldt & Reiss, 1989). Also of note, and prescient to Adult Attachment Theory, Terman and his colleagues concluded that "children who are strongly attached to their parents and have little conflict with them are more likely than others to be happy in marriage when they become men and women" (Terman, 1938, p. 34).

From the beginnings of the academic study of personal relationships, conflict was a prominent factor in relationship outcomes. Another notable contribution in this era was Ernest Burgess and Leonard Cottrell's theory of marital stability based on mutual accommodation, particularly when in conflict (Burgess & Cottrell, 1939). The National Council on Family Relations (NCFR) was established in 1938 (*National Council on Family Relations*, 1938), and its cofounder, Ernest Groves, championed the formation of an academic subdiscipline of a 'science of marriage and family'. This would take several decades to actualise. In 1939 the *Journal of Marriage and Family* was established (initially titled *Marriage and Family Living*).

1940s

The network model of the key factors being studied in the 1940s is shown in Figure

2.

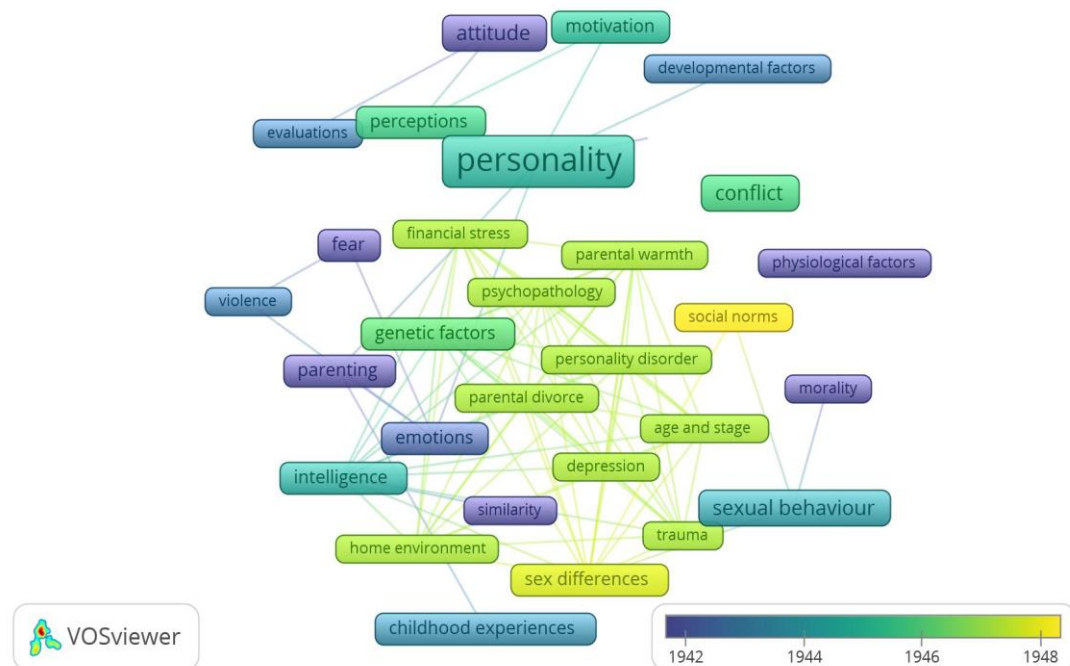


Figure 2. Factors from the 1940s publications

Personality continued to dominate as a research factor in the 1940s. Raymond Cattell (1946) published work on personality that would have an influence for decades to come. D. W. Fiske (1949) later analysed and found the personality traits of social adaptability, emotional control, conformity, and inquiring intellect, which were to inform the making of the **Big Five** Personality Model. The Big Five factors were originally described as: Surgency (or Extraversion), Agreeableness, Conscientiousness, Emotional Stability (versus Neuroticism), and Culture. More recently, Culture has been relabelled as Intellect (Peabody & Goldberg, 1989), or Openness to experience (McCrae & John, 1992).

In 1948 Kurt Lewin published a paper titled “The background of conflict in marriage”, and his field theory, which stipulated that behaviour was a function of the person and the environment ($B = f(P, E)$), helped redirect theory development to include an individual’s context (Lewin, 1951). Lewin went on to mentor several influential relationship scientists, including Leon Festinger, Stanley Schachter, John Thibaut, Harold Kelley, and Morton Deutsch (Reis, 2011). In 1949 Reuben Hill presented a theoretical framework (the **ABC-X Model**) to illustrate the impact of stressors and family resources on family outcomes. His model, along with Hill’s later contributions, had an “immense impact” on the field of family science (Olson & Boss, 1986),

although stress as a factor doesn't show up as prominently researched until the 1980s. However, stressors of various descriptions, and coping, were topics of research throughout the decades.

The American Association of Marriage Counsellors was founded in 1942 (later to become the American Association for Marriage and Family Therapy) and the ground-breaking sexual behaviour researcher Alfred Kinsey forged close ties with this organisation (Dowbiggin, 2014).

1950s

The network model of the key factors being studied in the 1950s is shown in Figure 3.

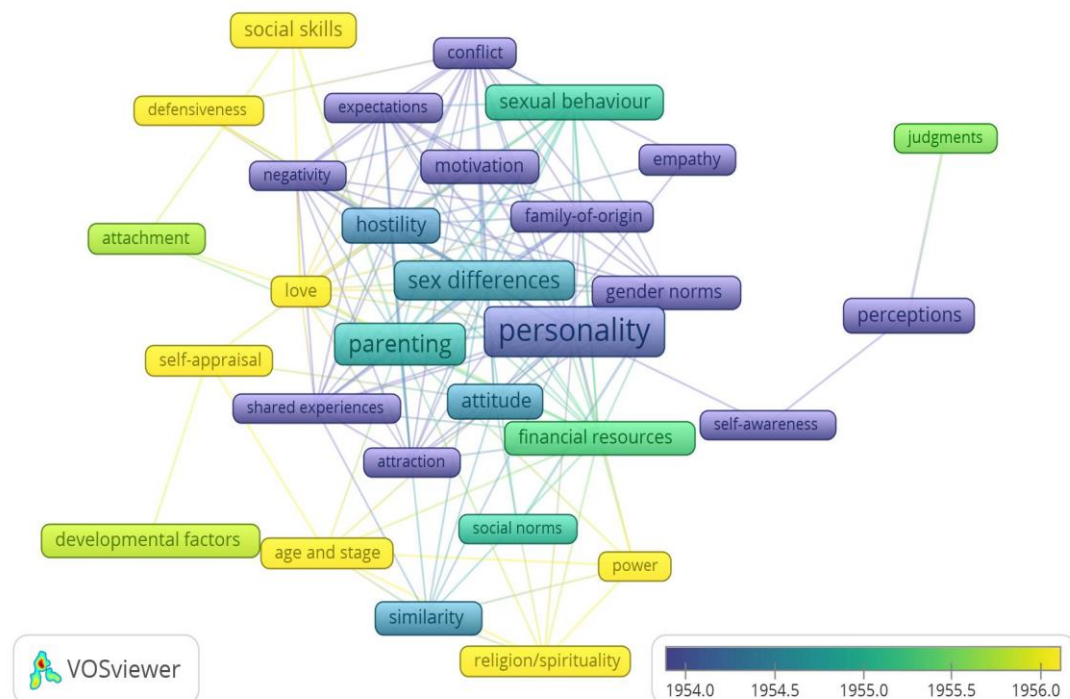


Figure 3. Factors from the 1950s publications

Personality still dominated as the key factor being researched in the 1950s. The controversial but highly cited personality psychologist – Hans Eysenck – was beginning to publish prolifically (e.g., Eysenck, 1952). Harry Stack Sullivan (1953) explored the concept of human personality development and its contribution to intimacy within couples.

Erik Erikson (1950, 1968) was making his mark in the 1950s through

conceptualising the foundations of psychosocial development across the lifespan, beginning with parenting in childhood. Erikson recognised that an individual's capacity to connect with others had an enduring and significant impact upon their development (Erikson, 1959). Murray Bowen began his work looking at the dyadic influences between mothers' parenting style and its impact on the mental health outcomes of their children. This was to later form the basis for **Bowenian Intergenerational Theory** (Bowen, 2013).

In 1954 Leon Festinger introduced **Social Comparison Theory**, which considered how people perceive themselves in comparison with others to appraise their social worth. Love, affection and a sense of belonging made their way to the top of Abraham **Maslow's Needs Pyramid** (Maslow, 1954). William Masters and Virginia Johnson began their research investigating couple's sexual behaviour in 1957 (Maier, 2009). In 1959 *The Psychology of Affiliation* was published by Stanley Schachter. This was followed shortly thereafter by Harold Kelley and John Thibaut's book *The Social Psychology of Groups* (Thibaut & Kelley, 1959) which described **Interdependence Theory**. Interdependence theory created a template of sorts for future research with its simple equation of interpersonal interactions being a function of the given situation and the behaviours of the individuals in that situation ($I = f(A, B, S)$).

In the 1950s Harry Harlow, with his controversial experiments, introduced the world to the horrifying detriments of caregiving neglect for infant monkeys and their later life outcomes (Harlow, 1958). John Bowlby expanded on this work and was an important influence throughout the mid-century. Bowlby's first published work was *Forty-Four Juvenile Thieves* in 1946, but his seminal work on attachment theory was published in 1958, and future significant works were published in the ensuing decades. Alongside Mary Ainsworth and Robert Hinde he advanced existing thought about the nature of healthy child development and consequent adult relationship outcomes (Ainsworth et al., 1978; Bowlby, 1958, 1969, 1973, 1979, 1980, 1988). Bowlby was influenced in this work by his friend, Noble prize-winning ethologist Nikolaas Tinbergen (Van der Horst et al., 2007).

1960s

The network model of the key factors being studied in the 1960s is shown in Figure 4.

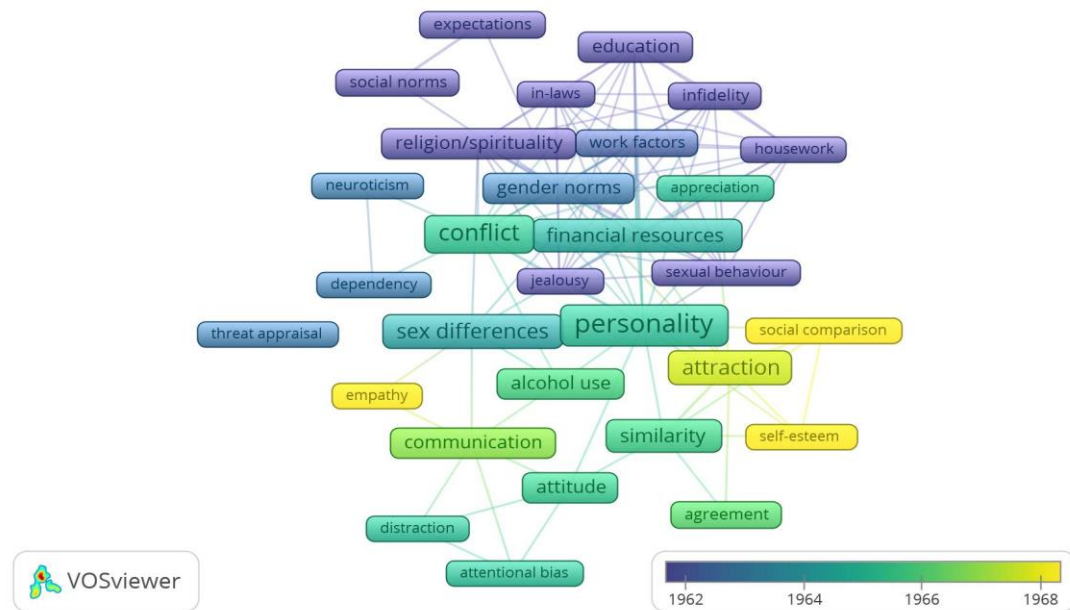


Figure 4. Factors from the 1960s publications

In the 1960s Tupes and Christel (Tupes & Christal, 1961) continued to advance the science of personality with their testing of the Big Five Personality factors. Personality was already well-established as a factor contributing to couple relationship well-being outcomes and while research continued at pace on this topic, other topics began to ascend. Theodore Newcomb (Newcomb, 1960) defined categories of interpersonal attraction (admiration, personal trust, role support, respect, value support—and a combined general attractiveness). He later introduced the **Reciprocity Principle** where it was noted that people reciprocate interactional behaviours (Newcomb et al., 1965). **Equity theory**, introduced by J. Stacy Adams (Adams 1965) and later extrapolated by G. William Walster, Ellen Berscheid and Elaine Walster (Walster et al., 1973), advanced Newcomb's idea by proposing that the ratio of a couple's reciprocated behaviours was key in this equation. Meanwhile, Don Byrne was investigating the correlation between interpersonal similarity and attraction (Byrne, 1961).

Eleanore Luckey (1960a, 1960b) published articles describing how couples' perceptions and expectations influence their relationship outcomes. Other work on perceptions, attributions, and expectations was in its embryonic stages. George McCall and Jerry Simmons (McCall & Simmons, 1966) noted that when partners affirm behaviours that corresponded with their own vision of their identity, their attachment to one another grew. William Lederer and Don Jackson published their

book *The Mirages of Marriage* (Lederer et al., 1968) which positioned couples as dyadically influential rather than as two individuals independently co-existing. Carl Rogers (1961) made his own enduring impact with his thesis on the importance of unconditional positive regard between people in the fostering of open and intimate relationships. Sidney Jourard (1964, 1971) further elaborated on this idea with his supposition that open disclosure of feelings fostered trust and facilitated more satisfying relationships. Despite these significant advances in the field of relationship science, Gerald Manns (1966) noted that marriage counselling still lacked an integrated theoretical underpinning.

Ellen Berscheid and Elaine Hatfield began their study of romantic relationships in the late sixties and early seventies. Their publication *Interpersonal Attraction* introduced the notion of attraction being motivated by reward (Berscheid & Walster, 1969). Their approach designated human relationships as central to human well-being, and while they faced challenges – such as the allegation in 1975 that their research was a waste of taxpayer money (Benson, 2006) – their persistence created a significant upward movement in relationship science research by highlighting successful relationships as prescient to success in almost every other life domain and central to the broader science of psychology (Reis et al., 2013).

1970s

The network model of the key factors being studied in the 1970s is shown in Figure 5.

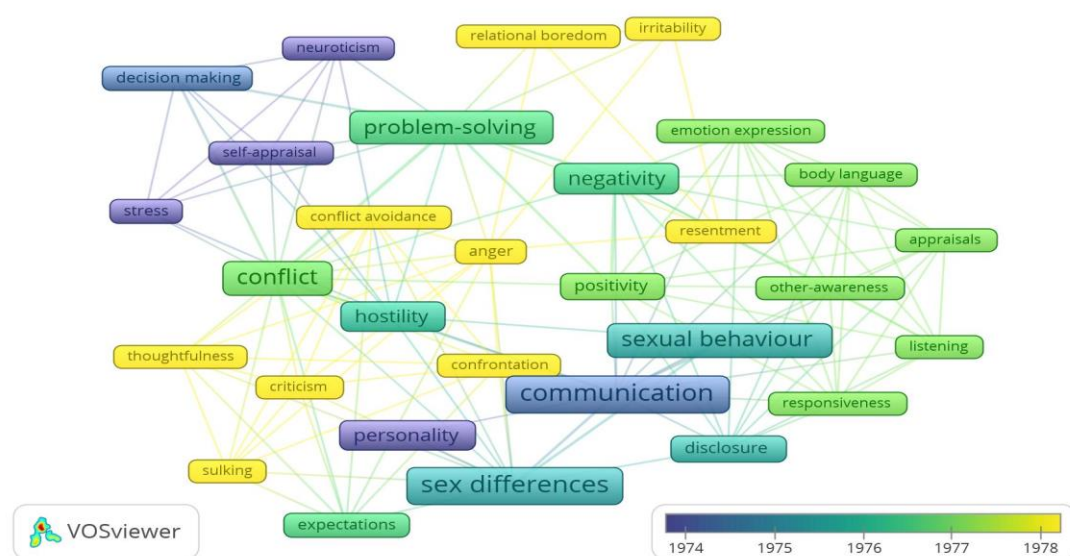


Figure 5. Factors from the 1970s publications

The 1970s saw the rapid ascent of the field of relationship science as numerous academics began their own programs of research into the mechanisms of marital happiness and stability. It is noted that at this point in time, heterosexual marriage was the primary couple relationship under investigation. Several researchers set up laboratories to study couple interactions and their findings shaped the course of research for the coming decades. This gave rise to a large and rapid increase in research into communication, sex differences, sexual behaviour, appraisals, and problem solving.

Irwin Altman and Dalmas Taylor (Altman & Taylor, 1973) outlined **Social Penetration Theory** in an attempt to describe the developmental processes of relationships. This theory proposed that relationships with significant others were vital to an individual's goals of autonomy, competence, and relatedness. Communication, particularly self-disclosure, was deemed a key mechanism in reaching these goals. George Levinger and his colleagues (Huston & Levinger, 1978; Levinger, 1974, 1976; Levinger & Snoek, 1972; Rands & Levinger, 1979) also studied the individual factors contributing to effective communication and mutuality, particularly the interchange of positivity within couples.

Thomas Wills, Robert Weiss and Gerald Patterson (Wills et al., 1974) published their behavioural analysis of the determinants of marital satisfaction – heralding a new season of relationship research focused on behavioural observation studies birthed out of **Reinforcement Theory** – the principle that individual behaviours are shaped by their consequences. Couple's therapist Clifford Sager published his book *Marriage Contracts and Couple Therapy: Hidden Forces in Intimate Relationships* (Sager, 1994), in which he expounds on the relational impact of uncommunicated expectations and obligations and offers ways to resolve these in therapy.

Harold Kelley formalised his **Theory of Interdependence** in 1978 and highlighted responsiveness as an undergirding principle of mutually satisfying couple communication (Kelley, 1979; Kelley & Thibaut, 1978). He was awarded the Kurt Lewin Memorial Award in 1990 and Albert Pepitone (1991) noted then that "Kelley's current theoretical synthesis of the conceptual types of dyadic interdependence and attribution of personal dispositions will bring us to the frontier in our understanding of interpersonal relationships." This statement was precognizant. Burgess and Huston published their **Social Exchange Theory** shortly after (Burgess & Huston, 1979). This theory identified mutually rewarding communication as a key

mechanism for building intimacy in couple relationships. Trust is seen to develop through confidence in each partner's willingness to invest in the well-being of the other. Sacrificial giving defined communal relationships as compared to merely exchange-based relationships (Clark & Mills, 1979). This distinction was important for the next decade of research where several studies were carried out to determine how communal orientation influenced relationship outcomes.

Other influences on the development of relationship science through the 1970s included Urie Bronfenbrenner's investigations into the impact of socio-contextual factors on relationships. **Ecological Systems Theory** (Bronfenbrenner, 1977) has been widely adopted across multiple disciplines with his published work cited thousands of times (Neal & Neal, 2013). Zick Rubin published his findings on the precedents of romantic love (Rubin, 1974), and the extensively cited scale of intimate relationship quality – the **Dyadic Adjustment Scale** (DAS) – was published by Graham Spanier (Spanier, 1976).

The American Association for Marriage and Family Therapy (AAMFT) began publishing in 1974 (Dowbiggin, 2014). In 1977 the first international relationship science conference was hosted in Wales by Mark Cook and Glen Wilson (Duck, 2014). During the 1970s family science pioneer Wes Burr, at Brigham Young University, developed a relationship inventory to assess relevant strengths and weaknesses in couple relationships. This began a four-decade long study of romantic relationships, and the assessment later morphed into the well-known RELATE. Since the late 1990s when RELATE was updated, 60,000+ people have contributed to the RELATE database (Willoughby, 2014). This data has served as the source for several notable texts later in the 2000s on relationship stability and satisfaction trajectories (Busby & Loyer-Carlson, 2002; Holman, 2001; Larson, 2003).

1980s

The network model of the key factors being studied in the 1980s is shown in Figure 6.

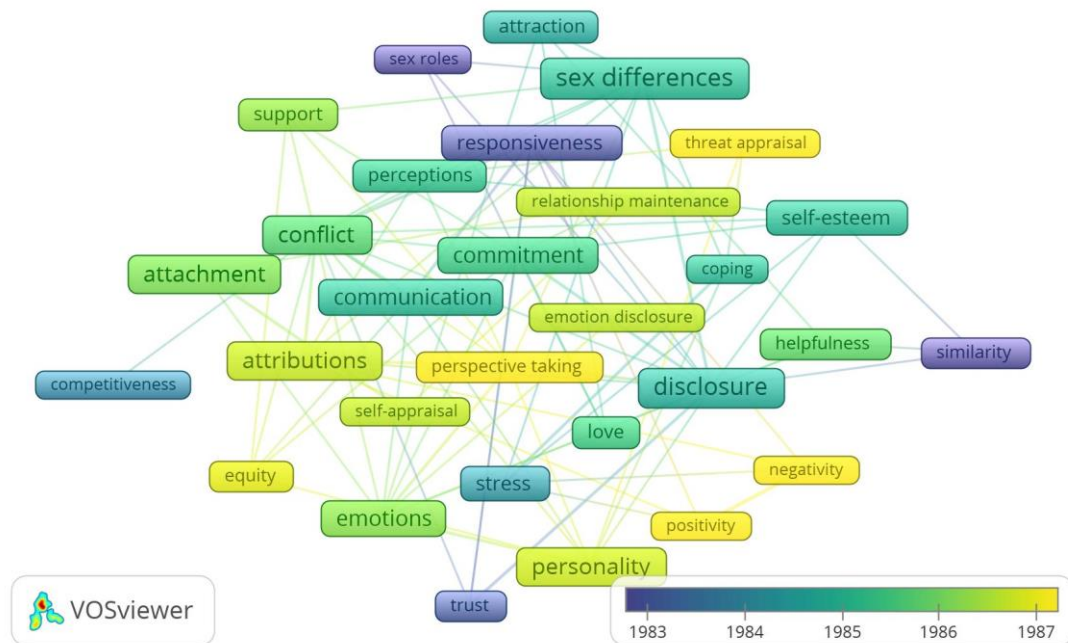


Figure 6. Factors from the 1980s publications

In the 1980s relationship therapy merged with relationship theory to become a discrete science – relationship science – that encompasses both the development and maintenance of close interpersonal relationships. During the 1980s universities in the United States had begun including master's degree programs in couple therapy into their curricula. Research carried out through this decade contributed to a new breed of marriage researchers who followed, according to Harry Reis, three established theoretical approaches: Interdependence, Evolutionary, and Attachment (Reis, 2011). So, it is no surprise that attachment becomes evident in the network models as a key factor in couple relationship well-being research.

Psychological Evolutionary Theory rose through the 1980s and lent insight in the coming years into the ways in which human relationships determine adaptation, how the brain is therefore designed to regulate efficiency in relationships, and how biological sex differences between men and women explained distinct adaptive behaviours (Buss & Schmitt, 2019; McKusick, 1986). Attachment Theory also evolved. In 1987 Cindy Hazan and Phillip Shaver published a paper hypothesising that attachment theory concepts apply not only to childhood relationships, but also to romantic adult relationships. Their hypothesis became the focus of a flurry of research that continues to the present day. The Adult Attachment Scale (AAS) was created, based on Ainsworth's original infant-mother categories (Ainsworth et al., 1978). This was later assessed, showing three adult attachment profiles: secure,

avoidant, and anxious (Collins & Read, 1990).

Personality factors were still being studied. Paul Costa, Robert McCrae, Lewis Goldberg and Warren Norman, carried out a large survey which further defined the Big Five and led to the development of the **Five-Factor Personality Model** – now deemed the most robust model of personality yet developed with 80% of personality variance observed in its five dimensions (Zhao & Seibert, 2006). While researchers such as Walter Schumm contributed significantly to the growing investigation and assessment of other individual factors influencing relationship well-being outcomes (e.g., self-esteem, number of children, religion, violence, emotional intimacy, stressors, coping, sex differences) (e.g., Schumm, 1981, 1984; Schumm et al., 1980; Schumm & Hammond, 1986; Schumm et al., 1985; Schumm et al., 1982), others began to investigate ways in which partners responded to each other and coordinated their needs and goals. Dave Kenny and Niall Bolger led the way in using dyadic analysis in research, opening up a new era of investigation of interactive elements of couple relationships (Perlman, 2022). Kelley's thesis of relationship interdependence (Kelley, 1983) – that partners influence one another – helped shift research focus from simply intra-individual factors to inter-individual factors. The **Convoy Model of Social Relations** was developed which contextualised the individual interacting among their broader relationships (Antonucci & Akiyama, 1987).

Relationship scientists were also coordinating their goals. In 1982 an International Conference of Personal Relationships was convened in the United States (Perlman & Duck, 2006) with guest speakers Harold Kelley, Elaine Hatfield, Steve Duck, Ted Huston, John Harvey, Ellen Berscheid, Jerry Ginsberg, Robert Hinde, Daniel Perlman, Wolfgang Stroebe and Michael Argyle. The International Society for the Study of Personal Relationships was formed in 1984. This was later to merge with the Iowa Network on Personal Relationships to form the International Association for Relationships Research. In 1987 the *Journal of Social and Personal Relationships* began publication as the first peer-reviewed journal focused on human relationships as its speciality (Kruglanski & Stroebe, 2011). Advances in technology in this decade, such as video and micro-processors, allowed new methods of observational relationship investigation in controlled conditions (e.g., Gottman, 1979). At the same time advances in statistical modelling, including structural equation modelling and multi-level modelling, introduced new levels of complexity and precision to relationship research.

Love was a highlighted research topic in the 1980s with researchers exploring facets of love, including passion and commitment (Fehr, 1988; Hatfield et al., 1984). Clyde and Susan Hendrick published a typology of love (Hendrick & Hendrick, 1986). The same year, their contemporary, Robert Sternberg, published his **Triangular Theory of Love** (Sternberg, 1986). The three corners of this triangle are passion, intimacy, and commitment. Arthur and Elain Aron (Aron & Aron, 1986) published *Love and the expansion of self: Understanding attraction and satisfaction*, which explained that the feelings, thoughts and behaviours associated with love are motivated by the need for self-expansion. Caryl Rusbult introduced the **Investment Model of Commitment** which determined commitment in a relationship to be directly related to an increase in relationship satisfaction and investment, and a decrease in perception of desirable partner alternatives (Rusbult, 1983). This model helped open up other avenues of research into relationship stability and maintenance and was the forerunner to Sandra Murray, John Holmes, and Nancy Collins' **Risk Regulation Model** which considered how couples balance closeness, interdependence, vulnerability, and potential rejection (Murray et al., 2006).

1990s

The network model of the key factors being studied in the 1990s is shown in Figure 7.

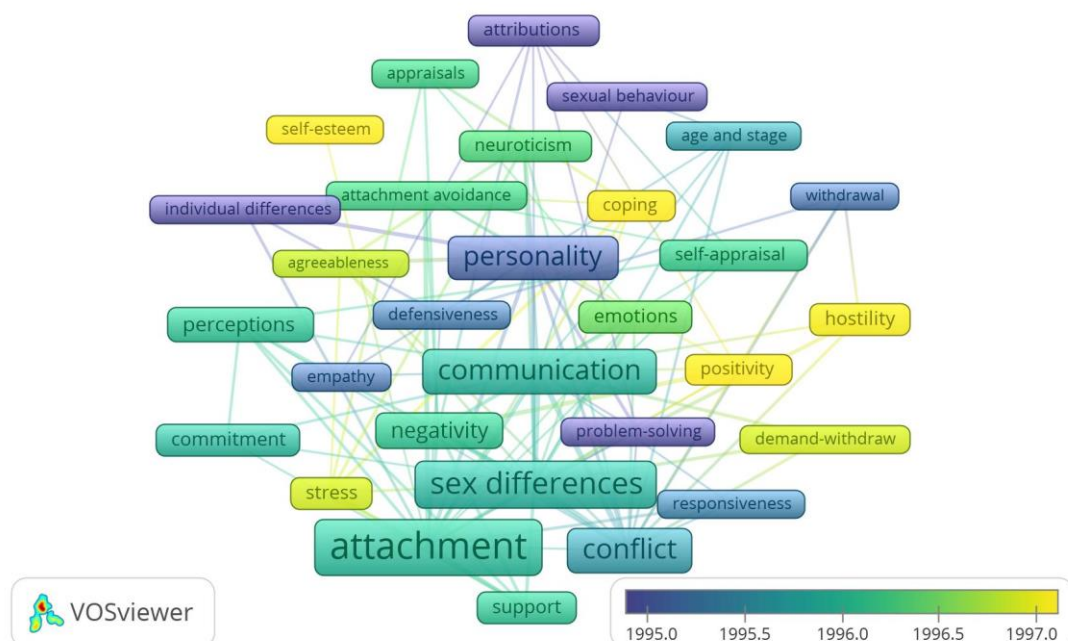


Figure 7. Factors from the 1990s publications

By the beginning of the 1990s relationship science was increasingly recognised as a significant arm of the field of psychology, and this environment of growing academic recognition and interest coincided with John Gottman's unique observational dyadic investigation of human relationship processes. As a result of his decades of work he has since been recognised as one of the top ten most influential psychotherapists of his generation (Cook et al., 2009). When he started out in the 1980s there were only a handful of existing prospective longitudinal studies investigating the predictors of marriage dissolution (e.g., Bentler & Newcomb, 1978; Constantine & Bahr, 1981), and none observed actual couple interaction or produced conclusive correlations (Gottman, 1991). Gottman recognised that to understand the mechanisms of marital stability he needed to understand the predictive correlates of marital stability. This required actually observing couples in action and following their marital trajectory longitudinally (Gottman & Silver, 1994).

Gottman and his colleagues carefully monitored the dynamic affective processes within the couple dyad (rather than the typical study of individual outcomes utilising only self-report) and found they could predict divorce to an accuracy of 92.7% simply from watching and coding the positive and negative affect present in a couple's repair conversation after conflict (Gottman & Levenson, 1999b). This accuracy increased to approximately 94% by assessing the amount of fondness, we-ness, negativity, and chaos in a couple's description of their marital history (Buehlman et al., 1992). Divorce could be forecast by analysing the behaviour and affect from just the first three minutes of a couple's conflict conversation (Carrère & Gottman, 1999), and could also be independently predicted simply through recording a couple's sweat and heart rate – with physiological monitoring proving to be an even more powerful prediction tool than interview observation (Levenson & Gottman, 1985).

In the 1990s network model, communication is seen as a rising factor, along with defensiveness, demand-withdraw patterns, and the positivity:negativity ratio – all factors that Gottman and his team brought to the fore of relationship science research. In 1999, as the decade of the 1990s closed out, Jay Lebow wrote that "Gottman's work ultimately will be seen as leading a paradigm shift, changing the very nature of what we look at, what we see when we look, and how we think about couples." (Lebow, 1999, p. 1).

Lawrence Kurdek's studies (e.g., Kurdek, 1991, 1993, 1995, 1997) investigated divorce predictors from multiple perspectives and greatly added to the understanding of what developmental factors contribute to marital well-being. Paul Amato began to publish studies on family relationships which highlighted the significant well-being outcomes of stable marriage (e.g., Amato & Booth, 1991; Amato & Keith, 1991a, 1991b, 1991c). While these studies were enlightening, they also led to millions of dollars being invested into the United States federal "Healthy Marriage Initiative", and a resultant flurry of marriage program development. These programs have now been described as being hastily created, poorly researched, and lacking thoughtful theoretical underpinning (Schramm et al., 2017), as well as being largely ineffective – particularly for their target group of lower socioeconomic families (Johnson, 2012).

Frank Floyd, Howard Markman, Shalonda Kelly, Susan Blumberg, and Scott Stanley published a "Prevention and Relationship Enhancement Program – PREP" (Floyd et al., 1995) – which has been taught to more than a million people and has had numerous longitudinal studies carried out to determine its efficacy – with mixed results (PREP Inc, 2022). One noteworthy finding has been that the program has not met the needs of those couples with the most need (Lloyd et al., 2014). However, while there is further to go with improving the effectiveness of these interventions, these early programs generated a large amount of helpful research to illuminate future directions.

As communication was recognised as a key factor in couples relationship well-being in this decade, a primary target of early cognitive behavioural programs was couple communication skills (Epstein & Baucom, 2002; Fincham & Beach, 2010; Hawkins et al., 2008; Jacobson & Margolin, 1979; Stanley et al., 1999), for example, teaching couples to use "I statements" during conflict or teaching active listening skills (Folger & Poole, 1984; Glick et al., 2000; Gottman, 1979; Gottman & Krokoff, 1989; Gottman & Notarius, 2000; Margolin & Weiss, 1978). This broadly infiltrated the American thinking (Cahn, 1992; Carroll et al., 2010), and from there the international audience. The overall premise of these therapeutic methods was that eliminating negative conflict communication in a couple's interactions would improve marital well-being overall. While studies showed this to have some positive impact on relationship outcomes (e.g., Allen et al., 2015; Loew et al., 2012; Markman et al., 1993), over the long terms results seemed to be mixed (Johnson & Bradbury, 2015). Many researchers now acknowledge these key foci may have caused a misdirection

in relationship science (e.g., Hawkins & Fackrell, 2010; J. Ross et al., 2019).

In 1995 Benjamin Karney and Thomas Bradbury proposed the **Vulnerability-Stress-Adaptation Model** – and coping with stress began to turn up as a factor in the research. They also carried out a comprehensive review of the published research regarding marriage quality and stability. This study encompassed 115 longitudinal studies representing over 45,000 marriages. It seemed to confirm that communication difficulties between couples such as expressions of contempt and lack of respect for each other's ideas were predictors of divorce and therefore should be the targets of change in therapy. However, this research data had a variety of sampling complexities – including 43% of the data sampling only including one partner in the dyad – leaving gaps in the interpretation of interpersonal communication dynamics. Nonetheless these studies helped to define the 1990s as focussed on marriage communication and conflict factors and led Frank Fincham and Steven Beach to conclude that “the investigation of conflictual interaction has a privileged status in this research” (Fincham & Beach, 1999, p. 48).

In 1992 John Gray published his book *Men are from Mars, Women are from Venus*. Gray's theses were not founded in empirical studies, and his doctoral education was as a Maharishi Mahesh Yogi disciple rather than the traditional route via conventional psychological training. Consequently, academia didn't welcome his book with open arms (e.g., Wood, 2002). Nonetheless it went on to sell more than 15 million copies, making it a best seller during the 1990s (Internet Archive Wayback Machine, 1999). The premise that men and women had different foci in their intimate relationships clearly struck a chord with the general public, and potentially with researchers as sex differences were a key factor of study in this decade. Gray's writings also alerted the scientific community to the hunger for relatable and accessible knowledge about relationships among the populace.

Attachment theory was picked up by researchers through the 1990s and Emotionally Focused Therapy – which focuses on couple attachment issues – received increasing research attention (Johnson et al., 1999). Evolutionary psychology continued to have an impact on relationship science through the 1990s – providing an undergirding theory for the central place of human relationships in adaptation and the development of the brain and thought (e.g., Buss, 1995; Buss & Schmitt, 1993a; Tooby & Cosmides, 1992). The journal *Personal Relationships* began publishing in 1994. Ellen Berscheid (1999) wrote in 'The Greening of

Relationship Science', "Today, if you squint your eyes and cock your ears just so, you can see the greening of a new science of interpersonal relationships" (p. 260).

2000s

The network model of the key factors being studied in the 2000s is shown in Figure 8.

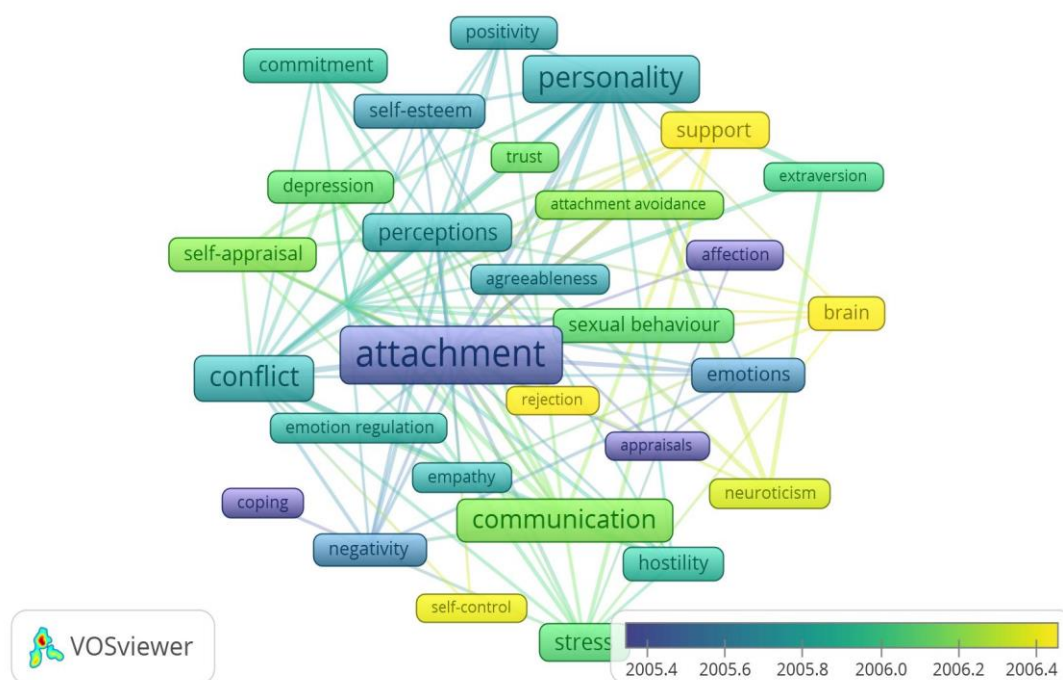


Figure 8. Factors from the 2000s publications

In 2001 Ted Huston and his colleagues published a novel study investigating couples in the early stages of their relationships. Their findings pointed away from communication dysfunction as the underpinning for the emergence of interpersonal problems and instead turned the focus towards the emotional climate of the marriage, particularly the development of emotional warmth or coldness between partners in the first two years of marriage. Nancy Collins and Brooke Feeney (Collins & Feeney, 2000) championed this concept of creating a "safe haven" of warm attachment in the marital relationship, and the giving and receiving of support in relationships was broadly investigated in this era (e.g., Cramer, 2006; Goldsmith et al., 2000; Iida et al., 2008).

In 2006, Jason Carroll, Sarah Badger and Chongming Yang published a multidimensional model of marital competence that highlighted the motivational factors underlying couples' communication and conflict behaviours (Carroll et al., 2006). Other researchers were beginning to publish findings that shifted the emphasis from conflict communication as the primary source of relationship dissolution. Instead, they were finding that "it is not whether couples fight but how they fight that is most pertinent" (Cummings et al., 2008, p. 193). In fact, researchers through the 2000s began to describe the avoidance of conflict in marriage as potentially hazardous to the relationship (e.g., Bertoni & Bodenmann, 2010; Papp et al., 2009) – a complete 180-degree change from earlier conceptualisations.

Guy Bodenmann published his work on dyadic coping prolifically through the 2000's onwards (e.g., Bodenmann, 2005; Bodenmann et al., 2006; Randall & Bodenmann, 2009). The impact of relationships on individual stress and coping consequently evolved into an impactful arm of relationship science. Shelley Taylor's **Tend and Befriend Model** (Taylor, 2006; Taylor et al., 2000) raised awareness of the impact of biological sex differences on human relating and highlighted the biopsychosocial nature of relationships (along with other studies e.g., Adler, 2009; Garland & Howard, 2009). Understanding of the hormonal (e.g., Floyd & Riforgiate, 2008), neurological (e.g., Bartels & Zeki, 2004) and physiological (e.g., Loving et al., 2009) processes that influence the ways people interact with one another became more fine-tuned. The neuropsychological structures and processes contributing to social emotion, thought, and behaviour also started to be investigated more prolifically (e.g., Bartels & Zeki, 2000; Bartz & Hollander, 2006; Depue & Morrone-Strupinsky, 2005; Eisenberger et al., 2007), partly due to the rise in fMRI research availability.

Much work had been, and was being done to understand basic emotions generally (e.g., Nair, 2008), including a new investment into understanding the cultural variations of emotional responses (e.g., Kuppens et al., 2008). **Emotion Regulation** and **Emotional Intelligence** had also become topics of interest to many researchers (e.g., Gross, 2002; Nezlek & Kuppens, 2008; Richards et al., 2003; Smith et al., 2008), and the study of emotion appraisal (e.g., Smith & Kirby, 2009), as well as appraisals, perception, and expectations generally (Fincham et al., 2000), continued to flourish.

The 2000s saw a large increase in relationship science publications. As the number of researchers increased, and technology aided in research processes, the topics being studied also diversified and expanded. While the older theories were mostly retained, and prominent ones such as attachment theory, personality theory, dyadic coping, and interdependence theory continued their steady growth and developed new branches, research was also building in the less investigated areas of relationship correlations with health and well-being (Repetti et al., 2002), commitment (e.g., Arriaga & Agnew, 2001), culture (e.g., Ditommaso et al., 2005), approach and avoidance motivation (e.g., Gable, 2006), and sexual behaviour (e.g., Brezsnyak & Whisman, 2004).

While Thomas Bradbury (2002) noted that relationship science was still in the early stages of theory development and lacked integration across disciplines, Harry Reis's article "Steps Towards the Ripening of Relationship Science" summarised the field at that point in time as "a multidisciplinary science of interpersonal relationships with enormous potential to advance knowledge about human behaviour and to provide an empirically informed framework for improving the human condition" (Reis, 2007, p. 1).

The *Cambridge Handbook of Personal Relationships* (Vangelisti & Perlman, 2006) made evident a focus in this decade on temporal relationship development, the influence of individual differences, communication, emotional and physiological responses, self-disclosure, social support, conflict, sexual behaviour, stress, deception and betrayal, abuse, and commitment. Attachment theory remained well-studied, and it was noted that Emotion Focused Couple Therapy was continuing its rise. Evolutionary theory was also seen to be increasing in significance for the field and included under this umbrella was research interest in the biologically based approach and avoidance motivation system.

2010s

The network model of the key factors being studied in the 2010s is shown in Figure 9.

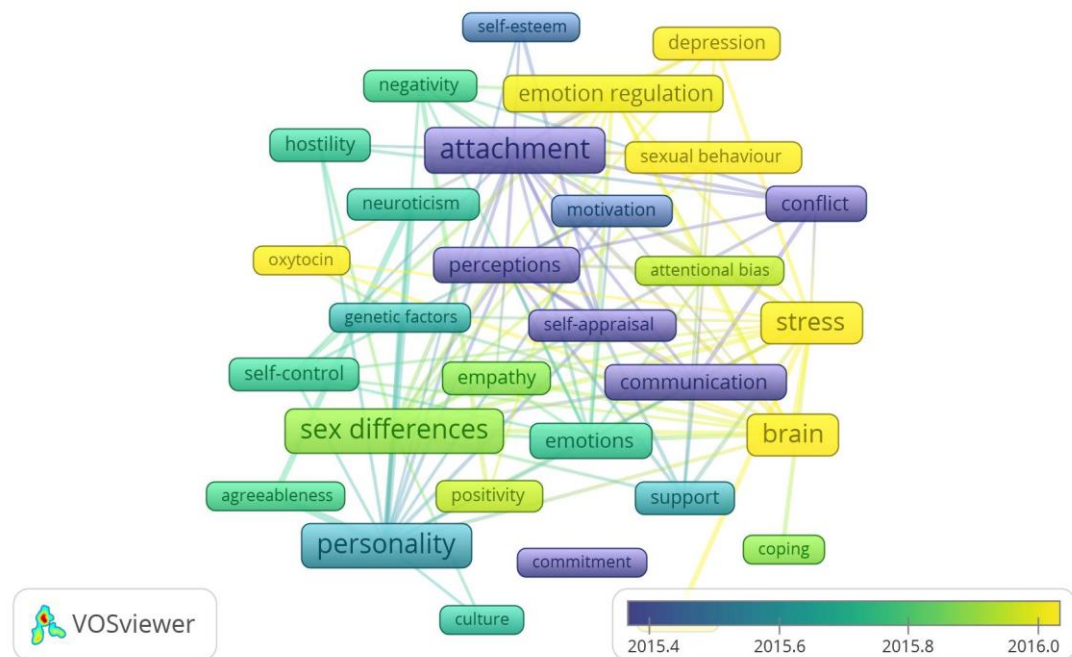


Figure 9. Factors from the 2010s publications

The past decade of 2010 to 2020 has seen rapid increases in relationship science research publications. Jeffrey Simpson and Lorne Campbell (Simpson & Campbell, 2013) describe relationship science as moving towards an interdisciplinary, theoretically integrated future with a focus on studying person-by-situation models, cognition in the relationship process, developmental relationship trajectories, physiological processes, and interconnections between partners. Attachment and personality theory continued to stand out as prominent and widely researched underlying theories of relationship science.

Neuroticism and agreeableness are the two personality factors that received the most attention by researchers in this corpus, while the unique and nuanced roles attachment avoidance and anxiety have in relationship well-being outcomes were investigated (e.g., Overall et al., 2015). Acevedo and Aron (2014); Acevedo et al. (2012a) and others published research on the hormonal and neurological correlates of attachment. Throughout this decade, genetic, hormonal (especially oxytocin), and neurological factors showed a significant rise as research factors, along with biological sex differences. The biopsychosocial integration of research factors became more of a feature in published work (e.g., Fletcher et al., 2013).

Guy Bodenmann and his team, as well as others, continued to research stress and coping factors (e.g., Bodenmann et al., 2019), and the research on partners' emotional support increased. There was a "revival" of the study of sexual behaviour and its impact upon relationship well-being (e.g., Maxwell & McNulty, 2019) with Emily Impett investigating it from a mutually beneficial perspective (e.g., Impett et al., 2020; Impett et al., 2018), and others investigating how attachment styles impacted sexual desire and behaviour (Busby et al., 2020).

Emotion, particularly negative and positive emotion as well as empathy, hostility, self-esteem, and depression were widely researched, often in conjunction with communication. Conflict also continued to be widely researched alongside communication, but with an increased emphasis on perceptions, self-appraisal, motivations, and attentional bias.

Commitment and culture both featured as significant areas of research but stood aside as unique factors lacking substantial integration into the rest of the corpus. Finally, the study of emotion regulation and self-control became increasingly significant areas of interest to relationship science researchers in this decade. Karney and Bradbury (2020) in their decade review noted that many of the findings had challenged conventional thinking about the mediating and moderating factors leading to relationship satisfaction and stability.

2020s

As we are not long out of the 2010s the 2020 to 2022 network model of the key factors being studied was very similar to the 2010s model. Therefore, a different approach was taken with the network modelling to attempt an understanding of the new and rising factors for this decade. Instead of looking at the most prominent 30 factors, the most prominent (occurring) factors were found, and from these the factors that had already been shown in the previous decades network models were removed. This left the factors that were most researched in the early 2020's but were not already noted in the previous decades. These factors are shown in Figure 10

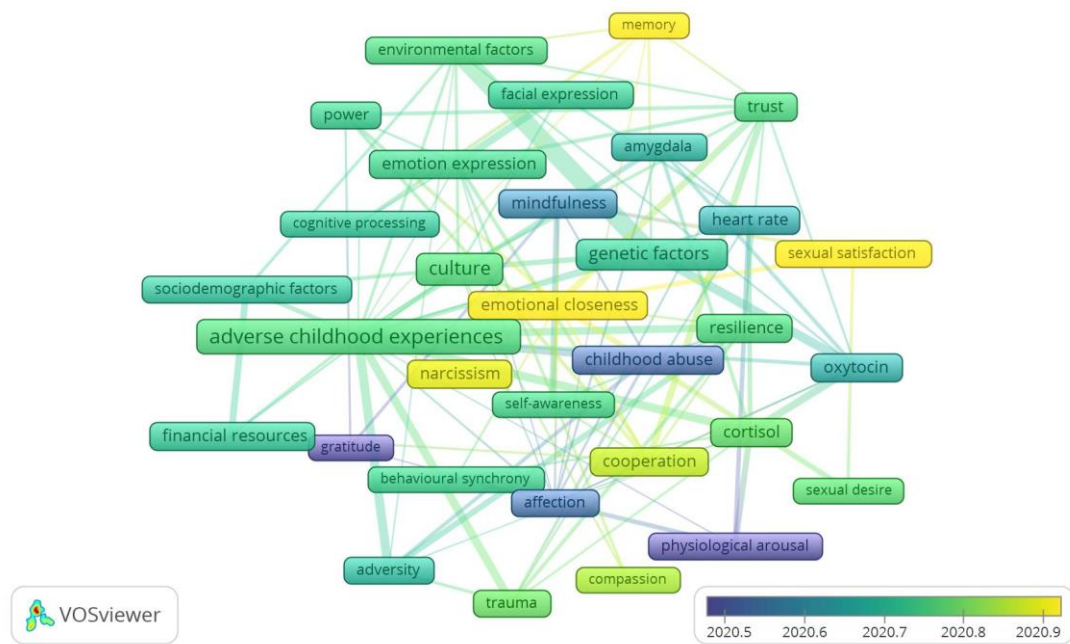


Figure 10. Rising factors from the 2020s publications

As can be seen in this model, adverse childhood experiences take centre stage in the rising factors. This is possibly in part because longitudinal studies are starting to be published that have taken several decades to amass their findings. While there has been a consistent consideration of the way developmental factors influence adult behaviours throughout the record, there is more emphasis being placed on the role stress plays in developmental outcomes. The study of neurological and physiological factors, and their impact upon couple relationships, is still on the rise and becoming more nuanced. Mindfulness has had a rapid trajectory as a research topic and considers the ways we manage stress in our personal awareness and how our self-awareness influences our other-awareness, and the kindness we show. Perhaps this is why narcissism is also shown as a rising factor. These relationally dysfunctional traits are often juxtaposed with compassionate and self-aware traits.

Discussion

The main factors investigated by the most prolific relationship researchers included intrapersonal and interpersonal processes. Conflict and personality influences were enduring topics through the decades. Communication patterns in relationships, psychological processes that affect the course and conduct of close relationships, relationship perceptions and appraisals, theories of emotion appraisal and individual

differences, emotional regulation, dyadic coping and stress, social support, approach-avoidance motivation in close relationships, interpersonal attraction, personality and attachment styles, commitment, cross-cultural and lifespan factors in relationships, and sexual satisfaction, were all studied broadly. Affective neuroscience has had a recent meteoric rise as a factor in the relationship science research. It is clear from this broad array of key factors that researchers in relationship science have traversed multiple disciplines across the decades.

Considerations and Limitations

The results of this study are intended to give an overview of key peer-reviewed research that has contributed to the development of current scientific knowledge in this field. Research related specifically to couple relationship processes and mechanisms was collated, and this presents an obvious limitation due to the potential researcher bias in the interpretation of this requirement. There will be articles missed and additionally articles unnecessarily gathered due to personal interpretation. The results are therefore presented not as a definitive answer but more as a discourse that helps reduce rather than eliminate uncertainty regarding the current state of the research underlying relationship science in the current era. In addition, the manual extraction of the factors presented a limitation due to the potential researcher bias in the interpretation of what should constitute a factor, and factors may also have been missed due to personal bias or lack of prior knowledge. Factors were extracted from abstracts, which offer a snapshot of the research project and don't always capture all the factors researched in the study – meaning factors may have been missed or misrepresented.

This study has highlighted a significant culture bias in relationship science research, which represents a limitation in the implications of the results of this review. The majority of journals publishing relationship research are based in the United States, and the few that are from other nations are predominantly based in western, educated, industrialized, rich, and democratic (WEIRD) nations, which comprise only about 12% of the world's population (Henrich et al., 2010). Originally, couple relationship research was almost invariably 'heterosexual marriage research'. Currently, the coupling of adults in committed sexual partnerships has taken a variety of forms, including variations regarding the gender of partners, the number of partners, and the formalisation of those partnerships. Although many relationship science theories have been shown to be replicable across time and relationship

variations (Finkel et al., 2017; Kurdek, 2004), there is sparse evidence of their generalisability, and this is an area of research needed to advance the robustness of relationship science findings (Cronbach et al., 1972; Shavelson et al., 1989).

Looking Forward

While this study is limited by the enormous amount of data available to collect and thematize and the inevitable incompleteness of this process, it nonetheless offers a representation of pertinent relationship science literature and provides an overview of its developmental trajectory. This study places relevance on researcher foci and productivity, and as such it provides a unique perspective on the research journey of the field of relationship science and the emphases that have directed its growth. This perspective may be helpful for those working in the field who do not have the opportunity to broadly investigate the scientific foundations of their practice. In homing in on the most researched factors, it may aid researchers and educators in understanding the underlying knowledge base around couple relationship theory. It may also help counsellors, psychologists, and other helping professionals who work with couples to understand the breadth of factors to be considered in providing therapeutic services. This comprehensive overview of the relationship science corpus will also help them to meet an ethical obligation to fulfil their discipline's core competency briefs – which often include demonstration of a knowledge of the history, theory and research literature relating to their area of practice (e.g., New Zealand Psychologists Board, 2018).

Expectations about couple relationships shift from generation to generation and these expectations may place different emphases on what is deemed to determine relationship satisfaction (Cherlin, 2010; Finkel, Hui, et al., 2014; Finkel, Larson, et al., 2014). To gain a better understanding of the current state of marital relationship theory, it behoves us to understand its past. Relationship research is complex due to the broad nature of the factors under investigation. This study is a starting point for lessening some of that complexity by providing a grounding in the research context that has brought relationship science to this point. The prominent longstanding factors stand out as the most relevant, valid, and reliable in this area of relationship science due to their continued and popular use and consequent recurrent testing (Peirce, 1878b). Further cross-disciplinary, cross-cultural, and cross-population investigation into the key findings of multiple researchers will lead to greater clarity around couple relationship factors via “structural

corroboration" (Eisner, 1998, p. 55).

In summary, this study provides a sweeping general view of the history of the field of relationship science. It also illuminates strengths in the field of relationship science, including extensive research regarding the ways in which conflict, communication, and personal differences impact upon relationship outcomes.

Appendix 4. Most Utilised Journals

(Contributing 5+ Articles to the Endnote Library)

Journal Name	Number of articles retrieved
Personality and Individual Differences	953
Journal of Personality and Social Psychology	775
Journal of Social and Personal Relationships	614
Frontiers in Psychology	606
Journal of Family Psychology	578
Personality and Social Psychology Bulletin	527
Emotion	520
Personal Relationships	417
Journal of Personality	381
Journal of Marriage and Family	374
Journal of Research in Personality	329
Current Opinion in Psychology	328
PLoS ONE: (Mainly Psychology)	325
Neuroscience and Biobehavioral Reviews	251
Family Process	249
European Journal of Personality	248
Social Cognitive and Affective Neuroscience	241
Social Psychological and Personality Science	241
Journal of Family Issues	239
Psychoneuroendocrinology	237
Journal of Marital and Family Therapy	213
Cognition and Emotion	202
Attachment & Human Development	201
The Family Journal	184
The American Journal of Family Therapy	177
Journal of Couple and Relationship Therapy	161
Developmental Psychology	157
Emotion Review	156
Journal of Sex & Marital Therapy	155
Psychosomatic Medicine	153
Family Relations	151
Development and Psychopathology	149
The Journal of Sex Research	145
Psychological Bulletin	140
Motivation and Emotion	139
Marriage and Family Review	138

Psychological Science	135
Journal of Experimental Social Psychology	133
Journal of Divorce & Remarriage	131
Biological Psychology	130
Social and Personality Psychology Compass	128
Archives of Sexual Behavior	127
Psychophysiology	126
Current Opinion in Behavioral Sciences	124
Journal of Child and Family Studies	122
Social Neuroscience	122
Journal of Aggression, Maltreatment & Trauma	116
Journal of Happiness Studies	114
Current Directions in Psychological Science	111
Journal of Family Theory & Review	111
NeuroImage	109
Child Development	104
Personality and Social Psychology Review	100
Couple and Family Psychology: Research and Practice	99
Sexual and Relationship Therapy	95
Hormones and Behavior	94
Journal of Interpersonal Violence	93
Psychological Inquiry	93
The Journal of Positive Psychology	93
Review of General Psychology	92
The Journal of Social Psychology	92
International Journal of Psychophysiology	83
Proceedings of the National Academy of Sciences of the United States of America (mostly Psychological)	83
International Journal of Behavioral Development	77
European Journal of Social Psychology	76
Self and Identity	76
Journal of Family Therapy	75
Australian and New Zealand Journal of Family Therapy	71
Behavior Therapy	70
Trends in Cognitive Sciences	70
Mindfulness	69
Frontiers in Behavioral Neuroscience	64
Behavior Genetics	61
Frontiers in Neuroendocrinology	61
Annals of Behavioral Medicine	60
Journal of Consulting and Clinical Psychology	59
Neurobiology of Stress	59
Journals of Gerontology	58

Psychological Reports	58
Sex Roles	58
Contemporary Family Therapy	57
Interpersona	57
Perspectives on Psychological Science	57
American Psychologist	56
Biological Psychiatry	55
Demography	55
Annual Review of Psychology	54
Anxiety, Stress, & Coping	54
Scientific Reports	53
Journal of Family Communication	52
Health Psychology	51
Social Behavior and Personality	51
Frontiers in Human Neuroscience	49
Journal of Nonverbal Behavior	49
Procedia Social and Behavioral Sciences	49
Aging & Mental Health	48
Annual Review of Clinical Psychology	48
Behaviour Research and Therapy	48
Behavioural Brain Research	47
International Journal of Psychology	47
Journal of Family Violence	46
Current Opinion in Neurobiology	45
Western Journal of Communication	45
Communication Monographs	44
Journal of Behavioral Medicine	44
Journal of Family Psychotherapy	44
Aggression and Violent Behavior	43
Communication Quarterly	43
Journal of Child Psychology and Psychiatry	43
Current Psychology	42
Journal of Relationships Research	41
Journal of Affective Disorders	39
Clinical Psychology Review	38
Cognitive, Affective and Behavioral Neuroscience	38
Psychology and Aging	38
Social Science & Medicine	38
Brain, Behavior, and Immunity	37
Journal of Youth and Adolescence	36
Neuropsychologia	36
American Journal of Psychiatry	35
Child Psychiatry and Human Development	35

Social Development	35
Social Indicators Research	33
Communication Studies	32
Human Brain Mapping	32
Journal of Adult Development	32
Adaptive Human Behavior and Physiology	31
Behavioral and Brain Sciences	31
Canadian Journal of Human Sexuality	31
Developmental Cognitive Neuroscience	31
Communication Reports	30
Communication Research	30
Human Communication Research	30
Physiology & Behavior	30
Aggressive Behavior	29
Journal of Personality Assessment	29
Psychological Review	29
European Sociological Review	28
Psychotherapy Research	28
Journal of Clinical Psychology	27
Journal of Family Studies	27
Psychological Assessment	27
Psychological Medicine	27
Social Science Research	27
Australian Journal of Psychology	26
British Journal of Psychology	26
Frontiers in Psychiatry	25
Neuroscience	24
Academy of Management Journal	23
American Journal of Public Health	22
Clinical Social Work Journal	22
Journal of Cross-Cultural Psychology	22
Europe's Journal of Psychology	21
Journal of Psychopathology and Behavioral Assessment	21
Psychotherapy	21
Brain Research	20
British Journal of Social Psychology	20
Child Abuse & Neglect	20
Demographic Research	20
Frontiers in Neuroscience	20
Journal of Clinical Child and Adolescent Psychology	20
Journal of Family and Economic Issues	20
Psychiatry Research	20
Stress and Health	20

Assessment	19
Communication Research Reports	19
International Journal of Group Psychotherapy	19
Journal of Abnormal Psychology	18
Journal of Aging and Health	18
Journal of Health and Social Behavior	18
Australian Psychologist	17
Behavioural Processes	17
Journal of Comparative Family Studies	17
Journal of Human Behavior in the Social Environment	17
Journal of Research on Adolescence	17
Neuropsychopharmacology	17
Review of Economics of the Household	17
British Journal of Guidance & Counselling	16
Developmental Psychobiology	16
European Psychologist	16
Journal of Organizational Behavior	16
Philosophical Transactions of the Royal Society	16
The Journal of Psychology	16
Violence Against Women	16
Academy of Management Review	15
BMC Public Health	15
Brain Imaging and Behavior	15
Cognitive Therapy and Research	15
Journal of Behavior Therapy and Experimental Psychiatry	15
Journal of Family Social Work	15
Neuron	15
Psychology & Health	15
Social Forces	15
Wiley Interdisciplinary Reviews. Cognitive Science	15
Basic and Applied Social Psychology	14
British Journal of Clinical Psychology	14
British Journal of Health Psychology	14
Cognition	14
Journal of Adolescence	14
Journal of Counseling & Development	14
Journal of Neuroscience	14
Neuroscience Letters	14
New Ideas in Psychology	14
Psychopharmacology	14
Scandinavian Journal of Psychology	14
The Journal of Neuroscience	14
American Sociological Review	13

Evolution and Human Behavior	13
Health Communication	13
Journal of Clinical Epidemiology	13
Journal of Health Psychology	13
Research in Human Development	13
Science	13
The Gerontologist	13
American Journal of Orthopsychiatry	12
Asian Journal of Social Psychology	12
Current Topics in Behavioral Neurosciences	12
Early Child Development and Care	12
Journal of Abnormal Child Psychology	12
Journal of Epidemiology and Community Health	12
Journal of Research & Health	12
Molecular Psychiatry	12
Parenting: Science and Practice	12
Progress in Neurobiology	12
Psychology and Psychotherapy: Theory, Research and Practice	12
Social Psychiatry and Psychiatric Epidemiology	12
Biology of Sex Differences	11
Cerebral Cortex	11
Clinical Neuropsychiatry	11
Clinical Psychological Science	11
Cortex	11
Frontiers in Integrative Neuroscience	11
Journal of Early Adolescence	11
Psychology, Health and Medicine	11
Sexual Addiction & Compulsivity	11
Sexuality & Culture	11
Trauma, Violence, & Abuse	11
Advances in Life Course Research	10
Body, Movement and Dance in Psychotherapy	10
Computers in Human Behavior	10
Evolutionary Psychological Science	10
Family Matters	10
Journal of Applied Communication Research	10
Memory and Cognition	10
Neurobiology of Learning and Memory	10
Personality and Mental Health	10
Personality Disorders: Theory, Research, and Treatment	10
Psychology of Women Quarterly	10
Research on Aging	10
Behavioral Sciences	9

Behaviour Change	9
Children and Youth Services Review	9
Clinical Psychology and Psychotherapy	9
Cross-Cultural Research	9
Current Biology	9
Developmental Science	9
European Child and Adolescent Psychiatry	9
Family Court Review	9
Infant Mental Health Journal	9
International Journal of Listening	9
Journal of Contemporary Psychotherapy	9
Journal of Experimental Psychology: General	9
Journal of Reproductive and Infant Psychology	9
Memory	9
Proceedings of the Royal Society B: Biological Sciences	9
Trends in Neurosciences	9
American Journal of Community Psychology	8
Annals of the New York Academy of Sciences	8
Annual Review of Sociology	8
Applied Research in Quality of Life	8
Brain and Behavior	8
Child Development Perspectives	8
College Student Journal	8
Counselling Psychology Quarterly	8
Couple Resilience	8
Developmental Review	8
Human Biology	8
Intelligence	8
International Journal of Behavioral Medicine	8
Journal of Applied Psychology	8
Journal of Community Psychology	8
Journal of Counseling Psychology	8
Journal of Nursing	8
Journal of Occupational and Organizational Psychology	8
Journal of Psychosomatic Research	8
Journal of Psychotherapy Integration	8
Journal of Social Issues	8
Neuropharmacology	8
Social Psychology Quarterly	8
Acta Sociologica	7
American Journal of Health Promotion	7
Australian and New Zealand Journal of Psychiatry	7
BMC Psychology	7

Brain Structure and Function	7
British Journal of Developmental Psychology	7
Clinical Child and Family Psychology Review	7
Community Mental Health Journal	7
Current Sexual Health Reports	7
Frontiers in Systems Neuroscience	7
Infant Behavior and Development	7
Journal of Anxiety Disorders	7
Journal of Experimental Child Psychology	7
Journal of Psychiatric Research	7
Journal of Social and Psychological Sciences	7
Journal of the American Academy of Child & Adolescent Psychiatry	7
Nature Communications	7
New Zealand Journal of Counselling	7
Personality Neuroscience	7
Population Research and Policy Review	7
Psychology of Violence	7
Psychotherapy in Australia	7
Scandinavian Journal of Public Health	7
Smith College Studies in Social Work	7
The Future of Children	7
Adult Attachment	6
Behavioral Ecology	6
BMC Medical Research Methodology	6
BMC Psychiatry	6
British Journal of Social Work	6
Canadian Journal of Behavioural Science	6
Child Maltreatment	6
Clinical Child Psychology and Psychiatry	6
Consciousness and Cognition	6
eLife	6
Experimental Brain Research	6
Human Nature	6
Infant and Child Development	6
Integrative Psychological and Behavioral Science	6
International Psychogeriatrics	6
Journal of Applied Social Psychology	6
Journal of Homosexuality	6
Journal of Women & Aging	6
Nature Human Behaviour	6
Negotiation and Conflict Management Research	6
Neural Plasticity	6
Population and Development Review	6

Psychoanalytic Psychology	6
Psychological Studies	6
Stress	6
The Qualitative Report	6
Addictive Behaviors	5
American Journal of Cardiology	5
American Journal of Epidemiology	5
American Journal of Sociology	5
Annals of the American Academy of Political and Social Science	5
Asia Pacific Journal of Counselling and Psychotherapy	5
Behavioral Ecology and Sociobiology	5
Brain and Cognition	5
Cell	5
Cognitive Behaviour Therapy	5
Communication Methods and Measures	5
Community, Work and Family	5
Comprehensive Psychiatry	5
Counselling and Psychotherapy Research	5
Culture, Health and Sexuality	5
Emerging Adulthood	5
Experimental Aging Research	5
Family and Consumer Sciences Research Journal	5
Frontiers in Neurology	5
Identity	5
International Journal of Fertility and Sterility	5
International Journal of Sexual Health	5
Journal for the Theory of Social Behaviour	5
Journal of Communication	5
Journal of Consumer Psychology	5
Journal of Consumer Research	5
Journal of Contextual Behavioral Science	5
Journal of Development Effectiveness	5
Journal of Marketing Research	5
Journal of Pain	5
Journal of Traumatic Stress	5
Journal of Women's Health	5
Lancet	5
Learning and Memory	5
National Symposium on Family Issues	5
Nature	5
New Directions for Child and Adolescent Development	5
Nutrients	5
Polish Psychological Bulletin	5

Prevention Science	5
Psychological Research	5
Psychology	5
Psycho-Oncology	5
Research on Social Work Practice	5
SAGE Open	5
Substance Use and Misuse	5
Swiss Journal of Psychology	5
Teaching of Psychology	5
The International Journal of Aging and Human Development	5

Appendix 5. Authors of More than 10 Articles in the Endnote Library

Researchers	Number of articles retrieved for this study
Acevedo, Bianca	15
Acitelli, Linda	20
Adler-Baeder, Francesca	22
Adolphs, Ralph	12
Afifi, Tamara	37
Agnew, Christopher	33
Aldao, Amelia	11
Algoe, Sara	22
Allan, Robert	10
Allemand, Mathias	29
Allen, Elizabeth	16
Allen, Joseph P.	14
Allik, Juri	21
Aloia, Lindsey	17
Aluja, Anton	17
Amato, Paul	37
Amodio, David	9
Anderson, Jared	19
Anderson, Shayne	23
Antle, Becky	11
Antonucci, Toni	21
Apostolou, Menelaos	10
Aron, Arthur	52
Aron, Elaine	14
Arriaga, Ximena	35
Ashton, Michael	12
Atkins, David	32
Babcock, Julia	18
Back, Mitja	33
Baker, Levi	18
Balconi, Michela	10
Balderrama-Durbin, Christina	11
Baldwin, Mark	20
Balliet, Daniel	13
Bandura, Albert	8
Bar-Kalifa, Eran	22

Bartholomew, Kim	12
Bartle-Haring, Suzanne	16
Barton, Allen	15
Bartz, Jennifer	15
Bastian, Brock	17
Batson, C. Daniel	9
Baucom, Brian	39
Baucom, Donald	49
Baucom, Katherine	17
Baumeister, Roy	35
Beach, Steven	52
Beck, Lindsey	14
Beckes, Lane	17
Bélanger, Claude	14
Belsky, Jay	20
Bennett, Margaret	10
Berg, Cynthia A.	21
Bergeron, Sophie	23
Berscheid, Ellen	13
Bertoni, Anna	15
Bevan, Jennifer	13
Birditt, Kira	42
Birmingham, Wendy	27
Birnbaum, Gurit	44
Blanch, Angel	11
Bleidorn, Wiebke	34
Blow, Adrian	8
Bodenmann, Guy	113
Bodie, Graham	11
Bookwala, Jamila	13
Boon, Susan	15
Booth, Alan	15
Borelli, Jessica	25
Borkenau, Peter	13
Bosmans, Guy	14
Bouchard, Genevieve	13
Bourassa, Kyle	9
Bowlby, John	8
Bradbury, Thomas	112
Bradford, Angela	16
Bradford, Kay	19
Braithwaite, Scott	11
Brassard, Audrey	26

Brennan, Kelly	9
Bretherton, Inge	8
Brimhall, Andrew	12
Brock, Rebecca	21
Brose, Annette	14
Brotto, Lori	12
Brown, Brene	1
Brown, Lucy	10
Brown, Susan	24
Burr, Brandon	12
Busby, Dean	57
Bushman, Brad	20
Buss, David	28
Butler, Emily	32
Butler, Mark	22
Buyse, Ann	15
Cacioppo, John T.	49
Cacioppo, Stephanie	25
Calkins, Susan	13
Cameron, Jessica	10
Campbell, Lorne	52
Campos, Belinda	10
Canary, Daniel	11
Canevello, Amy	18
Cao, Hongjian	19
Capezza, Nicole	10
Capitanio, John	10
Caprara, Gian	18
Carlson, Elizabeth	16
Carlson, Ryan G.	8
Carnelley, Katherine	23
Carr, Alan	22
Carr, Deborah	9
Carrère, Sybil	12
Carroll, Jason	26
Carstensen, Laura	10
Carswell, Kathleen	11
Carter, C. Sue	10
Carver, Charles	16
Caspi, Avshalom	13
Cassidy, Jude	34
Caughlin, John	20
Chen, Frances	10

Chen, Serena	19
Chen, Xu	20
Cherlin, Andrew	9
Chester, David	13
Chisholm, James	5
Chopik, William	54
Christensen, Andrew	53
Ciarrochi, Joseph	13
Clark, Margaret	67
Coan, James	38
Coe, Jesse	16
Cole, Pamela	10
Collins, Nancy	35
Conger, Rand	26
Conley, Terri	10
Conroy-Beam, Daniel	11
Cordova, James	33
Corr, Philip	35
Cortes, Kassandra	9
Costa, Paul T.	17
Costa, Rui Miguel	8
Costantini, Giulio	10
Cowan, Carolyn Pape	16
Cowan, Philip A.	18
Critchley, Hugo	10
Crocker, Jennifer	15
Cross, Emily	12
Crowell, Judith	12
Cummings, E. Mark	50
Cundiff, Jenny	10
Curran, Melissa	25
Cutrona, Carolyn	10
Dainton, Marianne	9
Daire, Andrew	13
Dalgleish, Tim	15
Davies, Patrick	49
Davila, Joanne	27
Davis, Don	15
De Dreu, Casten	12
Debrot, Anik	10
Decety, Jean	57
Del Giudice, Marco	22
DeMaris, Alfred	10

Denes, Amanda	28
Denissen, Jaap	46
Denson, Thomas	14
Denson, Thomas	14
Denton, Wayne	10
Derrick, Jaye	16
Dew, Jeffrey	16
Dewall, C. Nathan	34
Dewitte, Marieke	16
DeYoung, C.	23
Diamond, Lisa	23
Diener, Ed	31
Dillow, Megan	10
Ditzen, Beate	41
Doan, Stacey	10
Donato, Silvia	20
Donnellan, M. Brent	35
Doss, Brian	61
Downey, Geraldine	11
Duckworth, Angela	10
Dufner, Michael	12
Dugal, Caroline	12
Dunbar, Norah	15
Dunbar, Robin	15
Duncan, Stephen	10
Dunkel, Curtis	19
Dunlop, William	10
Dush, Claire	17
Eagly, Alice	10
Eastwick, Paul	29
Eckstein, Monica	10
Edelstein, Robin	21
Ein-Dor, Tsachi	27
Eisenberg, Nancy	24
Eisenberger, Naomi	46
Elfenbein, Hillary	10
Ellemers, Naomi	10
Elliot, Andrew J.	14
Ellis, Bruce	13
El-Sheikh, Mona	13
English, Tammy	14
Epstein, Norman B.	19
Erbas, Yasemin	11

Fagundes, Christopher	38
Fajkowska, Malgorzata	11
Falconier, Mariana	17
Falk, Emily	10
Farrell, Allison	16
Feeney, Brooke	42
Feeney, Judith	34
Fehr, Beverley	12
Feinberg, Mark	29
Feldman Barrett, Lisa	48
Feldman, Ruth	36
Fiese, Barbara	8
Fife, Stephen	10
Fincham, Frank	112
Fingerman, Karen	17
Finkel, Eli	70
Finkenauer, Catrin	34
Finn, Christine	10
Fischer, Agneta	16
Fischer, Melanie	19
Fischer, Ronald	16
Fisher, Helen	15
Fitzsimons, Grainne	18
Fleeson, William	14
Fletcher, Garth	41
Floyd, Kory	25
Fonagy, Peter	25
Ford, Brett	10
Fosco, Gregory	13
Fraley, R. Chris	53
Friedlander, Myrna	10
Furnham, Adrian	10
Futris, Ted	12
Gable, Shelley	35
Galovan, Adam	12
Gawronski, B.	10
Gebauer, Jochen	12
Gere, Judith	17
Geukes, Katharina	10
Gilbert, Paul	20
Gillath, Omri	45
Giordano, Peggy	16
Girme, Yuthika	20

Gleason, Marci	10
Goodboy, Alan	10
Gordon, Amie	19
Gottman, John	120
Gouin, Jean-Philippe	12
Graham, Cynthia	15
Greenaway, Katharine	14
Greenberg, Leslie	21
Greenman, Paul	10
Gross, James	72
Gunaydin, Gul	13
Gunnar, Megan	26
Ha, Thao	10
Hadden, Benjamin	18
Hagemeyer, Birk	14
Hahlweg, Kurt	26
Halford, W. Kim	54
Hall, Jeffrey	10
Hall, Judith	16
Halperin, Eran	15
Hammett, Julia	10
Hammond, Matthew	31
Harasymchuk, Cheryl	14
Harmon-Jones, Eddie	26
Hart, William	12
Hatfield, Elaine	12
Hawkins, Alan	38
Hawkley, Louise	15
Hazan, Cindy	18
Heinrichs, Markus	32
Hendrick, Clyde	10
Hendrick, Susan	12
Hengartner, Michael	12
Henriques, Gregg	10
Hepper, Erica	10
Hertlein, Katherine	11
Hess, Ursula	22
Hesse, Colin	18
Heyman, Richard	27
Higgins, E. Tory	16
Hilbig, Benjamin	14
Hill, Patrick	25
Hilpert, Peter	22

Hirschberger, Gilad	16
Hofmann, Stefan	20
Holman, Thomas	25
Holmes, Jeremy	6
Holmes, John	45
Holmstrom, Amanda	10
Holt-Lunstad, Julianne	26
Hook, Joshua	17
Hoppmann, Christiane	24
Hopwood, Christopher	35
Horan, Sean	10
Horn, Andrea	17
Horne, Rebecca	10
Hostinar, Camelia	14
Hudson, Nathan	21
Hughes, Brian	12
Hui, Chin Ming	15
Human, Lauren	15
Huston, Ted	25
Iafrate, Raffaella	16
Ickes, William	25
Impett, Emily	87
Inagaki, Tristen	18
Jackson, Chris	13
Jackson, Joshua J.	13
Jackson, Philip	9
Jacobson, Neil	21
Jakubiak, Brittany	13
James, Spencer	16
Jaremka, Lisa	22
Jayawickreme, Eranda	18
Jensen, Jakob	15
Jensen, Todd	16
Joel, Samantha	24
Johnson, Benjamin	10
Johnson, Lee	16
Johnson, Matthew D.	56
Johnson, Susan	32
Johnson, Wendy	14
Jokela, Markus	17
Jonason, Peter	21
Josephs, Lawrence	12
Joshanloo, Mohsen	24

Kafetsios, Konstantinos	17
Kalmijn, Matthijs	13
Kalokerinos, Elise	22
Kammrath, Lara	10
Kamp Dush, Claire	12
Kandler, Christian	29
Kane, Heidi	10
Kanske, Philipp	10
Kanter, Jeremy B.	10
Karantzas, Gery	31
Karney, Benjamin	84
Karremans, Johan	22
Kashdan, Todd	38
Katz, Lynn	15
Kelly, Allison	6
Keltner, Dacher	48
Kendler, Kenneth	15
Kenny, David	18
Kent de Grey, Robert	10
Keysers, Christian	12
Kiecolt-Glaser, Janice	48
Killgore, William	10
Kim, Heejung S.	11
Kimmes, Jonathan	17
Kirkpatrick, Lee	17
Kitayama, Shinobu	14
Kivlighan, Dennis	13
Klein, Robert	10
Kluwer, Esther	10
Knee, C. Raymond	29
Knobloch, Leanne	30
Knobloch-Fedders, Lynne	14
Knopp, Kayla	14
Knudson-Martin, Carmen	11
Kochanska, Grazyna	12
Kogan, Aleksandr	19
Kong, Feng	16
Koole, Sander	17
Koval, Peter	31
Kret, Mariska	10
Krueger, Frank	10
Krueger, Robert	30
Kuhl, Julius	10

Kumashiro, Madoka	20
Kuppens, Peter	105
Kurdek, Lawrence	14
Lafontaine, Marie-France	27
Lambert, Nathaniel	18
Lamm, Claus	17
Lang, Andras	10
Lang, Annie	9
Lansford, Jennifer	10
Larson, Jeffry	40
Laurenceau, Jean-Philippe	14
Laurent, Heidemarie	18
Lavner, Justin	36
Lavy, Shiri	11
Lawrence, Elizabeth	28
Le, Benjamin	10
Le, Bonnie	8
Leary, Mark	23
Leavitt, Chelom	20
Lebow, Jay	43
Ledbetter, Andrew	18
Lee, David	7
Leerkes, Esther	15
Lemay, Edward	38
Leonhardt, Nathan	24
Levenson, Robert	42
Lewandowski, Gary	14
Lilienfeld, Scott	21
Lindquist, Kristen	10
Liu, Hui	10
Longmore, Monica	17
Lorber, Michael	10
Loving, Timothy	24
Low, Rachel	10
Lucas, Richard	29
Luchies, Laura	15
Luhmann, Maike	27
Luyckx, Koen	10
Luyten, Patrick	12
Lydon, John	19
Lynam, Donald	26
Lynam, Donald	20
Lyubomirsky, Sonja	22

MacCann, Carolyn	12
MacDonald, Geoff	39
Mackinnon, Sean	13
Madigan, Sheri	12
Maner, Jon	19
Manning, Wendy	37
Mark, Kristen	21
Markman, Howard	69
Marshall, Andrew T.	14
Matthews, Gerald	19
Mattingly, Brent	13
Maxwell, Jessica	13
Mayer, John	10
McCabe, Marita	13
McCarthy, Barry	22
McEwen, Bruce	18
McHale, Susan	19
McLaren, Rachel	12
McLaughlin, Katie	15
McNulty, James	60
McRae, Kateri	12
Meltzer, Andrea	26
Merolla, Andy	12
Merrill, Anne	11
Mesquita, Batja	12
Meuwly, Nathalie	13
Meyer, Meghan	11
Mikolajczak, Moira	10
Mikulincer, Mario	101
Milek, Anne	10
Miller, Gregory	10
Miller, Joshua D.	36
Miller, Richard	25
Mizrahi, Moran	16
Monin, Joan	19
Monk, J. Kale	16
Montag, Christian	18
Moors, Agnes	10
Moors, Amy	9
Moskowitz, D. S.	13
Möttus, René	19
Muise, Amy	46
Murdock, Kyle	9

Murray, Sandra	32
Neff, Kristen	11
Neto, Félix	10
Neyer, Franz	30
Nezlek, John	20
Nguyen, Teresa	12
Niehuis, Sylvia	17
Niven, Karen	10
Noller, Patricia	22
Norcross, John	13
Norman, Greg	10
Novak, Joshua	12
Ochsner, Kevin	18
Ogolsky, Brian	26
Oka, Megan	10
O'Leary, K. Daniel	10
Ormel, Johan	17
Orth, Ulrich	25
Oveis, Christopher	15
Overall, Nickola	103
Øverup, Camilla	6
Owen, Jesse	35
Panksepp, Jaak	12
Papp, Lauren	17
Parise, Miriam	18
Pe, Madeline	11
Peloquin, Katherine	27
Penke, Lars	34
Pepping, Christopher	20
Perry, Bruce	9
Perry, Samuel	16
Peters, Brett	18
Peterson, Julie	9
Petrides, Konstantinos	11
Piercy, Fred	16
Pietromonaco, Paula	22
Pinsof, William	16
Poulin, Michael	9
Priest, Jacob	15
Pronk, Tila	9
Proulx, Christine	18
Quirk, Kelley	9
Raby, Kenneth Lee	15

Raley, R. Kelly	7
Randall, Ashley	40
Rauer, Amy	27
Rauthmann, John	18
Raznahan, Armin	16
Read, Stephen	9
Rehman, Uzma	15
Reid, Chelsea	9
Reis, Harry	79
Repetti, Rena	18
Revelle, William	16
Rhoades, Galena	72
Righetti, Francesca	33
Rilling, James	12
Roberson, Patricia	21
Roberts, Brent	30
Robinson, Michael	43
Robles, Theodore	14
Roddy, McKenzie	21
Rodriguez, Lindsey	18
Rogge, Ronald	22
Roisman, Glenn	40
Rook, Karen	9
Rosen, Natalie	31
Rowe, Angela	16
Ruch, Willibald	16
Ruiz, John	11
Rusbult, Caryl	9
Ryff, Carol	19
Sadikaj, Gentiana	9
Salvatore, Jessica	14
Samp, Jennifer	21
Sandberg, Jonathan	40
Sanford, Keith	17
Sassler, Sharon	11
Saxbe, Darby	17
Sbarra, David	52
Schmeichel, Brandon	15
Schmitt, David	21
Schoebi, Dominik	24
Schönbrodt, Felix	17
Schramm, David	18
Schrodt, Paul	19

Schutte, Nicola	11
Sedikides, Constantine	36
Seedall, Ryan	21
Segrin, Chris	24
Selcuk, Emre	23
Seligman, Martin	27
Sels, Laura	14
Shafer, Kevin	9
Shamay-Tsoory, Simone	21
Shapiro, Alyson	8
Shaver, Phillip	144
Sheldon, Kennon	18
Shi, Lin	9
Sibley, Chris	39
Siegel, Dan	7
Silvia, Paul	10
Simpson, Jeffry	119
Slatcher, Richard	29
Slotter, Erica	9
Smillie, Luke	27
Smith, Ryan	10
Smith, Timothy	61
Snyder, Douglas	22
Solomon, Denise	35
South, Susan	25
Specht, Jule	13
Spencer, Chelsea	15
Spielmann, Stephanie	12
Sprecher, Susan	27
Stafford, Laura	14
Stanley, Scott	76
Stanton, Sarah	22
Steele, Howard	10
Steptoe, Andrew	24
Stern, Jessica	14
Stith, Sandra	20
Strelan, Peter	10
Sullivan, Regina	20
Tambling, Rachel	16
Tamir, Maya	20
Tan, Kenneth	8
Theiss, Jennifer	28
Totenhagen, Casey	16

Tracy, Jessica	10
Traeen, Bente	12
Uchino, Bert	75
Umberson, Debra	24
van Anders, Sari	15
van der Linden, Dimitri	21
van Kleef, Gerben	23
Van Lange, Paul	28
van Vleet, Meredith	11
VanderDrift, Laura	10
Verduyn, Philippe	16
Verhofstadt, Lesley	21
Vrticka, Pascal	16
Wagner, Jenny	24
Waite, Linda	12
Waller, Rebecca	17
Wampler, Karen	14
Webster, Gregory	14
Weigel, Daniel	30
Weinstein, Netta	9
Weiser, Dana	9
Weiss, Alexander	10
Whisman, Mark	50
Whitton, Sarah	17
Wickrama, Kandauda	39
Widiger, Thomas	17
Wiebe, Stephanie	14
Wilkowski, Benjamin	10
Williamson, Hannah	22
Willoughby, Brian	40
Wilson, Stephanie J.	15
Wilson, Sylia	18
Wilt, Joshua	10
Wittenborn, Andrea	16
Worley, Timothy	16
Worthington, Everett, Jr.	34
Wright, Aidan	39
Xia, Ling-Xiang	20
Yorgason, Jeremy	20
Zaki, Jamil	21
Zayas, Vivian	10
Zeigler-Hill, Virgil	43
Zemp, Martina	19

Zhou, Nan	24
Zimmer-Gembeck, Melanie	27

Appendix 6. Theories Found in the Literature Used in this Study

Theory	Number of mentions in the study database	Year	Key Author
Emotion regulation theory	5,313	2001	James Gross
Big Five personality model/ Five-factor model	3,358	1985	Ernest Tupes and Raymond Christal (1961), Robert McCrae and Paul Costa (1976/1992), John Digman (1989), Lewis Goldberg (1990)
Attachment theory	3,091	1958	John Bowlby
Mindfulness and acceptance theories	2,008	1979	Jon Kabat-Zinn
Emotional intelligence theory	1,248	1990	e.g., Peter Salovey and John Mayer (1990), Reuven Bar-On, (1997); Robert Cooper and Ayman Sawaf, (1997); Daniel Goleman, (1995; 1998; 2001a); John Mayer and Peter Salovey, (1997); K. V. Petrides and Adrian Furnham, (2001), K. V. Petrides, Ria Pita, and Flora Kokkinaki, (2007)
Theory of mind	1,200	1991	Simon Baron-Cohen
Investment model of commitment processes	946	1983	Caryl Rusbult and Paul Van Lange
Biopsychosocial (BPS) model	814	1977	George Engel (1977, 1980); Jim Blascovich and Wendy Mendes (2010)
Dyadic coping theory	737	2004	Lisa Story and Thomas Bradbury, (2004); Lisa Neff and Benjamin Karney, (2007); Ashley Randall and Guy Bodenmann, (2009, 2017)

Self-determination theory (SDT)	586	2000	Edward Deci and Richard Ryan
Interdependence theory	578	1959	Harold Kelley and John Thibaut (1959/1978)
Developmental theory	558	1877	e.g., Darwin, Freud, Piaget, Erikson, Bowlby, and Bandura
Implicit theories/Basic beliefs	485	1989	e.g., David McClelland, Richard Koestner, and Joel Weinberger, (1989); Raymond Knee, (1998); Carol Dweck (2012)
Social learning theory	466	1963	Albert Bandura (1963), Julian Rotter (1954)
Social exchange theory/Behavior exchange theory/Equity theory	445	1959	John Thibaut and Harold Kelley, (1959); George Levinger (1965, 1976); Robert Lewis and Graham Spanier (1979, 1982); Harold Kelley, 2003; Caryl Rusbult and Paul Van Lange 2003
Regulatory focus theory/ Approach and avoidance goals	413	1998	E. Tory Higgins
Family systems theory	387	1960	Murray Bowen (1960/1978)
Interpersonal circumplex	297	1957	Timothy Leary (1957), Jerry Wiggins, (1979)
Evolutionary psychology theory	232	1935	e.g., Konrad Lorenz (1935), E. O. Wilson (1975), Jerome Barkow, Leda Cosmides, and John Tooby (1992), Konrad Lorenz, David Buss and David Schmitt, (1993), David Buss, (1998)
Attribution theory	228	1967	Kelly Fincham and Carol Fletcher
Life history theory	227	1967	Robert MacArthur and Edward Wilson (1967), Stephen Sterns (1976), Phillip Kavanagh (2016)
Reinforcement sensitivity theory (RST) and Revised	217	1973	Jeffrey Gray (1973, 1991)

reinforcement sensitivity theory			
Relational turbulence model/theory	192	2001	Denise Haunani Solomon and Leanne Knobloch
Appraisal theory	191	1993	Magda Arnold, (1960); Richard Lazarus (1966); Nico Frijda, (1993); Ira Roseman and Craig Smith (2001); Agnes Moors, (2009); Ira Roseman and Andreas Evdokas, (2004); Phoebe Ellsworth (2013)
Social baseline theory	168	2011	Lane Beckes and James Coan
Diathesis-Stress model	112	1962	Paul Meehl (1962), Manfred Bleuler (1963), and David Rosenthal (1963)
Vulnerability-Stress-Adaptation (VSA) model	108	1983	Benjamin Karney and Thomas Bradbury, 1995, Caryl Rusbult, 1983
Feelings-as-information theory	27	2012	Norbert Schwarz
The six love styles	25	1989	Susan Hendrick and Clyde Hendrick
Interpersonal theory of personality	22	1908	William McDougall (1908), George Herbert Mead (1934), Henry Stack Sullivan (1953), George Kelly (1955), Timothy Leary (1957), and Jerry Wiggins (1996)
Social cognitive theory	22	2000	Albert Bandura
The Neuropsychology of Anxiety	20	2000	Jeffrey Gray and Neil McNaughton
Relationship self-regulation (RSR)	19	1994	W. Kim Halford, Matthew Sanders and Brett Behrens
Affection exchange theory (AET)	16	2006	Kory Floyd
Social intelligence hypothesis (SIH)	15	1988	Richard Byrne and Andrew Whiten
Broaden-and-build theory	14	1998	Barbara Fredrickson (also 2001)

Vulnerability-stress-adaptation (VSA) model of marital development	14	1983	Benjamin Karney and Thomas Bradbury, 1995, Caryl Rusbult, 1983
Social baseline theory (SBT)	13	2011	Lane Beckes and James Coan
Humanistic theories of motivation	12	1943	e.g., Abraham Maslow (1943), Carl Rogers (1959)
Life span development	12	1997	e.g., Sigmund Freud, Erik Erikson, Jean Piaget, Lawrence Kohlberg, Baltes
Relational developmental systems (RDS)	12	2006	Willis Overton
Sociometer theory (SMT)	12	1995	Mark Leary and Deborah Downs (1995), Lee Kirkpatrick and Bruce Ellis (2001)
Ideal standards model	11	2000	Garth Fletcher and Jeffrey Simpson
Niche construction	11	1996	Kevin Laland, John Odling-Smee and Marcus Feldman (1996); John Odling-Smee (1988)
Theory of power in marital relationships	11	1976	Boyd Rollins and Stephen Bahr
Dyadic power theory	10	2004	Norah Dunbar
Piaget's theory of cognitive development	10	1965	Jean Piaget
Regulatory focus theory	10	1998	E. Tory Higgins
Rothbart's model of temperament	10	1981	Mary Rothbart
Actor-partner interdependence mediation model (APIMeM)	9	1996	David Kenny
Ambivalent sexism theory	9	1996	Peter Glick and Susan Fiske
Diathesis-stress model	9	1962	Paul Meehl (1962), Manfred Bleuler (1963), and David Rosenthal (1963)
Equity theory in close relationships	9	1975	Elaine Walster and G. William Walster, (1975); Elaine Hatfield, Daniel Canary and Laura Stafford, (1992/2006)

Family communication patterns theory (FCPT)	9	2002	Ascan Koerner, Paul Schrodtt and Mary Anne Fitzpatrick
Social role theory	9	1987	Alice Eagly, 1987; B. Ann Bettencourt and Cyndi Kernahan, 1997; Alice Eagly and Wendy Wood
Adaptive calibration model (ACM)	8	2011	Marco Del Giudice, Bruce Ellis, and Elizabeth Shirtcliff
Ecological systems theory (EST)	8	1974	Urie Bronfenbrenner (1974/1979); Gail Whitchurch and Larry Constantine (1993)
Extended process model of emotion regulation	8	2015	James Gross
General aggression model (GAM)	8	2002	Craig Anderson and Brad Bushman
Relational dialectics theory	8	1988	Leslie Baxter and Barbara Montgomery
The challenge hypothesis	8	1990	John Wingfield, Robert Hegner, Alfred Dufty and Gregory Ball
Balance theory	7	1958	Fritz Heider (1958), Theodore Newcomb, (1968), Donald Boswell and David Dodd (1994)
Feminist theory	7	2000	Greer Fox and Velma Murry
Maslow's hierarchy of needs	7	1943	Abraham Maslow, (1943, 1954, 1970)
Model of self-regulation	7	1990	Charles Carver and Michael Scheier (1990/1996)
Moral foundations theory	7	2004	Jonathan Haidt, Craig Joseph and Jesse Graham
Stress theory	7	1973	Wesley Burr
The accommodation model	7	1991	Caryl Rusbult, Julie Verette, Gregory Whitney, Linda Slovik, and Isaac Lipkus
Communal responsiveness theory	6	2018	Margaret Clark and Joan Monin
Communication privacy management theory (CPM)	6	1991	Sandra Petronio

Life course theories	6	1974	Glen Elder (1974, 1998), Tamara Hareven (1978), Michael Rutter (1996)
Relational frame theory (RFT)	6	1957	Steven Hayes
Risk regulation model	6	2006	Sandra Murray, John Holmes, and Nancy Collins
Systemic transactional model of dyadic coping	6	1995	Guy Bodenmann
The suffocation model	6	2014	Eli Finkel, Elaine Cheung, Lydia Emery, Kathleen Carswell and Grace Larson
Whole trait theory (WTT)	6	2015	William Fleeson and Eranda Jayawickreme
Big Three personality model	5	1952	Hans Eysenck (1952, 1967, 1997)
Cybernetic Big Five Theory	5	2014	Colin DeYoung
Dual-factor model of mental health	5	2001	Peter Greenspoon and Donald Saklofske
Dynamic systems theory	5	2006	Esther Thelen and Linda Smith
Emergent distress model	5	2001	Ted Huston, Sylvia Niehuis, and Shanna Smith,
Emotion-in-relationships model (ERM)	5	1983	Ellen Berscheid
Interpersonal process model of intimacy	5	1959	Harold Kelley and John Thibaut (1959); Harry Reis and Phil Shaver (1988)
Kellers ARCS motivational model	5	1979	John Keller
Relational regulation theory (RRT)	5	2011	Brian Lakey and Edward Orehek
Self-expansion theory	5	1986	Arthur Aron and Elaine Aron
Social identity theory	5	1979	Henri Tajfel
The bioecological model of human development	5	2006	Urie Bronfenbrenner and Pamela Morris
Theoretical model of thriving through relationships	5	2015	Brooke Feeney and Nancy Collins
Transactive goal dynamics theory (TGD)	5	2015	Gráinne Fitzsimons, Eli Finkel, and Michelle vanDellen

Triangular theory of love/Unified theory of love	5	1986	Robert Sternberg, (1986, 1988, 2019)
Zurich model of social motivation/ A systems approach toward the functional connections of attachment and fear	5	1985	Norbet Bischof
Affective social competence (ASC)	4	2001	Amy Halberstadt, Julie Dunsmore and Susanne Denham
Circumplex model of affect	4	1980	James Russell
Circumplex model of marital and family systems	4	1989	David Olson, Douglas Sprenkle and Candyce Russell
Communication accommodation theory (CAT)	4	1991	Howard Giles
Development of the early adult romantic relationships (DEARR) model	4	2002	Cui Bryant and Rand Conger
Dynamic-maturational model (DMM)	4	2009	Patricia Crittenden and Rudi Dallos
Enduring dynamics model	4	1994	Ted Huston (1994), Ted Huston and Renate Houts (1998)
Rokeach's theory of values	4	1973	Milton Rokeach
Self-affirmation theory	4	1988	Claude Steele
Self-verification theory	4	1983	William Swann
Sexual selection theory	4	1988	Martin Daly and Margo Wilson, 1988; John Archer, 1996, 2009;
Social evolution	4	1964	William Hamilton (1964), Edward Wilson (2010)
Social heuristics hypothesis (SHH)	4	2014	David Rand, Alex Peysakhovich, Gordon Kraft-Todd, George Newman, Owen Wurzbacher, Martin Nowak, Joshua Greene
Stress and coping theory	4	1984	Richard Lazarus and Folkman
The theory of personal intelligence (PI)	4	2005	John Mayer
Allostatic load model	3	1993	Bruce McEwen and Eliot Stellar
Cognitive dissonance theory	3	1957	Leon Festinger

Communal and exchange relationships theory	3	2011	Margaret Clark and Judson Mills
Conflict theory	3	1958	Ralf Dahrendorf
Dialogical self-theory	3	1990	Hubert Hermans
Differential susceptibility model	3	1997	Jay Belsky
Duplex theory of love	3	2006	Robert Sternberg
Emotional bookkeeping hypothesis	3	2021	Gabriele Schino and Filippo Aureli
Five love languages	3	2013	Gary Chapman
Interpersonal circumplex theory (IPC)	3	1957	Timothy Leary (1957), Jerry Wiggins, (1979)
Love styles (OCEAN)/Love attitudes scale (LAS)	3	1986	Clyde Hendrick and Susan Hendrick
Machiavellian intelligence	3	1997	Richard Byrne
Nested model (NM) of well-being	3	2014	Gregg Henriques, Kimberly Kleinman and Craig Asselin
Personality systems framework	3	2005	John Mayer
Personality systems interactions (PSI) theory	3	2000	Julius Kuhl
Social accuracy model (SAM)	3	2010	Jeremy Biesanz
Social dominance theory	3	1992	Jim Sidanius, Erik Devereux and Felicia Pratto
Social ecological model	3	1979	Urie Bronfenbrenner (1979, 1986)
Social interdependence theory	3	1949	Morton Deutsch, 1949, 1962; David Johnson and Roger Johnson, 1989/2005
Social niche construction	3	2010	Christopher Boehm and Jessica Flack
Social support theory	3	1995	Don Drennon-Gala and Francis Cullen
Symbolic interaction theory	3	1954	Herbert Blumer
System justification theory	3	1994	John Jost and Mahzarin Banaji
The rejection sensitivity (RS) model	3	1996	Geraldine Downey and Scott Feldman
The serial argument process model	3	2008	Jennifer Bevan, Andrea Finan, and Allison Kaminsky

Theory of resilience and relational load (TRRL)	3	2016	Tamara Afifi, Anne Merrill, and Sharde Davis
Triangulation theory	3	1988	Michael Kerr and Murray Bowen
Unified theory of psychology/ The tree of knowledge system	3	2003	Gregg Henriques
Identity theory	2	1966	James Marcia
A salience theory of learning	2	2007	Duane Rumbaugh, James King, Michael Beran, David Washburn and Kristy Gould
Accumulation model	2	2008	Panagiota Pervanidou
Arousal theory of motivation	2	1908	Robert Yerkes and John Dodson
Circumplex of identity formation modes (CIFM)	2	2017	Jan Cieciuch and Ewa Topolewska
Coercion theory	2	1982	Gerald Patterson
Dependency regulation model	2	2000	Sandra Murray, John Holmes, and John Griffin, 2000; Sandra Murray, John Holmes, and Nancy Collins, 2006
Developmental contextualism	2	1991	Richard Lerner
Devito's relationship stages	2	1993	Joseph Devito
Disillusionment model	2	1994	Ted Huston
Drive theory	2	1923	Sigmund Freud (1923), Clark Hull (1943)
Elementary pragmatic model (EPM)	2	1992	Piero De Giacomo and Alberto Silvestri
Emotion context insensitivity (ECI) theory	2	2005	Jonathan Rottenberg
Gender motivation theory	2	2017	Zeev Winstok, Michael Weinberg, and Ronit Smadar-Dror
Good-enough sex model	2	2007	Michael Metz and Barry McCarthy
I³ theory: Instigating, impelling, and inhibiting factors in aggression	2	2007	Eli Finkel
Model of social motivation	2	2006	Shelly Gable
Perfect storm theory	2	2008	Eli Finkel
Personality dynamics model	2	2020	Joanna Sosnowska, Peter Kuppens, Filip de Fruyt, and Joeri Hofmans

Social penetration theory	2	1973	Irwin Altman and Dalmás Taylor
Socioanalytic theory	2	2020	Robert Hogan, Ryne A. Sherman
The Buss and Plomin approach	2	1975	Arnold Buss and Robert Plomin
The convoy model of social relations	2	1980	Robert Kahn and Toni Antonucci
The relationship enhancement model of social support	2	2005	Carolyn Cutrona, Daniel Russell, and Kelli Gardner
Vulnerability cycle (VC)	2	2004	Michele Scheinkman and Mona Fishbane
A general theory of love	1	2000	Thomas Lewis, Fari Amini and Richard Lannon
A-B-C-D-E model	1	1977	George Levinger
Action-phase model of developmental regulation	1	1999	Jutta Heckhausen
Adaptationist framework for personality science	1	2020	Aaron Lukaszewski, David Lewis, Patrick Durkee, Aaron Sell, Daniel Sznycer, and David Buss
Affect theory of social exchange	1	2001	Edward Lawler
Affect-as-cognitive-feedback theory	1	2014	Jeffrey Huntsinger, Linda Isbell, Gerald Clore
Affinity maintenance theory	1	1987	Robert Bell, John Daly and M. Christina Gonzalez
Allport's theory of values	1	1931	Gordon Allport
Approach and avoidance temperament model	1	2002	Andrew Elliot and Todd Thrash, (2002, 2010)
Approach-avoidance social motivation model	1	2006	Shelly Gable
Approach-inhibition-avoidance (AIA) theory of power	1	2003	Dacher Keltner (2003), Eric Anicich and Jacob Hirsh (2017)
Argyris's maturity theory	1	1973	Chris Argyris
Attribution theory of motivation and emotion	1	1958	Fritz Heider (1958), Bernard Weiner (1986); Thomas Bradbury and Frank Fincham (1990)

Basic emotions theory (BET)	1	1962	Silvan Tomkins (1962), Paul Ekman and Wallace Friesen (1969)
Basic functional trade-offs in cognition: An integrative framework	1	2018	Marco Del Giudice and Bernard Crespi
Basic psychological need theory (BPNT)	1	2000	Edward Deci and Richard Ryan
Behavioral conceptualization of intimacy	1	2001	James Cordova and Rogina Scott
Behavioral theories of marriage	1	1959	Harold Kelley and John Thibaut (1959/1978)
Behaviorism	1	1913	John Watson (1913), Ivan Pavlov and B.F Skinner (1936), Clark Hull (1943)
Behavioural systems theory of love	1	1969	John Bowlby (1969/1982); Phillip R. Shaver and Mario Mikulincer
Berscheid's love styles	1	2018	Ellen Berscheid
Bilateral deterrence theory	1	1986	Edward Lawler
Biobehavioral model of attachment and bonding	1	2018	James Leckman, Sarah Hrdy, Eric Keverne, and Sue Carter
Burton's theory of basic human needs	1	1979	John Burton
Capitalisation support theory	1	2004	Shelley Gable, Harry Reis, Emily Impett, and Evan Asher
Carl Rogers humanist theory	1	1946	Carl Rogers
Character adaptation systems theory (CAST)	1	2017	Gregg Henriques
Classical conditioning	1	1890s	Ivan Pavlov
Cognition-Arousal Theory	1	1962	Stanley Schachter and Jerome Singer
Cognitive contextual model	1	1990	John Grych and Frank Fincham
Cognitive self-disclosure theory	1	1988	Edward Waring
Cognitive-experiential self-theory (CEST)	1	1996	Seymour Epstein
Cognitive-neoassociation theory of aggression	1	2012	Leonard Berkowitz

Cognitivism	1	1972	Jean Piaget
Comparison level theory	1	1959	John Thibaut and Harold Kelley
Complementarity theory	1	1999	Frank Fincham and Steven Beach
Conceptual framework for the neurobiological study of resilience	1	2015	Raffael Kalisch, Marianne B. Müller, Oliver Tüscher
Conservation of Resources (COR) Theory	1	1989	Stevan Hobfoll
Context-trait-process (C-T-P) model of marriage	1	1995	Benjamin Karney and Thomas Bradbury
Core relational theme	1	1991	Richard Lazarus
Correspondent inference theory	1	1965	Edward Jones and Keith Davis
Crisis theory (ABCX model)	1	1949	Reuben Hill (1949); Hamilton McCubbin and Joan Patterson (1982)
Culturally based romantic relationship (CBR2) model	1	2020	Ana Laura Fonseca, Melissa Curran, Tony Ye, Jill Koyama, Emily Butler
Distributive justice framework/Social contract theory	1	1971	John Rawls
Dyadic coping theory	1	2004	Lisa Story and Thomas Bradbury, (2004); Lisa Neff and Benjamin Karney, (2007); Ashley Randall and Guy Bodenmann, (2009, 2017)
Dyadic model of mediated communication	1	2015	Elena Corriero, Stephanie Tong and Pradeep Sopory
Dynamic human-centered communication systems theory (DHCCST)	1	2014	Annie Lang
Dynamical evolutionary view of love	1	2018	Douglas Kenrick
Eccles' expectancy-value model	1	1983	Allan Eccles and Jacquelynne Wigfield
Ecocultural framework	1	1966	John Berry
Ecological process model of systems change	1	2011	Leslea Peirson, Katherine Boydell, Bruce Ferguson, and Lorraine Ferris

Emotion regulation theory	1	1998	Rippere (1977); John Gross, (1998/1999/2004); Parkinson and Totterdell (1999); Koole, (2009)
Emotional competence framework	1	1998	Daniel Goleman
Empathizing–systemizing (E–S) theory	1	2003	Simon Baron-Cohen
Escape conditioning model	1	1986	John Gottman and Robert Levenson
EVLN model	1	1987	Caryl Rusbult, Gregory Morrow, and Dennis Johnson
Evolutionary and cross-cultural perspectives on love	1	2018	David Schmitt
Eysenck's psychobiological theory of personality	1	1967	Hans Eysenck
Find-remind-and-bind theory	1	2012	Sara Algoe
Focus theory of normative conduct	1	1990	Robert Cialdini, Raymond Reno and Carl Kallgren
Four loves	1	1960	C. S. (Clive) Lewis
Gene–culture co-evolution approach	1	2011	Herbert Gintis
General dynamics of personality approach (DPA)	1	2020	Markus Quirin, Michael Robinson, John Rauthmann, Julius Kuhl, Stephen Read, Mattie Tops and Colin Deyoung
Gottman method couples theory/ The sound relationship house in Gottman method couples therapy	1	2000	John Gottman and Julie Schwartz Gottman
Happy, healthy, safe relationships (HHSR) continuum	1	2021	Christine Murray, Ratchneewan Ross, and Jennifer Cannon
Hierarchical model for interpersonal verbal communication	1	2021	Jing Jiang, Lifan Zheng and Chunming Lu
Holistic–interactionistic approach	1	2007	David Magnusson and Hakan Stattin
Human motivation theory	1	1987	David McClelland
Huston's 3-level model of marriage	1	2000	Ted Huston

Hybrid model of learning in personality	1	2008	Chris Jackson
Idealization and disillusionment in intimate relationships model	1	2011	Sylvia Niehuis
Identity implications theory	1	1998	Steven Wilson, Carlos Aleman, and Geoff Leatham
Incentive theory	1	1957	e.g., Burrhus Frederic Skinner (1957), Frank Logan (1968)
Individual and family development	1	1948	Evelyn Duvall and Reuben Hill, (1948); Erik Erikson, (1950/1966)
Individualism and collectivism theory	1	2012	Harry Triandis and Michele Gelfand
Individualism, collectivism, and the psychology of love	1	2018	Karen Dion and Kenneth Dion
Inertia theory	1	2006	Scott Stanley, Galena Rhoades and Howard Markman
Instinct theory	1	1908	e.g., William James (1900s), William McDougall (1908), Sigmund Freud (1915), Konrad Lorenz and Nikolaas Tinbergen (1950)
Integrated model of relational self-construal (RSC)	1	2000	Susan Cross, Erin Hardin, and Berna Gercek-Swing
Integrative theory of the division of housework	1	2011	Jess Alberts, Sarah Tracy and Angela Trethewey
Interpersonal acceptance-rejection theory	1	1986	Ronald Rohner
Interpersonal model of capitilisation (InterCAP)	1	1988	Harry Reis and Shelly Gable
Interpersonal perception framework	1	1991	David Kenny
Intersection model of pair-relatedness	1	1979	George Levinger
Intimacy theory	1	1996	Harry Reis and Brian Patrick, (1996); Harry Reis, Margaret Clark, and John Holmes, (2004); Jean-Philippe

			Laurenceau, Lisa Barrett, and Michael Rovine, (2005);
Kelly's four ecological principles	1	1968	James Kelly
Knapp's relational development model	1	1978	Mark Knapp
Learning theory of attachment	1	2020	Guy Bosmansa, Marian Bakermans-Kranenburgb, Bram Vervlietc, Martine Verhees, Marinus van Ijzendoorn
Life course stress process perspective	1	2005	Leonard Pearlin, Scott Schieman, Elena Fazio, and Stephen Meersman
Life cycle model of stress	1	2009	Sonia Lupien
Life stage theory of personality	1	1950	Erik Erikson
Life-span theory of control	1	1993	Jutta Heckhausen and Richard Schulz
Love as caring maturity model	1	2020	Mehrnoosh Hedayati
Luhmann's boundaries of social systems theory	1	1984	Niklas Luhmann
Male control theory	1	1979	R. Emerson Dobash and Russell Dobash
Max-Neef's human needs theory	1	1986	Manfred Max-Neef
McClelland's theory of needs	1	1961	David McClelland
Memory for social information	1	1996	Steven Neuberg
Metatheory of evolutionary psychology	1	1992	e.g., John Tooby and Leda Cosmides (1992), David Buss (1995), Timothy Ketelaar and Bruce Ellis (2000)
Microbial influences on the social brain	1	2020	Amar Sarkar, Andrew Moeller, Rachel Carmody, Soili Lehto, Susan Erdman, Robin Dunbar and Philip Burnet
Mnemonic emotion regulation: A three-process model	1	2019	Simon Norby

MODE model	1	2014	Russell Fazio and Michael Olson
Model of defensive communication among romantic couples	1	2008	Jennifer Becker, Barbara Ellevold, and Glen Stamp
Model of differential susceptibility	1	2009	Jay Belsky and Michael Pluess
Model of personal intelligence	1	2008	John Mayer
Model of risk regulation in relationships	1	2006	Sandra Murray, John Holmes and Nancy Collins
Model of social inference	1	1984	Eliot Smith
Model of the social-safety system	1	2020	Sandra Murray, Veronica Lamarche, Mark Seery, Han Young Jung, Dale Griffin, Craig Brinkman
Motivational theory of life-span development	1	2010	Jutta Heckhausen, Carsten Wrosch, and Richard Schulz
Multiple inference model of social perception	1	2009	Bertram Gawronski
Mutual responsiveness model	1	2004	Grazyna Kochanska and Nazan Aksan (2004); Murray and Holmes (2009)
Nature and nurture in mental disorders: A gene-environment model	1	2020	Joel Paris
Necessary convergence communication (NCC) theory	1	2017	Michelle Miller-Day
Need to belong theory	1	2012	Roy Baumeister
Nineteen propositions	1	1951	Carl Rogers
Normative resource theory	1	1959	Robert Blood and Donald Wolfe
Operant conditioning	1	1938	Burrhus Skinner (1938/1948/1953/1957/1961/1969/1974/1989)
Optimal distinctiveness theory	1	1991	Marilynn Brewer
Optimal matching theory	1	1990	Cutrona and Russell
Optimal-level theory (The Yerkes–Dodson law)	1	1908	Robert Yerkes and John Dillingham Dodson
Partner accommodation framework	1	1991	Caryl Rusbult, Julie Verette, Gregory

			Whitney, Linda Slovik, and Isaac Lipkus
Passionate love: Cross-cultural and evolutionary perspective	1	2018	Debra Lieberman and Elaine Hatfield
Person-in-environment psychology: A holistic, developmental, systems-oriented perspective	1	2000	Seymour Wapner
Porter and Lawler's expectancy theory	1	1968	Lyman Porter and Edward Lawler
Predicted outcome value theory	1	1988	Michael Sunnafrank
Protective buffering theory	1	1991	e.g., James Coyne and David Smith (1991); Jerry Suls, Peter Green, Gail Rose, Patricia Lounsbury and Ellen Gordon (1997)
Psychobiological model of temperament and character	1	1993	C. Robert Cloninger, Dragan Svrakic, and Thomas Przybeck
Psychodynamic theory of personality	1	1905	Sigmund Freud
Psychosocial developmental theory	1	1963	Erik Erikson (1963, 1968, 1969, 1975, 1980)
Regulatory mode theory (RMT)	1	2000	Arie Kruglanski, Erik Thompson, Tory Higgins, Atash Nadir, Antonio Pierre, James Shah and Scott Spiege
Relational self-theory	1	1991	Susan Andersen and Serena Chen, 2002; Marilyn Brewer and Wendi Gardner, 1996; Hazel Markus and Shinobu Kitayama 1991
Relationship focused coping model	1	1990	Anita DeLongis and Tess O'Brien, (1990), James Coyne and David Smith, (1991);, Tess O'Brien and Anita DeLongis (1997)
Relationship motivation theory (RMT)	1	2017	Richard Ryan and Edward Deci

Resilience-as-regulation perspective	1	2015	David MacPhee, Erika Lunkenheimer and Nathaniel Riggs
Schwartz's theory of values	1	1992	Shalom Schwartz
Script theory	1	1978	Silvan Tomkins
Self-psychology theory	1	1985	Heinz Kohut
Self-broadcasting theory	1	2005	Sanjay Srivastava and Jennifer Beer
Sensation seeking and the hybrid model of learning in personality	1	2008	Chris Jackson
Shame resilience theory	1	2006	Brené Brown
Shared reality theory	1	2009	Gerald Echterhoff, Edward Higgins and John Levine
Social construction theory	1	1967	Berger and Luckmann
Social projection model of perceived partner responsiveness	1	2007	Edward Lemay, Margaret Clark, and Brooke Feeney
Social representation theory	1	1961	Serge Moscovici
Social-contextual model of coping	1	1998	Cynthia Berg, Sean Meegan and Frances Deviney
Spousal discrepancy theory	1	1993	Lawrence Kurdek
Sternberg's love triangle	1	1986	Robert Stenberg
Structural realist theory of the self (SRS)	1	2015	Majid Beni
Styles of romantic love	1	2006	Susan Hendrick and Clyde Hendrick
Synergistic change model	1	2017	Reuben Rusk, Diane Vella-Brodrick and Lea Waters
Tay and Deiner's global human needs	1	2011	Louis Tay and Ed Deiner
The affect theory of social exchange	1	2001	Edward Lawler
The cognitive-adaptive theory of traits (CATT)	1	2008	Gerald Matthews
The contextual model of personality	1	1983	Joseph Veroff (1983), Walter Mischel and Yuichi Shoda (1995)
The contextual relational uncertainty model	1	2019	Kale Monk and Brian Ogolsky
The drive to love	1	2018	Helen Fisher
The evolution of love	1	2018	David Buss
The ladder of inference	1	1970	Chris Argyris

The moralization gap theory	1	2011	Steven Pinker
The quadratic vagal activity–prosociality hypothesis	1	2014	Aleksandr Kogan, June Gruber, Amanda Shallcross, Ilmo van der Lowe, Bryant Hui, Christopher Oveis, Evan Carr, Iris Mauss, Emily Impett, Cecilia Cheng
The quadruple theory	1	2020	Tobore Onojighofia
The ReCAST model	1	2013	Paul Eastwick, Elizabeth Keneski, Taylor Morgan, Meagan McDonald and Sabrina Huang
The relational development model	1	2014	Mark Knapp
The sound marital house	1	1994	Julie Schwartz Gottman
The Thomas and Chess approach	1	1977	Alexander Thomas and Stella Chess
The two-polarities model of personality development	1	1983	Sidney Blatt, (1983, 2004, 2007)
Theory of allostatic load	1	1993	Bruce McEwen
Theory of basic human values	1	1994	Shalom Schwartz
Three motivational systems	1	2018	Phillip Shaver and Mario Mikulincer
Tinbergen’s four levels of behavioral analysis	1	1963	Nikolaas Tinbergen
Toxic stress model	1	2010	Jack Shonkoff (2010), Jack Shonkoff, Linda Richter, Jacques van der Gaag, and Zulfiqar Bhutta (2012)
Trait theory of personality	1	1937	Gordon Allport (1937), Raymond Cattell (1943), Hans Eysenck (1947)
Tripartite model of affect regulation	1	2008	Paul Gilbert
Uncertainty reduction theory	1	1975	Charles Berger and Richard Calabrese (1975), Marianne Dainton and Brooks Aylor (2001)
Uncertainty-identity theory	1	2007	Michael Hogg
Vroom’s theory of expectancy	1	1964	Victor Vroom
Wheel theory of love	1	1960	Ira Reiss

Zone of proximal development theory	1	1978	Lev Vygotsky
Parenting styles theory	1	1966	Diana Baumrind

Appendix 7. Explication of the 20 Most Cited Theories

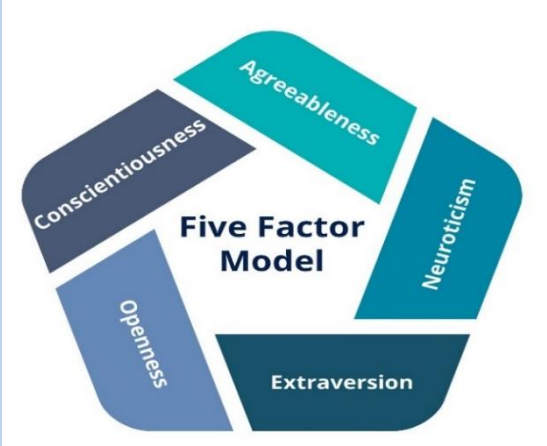
(In order of their citation count in the Endnote library)

Theory and Key Authors	Description of the Theory	Factors
Personality Theories <i>(Including Big Five, Big Two, HEXACO, OCEAN, Five Factor Model)</i> Authors: Allport (1937); Ashton and Lee (2001); Cattell (1946); Eysenck and Eysenck (1964); Goldberg (1990, 1992); Leary (1957); McCrae and Costa (1997); McCrae and John (1992); Terman and Bottenwieser (1935); Tupes and Christal (1961)	Personality is generally defined as the individual differences in stable but dynamic organisation of thoughts, behaviours and emotions. There are unresolved philosophical questions regarding the nature of personality – including its deterministic nature, how volition influences its development and expression, and its universality. These questions cause some confusion in distinguishing between personality and human character, temperament, or disposition, and how these develop. Character has been described as personality components that are socially desirable and contribute to collective thriving (Peterson & Seligman, 2004). Temperament refers to the “innate biological predispositions that influence automatic emotional reactivity” (Zwir et al., 2019, p. 1), and which play a role in predicting adult personality and personality disorder traits (Tang et al., 2020; Widiger et al., 2009). Temperament is generally considered to be genetically defined from birth (or earlier), and distinct from character in that character involves volitional self-control not automatic reactivity (Strelau, 1998; Thomas et al., 1968). The behavioural inhibition system and the behavioural activation system play a key role in temperament and these are seen by some researchers as promoting survival in childhood through avoidance of danger and seeking of nurture (Zwir et al., 2019). These are motivational systems that control “the pursuit of core biological goals” (Del Giudice, 2023, p. 4).	<i>Neuroticism</i> <i>Openness</i> <i>Extraversion</i> <i>Conscientiousness</i> <i>Agreeableness</i> <i>Honesty-Humility</i> <i>Emotional stability</i> <i>Dependable</i> <i>Impulsive</i> <i>Careless</i> <i>Critical</i> <i>Warmth</i> <i>Helpful</i> <i>Calm</i> <i>Cooperative</i> <i>Suspicious</i> <i>Encouraging</i> <i>Trusting</i> <i>Reserved</i> <i>Volatility</i> <i>Withdrawal</i> <i>Compassion</i> <i>Politeness</i> <i>Enthusiasm</i> <i>Assertiveness</i> <i>Intellect</i> <i>Industriousness</i> <i>Orderliness</i>

Undergirding this premise is an evolutionary framework that views the biological origins of emotion, thought and behaviour as purposeful or intentional – i.e., evolving for a reason (Davis & Panksepp, 2011; Montag & Davis, 2018; Montag & Panksepp, 2017; Panksepp, 1998). Personality is seen as a matured form of temperament, variously described as traits that reflect individual “predispositions toward specific patterns of thought, emotion, and behaviour in response to particular types of stimuli – whether it be rewards, punishments, or conspecifics” (Allen et al., 2022, p. 237).

Leary’s Interpersonal Circumplex model organised the interpersonal outworking of personality traits along the axes of dominance and affiliation. The HEXACO model (Ashton & Lee, 2007) adds honesty-humility (sincerity, fairness, greed-avoidance) to the existing five factors. Each of these personality models has lower-level facets, and these also show up in the personality network model.

The most frequently used personality measure, however, is the Big Five (Five-Factor Model, OCEAN, CANOE) model of personality (John et al., 2008). Developed in the 1980s using a taxonomy approach, words describing personality facets were grouped under the headings: extraversion (enthusiasm and assertiveness), neuroticism (volatility and withdrawal), agreeableness (compassion and politeness), openness to experience (intellect and openness), and conscientiousness (industriousness and orderliness) (DeYoung et al., 2007; Digman, 1990).

	The taxonomy of words used to create the Big Five personality types describe multiple factors of relationship well-being and therefore the literature on personality aligns closely with the literature collected in this study's database. There are also similarities regarding the development of the Five-Factor model and this study. Gordon Allport and Henry Odbert originally selected 4,504 words from the Webster's dictionary that represented psychological traits. This was augmented by Raymond Cattell in the 1940s, and subsequently abbreviated to 35 variables and 12 primary factors. In the 1960s Ernest Tupes and Raymond Christal defined five orthogonal factors leading to the current Big Five model.  Five-factor model	
Attachment Theory <i>(Including adult attachment theory)</i> Authors: Ainsworth (1969); Ainsworth et al. (1978); Ainsworth and Wittig (1969);	Attachment theory was developed by John Bowlby in the 1960s to explain an infant's reaction to briefly losing their mother. From this initial research has arisen one of the most influential theories in psychological science. Attachment theory postulates that early attachment experiences are integrated into stable perceptions of self and others (Bowlby, 1969) that later serve as the basis for emotions, perceptions, and behaviours in the context of romantic relationships (Hazan & Shaver, 1987). Secure	<i>Secure attachment</i> <i>Anxious attachment</i> <i>Avoidant attachment</i> <i>Disorganised attachment</i> <i>Parental sensitivity</i> <i>Fear of abandonment</i> <i>Interdependence</i>

Bartholomew and Horowitz (1991); Bowlby (1958, 1969, 1988); Crittenden (1981); Elliot and Reis (2003); Hazan and Shaver (1987); Main and Solomon (1990)

attachment is theorised as arising from sensitive and available caregiving by caregivers (Fonagy et al., 2014). When caregivers are trusted to meet needs the child can use them as a “secure base” from which they can freely explore the world (Sroufe, 2005). Secure attachment is formed when caregivers are sensitive, available, and responsive to children’s needs (Ainsworth et al., 1978; Fonagy et al., 2014), and therefore the child develops trust in being able to have their needs met, and in others’ trustworthiness in meeting these needs (Bowlby, 1973). When the need for reassurance and proximity is not consistently met through appropriate parental responsiveness, children often resign themselves to using alternative and often less optimal strategies (i.e., regulatory strategies such as deactivation or hyperactivation; Bowlby, 1969; 1982; Mikulincer & Shaver, 2016).

Mary Ainsworth and Barbara Wittig (Ainsworth & Wittig, 1969) categorised three attachment styles: secure, anxious and avoidant. Securely attached individuals have developed trust in their caregiver and therefore have comfort with both independence from and closeness to them. Therefore, they tend to be both independent from but comfortable with closeness to their adult relationship partners as well. The child’s trust in the availability and accessibility of significant others is used as a ‘mental model’ – an innate emotion regulation system – throughout life (Crocker & Canevello, 2016), and therefore the quality of parent-child interactions has a strong correlation with their later socioemotional functioning (Marquis-Brideau et al., 2022). Cindy Hazan and Philip Shaver explored the stability of attachment styles throughout the lifespan, including adult attachment.

	Anxiously attached adults tend to be uncomfortable with independence and avoidantly attached adults tend to be uncomfortable with closeness. By adulthood, most people have a secure attachment (around 55-65%) (Marvin et al., 2016), while approximately 20-30% of children have an avoidant attachment and 15-20% have an anxious attachment which stays reasonably stable over the lifespan (Cassidy & Shaver, 1999; Davila et al., 1997; J. Feeney & P. Noller, 1990; Hazan & Shaver, 1987; Kirkpatrick & Davis, 1994; Roisman et al., 2007; van IJzendoorn & Bakermans-Kranenburg, 1996). Positive model of others SECURE ATTACHMENT Comfortable with intimacy and autonomy. ANXIOUS ATTACHMENT Fears abandonment, clingy and lacking autonomy. Positive model of self AVOIDANT ATTACHMENT Fears intimacy, self-reliant and self-protective. AVOIDANT-FEARFUL ATTACHMENT Fears intimacy and abandonment. Negative model of self Negative model of others Attachment styles and working models	
Mindfulness Theory Authors: Hayes (2003); Kabat-Zinn (2003)	Mindfulness describes an attitude and intention of kindness, acceptance, and openness – both with oneself and towards others. Mindfulness is the process of purposefully and nonjudgmentally being present in the moment. A mindful person is one who is aware of their interconnectedness with others and gives attention to their current experiences (Hayes, 2003).	<i>Mindfulness</i> <i>Kindness</i> <i>Acceptance</i> <i>Openness</i> <i>Connectedness</i> <i>Closeness</i> <i>Self-compassion</i> <i>Non-judgemental</i>

	 Mindfulness Theory	
Emotion regulation theories (Including: Gross's Process Model of Regulation) Authors: Brennan and Shaver (1995); Davidson et al. (2000); (Gilbert, 2009); Gross (1998, 1999, 2002); Parkinson and Totterdell (1999); Pezza Leith and Baumeister (1996); Rippere (1977)	Emotion regulation involves being able to modulate, manage and modify one's emotions - expressing and suppressing emotion in an adaptive and functional manner. Emotions become dysfunctional when they interfere with one's ability to behave adaptively (Moyal et al., 2014). Gross' Emotion Regulation Theory Gross's theory of emotion regulation describes emotion regulation as "a process by which individuals influence what emotions they have, when they have them, and how they experience and express them" (Kobylynska & Kusev, 2019, p. 2). Gross (1998) describes different ways people can regulate their emotions, for example, attentional control and reappraisal (Bardeen et al., 2017). Attentional control includes distraction, rumination, worry, and cognitive suppression. Attentional control is the process of managing one's attention to divert it away from an emotional trigger. This can be achieved through various methods, including distraction, rumination, worry, and cognitive suppression. Distraction involves shifting one's focus onto something else to avoid	<i>Emotion regulation</i> <i>Emotion expression</i> <i>Emotion suppression</i> <i>Appraisal</i> <i>Reappraisal</i> <i>Attention</i>

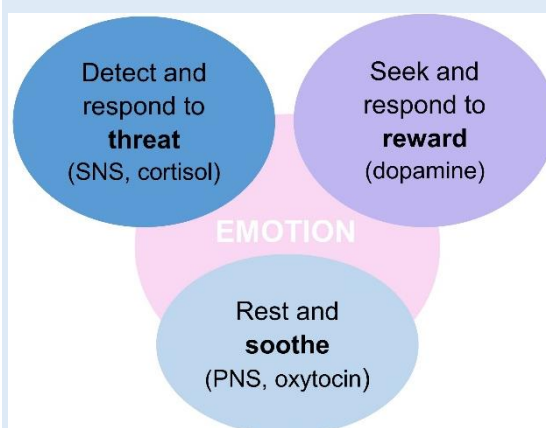
feeling overwhelmed by emotions. Rumination, on the other hand, involves repeatedly thinking about a situation or event that caused negative emotions, often leading to increased feelings of distress. Worry is another form of attentional control that involves anticipating potential negative outcomes to a situation, which can help prepare an individual for potential stressors. Lastly, cognitive suppression involves actively pushing away or suppressing negative emotions, which can be detrimental in the long term.

Reappraisal is the second strategy described by Gross' theory and involves changing one's perspective towards an emotional situation to modify the emotional response. Two common forms of reappraisal are distancing, and humour (Loskot, 2019; Wilms et al., 2020). Distancing involves creating emotional distance from the situation by viewing it from a detached or objective perspective, which can help reduce the intensity of the emotional response. Humour is another form of reappraisal that involves finding the humour in a situation to help regulate negative emotions. For example, making light of a stressful situation can help shift one's perspective and reduce the intensity of negative emotions. These strategies can be used in combination or separately depending on the situation and the individual's preference.

Gilbert's Evolutionary Model of Emotion Regulation

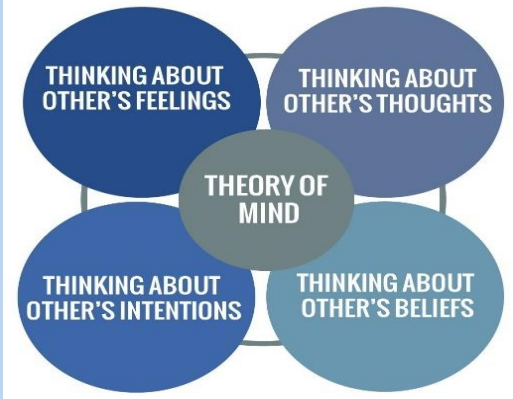
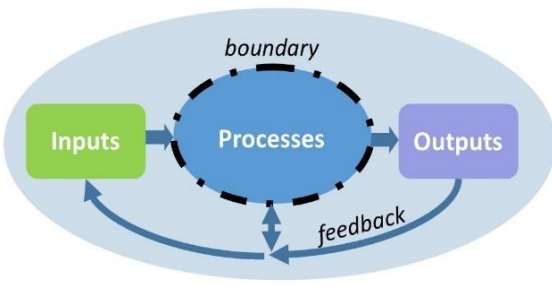
This framework proposes that human emotions are shaped by our evolutionary history and biological makeup. According to Gilbert's model, there are three primary emotional systems: the threat system, the drive system, and the soothing system. These systems work

together to regulate our emotional responses and behaviours. The threat system is responsible for detecting and responding to potential threats in our environment and it triggers a range of physical and emotional responses, such as fear, anxiety, and aggression. The drive system is responsible for our motivation and goal-directed behaviour. This system is activated when we experience positive emotions, such as excitement or joy, and it drives us to pursue our goals and desires. The third system, the soothing system, is responsible for calming and comforting us when we are distressed or overwhelmed. This system is activated when we experience positive emotions associated with safety, comfort, and nurturing, such as love, compassion, and contentment. When the soothing system is activated, it can help to reduce the activity of the threat and drive systems, promoting a sense of relaxation and well-being. Gilbert's model proposes that effective emotion regulation requires a balance between these three systems. When the threat system is overactive or the drive system is dominant, it can lead to negative emotional states and maladaptive behaviours. However, when the soothing system is activated and functioning properly, it can help to regulate our emotions and promote well-being.

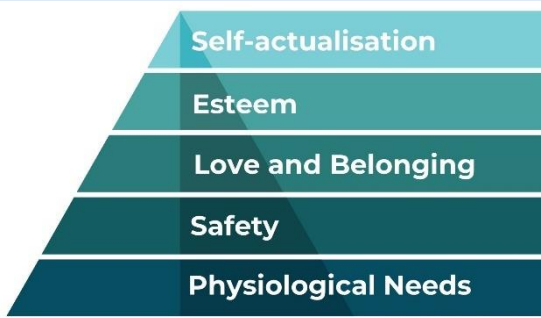


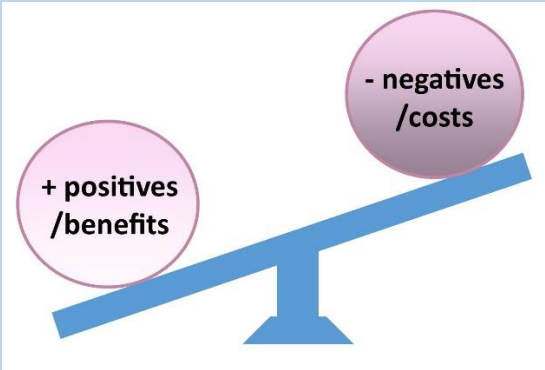
	Gilbert's emotion regulation model	
Interdependence Theory <i>(Including the Investment Model and the Accommodation Model)</i> Authors: Kelley and Thibaut (1978); Lewin (1948); Rusbult (1980); Rusbult and Van Lange (2003); Rusbult et al. (1991); Sprecher (1988); Thibaut and Kelley (1959)	Interdependence Theory evolved from Social Exchange Theory which considers the relationship between partners to be transactional wherein the rewards received from the relationship are weighed up against the costs incurred. The outcomes of this equation are then compared to an ideal standard of what is expected as acceptable in a relationship, resulting in satisfaction or dissatisfaction in the relationship. This satisfaction is then used to explain people's commitment to stay in the relationship or leave it. Satisfaction is high when one's partner is seen as meeting one's needs for companionship, security, intimacy, sexuality, and belonging. The Investment Model is theoretically based in Interdependence Theory. It posits that commitment to a partner is influenced by three independent factors: satisfaction level, attractive alternatives, and investment size. A meta-analysis of these factors indicated that they contribute up to 60% of the variance in a couple's commitment to one another, with the most significant factor being satisfaction level (Le & Agnew, 2003).  <pre> graph TD RI[Relationship investment] --> C[Commitment] QA[Quality of alternatives] --> C RS[Relationship satisfaction] --> C C --> RS2[Relationship stability] </pre> The investment model	<i>Ideal standards</i> <i>Commitment</i> <i>Attractive alternatives</i> <i>Intimacy</i> <i>Sexuality</i> <i>Belonging</i> <i>Companionship</i> <i>Investment</i>
Emotional Intelligence	Emotional intelligence (EI) describes the ability to solve emotional problems	<i>Emotional intelligence</i>

Theory Authors: Goleman (1998); Bar-On (2006); Ciarrochi et al. (2000); Petrides et al. (2007); Salovey and Mayer (1990); Schutte et al. (2001)	(Mayer, Roberts, & Barsade, 2008; Mayer & Salovey, 1997). At a broad level, emotional intelligence includes the abilities to “(a) perceive emotions accurately, (b) use emotions to facilitate thought, (c) understand the causes of emotions, and (d) regulate ones emotions” (Mayer et al., 2004, p. 197). Daniel Goleman’s theory of emotional intelligence (1998) considered emotional intelligence to be built in stages, with the first stage being self-awareness, then self-management (or self-regulation), then empathy (other-awareness), then social skills (ability to communicate each of these steps to others). Daniel Goleman’s (Goleman, 1998) Emotional Intelligence Theory	<i>Self-awareness</i> <i>Self-regulation</i> <i>Emotion regulation</i> <i>Empathy</i> <i>Social skills</i>
Theory of Mind Authors: Baron-Cohen (1991); Koster-Hale and Saxe (2013)	Theory of mind refers to someone’s capacity to ascribe mental states to another – and thereby have other-awareness – the awareness that other people’s perception of the world is distinct from one’s own. This awareness helps us to predict and interpret others’ behaviours, thoughts, and emotions.	<i>Theory of mind</i> <i>Attributions</i> <i>Perceptions</i>

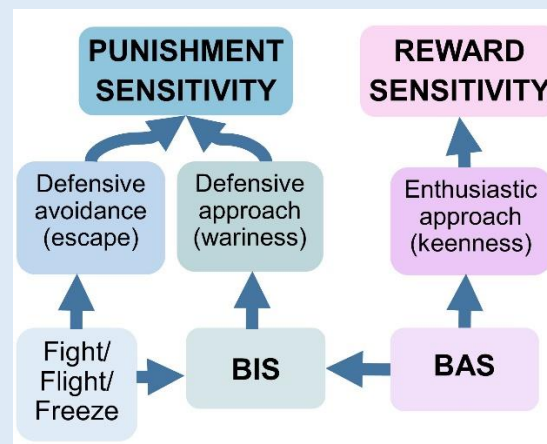
	 Theory of Mind	
General Systems and Biopsychosocial Theories <i>(Including the Biopsychosocial (BPS) and Model of Challenge and Threat)</i> Authors: e.g., Bronfenbrenner (1977); Burman and Margolin (1992); Engel (1977); Kiecolt-Glaser and Newton (2001); K. Miller et al. (2017); Slatcher and Selcuk (2017); Uchino (2009); von Bertalanffy (1968); Wood et al. (2000)	General systems theory (GST) is an interdisciplinary conceptual framework. To understand a system, we must first understand its parts, organisation, and development. The synergistic relationships between parts make up the whole system and this system exists within a context that has a boundary that can be closed off to other external influences or be open to varying degrees to outside influences. Input comes into the systems and output comes out of the system. Positive input creates useful energy, negative input may create entropy or disorder. The system may adapt to changes through positive and negative feedback loops.  General systems theory	<i>Relationship threats</i> <i>Stress responses</i> <i>Emotion regulation</i> <i>Physiological reactions</i> <i>Social context</i> <i>Appraisals</i> <i>SNS arousal</i> <i>SAM activation</i> <i>Heart rate</i>
Self-Determination Theory (SDT) Authors:	Self-Determination Theory is a macro theory of motivation and personality based on the premise that people have an innate need to become self-determined, and they become self-	<i>Motivation</i> <i>Personality</i> <i>Competence</i> <i>Autonomy</i> <i>Relatedness</i>

Deci and Ryan (2009); Ryan and Deci (2000, 2006)	determined when their needs for competence, relatedness and autonomy are met and autonomy refers to self-congruent volition. Relatedness refers to a person's feeling of connection, closeness, and support from others. Competence refers to a sense of capability and effectiveness in dealing with life goals or challenges. The three needs can be frustrated or supported by various environmental and social situations. People are believed to move towards (approach) growth and fulfilment when they are supported, and to move away from (avoid) growth when they are not. In critical, controlling, or rejecting situations they may even become defensive and attacking (move against) (Weinstein et al., 2022; Weinstein et al., 2013). Need-thwarting can lead to the development of negative coping strategies that may hinder personal and relationship well-being. The diagram illustrates the three basic psychological needs of humans. It features three colored speech bubbles: a pink one for 'AUTONOMY' (Being able to control one's life), a blue one for 'COMPETENCE' (Effectively managing one's environment), and a green one for 'RELATEDNESS' (Having close, warm relationships). Arrows from these three bubbles point towards a central blue box labeled 'MOTIVATION'. Below this central box, the text 'humans' basic needs' is written in a light blue font. Basic psychological needs in Self-Determination Theory	<i>Resilience</i> <i>Need satisfaction</i> <i>Need frustration</i> <i>Connection</i> <i>Support</i> <i>Approach/avoidance goals</i> <i>Coping</i>
Developmental theory Authors: e.g., Piaget (1931); Bandura (1963); Bowlby (1947); Erikson (1950); Stern et al. (2018); Maslow (1954)	Developmental theories consider the way a human develops from conception to death, and the different stages of development across their lifespan. There have been many developmental theories over the past century including Freud's psychosexual developmental theory, Erikson's eight-stage theory of psychosocial development, Skinner's operant conditioning theory, Piaget's cognitive development theory, Bowlby's	<i>Lifespan</i> <i>Age and stage</i> <i>Developmental factors</i> <i>Physical resources</i> <i>Safety</i> <i>Self-esteem</i> <i>Self-actualisation</i>

	attachment theory, Bandura's social learning theory, Vygotsky's sociocultural theory, Biopsychosocial theory, Maturationist theory, Watson's behaviorism theory, Selman's stage theory of role taking, Dodge's information-processing theory of social problem solving, Dweck's theory of self-attributions, Cognitive development theory, Ecological system theory. Perhaps the most commonly known developmental model (aside from Attachment Theory) is Maslow's (1954) pyramid. Abraham Maslow theorised that human potential was realised in stages of need. Once fundamental physiological and safety needs were met (the bottom of the pyramid), humans could develop their other 'basic needs' of love and belonging, self-esteem and self-actualisation.  <i>Maslow (1954)s hierarchy of needs</i>	
Social Exchange Theory <i>(Including Equity Theory in Close Relationships)</i> Authors: Blau (1964); Cook et al. (2013); Curry and Emerson (1970); Emerson	George Homans (1961), Peter Blau (1964), and Richard Emerson (1962) introduced exchange theory to explain the social exchanges that occur between people in relationships of all types. These are the daily exchanges of "activity, tangible or intangible, and more or less rewarding or costly" between two or more people (Cook et al., 2013, p. 62). Following on from Skinner's behaviourism, social exchange conceived behaviour to be a function of	<i>Equity</i> <i>Reciprocity</i> <i>Commitment</i> <i>Motivation</i> <i>Rewards</i> <i>Costs</i> <i>Power</i>

(1976); Homans (1961); Levinger (1965); Thibaut and Kelley (1959); Walster and Walster (1975)	rewards or costs that reinforced continuing behaviour. Dyadic exchange in a couple is therefore viewed as an economic exchange where equity, power and commitment are all variables, and inequity occurs when costs are greater than rewards – leading to reduced commitment motivation (Lawler, 2001; Redmond, 2015). Equity Theory specifically focuses on the way feelings of inequity impact a person's motivation.  Social exchange theory	
Regulatory focus theory/ Approach and avoidance goals/ Motivational theory (including Reinforcement sensitivity theory (RST & RRST)) Authors: Gray (1973); Gray and McNaughton (2000); Higgins (1997)	Motivational variables are a significant determinant of behaviour. They are the 'why' of behaviour and they orient, and energize behaviour (McClelland et al., 1989). Regulatory focus theory understands human motivation to be influenced alternately by the avoidance of pain and the pursuit of pleasure. The behavioural approach system (BAS) regulates the pursuit of pleasure and relates to positive emotions, and the behavioural inhibition system (BIS) regulates the pursuit of pain and distress and relates to negative emotions (Carver & White, 1994). Reinforcement Sensitivity Theory (RST) Gray's Reinforcement Sensitivity Theory views the fight/flight and freeze threat/stress defence mechanism as a biologically informed innate embodied	<i>Motivation Personality Behavioural inhibition Behavioural activation Fight Flight Freeze Behavioural approach Behavioural inhibition Stress</i>

system to aid in survival. RST also includes the Fight/Flight System (FFS). The FFS is seen as an innate evolutionary individual defence mechanism that produces physiological reactions to threat/stress to enable appropriate physical responses (Chen et al., 2020). Some of Gray's original ideas have been reconceptualised in the Revised RST.

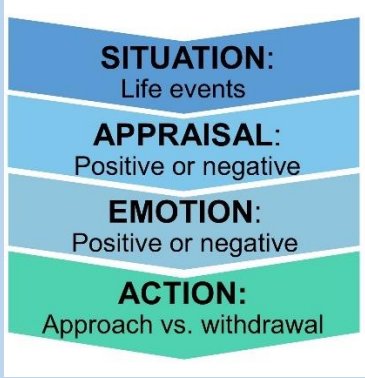


Reinforcement sensitivity theory:

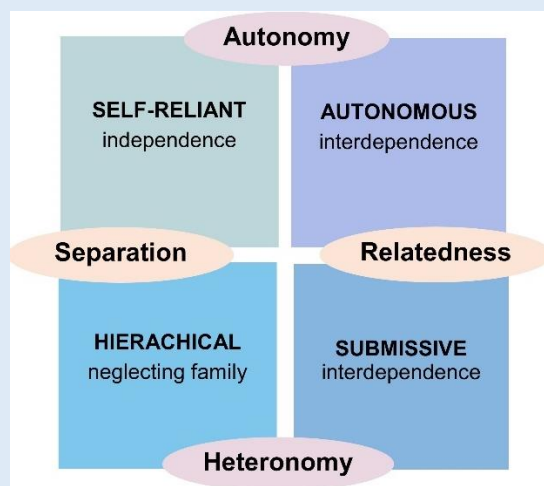
Biobehavioural architecture (Smillie et al., 2006)

Dynamic theories of motivation (Bischof, 1975; Schneider, 2001) posit that unpleasant experiences lead to future aversive reactions to repeats of those experiences, and pleasant experiences lead to future 'appetitive' reactions. In other words, we draw near to what we enjoy, and we retract from what we find unpleasant. Gray (1987) hypothesised that there are two genetically-based social motivational systems – the behavioural inhibition system (BIS) and the behavioural activation system (BAS). The BIS is stimulated to move away from punishment and inhibit behaviour, and the BAS is stimulated to move towards reward and activate behaviour. Because the BIS is triggered by aversive stimuli

	(e.g., stress) it correlates with negative emotions (Reese et al., 2015), whereas the BAS is more likely to correlate with positive emotions. Both systems are correlated with emotion regulation capabilities (Altan-Atalay, 2019). These responses may have significant genetic and neuronal input (Dipietro et al., 2018; Kalisch et al., 2015; Romero-Martinez et al., 2022; J. Wu et al., 2021).	
Attribution Theory /Appraisal Theory Authors: e.g., Arnold (1960); Dweck (1975); Fletcher and Fincham (1991); Frijda (1993); Knee (1998); Lazarus and Folkman (1984); McClelland et al. (1989); McCubbin and Patterson (1982); Moors et al. (2013); Roseman (1996)	Appraisal theory is concerned with how appraisals of a situation's personal meaning organise one's emotional response to that situation. Appraisals are evaluations about what is at stake for the individual in that situation, and their subsequent assessment of their ability to cope with that situation. Appraisal models commonly recognise five appraisal dimensions: relevance, valence, likelihood, agency, and coping potential. Relevance refers to the extent to which the situation is seen as important or relevant to the individual. Valence refers to whether the situation is perceived as positive or negative. Likelihood refers to the probability or likelihood of the situation occurring. Agency refers to the extent to which the individual perceives themselves as having control or influence over the situation. Finally, coping potential refers to the individual's assessment of their ability to handle the situation. (Arnold, 1960) and (Lazarus, 1966)'s early theories of appraisal are cited 48 times in the Endnote library, predominantly in the last decade, showing their endurance in the research. Arnold's theory described appraisal as intuitive and emotion arousing. Lazarus' theory described the balance between perceptions of demands, threats, or stressors in a person's life, and their	<i>Appraisal Reappraisal Evaluations Coping Agency Attributions Evaluations</i>

	resources to cope with them. Arnold (1960)'s early appraisal theory proposed that emotions are the result of a two-step process involving cognitive appraisal and physiological emotional response that are activated by a situation and result in action.  Arnold's (1960) appraisal theory	
Family Systems Theory (FST) Authors: Bowen (1966, 1978)	Murray Bowen's Family Systems Theory (Bowen, 1966, 1976) is a theoretical approach that focuses on understanding the dynamics of families and other social systems. This theory proposes that the family unit is a complex system that is composed of interrelated and interdependent individuals. According to Bowen, the family system operates based on a set of underlying rules and patterns of behaviour that are passed down from one generation to the next. One of the key concepts in Bowen's theory is the idea of intergenerational patterns. This refers to the ways in which patterns of behaviour, emotions, and relationships are transmitted from one generation to the next. These patterns can be positive or negative, and they can have a significant impact on the functioning of the family system. Another central concern of Bowen's theory is the development and expression of anxiety about either too much or too little closeness in family relationships. This anxiety can result in	<i>Intergenerational patterns</i> <i>Anxiety</i> <i>Differentiation</i> <i>Fusion</i>

what Bowen refers to as fusion, which is a lack of differentiation between individuals in the family system. When fusion occurs, individuals become over-involved with each other and may take on too much responsibility for each other's well-being. This can lead to a lack of individual autonomy and a sense of emotional enmeshment within the family. On the other hand, when there is a lack of closeness in family relationships, this can result in emotional cut-off. This occurs when individuals emotionally distance themselves from others to avoid tension in the relationship. This can lead to feelings of isolation and disconnection from the family system (Brown, 1999).



Bowen family systems theory

Evolutionary Psychological Theory
(Including *Life History Theory* and *Affection Exchange Theory AET*)

Authors:
Buss (1995);
Buss and Schmitt (1993b);
Darwin (1859);

Evolutionary Psychological Theory is a framework that aims to explain human behaviour and cognition by drawing on principles of evolutionary biology. These theories offer an explanation for the role of neurological, hormonal, and biological systems in human relational behaviour (Cisek & Hayden, 2022; Nettle & Frankenhuys, 2020) by positing that human psychological adaptations are the result of selective pressures that have shaped human evolution over time, particularly those related to survival and reproduction. This theory helps to explain

Physiological reactions
Life history
Affection
Brain
Sex differences

Floyd (2002, 2006); Hamilton (1964); James (1890); Kavanagh et al. (2010); McDougall (1908); Pianka (1976); Stearns and Koella (1986); Tinbergen (1963)	the biological imperatives of human physiological and behavioural responses. One key feature of Evolutionary Psychological Theory is the view that the human brain has evolved for social relationships (Kenrick et al., 2013). Human beings are social creatures, and social relationships have played a critical role in human evolution. The ability to form and maintain social connections has been essential for survival throughout human history. The human brain has evolved to facilitate social relationships by allowing individuals to communicate, cooperate, and coordinate with others. Evolutionary Psychological Theory suggests that many of the psychological traits and behaviours that humans exhibit have evolved in response to the challenges of survival and reproduction. These adaptations are thought to have been selected over time because they provided a survival or reproductive advantage to individuals who possessed them. Life History Theory (LHT) Life History Theory is a branch of evolutionary psychology that focuses on how individuals allocate their resources over the course of their lifetime to maximize their reproductive success. A key aspect of Life History Theory is the idea that early life experiences can have a significant impact on an individual's reproductive strategy later in life. According to this theory, individuals who experience adversity in early life, such as poverty, neglect, or abuse, may be more likely to adopt a fast life history strategy. This strategy involves focusing on short-term gains and taking risks to maximize reproductive success. For example, individuals who experience early life	

adversity may be more likely to engage in risky sexual behaviour, have multiple partners, and have children at a younger age. On the other hand, individuals who experience a more stable and supportive upbringing may be more likely to adopt a slow life history strategy. This strategy involves focusing on long-term goals and investing in offspring to maximize reproductive success. For example, individuals who experience a stable upbringing may be more likely to delay having children, invest more time and resources in their offspring, and seek out long-term relationships.

The relationship between early life experiences and reproductive strategy is believed to be mediated by a range of psychological and physiological factors, including stress responses, neural development, and socialization experiences (Simpson, 2019). This is seen as an evolutionary adaptation that enhances reproductive success.

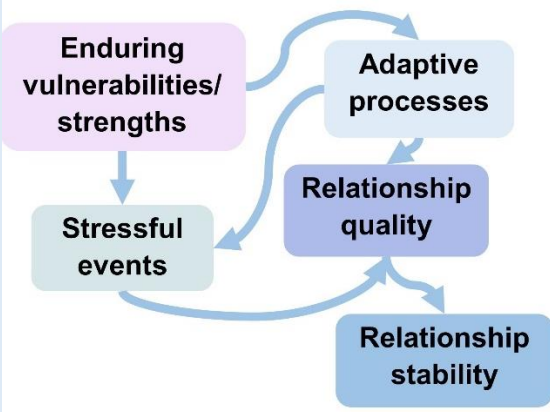
Affection Exchange Theory (AET)

AET integrates evolutionary theory into communication theory by way of the biological variables that can influence affection exchange. Affection is seen as an evolutionary adaptation that enhances human flourishing (Graves, 2021). Affection is defined as the expression of warmth, love, and positive regard towards others. This expression of affection is thought to serve several essential functions, including promoting social bonding, reducing stress, and enhancing physical and psychological well-being.

AET integrates evolutionary theory into communication theory, drawing on insights from biology and psychology to shed light on how and why affection exchange occurs. The biological

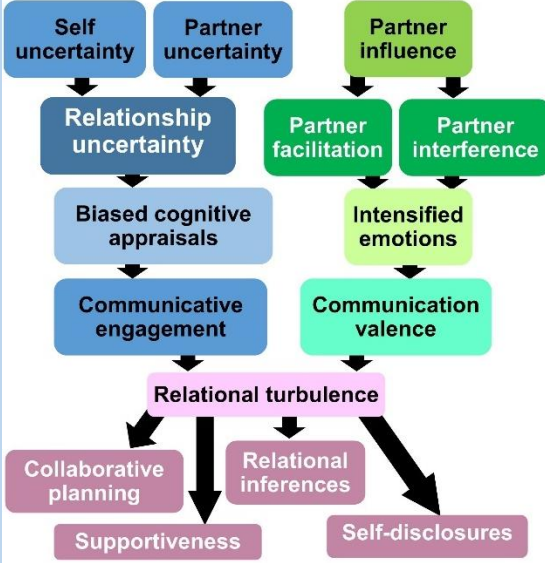
	variables that can influence affection exchange are an important focus of AET. For example, research has shown that the release of certain hormones, such as oxytocin, can promote feelings of affection and social bonding. Other factors, such as genetics and early life experiences, can also play a role in shaping an individual's propensity to express and receive affection. AET emphasizes the importance of reciprocity in affection exchange. When affection is exchanged in a mutually responsive way, it can enhance social bonds and promote positive affect. However, when affection is not reciprocated or is expressed in a way that is inconsistent with an individual's expectations, it can lead to negative affect and relationship strain. Life history cycle	
Dyadic Coping and stress theories (Including Vulnerability-Stress-Adaptation (VSA) model) Authors:	Dyadic coping is coping that occurs interactively between couples. Stressful situations are coped with by the sharing of support, joint stress appraisals, and joint stress management, allowing the regulation of stressful perceptions, and of stressful events. The Vulnerability-Stress-Adaptation (VSA) Model	<i>Enduring vulnerabilities</i> <i>Stressful events</i> <i>Stressors</i> <i>Coping</i> <i>Dyadic coping</i> <i>Stress</i> <i>Stress management</i> <i>Stress appraisals</i>

e.g., Bodenmann (1995, 2005); Falconier and Kuhn (2019); Karney et al. (2005); Lazarus and Folkman (1984); Lyons et al. (1998); McCubbin and Patterson (1983); O'Brien and DeLongis (1996); Randall and Bodenmann (2009)	The VSA Model is a framework that seeks to explain the stress related dynamics of romantic relationships (Bradbury et al., 1998; Karney & Bradbury, 1995). It recognises contextual stress as a key factor determining the development of couple relationship well-being, along with intra-personal vulnerabilities (individual differences that might lead to differing outcomes under stress) and interpersonal adaptive dyadic processes when faced with stress. According to this model, relationships are shaped by three key factors: enduring vulnerabilities, stressful events, and adaptive processes. Enduring vulnerabilities refer to individual differences that can either aid or inhibit coping responses in the face of stress. These can include personality traits, attachment styles, and previous life experiences. For example, individuals with high levels of neuroticism may be more prone to experiencing anxiety and depression in response to stressful events, while individuals with high levels of extraversion may be better able to cope with stress through social support. Stressful events are also a key factor in the VSA model. These can include external events such as financial problems, health issues, or job loss, as well as internal events such as disagreements or conflicts within the relationship. Stressful events can place a strain on the relationship, and how the couple responds to these events can determine whether the relationship is sustained or damaged. Adaptive processes are those that enhance coping within the couple. These might include supportive communication, problem-solving skills, and conflict resolution strategies. When couples can	<i>Support</i> <i>Behaviour</i> <i>regulation</i> <i>Emotion regulation</i>

	engage in adaptive processes, they are better able to cope with stress and maintain a healthy relationship. The VSA model emphasizes the interplay between these three factors. Enduring vulnerabilities can make couples more susceptible to the negative effects of stress, but adaptive processes can help to mitigate these effects. On the other hand, a lack of adaptive processes can exacerbate the negative effects of stress, leading to relationship distress or dissolution.  The Vulnerability-stress-adaptation (VSA) model (Karney & Bradbury, 1995)	
Relational Turbulence Model Authors: Solomon and Knobloch (2004)	The Relational Turbulence Model (RTM) is a theoretical framework that seeks to explain the dynamics of romantic relationships when they enter a state of uncertainty and instability. According to this model, repeated and frequent exposure to intense interactions between partners leads to relational turbulence. This turbulence is characterized by a global evaluation of the relationship as fragile, tumultuous, and chaotic. Relational uncertainty and interdependence are factors that shape one's relational experiences and communication outputs in the RTM. Relational uncertainty refers to the	<i>Uncertainty</i> <i>Interdependence</i> <i>Intimacy</i>

doubts and questions that arise in the minds of individuals when they are unsure about the status of their relationship. For example, they may be uncertain about the level of commitment or the future of the relationship. Interdependence, on the other hand, refers to the degree to which individuals rely on one another to meet their needs and achieve their goals. The greater the interdependence between partners, the more likely they are to experience relational turbulence when uncertainty arises.

The RTM suggests that relational turbulence can have a range of negative effects on the relationship. "Repeated and frequent exposure to intense interactions between partners leads to relational turbulence—a global evaluation of the relationship as fragile, tumultuous, and chaotic" (Brisini & Solomon, 2020, p. 66). It can lead to a decrease in relationship satisfaction, increased conflict and arguments, and a decrease in intimacy and trust between partners. Additionally, the model highlights the role of communication in shaping the experience of relational turbulence. Communication that is unclear or inconsistent can exacerbate uncertainty and contribute to the turbulence in the relationship.

	 <pre> graph TD SU[Self uncertainty] --> RU[Relationship uncertainty] PU[Partner uncertainty] --> RU PI[Partner influence] --> PF[Partner facilitation] PI --> PInt[Partner interference] RU --> BCA[Biased cognitive appraisals] PF --> IE[Intensified emotions] PInt --> IE BCA --> CE[Communicative engagement] IE --> CV[Communication valence] CE --> RT[Relational turbulence] CV --> RT RT --> CP[Collaborative planning] RT --> RI[Relational inferences] RT --> SD[Self-disclosures] CP --> S[Supportiveness] RI --> S RI --> SD </pre> Relational turbulence theory	
Interpersonal Circumplex Theory (IPC) Authors: Carson (1969); Leary (1957); Wiggins and Trobst (1997)	The interpersonal circumplex is a theoretical model used in social and personality psychology to understand interpersonal behaviour and relationship dynamics. The model is based on two orthogonal dimensions: affiliation and control. The affiliation dimension ranges from warmth and friendliness to coldness and unfriendliness, while the control dimension ranges from agency and dominance to submission and submissiveness. Researchers use the interpersonal circumplex to study the nature of interpersonal relationships and individual differences in interpersonal behaviour. The model has been used to explore how different personality traits, such as agreeableness and extraversion, are related to different regions of the circumplex. For example, individuals who score high on agreeableness tend to be located in the warm and friendly regions of the model, while those who score high on dominance tend to be located in the upper-right region, reflecting their tendency to assert control and dominance in social interactions.	<i>Affiliation</i> <i>Control</i> <i>Agency</i> <i>Arrogance</i> <i>Hostility</i> <i>Antagonism</i> <i>Dominance</i> <i>Extraversion</i> <i>Friendliness</i> <i>Warmth</i> <i>Agreeableness</i> <i>Ingenuous</i> <i>Lazy</i> <i>Submissive</i> <i>Introversion</i> <i>Aloofness</i> <i>Coldness</i> <i>Quarrelsome</i>

The interpersonal circumplex is also used to study how interpersonal behaviour changes over time and across situations. Researchers have found that individuals tend to show more warmth and friendliness in situations where they feel comfortable and secure, whereas they may exhibit more control and dominance in situations where they feel threatened or insecure. The model has also been used to explore how different situational factors, such as power differentials and social norms, influence the nature of interpersonal interactions.



The Interpersonal circumplex theory
(Smith, 2013, p. 454)

Social Baseline Theory

Authors:
Beckes and Coan (2011);
(Coan et al., 2014)

Social Baseline Theory proposes that social interaction and attachment with others is essential for human survival and well-being, and that individuals function best within a predictable, familiar, and interdependent social context. Social Baseline Theory perceives that “close proximity to social resources is the baseline assumption of the human brain” (Beckes & Coan, 2011, p. 976), and suggests that humans have evolved to depend on social resources for survival and reproduction, and that close proximity to others is a fundamental assumption of the human

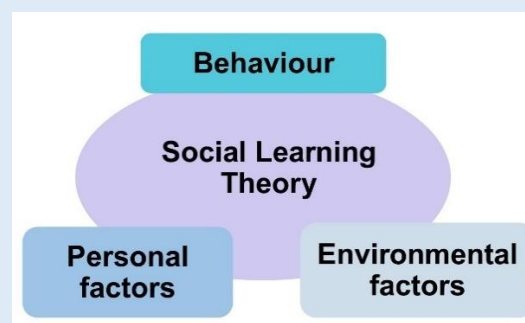
Closeness
Brain
Social network
Social support
Goals
Interdependence

	brain. A social context allows individuals to better manage stress, protect against threats, and achieve goals more effectively. For example, individuals who feel secure and supported by their social network are more likely to take risks, pursue goals, and perform well under pressure. The Social Baseline Theory also emphasizes the importance of interdependence in social relationships. The theory suggests that humans are hardwired to be interdependent and to rely on others for help and support. This interdependence is thought to provide a range of benefits, including the sharing of resources, the provision of emotional support, and the promotion of positive social interactions. <pre> graph TD A[Social proximity] --> B[Reduced vigilance and perception of threat] B --> C[Saved energy and lower stress] C --> D[Improved well-being and brain function] </pre> Social baseline theory	
Social Learning Theory Authors: (Bandura, 1963; Rotter, 1954)	Albert Bandura's Social Learning Theory is a theoretical framework that emphasizes the role of observational learning, modelling, and vicarious reinforcement in shaping human behaviour. Bandura's theory suggests that behavioural, personal, and environmental factors all interact to shape an individual's learning and behaviour. Behavioural factors refer to	<i>Modelling</i> <i>Cognitions</i> <i>Environmental factors</i>

the individual's actions and reactions, while personal factors refer to the individual's characteristics, such as personality traits, cognitive abilities, and emotions. Environmental factors include the social and cultural context in which the individual is situated.

Bandura argues that people learn by observing and imitating the behaviour of others, particularly those they perceive as role models. Bandura also highlights the importance of vicarious reinforcement, which occurs when individuals observe the positive or negative consequences of others' behaviour. If the behaviour is followed by a positive outcome, the individual is more likely to imitate it, whereas if it is followed by a negative outcome, the individual is less likely to imitate it.

Bandura's theory also suggests that parents are among the primary models that children learn from, and that reinforcement of certain behaviours by parents can contribute to their children's adoption of those behaviours. As children continue to learn and develop, they may also learn from other models in their social environment, such as teachers, peers, and media figures.



Social learning theory

Appendix 8. Factor List

Factors
Abandonment
Abandonment anxiety
Abdominal fat
Abuse
Acceptance
Accepting
Accessibility
Accommodation
Accommodating
Accommodation
Accumbens
Accurate perception
Accusation
Achievement
Acknowledgement
Active listening
Adaptability
Adaptive anger regulation
Addiction
Addictions
Adhd
Adjustment
Admiration
Admit fault
Adult attachment
Adultery
Adverse childhood experiences
Adverse events
Adverse experiences
Adverse life events
Adverse life experience
Adversity
Advice
Advice giving
Advice seeking
Affair
Affairs
Affect
Affect contagion
Affect labeling
Affect reciprocity
Affect regulation

Affect sharing
Affection
Affection deprivation
Affectionate communication
Affective disorder
Affective dysregulation
Affective empathy
Affiliation
Affiliative
Affiliativeness
Affirmation
Age
Age and stage
Age at marriage
Age differences
Ageing
Agency
Agency-communion
Aggreeableness
Aggression
Aggressive behavior
Aggressive behaviour
Aggressive humor
Aggressiveness
Aging
Agitation
Agreeableness
Agreement
Agression
Alcohol
Alcohol abuse
Alcohol addiction
Alcohol consumption
Alcohol drinking
Alcohol use
Alcoholism
Alexithymia
Allostasis
Allostatic load
Aloneness
Aloofness
Altruism
Altruistic
Altruistic behaviour
Altruistic love
Altruistic motivation

Altruism
Ambiguity
Ambivalence
Ambivalent sexism
Amplification
Amygdala
Androgens
Anger
Anger dysregulation
Anger expression
Anger regulation
Anger regulation
Anger rumination
Anger suppression
Anger-in
Anger-out
Angry
Annoyance
ANS reactivity
Antagonism
Antagonistic
Anterior amygdala
Anterior amygdala (AA)
Anterior cingulate
Anterior cingulate cortex
Anterior insula
Anterior insular cortex
Anticipation
Antisocial
Anti-social
Antisocial behavior
Antisocial behaviors
Antisocial behaviour
Antisocial behaviours
Antisocial personality disorder
Antisociality
Anxiety
Anxiety disorder
Anxiety sensitivity
Anxious
Anxious attachment
Apathetic
Apathy
Apologies
Apologising
Apologizing

Apology
Appearance
Appeasement
Appraisal
Appraisals
Appreciation
Approach
Approach and avoidance goals
Approach and avoidance motivation
Approach goals
Approach motivation
Approach-avoidance
Approach-avoidance motivation
Approval seeking
Arguing
Argument
Argument beliefs
Argumentative
Argumentative skill
Arguments
Arousal
Arrogance
Aspirations
Assertive
Assertive anger
Assertiveness
Assetiveness
Assumed similarity
Assurance
Assurances
Attachment
Attachment anxiety
Attachment avoidance
Attachment behavior
Attachment disorganization
Attachment insecurity
Attachment security
Attachment style
Attachment theory
Attack
Attacking behaviors
Attention
Attention bias
Attention control
Attention regulation
Attention seeking

Attentional
Attentional bias
Attentional capture
Attentional control
Attentional disengagement
Attentional narrowing
Attentional priority
Attention-deficit hyperactivity disorder
Attentive listening
Attitude
Attitude similarity
Attitudes
Attitudes toward sex
Attraction
Attractive alternative
Attractive alternatives
Attractiveness
Attributes
Attribution
Attribution bias
Attributional bias
Attributions
Attunement
Authentic
Authenticity
Authoritarian
Authoritarianism
Autism
Autobiographical memory
Automatic beliefs
Automatic thoughts
Autonomic nervous system
Autonomic nervous system activity
Autonomic regulation
Autonomy
Autonomy support
Availability
Aversion
Avoidance
Avoidance attachment
Avoidance behavior
Avoidance behaviors
Avoidance behaviours
Avoidance coping
Avoidance learning
Avoidance motivation

Avoidance of negative experience
Avoidant
Avoidant attachment
Avoidant conflict
Avoidant conflict management
Avoidant coping
Avoiding conflict
Awareness
Awe
Bargaining
Bas
Basal ganglia
Basal ganglion
Basic need frustration
Basic need satisfaction
Basic needs
Basic needs frustration
Basic needs satisfaction
Basic psychological need
Basic psychological need satisfaction
Basic psychological needs
Basic psychological needs frustration
Basolateral amygdala
Behavior
Behavior problems
Behavior regulation
Behavioral activation system
Behavioral economics
Behavioral inhibition
Behavioral inhibition system
Behavioral problems
Behavioral regulation
Behavioral synchronization
Behavioral synchrony
Behaviour
Behavioural synchronization
Behavioural synchrony
Belief
Beliefs
Belligerence
Belonging
Belongingness
Beneficence
Benevolence
Benevolent
Benevolent sexism

Benign intentions
Betrayal
Big five
Big-five
Biobehavioural synchrony
Biological factors
Biological synchronisation
Biological synchronization
Biological synchrony
Bipolar disorder
Birth order
Bis
Blame
Blaming
Blood pressure
Body image
Body language
Body temperature
Borderline personality disorder
Boredom
Boundaries
Brain
Brain physiology
Brain plasticity
Brain structure
Brooding
Buffer
Buffering
Buffers
Bullying
Burnout
Callous
Callous and unemotional
Callous unemotional
Callousness
Callous-unemotional
Callous-unemotional traits
Calm
Calmness
Capability
Capitalisation
Capitalising
Capitalization
Capitalizing
Cardiovascular disease
Cardiovascular reactivity

Cardiovascular responses
Care
Caregiving
Careless
Caring
Catastrophising
Catastrophizing
Caudate
Caudate nucleus
Centromedial amygdala
Cerebellum
Cerebral cortex
Certainty
Challenge
Change
Chaos
Character
Character strengths
Cheating
Cheerfulness
Cherishing
Child
Child abuse
Child care
Child development
Child maltreatment
Child neglect
Child psychological abuse
Child related strains
Child sexual abuse
Child trauma
Childcare
Childhood
Childhood abuse
Childhood adversity
Childhood emotional abuse
Childhood environment
Childhood experiences
Childhood maltreatment
Childhood neglect
Childhood psychological abuse
Childhood sexual abuse
Childhood trauma
Children
Choice
Choice behavior

Circadian rhythm
Circadian rhythms
Close relationships
Closeness
Codependency
Coercion
Cognition
Cognition regulation
Cognition self-regulation
Cognitions
Cognitive ability
Cognitive appraisal
Cognitive avoidance
Cognitive bias
Cognitive brooding
Cognitive conflict
Cognitive control
Cognitive disclosure
Cognitive empathy
Cognitive flexibility
Cognitive function
Cognitive load
Cognitive processing
Cognitive reappraisal
Cognitive strategies
Cognitive support
Coldness
Collaboration
Collaborativeness
Collectivism
Collectivist cultures
Collectivistic
Collectivistic culture
Comfort
Comforting
Commitment
Committed
Common humanity
Communal goals
Communal motivation
Communication
Communication clarity
Communication directness
Communication indirectness
Communication skills
Communication styles

Communications
Communion
Companionship
Comparison
Compassion
Compassionate love
Compatibility
Competence
Competition
Competitive
Competitive behavior
Competitiveness
Complaining
Complaint
Complaint avoidance
Complaint expression
Complaint withholding
Complaints
Compliment
Compliments
Comprehension
Compromise
Compromising
Compulsion
Compulsive behavior
Compulsiveness
Concealment
Conceding
Concern
Concession
Concessions
Condemn
Conditioned emotional response
Conduct disorder
Conduct problems
Confession
Confidence
Confident
Confiding
Conflict
Conflict avoidance
Conflict beliefs
Conflict content
Conflict escalation
Conflict escalation
Conflict is beneficial beliefs

Conflict is threatening beliefs
Conflict management
Conflict of interests
Conflict resolution
Conflict resolution styles
Conflict resolvability
Conflict strategies
Conflict style
Conflict tactics
Conflict topic
Conformity
Confrontation
Confrontation
Connectedness
Connection
Conscientious
Conscientiousness
Consciousness
Consequence awareness
Consideration
Consolation
Consoling
Constraint
Constructive communication
Constructive conflict
Contempt
Contentment
Context
Contextual factors
Contextual issues
Control
Controllability
Controlling
Conventionality
Conversation
Conversations
Cooperation
Cooperative behavior
Cooperativeness
Coping
Coregulation
Cortex
Cortical thickness
Corticolimbic system
Corticosterone
Cortisol

Cortisol reactivity
Courage
Courtesy
Courtesy
Creativity
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Telomere
Temperament
Temperate
Temperature
Temporal lobe
Temptation
Temptations
Tend and befriend
Tend-and-befriend
Testosterone
Thankfulness
Theory of mind
Theory-of-mind
Thinking
Thought
Thought avoidance
Thought expression
Thought regulation
Thought self-regulation
Thought suppression
Thought supression
Thoughtfulness
Threat
Threat appraisal
Threat sensitivity
Threats
Tidiness
Time factors
Time perception
Time-pressure
Tiredness
Togetherness
Tolerance
Tone of voice
Topic avoidance
Touch
Trait emotional intelligence
Trajectories
Transgression
Transgression
Transgressions
Transition
Transition to parenthood

Trauma
Triggers
Trust
Trusting
Trustworthiness
Trustworthy
Truth
Truth disclosure
Truthfulness
Turning against
Turning away
Turning toward
Uncertainty
Understanding
Unemployment
Unenthusiastic
Unfaithfulness
Unforgiveness
Unhappiness
Uninterested
Unpredictability
Unstable self-esteem
Untidy
Urgency
Vagal tone
Vagus nerve
Valence
Validation
Value
Values
Valuing
Vasopressin
Vasopressins
Vassopressin
Ventral striatum
Ventrolateral prefrontal cortex
Verbal ability
Verbal abuse
Verbal aggression
Verbal aggressiveness
Verbal behavior
Verbal communication
Verbal expression
Verbal fluency
Verbal rumination
Verbalizations

Victim
Victimisation
Victimization
Violence
Virtue
Virtues
Visible support
Visual perception
Vitality
Vocal cues
Vocal delivery
Vocal expression
Voice
Volatility
Volition
Vulnerabilities
Vulnerability
Vulnerable narcissism
Wakefulness
Warmth
Wealth
Weeping
Weight
Well-being
We-ness
Whining
Willingness to sacrifice
Willpower
Wisdom
Withdrawal
Withholding
Withholding affection
Work
Work factors
Work satisfaction
Work stress
Work-family
Work-family conflict
Working memory
Work-life balance
Worries
Worry
Writing
Yelling

Appendix 9. Thesaurus Development: Factor Merging

Factor Used	Merged Factors
Abandonment anxiety	
Acceptance	Accepting
Accommodation	Accommodating, accommodation, mutual accommodation
Acknowledgment	Acknowledgement
Adaptability	Adaptation, adjustment
Addiction	Addictions, drug addiction, alcohol addiction, substance addiction
ADHD	
Admiration	
Admit fault	Confession, admitting fault
Adrenalin	
Adverse childhood experiences	Childhood adversity, early life adversity, early life stress
Adverse events	Adverse experiences, adverse life events, adverse life experience, adversity
Advice giving	
Advice seeking	
Affection	Fondness, liking
Affection deprivation	Withholding affection
Affectionate communication	
Affiliative	Affiliation, affiliativeness, affiliative bonding, affiliative motivation, affiliation motivation
Affirmation	Affirming
Age and stage	Life stage, age, age differences, stage of life, age factors
Age at marriage	
Agency	Agency-communion
Aggression	Aggressive behaviour, aggressiveness, aggressive behavior
Aging	
Agreeableness	Aggreeableness
Alcohol abuse	Alcohol use, alcoholism, intoxication, alcohol consumption
Alexithymia	
Allostasis	
Allostatic load	
Aloneness	Loneliness
Aloofness	Emotionally distant, emotionally removed
Altruism	Altruistic, altruistic behaviour, altruistic love, altruistic motivation, altruism

Ambivalence	
Amygdala	Anterior amygdala (AA), anterior amygdala
Anger	Angry
Anger dysregulation	Maladaptive anger regulation
Anger expression	Anger-out
Anger regulation	
Anger rumination	
Anger suppression	Repressed anger, anger-in
Antagonism	
Anterior cingulate cortex	Anterior cingulate
Anterior insula cortex	Anterior insula
Antisocial personality disorder	
Antisociality	Antisocial behaviors, anti-social, antisocial behaviours, antisocial behaviour, antisocial behavior
Anxiety	Worry, concern, nervousness
Anxiety disorder	Phobia, social anxiety disorder, separation anxiety disorder, panic disorder
Apathy	
Apology	Apologizing, apologies
Appraisals	Appraisal, judgement, judgment, evaluation, evaluations, relationship appraisal, relationship evaluations
Appreciation	Value, valuing
Approach and avoidance motivation	Approach, approach goals, goals, approach motivation, approach-avoidance, approach-avoidance motivation, approach and avoidance goals, motivation
Approval seeking	Recognition seeking
Argument	Arguments, argumentative, arguing, disagreement, disagreements
Arrogance	Superiority, overbearance
Aspirations	Life dream, life dreams, dreams
Assertiveness	Assertive
Assurances	
Attachment	Adult attachment
Attachment	Attachment theory, attachment style, attachment behavior, attachment security, romantic attachment
Attachment anxiety	Anxious attachment
Attachment avoidance	Avoidant attachment
Attention seeking	Need for attention
Attentional bias	Attention, attention bias
Attentional control	Attentional disengagement, attention control, executive attention, endogenous attention, attentional, attentional capture, attentional priority

Attentiveness	
Attitude	Attitudes
Attraction	Physical attraction, sexual attraction, romantic attraction, interpersonal attraction, partner attraction
Attractive alternatives	Attractive alternative
Attributes	
Attribution bias	Attributional bias, bias
Attributions	Attribution, intent attribution
Authenticity	Authentic
Authoritarian	Authoritarianism
Autism	
Autobiographical memory	Memories, memory, mental recall
Automatic thoughts	
Autonomic nervous system	
Autonomic nervous system reactivity	Respiratory sinus arrhythmia, cardiovascular reactivity, autonomic nervous system activity, autonomic nervous system, heart rate variability, autonomic nervous system
Autonomy	Personal autonomy
Autonomy support	
Aversion	
Avoidance coping	Avoidance, avoidant coping, avoidance behaviors, avoidance behaviours, avoidance of negative experience, stress avoidance, passive avoidance, active avoidance
Awe	
Basal ganglia	Caudate nucleus, putamen, globus pallidus, substantia nigra, subthalamic nucleus
Basic psychological need satisfaction	Basic need satisfaction, basic needs satisfaction, need satisfaction
Basic psychological needs	Basic needs, basic psychological need
Basic psychological needs frustration	Basic need frustration, basic needs frustration, need frustration
Behavior	
Behavior problems	Problem behaviors, problem behaviours
Behavioral activation system	BAS
Behavioral inhibition system	BIS
Belligerence	
Benevolence	Beneficence, benevolent, goodness
Benevolent sexism	

Benign intentions	
Betrayal	
Blame	Blaming, accusation, fault-finding, condemn
Blood pressure	
Body image	
Body language	Non-verbal communication, nonverbal communication
Body temperature	Temperature
Borderline personality disorder	
Boredom	Relational boredom
Brain	Brain structure, brain physiology
Broca's area	
Bullying	Coercion, intimidation
Callous-unemotional	Callous, callous unemotional, callous-unemotional traits, cu traits, callousness
Calmness	Calm, temperate, peaceful, peacefulness
Capability	
Capitalization	Capitalisation
Careless	
Caring	Care
Catastrophizing	Catastrophising
Catecholamines	
Cerebellum	
Cerebral cortex	
Change resistance	
Character strengths	
Cheerfulness	
Cherishing	
Childcare	
Childhood abuse	Child abuse, childhood maltreatment, child maltreatment
Childhood neglect	Child neglect, deprivation
Childhood psychological abuse	Child psychological abuse
Childhood sexual abuse	Child sexual abuse
Childhood trauma	Child trauma, early traumatic experience
Circadian rhythm	
Codependency	Dependency
Cognition regulation	Thought regulation, cognition self-regulation, thought self-regulation
Cognitive avoidance	Thought avoidance
Cognitive conflict	
Cognitive control	

Cognitive flexibility	
Cognitive processing	
Cognitive strategies	
Collaboration	Collaborativeness
Collectivistic culture	Collectivistic, collectivism
Comforting	Comfort, consolation consoling
Commitment	Committed, relationship commitment
Common humanity	
Communal goals	Shared goals
Communication	Message, message style, messages, oral communication
Communication avoidance	
Communication skills	Communication styles, communications, conversation, conversations, discussion, dialogue, discussions
Communion	
Companionship	Friendship, partner friendship
Compassion	Compassionate love, pity
Compatibility	
Compatibility	Like-mindedness
Competitiveness	Competition, competitive behavior
Complaint avoidance	Complaint withholding
Complaint expression	Complaint, complaining, complaints
Compliment	Compliments, praise
Compromise	Compromising, concession, conceding
Compulsiveness	Compulsion
Conditional regard	
Conduct disorder	Conduct problems
Conflict	Conflict of interests, discord, arguing, arguments, perceived conflict
Conflict avoidance	Avoidant conflict management, avoiding conflict, avoidant conflict
Conflict avoidance	
Conflict beliefs	Argument beliefs, conflict is beneficial beliefs, conflict is threatening beliefs
Conflict content	Conflict topic
Conflict escalation	
Conflict escalation	
Conflict frequency	Serial arguments
Conflict management	Conflict strategies, conflict resolution, conflict resolution styles, conflict tactics
Confrontation	Interpersonal confrontation
Connectedness	affinity, belongingness, belonging, connection, sense of belonging

Conscientious	Conscientiousness
Consequence awareness	
Constructive communication	Constructive conflict
Contempt	
Contextual factors	Context, contextual issues
Control	Perceived control, partner control
Controllability	
Controlling	Dominating?
Conventionality	
Cooperation	Cooperative behavior, cooperativeness
Coping	Stress management, stress control
Co-regulation	Partner regulation
Cortisol	
Cortisol	Hydrocortisone
Courtesy	Politeness
Criticism	Critical, criticalness
Criticism, contempt, defensiveness, and stonewalling	Four horsemen
Cruelty	Cruel
Crying	Weeping
Cuddling	Hugging, embracing
Culture	Cross-cultural factors, cultural differences, cross-cultural
Culture	
Curiosity	
Cursing	
Cynicism	
Daily hassles	
Dark triad	
Decentering	
Deception	
Decision-making	
Deescalation	Deescalate
Defensiveness	
Deflection	
Demandingness	
Demand-withdraw	Demand withdraw, demand/withdraw, demand/withdraw interaction
Denial	Denying
Dependable	Dependability? Trustworthiness?
Depression	

Derogation	
Destructive behaviour	
Destructive communication	
Destructive conflict	
Detachment	
Developmental factors	Development, developmental, developmental experiences, human development, trajectories
Devious	
Diet	
Differentiation	
Directness	
Disagreement	
Disappointment	Disillusionment
Disclosure	Confiding, disclosing
Disdain	Contempt
Disengagement	
Disgust	
Disinhibition	
Dismissiveness	Dismissing, dismiss
Disorganized	Untidy, messy
Disorganized attachment	
Disposition	Dispositions
Disregard	Ignoring
Dissent	
Dissociation	
Distancing	
Distortion	
Distraction	
Distributive conflict	
Distrust	
Distrusting	Suspicious
Divorce attitudes	Divorce beliefs
Domestic labour	
Dominance	Domineering, dominating in conflict
Dopamine	
Dorsal anterior cingulate	
Dorsal striatum	
Downregulation	Downregulation of negativity
Dreams	
Drug use	Drug abuse, substance abuse
Dyadic coping	

Dysregulation	
Early adverse experiences	early adversity, early life adversity, early-life stress,
Early environment	Childhood environment
Education	Educational status
Egalitarianism	
Ego depletion	Ego-depletion
Egocentric	Egocentrism, self-focused, I-ness
Egotism	
Embarrassment	
Emotion	
Emotion avoidance	Affect avoidance
Emotion contagion	Affect contagion, emotional contagion, mood contagion, emotional synchrony, emotional synchronisation, emotional synchronization, emotion reciprocity, affect reciprocity
Emotion down-regulation	
Emotion dysregulation	Affect dysregulation, emotion dysregulation, emotional dysregulation, affective volatility, emotional volatility
Emotion escalation	Arousal, emotional arousal, emotion arousal, emotion reactivity, emotional reactivity
Emotion expression	Affect sharing, emotion sharing, emotional expression, affective expression, emotional expressivity, emotional expressions, emotional expressiveness, emotional expression, emotional expressivity
Emotion forecasting	
Emotion labelling	Emotion recognition, affect labelling, affect labeling, emotion labeling
Emotion reactivity	Affect reactivity
Emotion recognition	Emotion differentiation
Emotion regulation	Adaptive emotion regulation, emotion-regulation, affect regulation, mood regulation, emotion management, mood regulation, positive emotion regulation
Emotion suppression	Emotion concealment, emotional suppression, affect suppression, suppressive emotion, suppression
Emotional abuse	
Emotional arousal	Affect arousal, mood arousal, emotional intensity
Emotional attunement	Affect attunement, affective attunement, emotion attunement
Emotional availability	
Emotional awareness	Emotional clarity, emotional complexity, emotional granularity, emotion perception
Emotional closeness	Closeness, emotional intimacy, intimacy

Emotional coldness	Coldness
Emotional conditioning	Conditioned emotional response
Emotional coregulation	
Emotional cues	
Emotional dependency	
Emotional disclosure	Emotion expression, emotion self-disclosure, emotional self-disclosure, emotion communication, emotional communication, affective communication, affect communication
Emotional influences	
Emotional intelligence	
Emotional interference	
Emotional labour	Emotional labor, emotion work, emotional work
Emotional neglect	
Emotional openness	Openness to ideas
Emotional pain	
Emotional processing	
Emotional reactions	Emotional reactivity, emotional responses
Emotional responsiveness	
Emotional security	Emotional stability
Emotional support	Caring
Emotional valence	Valence
Emotionality	
Emotionally unavailable	Emotional unavailability
Emotions	Emotion, feeling, feelings, mood
Empathic accuracy	Cognitive empathy, accurate empathy
Empathic concern	
Empathy	Emotional empathy
Employment	Work
Empowerment	Empowering
Empty nest	
Encouragement	
Endocrine system	
Engagement	Engaging, engaged
Enmeshment	
Enthusiasm	
Entitlement	
Environment	Environmental quality, environment, environmental

	factors, environmental adversity, environmental stress, physical environment, environmental influences, environmental, environmental context
Environmental adversity	Deprivation
Epigenetic	Epigenetics, epigenetic mechanisms
Equality	Gender equality
Equity	Fairness, justice
Estrogen	Estradiol
Ethnicity	Etnicity
Evaluations	Evaluation, judgements, judgment, judgement, partner evaluation
Excitement	
Executive functioning	Executive function
Exercise	
Expectations	Expectancies, expectation, prediction, predictions, forecasting, forecast, future thinking
Experiential avoidance	Cognitive avoidance, emotional avoidance
Explanations	Rationale, rationalising, justification, justifying
Explicit beliefs	Beliefs, attitudes
Exploration	
Expressed affection	Affectionate behavior, affectionate behaviour
Expressed emotion	Emotional disclosure, emotion expression
Expressed gratitude	
Expression	Expressions, emotional expression, thought expression, expressiveness, expressivity
Expressive suppression	Suppression
Externalizing	Externalising
Extraversion	Extroversion
Eye-gaze	Eye gaze
Face recognition	Face perception, facial recognition
Facial expression	Facial reactions, facial expressions, facial affect, facial experssion
Failure	
Familiarity	
Family characteristics	
Family culture	Family climate
Family-of-origin	Family of origin
Fathering	Fatherhood
Fatigue	Tiredness, exhaustion
Fear	Fearfulness
Fear conditioning	

Fear of being single	
Feedback	
Felt security	Security
Femininity	
Fight flight freeze	Fight/flight/freeze, FFF, fight-or-flight-or-freeze, fight-flight, fight-flight response
Financial resources	
Financial stress	Economic stress
Fixed mindset	
Fondness	Liking
Forgiveness	Forgiving
Foster care	
Fragile self-esteem	Unstable self-esteem
Fragility	
Free will	
Friends	Friendships
Frontal lobe	
Frontostriatal circuit	
Frustration	Annoyance
Gas lighting	Gas-lighting
Gender	
Gender norms	Gender role, gender roles, gender stereotypes, gender role attitudes
Gene-environment interaction	Genetic–environmental, gene environment, gene environment interaction, gene x environment interaction, gene-environment
Generosity	Generous
Genetic factors	Genes, gene, genetic, genetics, genotype, heritability, genome, genomes
Gift giving	Gift exchange, giving, gift-giving
Goal	Goals
Goal conflict	
Goal contagion	
Goal pursuit	Goal achievement, goal achievement, goal regulation
Gossip	Gossiping
Grammar nitpicking	
Gratitude	Gratitude expression
Grief	
Grit	Courage, resolve
Growth mindsets	Growth
Guilt	
Gut microbiota	
Gut-brain axis	Gut-brain connection
Habits	

Handholding	Hand-holding
Hangry	
Happiness	Contentment, satisfaction, joy
Harm avoidance	
Harsh parenting	Harsh parental discipline
Harshness	Cruelty, cruel
Hate	
Health	
Heart disease	Cardiovascular disease
Heart rate	Heart rate acceleration
Heart rate variability	
Help seeking	
Helping	Helping behavior, helpfulness
Helplessness	
Hippocampus	
Honesty	Truthfulness
Hope	Hopeful, hopefulness
Hormonal	Hormones, hormone
Hostile sexism	
Hostility	Hostility, hostile-dominance
Household chaos	Chaos
Housework	Household chores, household labor division, household labor, household labour, domestic labor, domestic labour, shared housework
Hpa axis	Hypothalamic-pituitary-adrenal axis, hypothalamic–pituitary–adrenal (hpa) axis, hypothalamic pituitary adrenal axis, hypothalamic pituitary adrenal axis, hypothalamic-pituitary-adrenal-hpa axis, pituitary-adrenal system, hypothalamic-pituitary-adrenal axis
Humility	
Humor	Humour, humor, shared humour
Hurt feelings	Hurt
Hurtful communication	Hurtful messages
Hypothalamus	
Ideal self	
Ideal standards	
Idealization	
Identity	
Ideologies	Ideology
Ignoring	Ignore
Imagination	
Imitation	
Immaturity	
Immune system	

Impasses	Deadlock
Implicit beliefs	
Impulsivity	Impulsive behavior, impulsiveness
Inaccessible	
Inattentiveness	
Income	
Independence	
Indifference	Indifferent
Indignation	
Indirectness	
Individual differences	Individuality, individualism
Individuation	
Inequity	
Inferiority	Inferiority complex
Infidelity	Adultery, emotional infidelity, cheating, unfaithfulness, affair, affairs
Inflammation	
Influence	Perceived influence
Information processing	
Inhibition	
Inhibitory control	Response inhibition
In-law relationships	
Insensitivity	
Insight	
Instability	
Instrumental support	
Insula	
Integrating in conflict	
Integrative conflict	
Intelligence	General intelligence
Intention	Intentions, intentionality
Interaction	
Interdependence	Interdependance, interdependency
Interference	
Intergenerational factors	Intergenerational, intergenerational transmission
Interindividual differences	
Interindividual distance	
Internalizing	Internalising
Internalizing disorders	
Interpersonal emotion	

dynamics	
Interpersonal emotion regulation	Interpersonal regulation, co-regulation, coregulation
Intersubjectivity	
Intimacy	Closeness, emotional intimacy, emotional closeness
Introspection	Reflection, reflectiveness
Introversion	Introverted
Intrusiveness	Intrusive
Intuition	
Invalidation	
Investment in the relationship	Investment, relationship investment
Invisible harm	
Invisible support	
Irritability	Annoyance
Jealousy	Envy
Justification	Justifying
Kindness	Kind
Kissing	
Language use	Language, language processing
Laughter	
Laziness	Lazy
Leisure	
Life events	Life span changes, life change events
Life history	Life-history theory
Life narratives	Narrative, narratives, life stories
Life satisfaction	Satisfaction
Life span factors	Life-course, life span, lifespan, life course
Limbic system	
Listening	Active listening, attentive listening
Locus of control	Internal-external control, egocentrism
Love	Romantic love
Loyalty	
Machiavellianism	
Maladjustment	
Maltreatment	
Manipulation	
Masculinity	
Mastery	
Masturbation	
Mattering	
Meaning in life	Meaning
Media influences	Media

Mediation	
Menstrual cycle	Estrous cycle
Mental disorders	Mental illness, mental health, mood disorder, mood disorders, mental health disorder, mental health disorders
Mental representations	
Mentalizing	Mentalization, mentalising, mentalisation, self-other
Microbiome	Microbiota, gut microbiota, gut microbiome
Mindfulness	
Mind-reading	Mindreading, mind reading
Mindsets	
Minimization	Minimisation, minimizing
Mockery	Mocking, mimicking
Monitoring	
Monogamy	Sexual faithfulness
Mood	Feelings
Morality	Moral, morals, moral emotions
Motivations	Motivation, motives
Move against	
Move away	
Move toward	
Music	
Mutual problem solving	
Mutual responsiveness	Mutuality, mutual influence
Narcissism	Narcissim
Need	
Need fulfillment	Need satisfaction
Need to belong	Belongingness
Negative communication	Negative verbal communication
Negative emotion	Negative emotions
Negative emotionality	Emotionality?
Negative empathy	
Negative events	
Negative expectations	
Negative feedback	
Negative regard	
Negative sentiment override	Negative perspective, sentiment override
Negativity	Negative emotions, affect, negative emotion, negative affect, negative mood, negative affectivity, negative

	affective experiences, negative emotion, negative mood
Negativity bias	Negative evaluation, negative evaluations, negative appraisal, negative appraisals
Neglect	
Negotiation	Bargaining, negotiating, negotiations
Neighbourhood	
Neurobiological systems	Neurobiology
Neurosis	Neurotic disorders
Neuroticism	
New baby	Newborn, transition to parenthood
Nonverbal communication	Body language
Norms	
Nostalgia	
Nucleus accumbens	
Nurture	Nurturance, nurturing
Obliging in conflict	
Obsession	
Offense, offence	
Openness to experience	Openness
Opinions	
Optimism	Hopefulness, hope
Organised	Organized, planning
Orgasm	
Ostracism	
Other-awareness	
Other-blame	
Other-oriented attitudes	
Over-protection	Overprotection
Oxytocin	
Pain	
Parasympathetic nervous system	
Parental acceptance	Maternal acceptance, paternal acceptance
Parental conflict	
Parental divorce	
Parental investment	Maternal investment, paternal investment
Parental sensitivity	Maternal sensitivity, paternal sensitivity
Parental warmth	
Parent-child	Mother-child relations, mother-child interactions,

interactions	father-child relations, father-child interactions
Parenting	Children, parent & child, parental bonding, parent-child, parent-child relations, parent-child relationship, parenthood, parents
Parenting style	
Parietal lobe	
Partner buffering	
Partner imperfections	
Partner presence	
Partner regard	
Partner responsiveness	
Partner similarity	Similarity, similarities
Partner support	
Passion	
Passive aggression	
Perceived	
Perceived partner responsiveness	Perceived responsiveness
Perceived reciprocity	
Perceived regard	
Perceived resolvability	
Perceived support	
Perceptions	Social perception, perception
Persistence	
Personal control	
Personal growth	Personal improvement
Personality	Personality traits
Personality development	
Personality disorder	Personality disorders
Perspective-taking	Perspective taking
Persuasion	
Pessimism	
Phobia	
Physical abuse	Domestic violence
Physical attractiveness	Attractiveness
Physical health	
Physical neglect	
Physical proximity	
Physical warmth	
Physiological arousal	Physiological reactions, physiological reactivity, physiology, physiological responses, physiological

	reactivity, physiological reactions, physiological responses
Physiological factors	Physiological, physiology
Planning	
Playfulness	
Pleasure	
Pons	
Pornography use	
Pornography addiction	
Positive communication	
Positive feedback	
Positive illusions	Self-enhancement, self-deception
Positive reframing	
Positive regard	
Positive sentiment override	
Positivity	Positive emotion, positive affect, positive mood, positive affect, positive emotions, positive valence
Positivity bias	
Possessiveness	
Poverty	
Power	
Powerlessness	
Prefrontal cortex	Pfc, medial prefrontal cortex
Pregnancy	
Prejudice	
Premarital pregnancy	
Previous relationship history	Previous relationships, previous sexual partners, relationship histories
Pride	
Priming	
Privacy	
Proactive aggression	
Problem behavior	
Problems	
Problem-solving	Problem solving
Progesterone	
Projection	
Pronoun use	
Prosociality	Pro-social behavior, prosocial behavior, prosocial behaviour, prosocial
Prosody	

Protection	
Psychological abuse	Psychological aggression
Psychological flexibility	Flexibility, flexible
Psychopathological predisposition	
Psychopathology	
Psychopathy	
Psychophysiological disorder	Psychophysiology
Ptsd	Posttraumatic stress disorder, post-traumatic stress disorder, stress disorders, stress-related-disorders
Punishment	
Purpose	
Quality time	
Quarrelling	
Quarrelsome	Quarrelsomeness, argumentative
Quiet ego	
Racial differences	
Rage	
Rapport	
Rationalisation	Justification
Reactive aggression	
Readiness to change	
Reappraisal	Cognitive reappraisal, emotional reappraisal
Reassurance	
Reciprocity	Reciprocation
Reconciliation	
Reflectiveness	Reflection, reflective functioning, reflective thinking
Regret	
Regulation depletion	Ego depletion
Rejection	Exclusion
Rejection sensitivity	
Relatedness	Connectedness
Relational boundaries	Boundaries
Relational load	
Relational turbulence	
Relational uncertainty	
Relationship confidence	Confidence, confident
Relationship duration	Marriage duration, length of relationship, relationship length
Relationship maintenance	Relationship maintenance, relational maintenance

Relationship narratives	
Relationship problems	
Relationship repair	Relational repair, repair
Relationship satisfaction	
Relationship stage	
Relationship-defining memories	
Reliability	Dependability, trustworthiness
Religion	
Remorse	
Reputation	
Resentment	
Reserved	Shy, shyness
Resilience	
Resistance to influence	Influence resistance, resisting influence
Resolvability	
Resources	Resource
Respect	
Respiratory sinus arrhythmia	
Responsibility	Accepting responsibility, acting responsibly
Responsiveness	Emotional responsiveness, affective responsiveness
Retaliation	Revenge
Risk regulation	
Risk-taking	Risk taking, risky behavior
Role conflict	Role conflicts
Rostral anterior cingulate cortex	
Rumination	Brooding, repetitive thoughts, verbal rumination
Sacrifice	
Sadness	Unhappiness
Safety	
Sarcasm	
Schadenfreude	
Scorn	Contempt, Disdain,
Security	
Self-absorbed	Ego-centric, egotistical, self-centred
Self-acceptance	
Self-affirmation	
Self-appraisal	Self-assessment, self-evaluation, self-evaluations
Self-awareness	Awareness, self aware, self awareness, self-

	knowledge, self-reflection
Self-blame	
Self-centeredness	Self-interest, selfishness
Self-compassion	Self-kindness
Self-concept	Self concept, self-construal, self-perception
Self-confidence	
Self-consciousness	Self-conscious emotions
Self-control	Self control, self-regulation
Self-criticism	Self-critical, self criticism, self-critical rumination
Self-directedness	Self-determination
Self-discipline	Self-control
Self-disclosure	Self disclosure
Self-doubt	
Self-efficacy	Self efficacy
Self-enhancement	
Self-esteem	Self-regard, self-worth, positive self-regard
Self-expansion	
Self-expression	
Self-fulfilling prophecy	
Self-image	
Self-importance	Self-aggrandizing, ego
Self-improvement	Self-improvement intentions, self-realization
Selflessness	Selfless
Self-management	Responsibility
Self-presentation	
Self-protection	Self-protective
Self-reliance	
Self-serving attributional bias	
Self-verification	
Sense of agency	Sense of control, control, agency
Sense of purpose	
Sense-making	
Serial arguments	Serial arguments, serial argument, serial arguing
Serotonin	
Sex addiction	
Sex characteristics	
Sex differences	Gender differences, gender difference, sex difference, sex factors
Sexism	
Sexual abuse	
Sexual addiction	
Sexual assertiveness	

Sexual attitudes	Sexual expectations, sexual ideals, sexual self-schema
Sexual attraction	
Sexual behavior	Sexual activity, sexual behaviour, sexual strategies, sex, sexual intercourse, sexual needs
Sexual communication	
Sexual desire	Desire, sexual arousal, sexual excitement, sexual passion
Sexual dysfunction	Sexual dysfunctions
Sexual frequency	Sexual timing, sexual duration
Sexual satisfaction	Sexual pleasure
Shame	Humiliation
Shared activities	Shared recreation
Shared emotions	Sharing
Shared experience	
Shared meaning	Shared reality
Shared problem solving	Shared responsibilities
Shyness	
Sibling relationships	Sibling relations, siblings
Sighing	
Silence	
Sincerity	
Sleep	
Smiling	
Smoking	
Sociability	Sociable
Social anxiety disorder	Social phobia
Social buffering	Buffering
Social cognition	Cognition, cognitions
Social comparison	Cognitive brooding
Social context	Family context, family relationships, family culture, extended family, social environment
Social desirability	
Social environment	
Social evaluation	
Social intelligence	
Social interaction	Interaction
Social motivation	
Social network	Social networks
Social norms	
Social perception	

Social safeness	
Social skills	
Social status	Social class, status
Social values	
Socialization	
Societal attitudes	
Sociodemographic factors	Sociodemographic characteristics
Socioeconomic factors	Socioeconomic status
Soothing	
Spirituality	
Spitefulness	
Spying	
Stepfamily	
Stereotyping	
Stonewalling	
Stress	Perceived stress
Stress buffer	Buffers, buffer, stress buffering
Stress management	Stress regulation
Stress reactivity	Stress response, stress sensitivity
Stress recovery	
Stress vulnerabilities	
Stressors	Stresors, stressor, life stressors, stressful life events
Subjugation	
Submissiveness	
Substance abuse	Substance use, substance use disorder
Superiority	
Support	Social support, social support options, support, supportiveness
Support provision	
Support seeking	
Supportive communication	
Sympathetic nervous system	
Sympathy	Pity
Synchrony	Behavioral synchronization, behavioural synchronization, synchronization, synchronisation, behavioral synchrony, behavioural synchrony, physiological synchronisation, physiological synchronization, biological synchronisation, biological synchronization, physiological synchrony, interpersonal synchrony, mirroring, biobehavioural

	synchrony
Taking of influence	
Talking	Talk
Task sharing	Tasks
Temperament	
Temporal lobe	
Temptation	
Tend-and-befriend	Tend and befriend
Testosterone	
Theory of mind	
Thinking	
Thought suppression	Thought suppression, memory suppression, emotion suppression
Thoughtfulness	Consideration, sensitivity
Threat	Threats
Threatening behavior	
Time factors	Time-pressure
Tone of voice	
Topic avoidance	
Touch	Affectionate touch
Transgression	Transgressions, interpersonal transgressions
Trauma	
Triggers	
Trust	Inter-personal trust
Trusting	
Trustworthiness	Reliability
Truth	
Truth disclosure	
Uncertainty	
Understanding	Accurate perception, accurate understanding
Uninvested	
Unresponsive	
Vagus nerve	Vagal tone
Validation	Affirmation, recognition
Values	
Valuing	
Vasopressin	Vasopressin
Verbal ability	Speech, verbal behavior, vocal delivery
Verbal aggression	Verbal aggressiveness
Victim	
Victimization	Victimisation
Violence	
Virtue	Virtues

Vitality	
Vocal expression	Voice, tone of voice, vocal cues
Volatility	
Volition	
Vulnerability	Vulnerabilities
Warmth	
Wealth	
Weight	Abdominal fat, obesity
Well-being	
We-ness	
Whining	
Willingness to sacrifice	
Withdrawal	Exiting
Work satisfaction	Job satisfaction, job stress
Work-family conflict	
Work-life balance	
Writing	
Yelling	Screaming, shouting

Appendix 10. VOSviewer Thesaurus

label	replace by
accepting	acceptance
accomodating	accommodation
accomodation	accommodation
tolerance	accommodation
acknowledgement	acknowledgment
adjustment	adaptability
addictions	addiction
pornography addiction	addiction
sex addiction	addiction
sexual addiction	addiction
attention-deficit hyperactivity disorder	ADHD
childhood adversity	adverse childhood experiences
early adverse experiences	adverse childhood experiences
early adversity	adverse childhood experiences
early childhood adversity	adverse childhood experiences
early life adversity	adverse childhood experiences
early life stress	adverse childhood experiences
early-life adversity	adverse childhood experiences
early-life stress	adverse childhood experiences
adverse events	adversity
adverse experiences	adversity
adverse life events	adversity
adverse life experience	adversity
suffering	adversity
withholding affection	affection deprivation
affiliativeness	affiliative
age	age and stage
ageing	age and stage
aging	age and stage
life stage	age and stage
relationship stage	age and stage
stage of life	age and stage
marital timing	age at marriage
agency-communion	agency
sense of agency	agency
sense of control	agency
agreeableness	agreeableness
alcohol addiction	alcohol abuse
alcoholism	alcohol abuse
intoxication	alcohol abuse
alcohol	alcohol use
alcohol consumption	alcohol use

alcohol drinking	alcohol use
allostasis	allostatic load
isolation	aloneness
loneliness	aloneness
social isolation	aloneness
detachment	aloofness
emotional unavailability	aloofness
emotionally distant	aloofness
Emotionally removed	aloofness
emotionally unavailable	aloofness
altruistic	altruism
altruistic behaviour	altruism
altruistic love	altruism
altruistic motivation	altruism
alturism	altruism
anterior amygdala	amygdala
anterior amygdala (AA)	amygdala
basolateral amygdala	amygdala
centromedial amygdala	amygdala
maladaptive anger regulation	anger dysregulation
rage	anger dysregulation
anger-out	anger expression
angry	anger expression
assertive anger	anger expression
adaptive anger regulation	anger regulation
anger-in	anger suppression
repressed anger	anger suppression
autonomic nervous system	ANS reactivity
autonomic nervous system activity	ANS reactivity
autonomic regulation	ANS reactivity
antagonistic	antagonism
belligerence	antagonism
anterior cingulate	anterior cingulate cortex
anterior insula	anterior insular cortex
antisocial	antisociality
anti-social	antisociality
antisocial behavior	antisociality
antisocial behaviors	antisociality
antisocial behaviour	antisociality
antisocial behaviours	antisociality
subversiveness	antisociality
anxious	anxiety
concern	anxiety
nervousness	anxiety
worry	anxiety
generalized anxiety disorder	anxiety disorder

panic disorder	anxiety disorder
phobia	anxiety disorder
separation anxiety disorder	anxiety disorder
social anxiety	anxiety disorder
social anxiety disorder	anxiety disorder
social phobia	anxiety disorder
apathy	apathetic
unenthusiastic	apathetic
uninterested	apathetic
apologies	apology
apologising	apology
apologizing	apology
attractiveness	appearance
personal appearance	appearance
physical attractiveness	appearance
physical attractiveness	appearance
appraisal	appraisals
cognitive appraisal	appraisals
evaluation	appraisals
interpersonal appraisal	appraisals
relationship appraisal	appraisals
relationship evaluations	appraisals
valuing	appreciation
approach	approach motivation
approach goals	approach motivation
move toward	approach motivation
attention seeking	approval seeking
need for attention	approval seeking
recognition seeking	approval seeking
entitlement	arrogance
pride	arrogance
superiority	arrogance
dreams	aspirations
life dream	aspirations
life dreams	aspirations
assertive	assertiveness
assetiveness	assertiveness
adult attachment	attachment
attachment behavior	attachment
attachment style	attachment
attachment theory	attachment
romantic attachment	attachment
anxious attachment	attachment anxiety
avoidance attachment	attachment avoidance
avoidant	attachment avoidance
avoidant attachment	attachment avoidance

insecure attachment	attachment insecurity
insecurity	attachment insecurity
security	attachment security
attacking behaviors	attack
attention	attentional bias
attention bias	attentional bias
attentional narrowing	attentional bias
attentional priority	attentional bias
regulatory focus	attentional bias
attention control	attentional control
attention regulation	attentional control
attentional	attentional control
attentional capture	attentional control
endogenous attention	attentional control
executive attention	attentional control
attitudes	attitude
interpersonal attraction	attraction
partner attraction	attraction
physical attraction	attraction
romantic attraction	attraction
attractive alternative	attractive alternatives
temptation	attractive alternatives
temptations	attractive alternatives
attribution	attribution bias
attributional bias	attribution bias
intent attribution	attribution bias
authentic	authenticity
genuineness	authenticity
sincerity	authenticity
emotional memory	autobiographical memory
memories	autobiographical memory
memory	autobiographical memory
mental recall	autobiographical memory
nostalgia	autobiographical memory
relationship-defining memories	autobiographical memory
reminiscing	autobiographical memory
working memory	autobiographical memory
independence	autonomy
individualism	autonomy
individuation	autonomy
personal autonomy	autonomy
self-reliance	autonomy
avoidance	avoidance coping
avoidance behavior	avoidance coping
avoidance behaviors	avoidance coping
avoidance behaviours	avoidance coping

avoidance learning	avoidance coping
avoidance of negative experience	avoidance coping
avoidant coping	avoidance coping
passive avoidance	avoidance coping
risk aversion	avoidance coping
sensitivity to punishment	avoidance coping
stress avoidance	avoidance coping
avoidance	avoidance motivation
harm avoidance	avoidance motivation
behavioral activation system	BAS
basal ganglion	basal ganglia
globus pallidus	basal ganglia
putamen	basal ganglia
substantia nigra	basal ganglia
subthalamic nucleus	basal ganglia
basic needs	basic psychological needs
basic psychological need	basic psychological needs
need	basic psychological needs
behavioral problems	behavior problems
problem behavior	behavior problems
problem behaviors	behavior problems
problem behaviours	behavior problems
BAS	Behavioral Activation System
BIS	Behavioral Inhibition System
behavioral synchronization	behavioral synchrony
behavioural synchronization	behavioral synchrony
behavioural synchrony	behavioral synchrony
Biobehavioural synchrony	behavioral synchrony
imitation	behavioral synchrony
interpersonal synchrony	behavioral synchrony
mirroring	behavioral synchrony
synchronisation	behavioral synchrony
synchronization	behavioral synchrony
synchrony	behavioral synchrony
belonging	belongingness
mattering	belongingness
need to belong	belongingness
need-to-belong	belongingness
sense of belonging	belongingness
behavioral inhibition	BIS
behavioral inhibition system	BIS
accusation	blame
blaming	blame
condemn	blame
fault-finding	blame
other-blame	blame

nonverbal behavior	body language
non-verbal behavior	body language
nonverbal behaviour	body language
nonverbal communication	body language
non-verbal communication	body language
temperature	body temperature
brain physiology	brain
brain structure	brain
neurology	brain
neuroplasticity	brain plasticity
plasticity	brain plasticity
coercion	bullying
demandingness	bullying
intimidation	bullying
callous	callous-unemotional
callous and unemotional	callous-unemotional
callous unemotional	callous-unemotional
callousness	callous-unemotional
callous-unemotional	callous-unemotional
callous-unemotional traits	callous-unemotional
cu traits	callous-unemotional
calm	calmness
peaceful	calmness
peacefulness	calmness
temperate	calmness
capitalisation	capitalizing
capitalising	capitalizing
capitalization	capitalizing
care	caring
cherishing	caring
nurturance	caring
nurture	caring
nurturing	caring
catastrophising	catastrophizing
caudate	caudate nucleus
character	character strengths
child related strains	childcare
infant care	childcare
child abuse	childhood abuse
child maltreatment	childhood abuse
childhood maltreatment	childhood abuse
child	childhood experiences
childhood	childhood experiences
early childhood	childhood experiences
infancy	childhood experiences
infant	childhood experiences

infants	childhood experiences
child neglect	childhood neglect
deprivation	childhood neglect
child psychological abuse	childhood psychological abuse
child sexual abuse	childhood sexual abuse
child trauma	childhood trauma
early life trauma	childhood trauma
early traumatic experience	childhood trauma
early-life trauma	childhood trauma
choice	choice behaviour
choice behavior	choice behaviour
circadian rhythms	circadian rhythm
enmeshment	codependency
cognitions	cognition processing
cognition self-regulation	cognition regulation
cognitive conflict	cognition regulation
cognitive control	cognition regulation
cognitive flexibility	cognition regulation
thought regulation	cognition regulation
thought self-regulation	cognition regulation
thought avoidance	cognitive avoidance
confiding	cognitive disclosure
intersubjectivity	cognitive disclosure
self-expression	cognitive disclosure
thought expression	cognitive disclosure
cognition	cognitive processing
cognitive ability	cognitive processing
cognitive function	cognitive processing
cognitive strategies	cognitive processing
comprehension	cognitive processing
information processing	cognitive processing
thinking	cognitive processing
thought	cognitive processing
collaborativeness	collaboration
collectivism	collectivistic culture
collectivist cultures	collectivistic culture
Collectivistic	collectivistic culture
comforting	comfort
consolation	comfort
consoling	comfort
soothing	comfort
committed	commitment
promises	commitment
relationship commitment	commitment
communal motivation	communal goals
shared goals	communal goals

communications	communication
conversation	communication
conversations	communication
dialogue	communication
discussion	communication
discussions	communication
dyadic communication	communication
Message	communication
message style	communication
messages	communication
oral communication	communication
sighing	communication
talk	communication
talking	communication
verbal communication	communication
verbal expression	communication
verbalizations	communication
writing	communication
direct request	communication directness
directness	communication directness
indirectness	communication indirectness
inference	communication indirectness
communication styles	communication skills
friendship	companionship
partner	companionship
partnership	companionship
Compassionate love	compassion
like-mindedness	compatibility
competition	competitiveness
competitive	competitiveness
competitive behavior	competitiveness
complaint withholding	complaint avoidance
complaining	complaint expression
Complaint	complaint expression
Complaints	complaint expression
Compliments	compliment
compromising	compromise
conceding	compromise
concession	compromise
compulsion	compulsiveness
compulsive behavior	compulsiveness
appeasement	concessions
conduct problems	conduct disorder
admit fault	confession
conflict of interests	conflict
discord	conflict

interpersonal conflict	conflict
interpersonal problems	conflict
perceived conflict	conflict
avoidant conflict	conflict avoidance
avoidant conflict management	conflict avoidance
avoiding conflict	conflict avoidance
topic avoidance	conflict avoidance
argument beliefs	conflict beliefs
conflict is beneficial beliefs	conflict beliefs
conflict is threatening beliefs	conflict beliefs
conflict topic	conflict content
four horsemen	conflict escalation
conflict resolution styles	conflict management
conflict strategies	conflict management
conflict style	conflict management
conflict tactics	conflict management
perceived resolvability	conflict resolvability
resolvability	conflict resolvability
resolve	conflict resolvability
interpersonal confrontation	confrontation
affiliation	connectedness
connection	connectedness
relatedness	connectedness
social connection	connectedness
togetherness	connectedness
conscientious	conscientiousness
risk regulation	conscientiousness
risk-regulation	conscientiousness
rapport	constructive communication
integrating in conflict	constructive conflict
Integrative conflict	constructive conflict
derogation	contempt
disdain	contempt
disgust	contempt
distain	contempt
hate	contempt
scorn	contempt
context	contextual factors
contextual issues	contextual factors
authoritarian	controlling
authoritarianism	controlling
dominance	controlling
dominating	controlling
dominating in conflict	controlling
domineering	controlling
monitoring	controlling

overbearance	controlling
overcontrolled	controlling
partner control	controlling
possessiveness	controlling
social dominance	controlling
spying	controlling
conformity	conventionality
cooperative behavior	cooperation
cooperativeness	cooperation
stress control	coping
Stress management	coping
cerebral cortex	cortex
corticosterone	cortisol
cortisol reactivity	cortisol
hydrocortisone	cortisol
politeness	courtesy
critical	criticism
criticalness	criticism
negative feedback	criticism
perceived criticism	criticism
cross-cultural	culture
cross-cultural factors	culture
cultural	culture
cultural differences	culture
difficulties	daily hassles
problems	daily hassles
worries	daily hassles
dark traits	dark triad
betrayal	deception
devious	deception
dishonesty	deception
exaggeration	deception
lying	deception
deescalate	de-escalation
deescalation	de-escalation
downregulation	de-escalation
defense mechanisms	defensiveness
defensive	defensiveness
self-preservation	defensiveness
self-protection	defensiveness
Self-protective	defensiveness
criticism avoidance	deflection
distortion	deflection
distributive conflict	deflection
gas lighting	deflection
gas-lighting	deflection

grammar nitpicking	deflection
responsibility avoidance	deflection
demand withdraw	demand-withdraw
demand/withdraw	demand-withdraw
demand/withdraw interaction	demand-withdraw
denying	denial
dependability	dependable
reliability	dependable
Trustworthiness	dependable
trustworthy	dependable
dependence	dependency
emotional dependency	dependency
depression	depression
depressed	depression
depressive symptoms	depression
hurtful communication	destructive communication
hurtful messages	destructive communication
hurtfulness	destructive communication
relational load	destructive conflict
child development	developmental factors
development	developmental factors
developmental	developmental factors
developmental experiences	developmental factors
human development	developmental factors
infant development	developmental factors
personality development	developmental factors
trajectories	developmental factors
differentiation of self	differentiation
argument	disagreement
arguments	disagreement
disagreements	disagreement
dissent	disagreement
disclosing	disclosure
self-disclosure	disclosure
disappointment	disillusionment
consequence awareness	disinhibition
dismiss	dismissiveness
dismissing	dismissiveness
messy	disorganized
untidy	disorganized
ignore	disregard
ignoring	disregard
inattentiveness	disregard
negative regard	disrespect
self-distancing	dissociation
attentional disengagement	distraction

emotional distraction	distraction
cynicism	distrusting
distrust	distrusting
suspicious	distrusting
divorce beliefs	divorce attitudes
substance abuse	drug addiction
substance addiction	drug addiction
substance use disorder	drug addiction
drug abuse	drug use
drugs	drug use
substance use	drug use
childhood environment	early environment
early life	early life experience
early life experiences	early life experience
educational status	education
affect contagion	emotion contagion
affect reciprocity	emotion contagion
emotion reciprocity	emotion contagion
emotional contagion	emotion contagion
mood contagion	emotion contagion
stress contagion	emotion contagion
coregulation	emotion co-regulation
co-regulation	emotion co-regulation
interpersonal emotion dynamics	emotion co-regulation
interpersonal emotion regulation	emotion co-regulation
interpersonal regulation	emotion co-regulation
partner regulation	emotion co-regulation
downregulation of negativity	emotion de-escalation
emotion down-regulation	emotion de-escalation
affect sharing	emotion disclosure
emotion communication	emotion disclosure
Emotion-disclosure	emotion disclosure
emotion self-disclosure	emotion disclosure
emotion sharing	emotion disclosure
emotional communication	emotion disclosure
emotional disclosure	emotion disclosure
emotional openness	emotion disclosure
emotional self-disclosure	emotion disclosure
expressed emotion	emotion disclosure
expressiveness	emotion disclosure
expressivity	emotion disclosure
interpersonal openness	emotion disclosure
self disclosure	emotion disclosure
shared emotions	emotion disclosure
Sharing	emotion disclosure
affective dysregulation	emotion dysregulation

dysregulation	emotion dysregulation
emotional dysregulation	emotion dysregulation
emotional volatility	emotion dysregulation
arousal	emotion escalation
emotion arousal	emotion escalation
emotion reactivity	emotion escalation
emotional expressions	emotion expression
emotional expressiveness	emotion expression
emotional expressivity	emotion expression
expression	emotion expression
expressions	emotion expression
affect labeling	emotion labelling
emotion differentiation	emotion labelling
emotion labeling	emotion labelling
emotion recognition	emotion labelling
emotional granularity	emotion labelling
manipulation	emotion manipulation
manipulativeness	emotion manipulation
affect regulation	emotion regulation
emotion control	emotion regulation
emotion management	emotion regulation
emotion processing	emotion regulation
emotion regulation strategies	emotion regulation
emotional competence	emotion regulation
emotional control	emotion regulation
emotional processing	emotion regulation
emotional regulation	emotion regulation
emotional responses	emotion regulation
emotional restraint	emotion regulation
emotion-regulation	emotion regulation
mood regulation	emotion regulation
positive emotion regulation	emotion regulation
emotion concealment	emotion suppression
emotional inhibition	emotion suppression
emotional suppression	emotion suppression
suppressive emotion	emotion suppression
suppression	emotion suppression
suppressive emotion	emotion suppression
affect	emotional arousal
emotional intensity	emotional arousal
emotional reactions	emotional arousal
mood arousal	emotional arousal
mood variability	emotional arousal
attunement	emotional attunement
emotion attunement	emotional attunement
accessibility	emotional availability

availability	emotional availability
emotion awareness	emotional awareness
emotion perception	emotional awareness
emotional clarity	emotional awareness
emotional complexity	emotional awareness
closeness	emotional closeness
emotional intimacy	emotional closeness
intimacy	emotional closeness
interpersonal closeness	emotional closeness
intimacy	emotional closeness
coldness	emotional coldness
inaccessible	emotional coldness
indifference	emotional coldness
indifferent	emotional coldness
insensitivity	emotional coldness
conditioned emotional response	emotional conditioning
cues	emotional cues
triggers	emotional cues
depletion	emotional depletion
maternal deprivation	emotional deprivation
instability	emotional instability
interpersonal sensitivity	emotional intelligence
social intelligence	emotional intelligence
trait emotional intelligence	emotional intelligence
emotion work	emotional labour
emotional labor	emotional labour
emotional work	emotional labour
hurt	emotional pain
hurt feelings	emotional pain
reactance	emotional reactivity
reactive	emotional reactivity
reactivity	emotional reactivity
emotion responses	emotional response
emotional safety	emotional security
emotional stability	emotional security
felt security	emotional security
safeness	emotional security
safety	emotional security
social safeness	emotional security
stability	emotional security
emotion synchrony	emotional synchrony
emotional mutuality	emotional synchrony
emotional synchronisation	emotional synchrony
emotional synchronization	emotional synchrony
emotion intensity	emotional valence
emotion valence	emotional valence

valence	emotional valence
valence	emotional valence
warmth	emotional warmth
emotion	emotions
feeling	emotions
feelings	emotions
mood	emotions
mood	emotions
cognitive empathy	empathic accuracy
affective empathy	empathy
Emotional empathy	empathy
empathic concern	empathy
negative empathy	empathy
pity	empathy
positive empathy	empathy
sympathy	empathy
empowering	empowerment
affirmation	encouragement
encourage	encouragement
praise	encouragement
engaged	engagement
engaging	engagement
interest	engagement
environment	environmental factors
environmental	environmental factors
environmental adversity	environmental factors
environmental context	environmental factors
environmental influences	environmental factors
environmental quality	environmental factors
neighbourhood	environmental factors
physical environment	environmental factors
environmental harshness	environmental stress
epigenetic	epigenetic factors
epigenetic mechanisms	epigenetic factors
epigenetics	epigenetic factors
egalitarianism	equality
gender equality	equality
behavioral economics	equity
Fairness	equity
justice	equity
crying	escalated communication
escalation	escalated communication
shouting	escalated communication
weeping	escalated communication
whining	escalated communication
yelling	escalated communication

estradiol	estrogen
estrogens	estrogen
ethnicity	ethnicity
judgement	evaluations
judgements	evaluations
judgment	evaluations
partner evaluation	evaluations
executive function	executive control
executive functioning	executive control
burnout	exhaustion
emotional exhaustion	exhaustion
fatigue	exhaustion
fatigue	exhaustion
fatigue	exhaustion
tiredness	exhaustion
anticipation	expectations
emotion forecasting	expectations
Expectancies	expectations
Expectation	expectations
forecast	expectations
forecasting	expectations
future thinking	expectations
prediction	expectations
predictions	expectations
emotional avoidance	experiential avoidance
rationale	explanations
rationalisation	explanations
Rationalising	explanations
belief	explicit beliefs
beliefs	explicit beliefs
exploitation	exploitative
exploitativeness	exploitative
manipulativeness	exploitative
affectionate communication	expressed affection
externalising	externalizing
externalization	externalizing
extroversion	extraversion
eye gaze	eye-gaze
face perception	face recognition
face processing	face recognition
facial recognition	face recognition
facial affect	facial expression
facial experssion	facial expression
facial expressions	facial expression
facial mimicry	facial expression
Facial Reactions	facial expression

smile	facial expression
smiling	facial expression
family characteristics	family-of-origin
family of origin	family-of-origin
father-child interactions	fathering
father-child relations	fathering
fatherhood	fathering
fathering	fathering
fathers	fathering
fearfulness	fear
paranoia	fear
social feedback	feedback
FFF	fight flight freeze
fight/flight/freeze	fight flight freeze
fight-flight	fight flight freeze
fight-flight response	fight flight freeze
fight-or-flight-or-freeze	fight flight freeze
finances	financial resources
income	financial resources
resource	financial resources
debt	financial stress
economic hardship	financial stress
economic strain	financial stress
economic stress	financial stress
low-income	financial stress
poverty	financial stress
resource depletion	financial stress
Liking	fondness
forgiving	forgiveness
forgivingness	forgiveness
play	fun
playfulness	fun
gender role	gender norms
gender role attitude	gender norms
gender role attitudes	gender norms
gender roles	gender norms
gender stereotypes	gender norms
gene × environment	gene-environment interaction
gene environment	gene-environment interaction
gene environment interaction	gene-environment interaction
gene x environment	gene-environment interaction
gene x environment interaction	gene-environment interaction
gene–environment	gene-environment interaction
genetic–environmental	gene-environment interaction
generous	generosity
gene	genetic factors

gene expression	genetic factors
genes	genetic factors
genetic	genetic factors
genetics	genetic factors
genome	genetic factors
genomes	genetic factors
genotype	genetic factors
heritability	genetic factors
gift exchange	gift giving
gift-giving	gift giving
giving	gift giving
goal	goal pursuit
goal achievement	goal pursuit
goal conflict	goal pursuit
goal contagion	goal pursuit
goal regulation	goal pursuit
goals	goal pursuit
gossiping	gossip
expressed gratitude	gratitude
gratitude expressions	gratitude
thankfulness	gratitude
growth	growth mindsets
growth beliefs	growth mindsets
growth mindsets	growth mindsets
self-blame	guilt
gut microbiota	gut microbiome
microbes	gut microbiome
microbiome	gut microbiome
microbiota	gut microbiome
gut-brain connection	gut-brain axis
microbiota-gut-brain axis	gut-brain-axis
hand-holding	handholding
hunger	hangry
contentment	happiness
joy	happiness
personal satisfaction	happiness
satisfaction	happiness
harsh parental discipline	harsh parenting
parental harshness	harsh parenting
cruel	harshness
cruelty	harshness
meanness	harshness
health status	health
physical health	health
cardiovascular disease	heart disease
heart	heart disease

cardiovascular reactivity	heart rate
cardiovascular responses	heart rate
heart rate acceleration	heart rate
heart rate variability	heart rate
respiratory sinus arrhythmia	heart rate
help-seeking	help seeking
helping	helpfulness
helping behavior	helpfulness
helping behaviors	helpfulness
instrumental support	helpfulness
practical help	help-giving
truth	honesty
truth disclosure	honesty
truthfulness	honesty
hormone	hormonal factors
Hormones	hormonal factors
sex hormones	hormonal factors
aggression	hostility
aggressive behavior	hostility
aggressive behaviour	hostility
aggressiveness	hostility
agression	hostility
hositility	hostility
hostile-dominance	hostility
hostility	hostility
move against	hostility
proactive aggression	hostility
reactive aggression	hostility
reactive aggression	hostility
turning against	hostility
chaos	household chaos
division of household labor	housework
division of labor	housework
domestic labor	housework
domestic labour	housework
household chores	housework
household labor	housework
household labor division	housework
household labour	housework
shared housework	housework
hpa-axis	HPA axis
hypothalamic pituitary adrenal axis	HPA axis
hypothalamic-pituitary-adrenal axis	HPA axis
hypothalamic–pituitary–adrenal (HPA) axis	HPA axis
hypothalamic-pituitary-adrenal axis	HPA axis
hypothalamus-pituitary-adrenal axis	HPA axis

hypothalamic-pituitary-adrenal-HPA axis	HPA axis
Pituitary-Adrenal System	HPA axis
common humanity	humility
honesty-humility	humility
humor	humour
shared humour	humour
interpersonal harm	hurtful behavior
partner ideals	ideal standards
ideology	ideologies
immune system	immune function
deadlock	impasse
impasses	impasse
automatic beliefs	implicit beliefs
automatic thoughts	implicit beliefs
implicit theories	implicit beliefs
Impulsive Behavior	impulsivity
impulsiveness	impulsivity
individual difference	individual differences
individuality	individual differences
individualist cultures	individualistic culture
individualistic	individualistic culture
individualistic cultures	individualistic culture
gender inequality	inequality
adultery	infidelity
affair	infidelity
affairs	infidelity
cheating	infidelity
emotional infidelity	infidelity
unfaithfulness	infidelity
influence	influence taking
perceived influence	influence taking
taking influence	influence taking
taking of influence	influence taking
inhibitory control	inhibition
response inhibition	inhibition
insula	insular cortex
general intelligence	intelligence
intellect	intelligence
intentionality	intention
intentions	intention
interdependance	interdependence
interdependency	interdependence
family history	intergenerational factors
Intergenerational	intergenerational factors
intergenerational transmission	intergenerational factors
internalising	internalizing

internalization	internalizing
internalising disorders	internalizing disorders
internalizing problems	internalizing disorders
parental conflict	interparental conflict
parental hostility	interparental conflict
introverted	introversion
interference	intrusiveness
interfering	intrusiveness
intrusive	intrusiveness
agitation	irritability
annoyance	irritability
frustration	irritability
irritation	irritability
irritations	irritability
envy	jealousy
opinions	judgments
justification	justifications
justifications	justifications
justifying	justifications
beneficence	kindness
benevolence	kindness
benevolent	kindness
benign intentions	kindness
goodness	kindness
kind	kindness
Language	language use
language processing	language use
pronoun use	language use
verbal fluency	language use
lazy	laziness
life change events	life events
life event	life events
life experiences	life events
life span changes	life events
situations	life events
transition	life events
Life-history theory	life history
life stories	life narratives
narrative	life narratives
narratives	life narratives
relationship narratives	life narratives
life course	life span factors
life span	life span factors
life spans	life span factors
Life-Course	life span factors
lifespan	life span factors

life-span	life span factors
longevity	life span factors
active listening	listening
attentive listening	listening
romantic love	love
fragile self-esteem	low self-esteem
fragility	low self-esteem
inferiority	low self-esteem
inferiority complex	low self-esteem
self-hating	low self-esteem
unstable self-esteem	low self-esteem
achievement	mastery
capability	mastery
competence	mastery
self efficacy	mastery
self-directedness	mastery
self-efficacy	mastery
meaning	meaning in life
meaning making	meaning in life
meaning-making	meaning in life
purpose	meaning in life
sense of purpose	meaning in life
sense-making	meaning in life
media	media influences
estrous cycle	menstrual cycle
mental health	mental disorders
mental health disorder	mental disorders
mental health disorders	mental disorders
mental illness	mental disorders
mood disorder	mental disorders
mood disorders	mental disorders
psychiatric disorders	mental disorders
mental representations	mentalizing
mentalisation	mentalizing
mentalising	mentalizing
mentalization	mentalizing
self-other	mentalizing
emotional acceptance	mindfulness
mind reading	mind-reading
mindreading	mind-reading
minimisation	minimization
minimizing	minimization
mimicking	mockery
mimicry	mockery
mocking	mockery
sarcasm	mockery

teasing	mockery
sexual faithfulness	monogamy
moral	morality
moral emotions	morality
moral judgment	morality
moral reasoning	morality
morals	morality
mother-child	mothering
mother-child interactions	mothering
mother-child relations	mothering
mothers	mothering
approach and avoidance goals	motivation
approach and avoidance motivation	motivation
Approach-avoidance	motivation
approach-avoidance motivation	motivation
motivations	motivation
motives	motivation
singing	music
mutual influence	mutual responsiveness
mutuality	mutual responsiveness
grandiose narcissism	narcissism
grandiosity	narcissism
narcissim	narcissism
vulnerable narcissism	narcissism
basic need frustration	need frustration
basic needs frustration	need frustration
basic psychological needs frustration	need frustration
basic need satisfaction	need satisfaction
basic needs satisfaction	need satisfaction
basic psychological need satisfaction	need satisfaction
need fulfillment	need satisfaction
negative verbal communication	negative communication
negative evaluations	negative evaluation
aggressive humor	negative humour
Negative perspective	negative sentiment override
sentiment override	negative sentiment override
negative affect	negativity
negative affective experiences	negativity
negative affectivity	negativity
negative emotion	negativity
negative emotionality	negativity
negative emotions	negativity
negative mood	negativity
negative perception	negativity
negative urgency	negativity
pessimism	negativity

urgency	negativity
negative bias	negativity bias
negative appraisal	negativity bias
negative appraisals	negativity bias
physical neglect	neglect
social deprivation	neglect
bargaining	negotiation
negotiating	negotiation
negotiations	negotiation
persuasion	negotiation
persuasive communication	negotiation
neurobiology	neurobiological systems
emotionality	neuroticism
neurosis	neuroticism
neurotic disorders	neuroticism
neurotics	neuroticism
newborn	new baby
transition to parenthood	new baby
offence	offense
openness	openness to experience
hope	optimism
hopeful	optimism
hopefulness	optimism
organized	organised
planning	organised
tidiness	organised
other-focus	other-awareness
other-oriented attitudes	other-awareness
negative empathy	overly sensitive
projection	overly sensitive
overprotection	over-protection
maternal acceptance	parental acceptance
paternal acceptance	parental acceptance
paternal investment	parental investment
parental bonding	parental sensitivity
paternal sensitivity	parental sensitivity
children	parenting
foster care	parenting
parent & child	parenting
parent-child	parenting
parent-child interaction	parenting
parent-child interactions	parenting
parent-child relations	parenting
parent-child relationship	parenting
parenthood	parenting
parenting strategies	parenting

parents	parenting
parenting styles	parenting style
interindividual distance	partner presence
physical proximity	partner presence
proximity	partner presence
proximity seeking	partner presence
proximity-seeking	partner presence
patronize	patronizing
perceived social support	perceived support
social perception	perceptions
visual perception	perceptions
partner-perception	perceptions
perceived	perceptions
perceiving	perceptions
perception	perceptions
goals	personal goals
change	personal growth
personal improvement	personal growth
self-change	personal growth
self-concept change	personal growth
attributes	personality
big five	personality
big-five	personality
disposition	personality
dispositions	personality
hexaco	personality
personality traits	personality
temperament	personality
personality disorders	personality disorder
perspective	perspective-taking
perspective taking	perspective-taking
cuddling	physical affection
embracing	physical affection
hugging	physical affection
hugs	physical affection
kissing	physical affection
touch	physical affection
physiological reactions	physiological arousal
physiological reactivity	physiological arousal
physiological responses	physiological arousal
physiological	physiological factors
physiology	physiological factors
flooding	physiological flooding
physiological stress responses	physiological flooding
biological synchronisation	physiological synchrony
biological synchronization	physiological synchrony

biological synchrony	physiological synchrony
physiological synchronisation	physiological synchrony
physiological synchronization	physiological synchrony
pornography	pornography use
positive reframing	positive reappraisal
positivity bias	positive sentiment override
enthusiasm	positivity
excitement	positivity
positive affect	positivity
positive emotion	positivity
positive emotions	positivity
positive expressivity	positivity
positive mood	positivity
positive valence	positivity
social power	power
helplessness	powerlessness
prefrontal regions	prefrontal cortex
medial prefrontal cortex	prefrontal cortex
PFC	prefrontal cortex
discrimination	prejudice
prejudices	prejudice
stereotyping	prejudice
decision-making	problem-solving
mutual problem-solving	problem-solving
problem resolution	problem-solving
problem solving	problem-solving
pro-relationship behaviors	prosociality
prosocial	prosociality
prosocial behavior	prosociality
Pro-social behavior	prosociality
Prosocial behaviour	prosociality
prosocial motivation	prosociality
prosocial motives	prosociality
emotional abuse	psychological abuse
emotional maltreatment	psychological abuse
emotional manipulation	psychological abuse
psychological aggression	psychological abuse
flexibility	psychological flexibility
flexible	psychological flexibility
inflexibility	psychological inflexibility
maladjustment	psychological maladjustment
psychopathological predisposition	psychopathology
psychophysiology	psychophysiological disorder
posttraumatic stress	PTSD
posttraumatic stress disorder	PTSD
post-traumatic stress disorder	PTSD

stress disorders	PTSD
stress-related-disorders	PTSD
arguing	quarrelsome
argumentative	quarrelsome
quarrelling	quarrelsome
quarrelsomeness	quarrelsome
cognitive reappraisal	reappraisal
emotional reappraisal	reappraisal
assurance	reassurance
assurances	reassurance
abandonment	rejection
exclusion	rejection
ostracism	rejection
social rejection	rejection
abandonment anxiety	rejection sensitivity
boredom	relational boredom
relationship boredom	relational boredom
boundaries	relational boundaries
doubt	relational uncertainty
relational turbulence	relational uncertainty
uncertainty	relational uncertainty
certainty	relationship confidence
confidence	relationship confidence
confident	relationship confidence
relational certainty	relationship confidence
length of relationship	relationship duration
marriage duration	relationship duration
relationship length	relationship duration
previous relationship history	relationship history
previous relationships	relationship history
previous sexual partners	relationship history
relationship histories	relationship history
investment	relationship investment
investment in the relationship	relationship investment
maintenance	relationship maintenance
negative maintenance	relationship maintenance
relational maintenance	relationship maintenance
relational repair	relationship maintenance
conflict resolution	relationship repair
mediation	relationship repair
reconciliation	relationship repair
recovery	relationship repair
repair	relationship repair
indignation	resentment
modesty	reserved
shy	reserved

shy	reserved
shyness	reserved
courage	resilience
ego resilience	resilience
hardiness	resilience
mental toughness	resilience
persistence	resilience
influence resistance	resistance to influence
resisting influence	resistance to influence
wealth	resources
honor	respect
partner regard	respect
perceived regard	respect
positive regard	respect
regard	respect
responsibility	responsibility acceptance
responsible	responsibility acceptance
emotional responsiveness	responsiveness
partner responsiveness	responsiveness
perceived partner responsiveness	responsiveness
perceived reciprocity	responsiveness
perceived responsiveness	responsiveness
reciprocation	responsiveness
reciprocity	responsiveness
punishment	retribution
reward	reward sensitivity
risk taking	risk-taking
risky behavior	risk-taking
role conflicts	role conflict
brooding	rumination
cognitive brooding	rumination
repetitive thoughts	rumination
verbal rumination	rumination
self-sacrifice	sacrifice
willingness to sacrifice	sacrifice
sad	sadness
unhappiness	sadness
concealment	secrecy
self-affirmation	self-acceptance
self-compassion	self-acceptance
self-confidence	self-acceptance
self-forgiveness	self-acceptance
self-kindness	self-acceptance
self-soothing	self-acceptance
identity	self-appraisal
self concept	self-appraisal

self-assessment	self-appraisal
self-concept	self-appraisal
self-construal	self-appraisal
self-construals	self-appraisal
self-definition	self-appraisal
self-evaluation	self-appraisal
self-evaluations	self-appraisal
self-image	self-appraisal
self-perception	self-appraisal
self-perceptions	self-appraisal
self-verification	self-appraisal
self-view	self-appraisal
awareness	self-awareness
consciousness	self-awareness
insight	self-awareness
quiet ego	self-awareness
self aware	self-awareness
self awareness	self-awareness
self-concept clarity	self-awareness
self-identity	self-awareness
self-knowledge	self-awareness
self-pruning	self-awareness
self-realization	self-awareness
self-transcendence	self-awareness
ego	self-centered
egocentric	self-centered
ego-centric	self-centered
egocentricity	self-centered
egocentrism	self-centered
egotism	self-centered
egotistical	self-centered
I-ness	self-centered
internal-external control	self-centered
locus of Control	self-centered
self-absorption	self-centered
self-centeredness	self-centered
self-centred	self-centered
self-centredness	self-centered
self-focused	self-centered
self-interest	self-centered
selfish	self-centered
selfishness	self-centered
egoism	self-centered
self-serving attributional bias	self-centered
self-conscious emotions	self-consciousness
behavior regulation	self-control

behavioral regulation	self-control
constraint	self-control
effort	self-control
effortful control	self-control
perceived control	self-control
personal control	self-control
regulation	self-control
self control	self-control
self regulation	self-control
self-discipline	self-control
Self-management	self-control
self-monitoring	self-control
self-regulation	self-control
ego depletion	self-control depletion
ego-depletion	self-control depletion
regulation depletion	self-control depletion
self criticism	self-criticism
self-critical	self-criticism
self-critical rumination	self-criticism
self-doubt	self-criticism
self-judgment	self-criticism
deluded	self-deception
delusion	self-deception
illusions	self-deception
positive illusions	self-deception
positive self-regard	self-esteem
self esteem	self-esteem
selfesteem	self-esteem
self-regard	self-esteem
self-respect	self-esteem
self-worth	self-esteem
self-aggrandizing	self-importance
self-expansion	self-improvement
self-improvement intentions	self-improvement
selfless	selflessness
introspection	self-reflection
reflection	self-reflection
reflective functioning	self-reflection
reflective thinking	self-reflection
reflectiveness	self-reflection
serial arguing	serial arguments
serial argument	serial arguments
serial-arguments	serial arguments
gender	sex differences
gender difference	sex differences
gender differences.	sex differences

sex characteristics	sex differences
sex difference	sex differences
gender-differences	sex differences
gender differences	sex differences
sex factors	sex differences
sex	sex differences
sexist attitudes	sexism
masturbation	sexual behaviour
orgasm	sexual behaviour
sex	sexual behaviour
sexual	sexual behaviour
Sexual activity	sexual behaviour
sexual assertiveness	sexual behaviour
sexual behaviors	sexual behaviour
sexual behavior	sexual behaviour
sexual function	sexual behaviour
sexual functioning	sexual behaviour
sexual intercourse	sexual behaviour
sexual intimacy	sexual behaviour
sexual needs	sexual behaviour
sexual partner	sexual behaviour
sexual partners	sexual behaviour
sexual permissiveness	sexual behaviour
sexual strategies	sexual behaviour
sexuality	sexual behaviour
attitudes toward sex	sexual beliefs
sexual attitudes	sexual beliefs
sexual expectations	sexual beliefs
sexual ideals	sexual beliefs
sexual self-schema	sexual beliefs
sexual aggression	sexual coercion
desire	sexual desire
fantasies	sexual desire
passion	sexual desire
sensory pleasure	sexual desire
sexual arousal	sexual desire
sexual attraction	sexual desire
sexual excitement	sexual desire
sexual passion	sexual desire
Sexual Dysfunctions	sexual dysfunction
sexual inhibition	sexual dysfunction
sexual duration	sexual frequency
sexual timing	sexual frequency
pleasure	sexual satisfaction
sexual pleasure	sexual satisfaction
embarrassment	shame

humiliation	shame
shared activities	shared experiences
shared experience	shared experiences
shared leisure	shared experiences
shared recreation	shared experiences
shared reality	shared meaning
shared problem solving	shared responsibilities
sibling relations	sibling relationships
siblings	sibling relationships
assumed similarity	similarity
partner similarity	similarity
perceived similarity	similarity
similarities	similarity
sleep deprivation	sleep
sleep quality	sleep
wakefulness	sleep
sociable	sociability
comparison	social comparison
impression management	social comparison
social class	social comparison
social desirability	social comparison
social evaluation	social comparison
social motivation	social comparison
social status	social comparison
status	social comparison
extended family	social context
family climate	social context
family context	social context
family culture	social context
family environment	social context
family relationships	social context
friends	social context
friendships	social context
social environment	social context
interaction	social interaction
social networks	social network
social values	social norms
societal attitudes	social norms
argumentative skill	social skills
social behavior	social skills
social control	social skills
modelling	socialization
social learning	socialization
demographic factors	sociodemographic factors
sociodemographic characteristics	sociodemographic factors
socioeconomic	sociodemographic factors

socioeconomic factors	sociodemographic factors
socioeconomic status	sociodemographic factors
retaliation	spitefulness
revenge	spitefulness
perceived stress	stress
strain	stress
stres	stress
buffer	stress buffering
buffering	stress buffering
buffers	stress buffering
partner buffering	stress buffering
social buffering	stress buffering
stress buffer	stress buffering
stress response	stress reactivity
stress sensitivity	stress reactivity
stress-reactivity	stress reactivity
anxiety sensitivity	stress vulnerability
stress-sensitivity	stress vulnerability
life stress	stressors
life stressors	stressors
psychosocial stress	stressors
social stress	stressors
stresors	stressors
stressful events	stressors
stressful life events	stressors
stressor	stressors
controllability	submissiveness
obliging in conflict	submissiveness
subjugation	submissiveness
cognitive support	support
emotional support	support
partner support	support
social support	support
social support options	support
support provision	support
supportive	support
supportive communication	support
supportiveness	support
turning toward	support
tasks	task sharing
tend and befriend	tend-and-befriend
theory of mind	theory-of-mind
expressive suppression	thought suppression
memory suppression	thought suppression
repression	thought suppression
thought supression	thought suppression

consideration	thoughtfulness
sensitivity	thoughtfulness
threat	threat appraisal
threats	threat appraisal
time perception	time factors
time-pressure	time factors
interpersonal transgressions	transgression
Transgressions	transgression
interpersonal trust	trust
inter-personal trust	trust
trusting	trust
accurate perception	understanding
feeling understood	understanding
vagal tone	vagus nerve
recognition	validation
ideals	values
value	values
vasopressins	vasopressin
vassopressin	vasopressin
speech	verbal ability
speech perception	verbal ability
verbal behavior	verbal ability
vocal delivery	verbal ability
verbal aggression	verbal abuse
verbal aggressiveness	verbal abuse
victim	victimization
victimisation	victimization
domestic violence	violence
intimate partner violence	violence
physical abuse	violence
virtues	virtue
prosody	vocal expression
tone of voice	vocal expression
vocal cues	vocal expression
voice	vocal expression
unpredictability	volatility
free will	volition
willpower	volition
psychological vulnerability	vulnerability
vulnerabilities	vulnerability
abdominal fat	weight
obesity	weight
disengagement	withdrawal
distancing	withdrawal
exiting	withdrawal
move away	withdrawal

silence		withdrawal
stonewalling		withdrawal
turning away		withdrawal
withholding		withdrawal
employment		work factors
job satisfaction		work factors
work		work factors
work satisfaction		work factors
work-family		work factors
work-family conflict		work factors
work-life balance		work factors
job stress		work stress
unemployment		work stress

**Appendix 11: The 1000 Final Factors used in the Network Modelling,
in Order of their Inter-Connectedness (Links) and Prominence
(Occurrences)**

label	weight<Links>	weight<Occurrences>
attachment	598	2380
personality	565	2210
sex differences	622	2196
stress	561	1784
brain	497	1722
emotion regulation	503	1243
conflict	559	1193
communication	556	1186
perceptions	526	1112
emotions	508	1085
support	486	942
hostility	524	937
depression	442	905
empathy	453	839
negativity	524	793
sexual behaviour	399	789
self-control	436	764
motivation	422	712
neuroticism	391	692
positivity	470	682
self-esteem	402	628
self-appraisal	393	605
developmental factors	356	563
agreeableness	347	561
culture	380	559
psychological maladjustment	339	544
genetic factors	303	522
violence	303	516
happiness	366	512
commitment	383	501
attentional bias	355	482
oxytocin	293	464
anxiety	386	461
individual differences	312	448
extraversion	306	447
coping	370	446
parenting	350	443
responsiveness	441	437
age and stage	344	434

emotional closeness	391	416
trust	400	389
anger	378	387
prosociality	331	387
conscientiousness	297	383
cortisol	336	381
adverse childhood experiences	263	372
attachment avoidance	427	368
emotion expression	358	363
facial expression	268	354
resilience	308	348
connectedness	363	344
threat appraisal	398	331
openness	294	329
autonomy	329	320
cooperation	329	320
attachment anxiety	380	318
amygdala	297	312
psychopathology	274	306
attitude	287	301
problem-solving	351	300
emotional intelligence	246	299
sociodemographic factors	255	296
affection	346	291
heart rate	319	291
appraisals	327	283
fear	326	283
mastery	294	266
power	287	266
financial resources	249	265
expectations	343	251
rejection	306	251
sexual desire	205	250
mindfulness	227	248
infidelity	252	243
reappraisal	220	237
trauma	244	233
memory	217	229
love	295	225
environmental factors	276	222
childhood abuse	189	222
avoidance approach goals	283	221
forgiveness	267	221
disclosure	311	218
physiological arousal	272	218
sexual satisfaction	217	216

personal goals	289	214
narcissism	240	212
rumination	249	206
defensiveness	335	201
loneliness	177	199
cognitive processing	287	195
temperament	192	195
emotional arousal	243	194
work factors	184	192
self-awareness	267	191
caring	321	190
optimism	237	189
relationship maintenance	236	188
controlling	333	186
control	297	185
decision making	207	182
compassion	257	180
attributions	228	178
affiliative	221	177
beliefs	242	176
gratitude	247	173
withdrawal	363	171
personality disorder	211	171
self-acceptance	209	170
perspective taking	266	168
agency	279	167
testosterone	164	166
hpa axis	217	158
social context	211	158
financial stress	174	157
emotion suppression	237	155
gender norms	205	155
health	204	154
emotional warmth	302	151
prefrontal cortex	257	150
altruism	196	148
evaluations	200	145
psychopathy	160	144
helpfulness	231	143
behavioural synchrony	165	142
emotion dysregulation	161	142
adversity	178	141
similarity	199	139
abusive	195	139
adaptability	230	138
attraction	190	138

emotion recognition	204	137
religion/spirituality	172	135
equity	170	135
life span factors	167	135
touch	163	135
morality	167	132
housework	161	131
self-centered	250	129
theory of mind	147	129
ptsd	125	129
values	210	128
acceptance	250	127
deception	229	126
physiological factors	300	122
demand-withdraw	234	122
social skills	196	120
conflict resolution	233	119
contempt	302	118
comforting	260	117
interdependence	211	116
life events	183	115
externalising	153	115
sleep	136	115
emotional security	268	114
dyadic coping	138	114
criticism	322	113
listening	228	113
relational uncertainty	180	112
belongingness	179	112
hippocampus	163	111
negotiation	163	111
cognitions	233	108
avoidance motivation	259	104
pornography	72	104
disagreement	221	103
shame	244	102
dark triad	124	102
inflammation	123	102
kindness	241	101
body language	141	100
autobiographical memory	145	99
family-of-origin	204	98
antisociality	192	98
blood pressure	178	97
language use	148	97
mentalising	142	97

emotion disclosure	200	96
jealousy	156	96
internalising	139	95
callous-unemotional	138	95
dopamine	147	94
hormonal factors	146	94
understanding	289	93
positive regard	249	93
collaboration	202	93
guilt	248	92
thoughtfulness	254	91
emotional reactivity	200	90
intergenerational factors	143	90
rejection sensitivity	213	88
childhood experiences	163	88
inhibition	149	88
bis	120	88
authenticity	162	87
education	157	87
anxiety disorder	138	87
addiction	85	87
influence taking	242	85
encouragement	216	85
competitiveness	183	85
humour	221	84
impulsivity	183	82
goal pursuit	167	82
epigenetic factors	127	82
companionship	211	81
meaning in life	134	81
weight	84	81
sexual dysfunction	72	81
alcohol use	142	80
appearance	119	80
sadness	143	79
empathic accuracy	128	79
serotonin	128	76
neglect	195	75
sacrifice	191	75
bas	113	75
humility	135	73
contextual factors	194	72
stressors	161	72
blame	225	71
social comparison	177	71
honesty	156	71

parental conflict	105	70
self-reflection	122	69
diet	100	69
arrogance	192	68
new baby	143	68
emotion escalation	134	68
character strengths	117	68
stress buffering	171	67
gift giving	137	67
life history	100	67
attractive alternatives	165	66
intention	162	66
gut microbiome	65	66
socialisation	133	65
gene-environment interaction	90	64
emotional vulnerability	196	63
cognition regulation	115	63
accommodation	201	62
transgression	115	62
judgments	130	60
verbal ability	129	60
vasopressin	115	60
psychological abuse	110	60
disposition	116	59
allostatic load	104	59
emotion contagion	110	58
antagonism	185	57
dependable	173	57
exercise	95	57
emotional awareness	147	56
differentiation	79	56
resources	138	55
priming	103	55
victimisation	89	55
media influences	80	55
eye-gaze	95	54
irritability	176	53
self-improvement	113	53
dependency	153	52
engagement	239	50
responsibility acceptance	178	50
expression suppression	135	50
distraction	126	50
autonomic nervous system	119	50
personal growth	108	50
attentional control	95	50

sexism	105	49
emotional pain	175	48
social norms	111	48
communal goals	105	48
appreciation	181	47
risk-taking	112	47
spitefulness	116	46
negativity bias	97	46
pregnancy	76	46
drug use	120	45
social network	117	44
aloneness	93	44
machiavellianism	90	44
vocal expression	79	44
attack	154	43
basic psychological needs	116	43
sexual abuse	55	43
constructive conflict	145	42
relationship duration	92	42
compromise	153	41
intelligence	136	41
conflict management	117	41
we-ness	103	41
feedback	95	41
sexual beliefs	68	41
bullying	137	40
generosity	131	40
executive control	95	40
constructive communication	91	40
destructive conflict	144	39
escalated communication	116	39
antisocial personality disorder	85	39
childhood sexual abuse	76	39
perfectionism	67	39
sexual communication	53	39
aloofness	146	38
harsh parenting	119	38
implicit beliefs	88	38
adhd	80	38
other-awareness	156	37
equality	114	37
childhood trauma	99	37
parental divorce	83	37
heart disease	74	37
fun	68	37
validating	184	36

emotional attunement	144	36
mutual responsiveness	133	36
attribution bias	128	36
masculinity	98	36
life narratives	92	36
behaviour	89	36
capitalising	86	36
face recognition	73	36
partner presence	67	36
sexual frequency	57	36
relationship repair	132	35
self-criticism	100	35
serial arguments	97	35
benevolent sexism	73	35
assertiveness	140	34
confrontation	109	34
ambivalent	104	34
conflict avoidance	98	34
dissociation	80	34
ideal standards	80	34
sibling relationships	47	34
help seeking	119	33
childhood neglect	97	33
physiological synchrony	55	33
paternal care	53	33
retribution	122	32
conduct disorder	85	32
age differences	68	32
emotional coldness	130	31
shared experiences	84	31
autism	82	31
behaviour problems	62	31
parenting style	57	31
maternal sensitivity	54	31
gut-brain axis	40	31
fondness	153	30
hypothalamus	124	30
prejudice	82	30
expressed affection	67	30
body image	65	30
oestrogen	58	30
secrecy	54	30
virtue	54	30
advice giving	136	29
mockery	134	29
growth mindsets	132	29

insular cortex	127	29
collectivism and individualism	101	29
vagus nerve	98	29
verbal abuse	104	28
quality time	99	28
volition	81	28
apology	70	28
psychological flexibility	91	27
ideologies	88	27
drug addiction	71	27
disillusionment	70	27
brain plasticity	59	27
conflict escalation	152	26
fight flight freeze	149	26
co-regulation	103	26
cortex	98	26
stress reactivity	84	26
self-enhancement	75	26
maternal care	60	26
admiration	127	25
relationship investment	105	25
emotional availability	104	25
menstrual cycle	42	25
catastrophising	94	24
agreement	81	24
mind-reading	62	24
alexithymia	44	24
destructive communication	55	23
immune function	52	23
reward sensitivity	118	22
quarrelsome	96	22
aspirations	92	22
shared meaning	70	22
subjective well-being	66	22
habits	53	22
self-control depletion	43	22
manipulation	107	21
emotion co-regulation	83	21
hostile sexism	75	21
laughter	58	21
exhaustion	48	21
honesty-humility	46	21
music	39	21
mate value	37	21
organised	126	20
disorganised attachment	77	20

physical affection	68	20
self-deception	68	20
relationship confidence	63	20
tend and befriend	52	20
distrusting	51	20
monogamy	51	20
age at marriage	49	20
need satisfaction	40	20
reassurance	119	19
attachment security	110	19
submissiveness	97	19
thought suppression	92	19
communication skills	57	19
leisure	41	19
avoidance coping	95	18
loyalty	93	18
intrusiveness	74	18
negative communication	70	18
emotion labelling	68	18
borderline pd	57	18
circadian rhythm	56	18
premarital cohabitation	32	18
grit	24	18
anterior cingulate cortex	90	17
low self-esteem	88	17
support seeking	70	17
regret	68	17
time factors	61	17
household chaos	48	17
relational boredom	45	17
perceived support	36	17
dismissiveness	135	16
compatibility	83	16
emotional triggers	64	16
experiential avoidance	61	16
conflict resolvability	69	15
autonomy support	56	15
anger expression	52	15
relationship history	51	15
cheerfulness	49	15
smoking	42	15
life satisfaction	34	15
approach motivation	77	14
basal ganglia	63	14
cognitive disclosure	58	14
parental sensitivity	58	14

creativity	56	14
emotional synchrony	44	14
progesterone	40	14
self-presentation	36	14
alcohol abuse	34	14
denial	125	13
disregard	103	13
courtesy	78	13
disinhibition	69	13
complaint expression	68	13
harshness	67	13
reserved	59	13
parental warmth	57	13
anterior insular cortex	43	13
pathology	43	13
emotional valence	38	13
early life experience	36	13
in-laws	36	13
empowerment	31	13
physical warmth	25	13
communication directness	72	12
positive sentiment override	60	12
emotional neglect	52	12
anger regulation	50	12
grief	46	12
powerlessness	45	12
positive expectations	39	12
frontal lobe	36	12
ocd	31	12
childcare	30	12
divorce attitudes	27	12
unforgiveness	26	12
resistance to influence	72	11
compliment	71	11
attachment insecurity	61	11
emotional expression	57	11
over-protection	55	11
self-consciousness	48	11
familiarity	47	11
sympathetic nervous system	39	11
premarital pregnancy	37	11
conflict content	36	11
racial differences	30	11
birth order	15	11
menopause	14	11
deflection	84	10

emotion de-escalation	81	10
exploitative	60	10
introversion	42	10
mindsets	27	10
negative life events	25	10
ambivalent sexism	23	10
cognitive dissonance	11	10
calmness	116	9
secure attachment	69	9
justifications	67	9
resentment	63	9
invalidation	55	9
minimisation	55	9
limbic system	44	9
anger dysregulation	43	9
childhood psychological abuse	39	9
endocrine system	38	9
choice behaviour	34	9
vitality	29	9
anger rumination	26	9
inequity	26	9
negative expectations	26	9
work stress	23	9
stress regulation	22	9
fear conditioning	19	9
sociability	56	8
communication indirectness	45	8
schizophrenia	41	8
intuition	38	8
modelling	36	8
cortical thickness	32	8
imagination	32	8
self-care	32	8
relationship satisfaction	28	8
temporal lobes	27	8
positive communication	25	8
self-fulfilling prophecy	25	8
relational boundaries	22	8
hopelessness	20	8
telomere	18	8
emotion understanding	12	8
turn towards	107	7
partner protection	68	7
volatility	55	7
careless	42	7
parietal lobe	37	7

childhood environment	34	7
parasympathetic nervous system	33	7
daily hassles	31	7
destiny beliefs	28	7
wisdom	26	7
paranoia	25	7
advice seeking	24	7
lust	24	7
body temperature	22	7
media use	21	7
flirting	20	7
hangry	20	7
resistance to change	20	7
provocation	18	7
handholding	14	7
parenting stress	14	7
remarriage	13	7
emotional labour	6	7
bids for connection	88	6
hypersensitivity	69	6
striatum	67	6
insulting	54	6
remorse	44	6
selflessness	42	6
emotional flooding	41	6
life difficulties	40	6
nucleus accumbens	40	6
distress	37	6
co-dependency	31	6
disagreeableness	24	6
inequality	20	6
premarital sex	20	6
sociality	20	6
femininity	16	6
facial processing	14	6
mind wandering	14	6
sexual aggression	14	6
distress tolerance	13	6
positive feedback	13	6
sex roles	13	6
coercive control	12	6
meal-time traditions	10	6
tenderness	78	5
neediness	75	5
undermining	48	5
cingulate	40	5

parental rejection	38	5
threat sensitivity	38	5
cohabitation	37	5
parietal cortex	36	5
complaint avoidance	33	5
family structure	32	5
oppositional	32	5
attentiveness	31	5
illness	31	5
approval	30	5
early life environments	30	5
routines	29	5
compulsiveness	22	5
environmental stress	21	5
partner knowledge	21	5
disapproval	20	5
individualistic culture	20	5
positive events	19	5
gossip	17	5
negative events	17	5
sensation seeking	13	5
frontal cortex	12	5
startle reflex	11	5
infertility	10	5
attitude similarity	9	5
non-monogamy	9	5
chronic fatigue syndrome	7	5
biological factors	6	5
annoyance	50	4
asking	49	4
gentleness	49	4
task sharing	47	4
relationship trajectory	40	4
gyrus cinguli	39	4
reassurance seeking	39	4
negative reciprocity	37	4
destructive behaviour	36	4
environmental enrichment	31	4
constructive criticism	29	4
hurtful behaviour	23	4
neighbourhood	22	4
offense	22	4
parental acceptance	22	4
disappointment	20	4
internalising disorders	20	4
reasoning	20	4

ambiguity	19	4
fear of intimacy	19	4
sympathetic nervous system	19	4
sadism	17	4
conflict frequency	16	4
need frustration	16	4
right brain	16	4
self-reassurance	16	4
conventionality	15	4
curiosity	15	4
negative evaluations	15	4
stress vulnerability	15	4
orbitofrontal cortex	14	4
hypocrisy	13	4
positive reappraisal	13	4
androgens	12	4
emotional depletion	12	4
bipolar disorder	11	4
argumentativeness	9	4
maternal depression	9	4
meditation	9	4
paraphrasing	9	4
social exclusion	9	4
work–family conflict	7	4
adoption	6	4
negative sentiment override	6	4
premature ejaculation	3	4
adrenaline	60	3
non-judgmental	40	3
disassociation	34	3
fear of abandonment	31	3
disrespectful	25	3
acknowledgment	24	3
cytokines	22	3
emotional bank account	21	3
parental responsiveness	20	3
perseverance	20	3
self-congruence	19	3
emotional conditioning	18	3
interruptions	18	3
anger suppression	16	3
emotion avoidance	16	3
bonding	15	3
dreaming	15	3
ventral striatum	15	3
grey matter	14	3

romance	14	3
self-importance	14	3
temporal cortex	14	3
tension	14	3
cognitive bias	13	3
greed	13	3
conflict of interest	12	3
empty nest	12	3
communication clarity	11	3
emotional flexibility	11	3
inclusion	11	3
interpretation bias	11	3
parental care	11	3
couple identity	10	3
dorsal anterior cingulate cortex	10	3
libido	10	3
procrastination	10	3
psychological inflexibility	10	3
rest	10	3
confession	9	3
eveningness	9	3
reparation	9	3
visible support	9	3
dorsolateral prefrontal cortex	8	3
melatonin	8	3
nervous system	8	3
self-actualization	8	3
cognitive functioning	7	3
delusions	7	3
motivational	7	3
self-esteem	7	3
parental modelling	6	3
partner influence	6	3
traditions	6	3
unfairness	6	3
emotional mimicry	5	3
mortality	5	3
sexual dissatisfaction	4	3
fixed mindset	68	2
enduring vulnerabilities	41	2
explanations	40	2
disinterest	36	2
ventral tegmental	33	2
moody	28	2
demeaning	27	2
frontal gyrus	27	2

countering	26	2
prelimbic	26	2
threatening behaviour	26	2
softened start-up	25	2
approval seeking	23	2
needs	22	2
dyadic power	21	2
hypervigilance	21	2
concessions	20	2
emotional distress	20	2
schadenfreude	20	2
accountability	18	2
direct aggression	17	2
dorsal striatum	17	2
indirect aggression	17	2
middle frontal gyrus	16	2
sexual distress	16	2
determination	15	2
intercourse	15	2
mutual dependence	15	2
physiological flooding	15	2
cerebellum	14	2
home environment	14	2
permissive parenting	14	2
sulking	14	2
vocal arousal	14	2
communication negativity	13	2
mental fatigue	13	2
sinus arrhythmia	13	2
thalamus	13	2
norepinephrine	12	2
open-mindedness	12	2
psychotic	12	2
ventromedial prefrontal cortex	12	2
bragging	11	2
co-rumination	11	2
dna	11	2
friendliness	11	2
intrusive memories	11	2
loss aversion	11	2
passivity	11	2
superior frontal gyrus	11	2
affection deprivation	10	2
apathetic	10	2
emotional instability	10	2
fearlessness	10	2

inequity aversion	10	2
misunderstandings	10	2
pons	10	2
positive tone	10	2
proactivity	10	2
cognitive avoidance	9	2
identity development	9	2
premarital doubts	9	2
risky driving behaviour	9	2
ventrolateral prefrontal cortex	9	2
ans reactivity	8	2
family conflict	8	2
interpersonal perception	8	2
morningness	8	2
movement	8	2
neuroendocrine	8	2
neuropeptides	8	2
neurotransmitters	8	2
prenatal stress	8	2
suspicion	8	2
acute stress	7	2
boundary	7	2
chronic stress	7	2
compliance	7	2
conscience	7	2
emotional dysfunction	7	2
emotional interdependence	7	2
hpa axis function	7	2
insightfulness	7	2
negative humour	7	2
negative thoughts	7	2
nutrition	7	2
privacy	7	2
self-talk	7	2
self-concept	7	2
sexual objectification	7	2
body satisfaction	6	2
borderline	6	2
honest-humility	6	2
inference-making	6	2
mind-sets	6	2
morningness-eveningness	6	2
obsession	6	2
parental communication	6	2
parental discipline	6	2
parenting sensitivity	6	2

shared feelings	6	2
social roles	6	2
sociodemographics	6	2
stress sensitivity	6	2
time together	6	2
vocalisations	6	2
being present	5	2
mutual reciprocity	5	2
parental investment	5	2
racism	5	2
sensory perceptions	5	2
societal norms	5	2
safe haven	40	1
grammar correction	33	1
lateral septum	29	1
single parenting	29	1
lingual gyrus	25	1
precuneus	25	1
superior temporal sulcus	25	1
infatuation	24	1
love styles	24	1
swearing	24	1
destructive criticism	22	1
interpersonal vulnerability	22	1
maladaptive appraisals	22	1
odd	22	1
mpfc	21	1
other-centeredness	20	1
assumptions	19	1
desensitised	18	1
overbearing	18	1
surprise	18	1
passive aggression	17	1
pollution	17	1
turn against	16	1
turn away	16	1
love maps	15	1
rostral anterior cingulate cortex	15	1
catecholamines	14	1
emotional environment	14	1
frowning	14	1
influence strategies	14	1
relational devaluation	14	1
tears	14	1
flirtatiousness	13	1
gender identity	13	1

negative comparisons	13	1
stoicism	13	1
time management	13	1
authoritarian parenting style	12	1
caudate nucleus	12	1
perceived anger	12	1
perceived neglect	12	1
peripheral nervous system	12	1
belonging support	11	1
conflict communication	11	1
cooperative communication	11	1
corticolimbic system	11	1
oppositional communication	11	1
self-esteem support	11	1
tangible support	11	1
broca's region	10	1
demands	10	1
gaslighting	10	1
immorality	10	1
patronising	10	1
self-improvement intention	10	1
sexual quality	10	1
situational power	10	1
derogate	9	1
despise	9	1
inferior frontal gyrus	9	1
interpersonal value	9	1
middle temporal gyrus	9	1
miscommunication	9	1
occipital gyrus	9	1
parahippocampal gyrus	9	1
positive reminiscence	9	1
restitution	9	1
superior temporal gyrus	9	1
ventral anterior cingulate cortex	9	1
vindictiveness	9	1
affective disorder	8	1
androgen	8	1
arrogance	8	1
dancing	8	1
emotion sensitivity	8	1
negative affect reciprocity	8	1
negative tone	8	1
paraventricular nucleus	8	1
parietal lobe	8	1
perceptual accuracy	8	1

physiological dysregulation	8	1
posterior cingulate cortex	8	1
pro-relationship behaviours	8	1
self-determination	8	1
accumbens	7	1
amygdaloid body	7	1
anticipatory feelings	7	1
appearance anxiety	7	1
autism spectrum disorder	7	1
body posture	7	1
body shame	7	1
catastrophic thinking	7	1
childbirth	7	1
childhood emotional maltreatment	7	1
cognitive exhaustion	7	1
conditional regard	7	1
conservatism	7	1
derogation of alternatives	7	1
egalitarian	7	1
ego-threat	7	1
emotional investment	7	1
emotional management	7	1
emotional negativity	7	1
emotional sharing	7	1
empathic responding	7	1
expectation of reciprocity	7	1
expressive flexibility	7	1
harmonious relationships	7	1
infralimbic	7	1
interpersonal influence	7	1
meaning violation	7	1
mesotocin	7	1
mutual problem solving	7	1
nagging	7	1
negative feelings	7	1
negative-direct communication	7	1
obsessive behaviour	7	1
panic	7	1
partner feedback	7	1
personal confidence	7	1
phobic disorders	7	1
pineal gland	7	1
preciseness	7	1
predictability	7	1
punitiveness	7	1
self-promotion	7	1

sensitive parenting	7	1
sex offenses	7	1
sex role attitudes	7	1
social marginality	7	1
standards	7	1
support exchange	7	1
tend and defend	7	1
vasotocin	7	1
microexpressions	6	1
morningness	6	1
mood stability	6	1
mother–child interaction	6	1
negative attributions	6	1
negative conflict	6	1
nightmares	6	1
noradrenaline	6	1
paranoid personality disorder	6	1
parasympathetic regulation	6	1
partner perspective	6	1
persuasive messages	6	1
positive attributions	6	1
protectiveness	6	1
pursuit	6	1
questioning	6	1
request	6	1
responsive behaviour	6	1
right angular gyrus	6	1
self-blaming	6	1
self-condemnation	6	1
self-focus	6	1
self-knowledge	6	1
shared responsibilities	6	1
temporoparietal junction	6	1
thought control	6	1
withdrawn	6	1
parenting resources	5	1
relationship perceptions	5	1
midbrain	4	1
spirituality	4	1
partner fit	3	1

Appendix 12: Grouping the Factors into Categories

1. Developmental Factors

A preliminary investigation was made of the research before creating the developmental group for the final explanatory model. I read through the highly relevant developmental studies in my Endnote library (N=50), and created a new developmental factors network model (www.relationship-science.com) before grouping the factors into: parenting style, social modelling, societal and cultural influences, ACEs (adverse childhood experiences), life experiences, and attachment processes. These factors are shown in Table A.

Table A: Grouping the developmental factors

Subcategories	Category: Developmental Factors
Parenting style	affiliative permissive authoritarian parental discipline strategies confused/chaotic parenting
Social modelling	parent's traits and personality parental and family communication family of origin structure and functioning birth order sibling relationships peer relationships social media emotional conditioning
Societal and cultural influences	collectivism vs individualism social values norms, religion cultural input
ACEs (Adverse childhood experiences)	childhood sexual abuse childhood physical abuse childhood neglect parental divorce
Life experiences	environmental enrichment intellectual input education social experiences
Attachment processes	parental sensitivity parental safety parental autonomy support and encouragement parental mastery support and encouragement parental belongingness support parental responsiveness

	parental warmth parental rejection parental neglect parental proximity and accessibility

2. Biological Factors

I grouped brain factors and sex difference factors under one category: biological factors. In reviewing the literature on both factors, it was apparent that they were part of a larger set of factors encompassing the biology of the individual, and the physiological contagion between couples. Biological factors are therefore grouped as neurological factors, and biological sex differences, and also as hormonal factors, physiological factors, genetic factors, drives/instincts, and health. The factors therefore share the grouping and are found in Table B.

Table B: Grouping the biological factors

GROUPS	BIOLOGICAL FACTORS
Brain	brain development brain chemistry and circuitry brain structure, size, and connectedness amygdala hypothalamus hippocampus prefrontal cortex cingulate cortex insula nucleus accumbens
Hormones	cortisol oxytocin dopamine serotonin adrenalin oestrogen testosterone vasopressin menstrual cycle menopause
Physiology	VSA heart rate blood pressure allostatic load hypothalamic-pituitary-adrenal axis (HPA) autonomic nervous system (ANS) sympathetic nervous system (SNS) circadian rhythm sweat and overheating
Genetics	DNA

	gene-environment interaction epigenetics
Drives/Instincts	behavioural approach/avoidance system attentional focus emotion avoidance fight flight freeze tend befriend defend
Sex Differences	primary and secondary sexual organs brain differences molecular level differences physical appearance differences hormonal differences
Health	sleep exhaustion exercise diet and nutrition drug use alcohol use addictions physical disease and disorder gut-brain axis inflammation

3. Stress Factors

Stress factors were broadened to include general contextual factors, noting that it was the stressful elements of context that impacted most upon relationship well-being outcomes. Both historic and current stress contributed. Stress factors are therefore grouped as: stressful experiences: historic, stressful experiences: current, coping resources, societal and cultural influences, and stressful life experiences. I also renamed the group: Contextual stress factors. The grouping of factors in the stress category are shown in Table C.

Table C: Grouping the stress factors

GROUPS	CONTEXTUAL STRESS FACTORS
Stressful experiences: historic	maternal depression paternal depression parental/caregiver mental health parental/caregiver personality disorders parental/caregiver divorce parental/caregiver conflict parental/caregiver addictions traumatic experiences health difficulties grief/loss

	financial strain or poverty relationship history
Stressful experiences: current	personal addictions daily hassles work stress housework load traumatic experiences health difficulties grief/loss financial strain or poverty age and stage concerns major life transitions new baby/children
Coping resources	education/information social support broader societal support material wealth
Societal and cultural stressors	societal unrest/war national and international calamities stressful neighbourhoods household chaos oppressive social values social norms including sexism, racism, gender minority stressors

4. Adult attachment Style Factors

Attachment styles were grouped as secure attachment, anxious attachment, avoidant attachment, and disorganised attachment. The development of attachment was moved to the new group 'developmental factors', leaving the current experience and expression of adult attachment style. Their associated factors are shown in Table D.

Table D: Grouping the adult attachment style factors

GROUPS	ADULT ATTACHMENT STYLE FACTORS
Secure attachment	bonded sense of safety connectedness interdependent trusting enjoyment of intimacy affirming encouraging celebrating of others wins positive optimistic

	help-seeking emotionally expressive secure self-worth resilience calmness
Avoidant attachment (dismissive)	overly boundaried judgemental intolerant distant aloof dissociative lacking vulnerability emotionally unavailable self-important self-protective self-focused secretive minimising invalidating withdrawing disengaged dismissive avoids intimacy distrusting independent distress tolerant
Anxious attachment (preoccupied/ambivalent)	attention seeking needing validation needing reassurance manipulative gas-lighting critical over-reacting obsessive possessive negative ruminations anxious in the relationship uncertain in the relationship jealous clingy needy rejection sensitivity wary of people's trustworthiness low self-esteem unstable emotion regulation fear of abandonment co-dependence
Disorganised attachment (fearful-avoidant)	anti-social behaviour risky alcohol use risky drug use risky sexual behaviour

	risk of violence responsibility avoidant emotionally unstable unpredictable craving connection fearing connection personality disorders

5. Personality Factors

The personality group included the Big Five personality traits and their opposites, and personality disorders. Personality traits were agreeableness (vs. antagonism), neuroticism (vs. emotional stability), extraversion (vs. introversion), conscientiousness (vs. disinhibition), and openness to experience (vs. closed-mindedness). The decision was made to place personality disorders with personality traits. This was questioned as researchers have yet to conclude the genesis story of personality disorders. Nonetheless, several researchers are now calling for these to be considered together. Personality factors are shown in Table E.

Table E: Grouping the personality factors

GROUPS	PERSONALITY FACTORS
Agreeableness	cooperative emotional warmth altruism compassion empathy perspective-taking supportive affiliative trustworthy trusting responsible emotionally vulnerable courteous helpful pleasant kind generous self-less integrous authentic honest humble submissive gullible
Antagonism	argumentative oppositional

	disagreeable contemptuous competitive uncooperative resistant to influence emotional coldness unsympathetic unkind harsh verbal aggression critical suspicious overbearing arrogant rude malevolent exploitative deceitful manipulative callous punitive physical aggression
Conscientiousness	self-controlled self-disciplined organised thoughtful consequence aware dependable planned focused diligent systematic thorough responsible persevering grit punctual perfectionism workaholism
Carelessness	thoughtless undisciplined apathetic procrastinating distractable impulsive disorganised inefficient imprecise rash irresponsible

Extraversion	sociable outgoing cheerful optimistic confident agency assertive adventure seeking excitement seeking attention seeking energetic active liveliness talkative expressive self-disclosing high reward sensitivity impulsivity
Introversion	inhibited passive with-holding withdrawn quiet non-disclosing aloof shy bashful timid reserved
Openness	curious imaginative creative intelligent open-minded non judgemental psychologically flexible growth mindset many interests innovative introspective intellectual magical thinking explorative seeing the big picture open to new experiences expansion of self insightfulness

	- risk-taking - independent
Closed-mindedness	- conventional - practical - likes routine - psychologically inflexible - resistant to change - fixed mind set - judgmental
Emotional stability	- even tempered - emotionally secure - emotionally predictable - emotionally stable - happy - content - positive - calm - gentle - patient - slow to anger - resilient in uncertainty - stress tolerant - able to cope - self-confident - self-reassuring - high self-esteem - self-aware - self-regulated - self-mastery - stoic
Neuroticism	- emotional lability - emotional unpredictability - emotion sensitivity - stress sensitivity - threat sensitivity - worry - catastrophising - aggressive - hostility - irritability - negativity - depressed - helplessness - anxious - aggressive - easily upset - quick to anger

	controlling moody lacking resilience obsessive rumination resentful tense nervous shame conscious self-conscious emotionally insecure
Personality disorders	psychopathy narcissism machiavellian anti-social pd sadism conduct disorder bipolar disorder borderline pd anxiety disorders major depressive disorder obsessive compulsive disorder ADHD/ADD asperger syndrome alexithymia autism

6. Self-Regulation Factors

Emotion regulation is a subset of the broader self-regulation group therefore this group was renamed self-regulation which encompasses emotion regulation, as well as cognitive and behavioural regulation (Andersen & Chen, 2002), and co-regulation was added as well. Grouping of factors is shown in Table F.

Table F: Grouping the self-regulation factors

GROUPS	PERSONAL BIOLOGY FACTORS
Emotion regulation	emotional intelligence emotion recognition emotion awareness emotion understanding empathic accuracy emotional availability emotion de-escalation physiological soothing emotion suppression emotion reactivity

Behaviour regulation	self-control self-management self-responsibility
Cognitive regulation	attentional control emotion reappraisal cognition reappraisal theory of mind intelligence life wisdom problem solving skills
Co-regulation	social regulation bring present ability to read body language support seeking support giving collaborative life organisation emotion contagion comfort

7. Emotions Factors

Emotions were grouped as emotion processes and types. These are shown in Table G.

Table G: Grouping the emotions factors

GROUPS	EMOTIONS FACTORS
Emotion processes	emotional attunement emotional arousal emotional escalation emotional synchrony
Emotions	sexual desire attraction relief romance positive sentiment override negative sentiment override positive regard negative regard optimism positivity nostalgia love happiness fondness empathy compassion caring calmness adoration

	admiration shame guilt schadenfreude sadness resentment remorse rejection paranoia jealousy hopelessness hangry fear of intimacy fear of abandonment fear envy emotional pain grief distress distain contempt disgust disappointment despair depression callousness boredom arrogance anxiety anger rage resentment bitterness malice

8. Perceptions Factors

Perceptions factors were grouped as self-appraisals, appraisals, cognitions/beliefs, expectations, and motivations. These are shown in Table H.

Table H: Grouping the perceptions factors

GROUPS	PERCEPTIONS FACTORS
Self-appraisals	self-esteem self-awareness life narratives body image self-efficacy self-acceptance self-condemnation self-congruence self-criticism

	self-deception self-enhancement self-importance self-knowledge
Appraisals	resentment distrusting taking offense perceived support mind reading derogation of alternatives couple identity interpretation bias inference making judgements negative attributions mate value evaluations regret perception of powerlessness pre-marital doubts suspicion sense of belonging power-sharing appraisals ambiguity ego threat social comparison similarity appraisal catastrophising threat appraisals about partners attractiveness
Cognitions/beliefs	partner knowledge ruminations intuitions aspirations memories cognitive avoidance thought suppression delusions intrusive memories mentalising mind wandering mindfulness self-reflection theory of mind understanding reminiscing equity beliefs masculinity/femininity beliefs sex role beliefs ambivalent sexism benevolent sexism hostile sexism racism destiny beliefs

	growth beliefs ideal standards ideologies meaning-making morality beliefs prejudice sexual beliefs personal growth value religion spirituality
Expectations	about commitment about boundaries about own and others responsiveness about power about power sharing about control about responsibility about influence about support about reciprocity about intimacy and closeness about others' attitudes about others' expectations about others' competency to support you optimism mind reading
Motivations	self-protection rejection sensitivity triggers avoidance goals approach goals sacrifice distrusting taking offense

9. Communication Factors

Communication is grouped as communication content/intent/behaviours, and body language. These are shown in Table I.

Table I: Grouping the communication factors

GROUPS	COMMUNICATION FACTORS
Communication behaviours	responsiveness daily dialogue persuasive messages paraphrasing laughter humour gossip swearing listening

	engagement interested disengaged reflecting back understanding compliment sharing opinions explaining sharing stories bragging boasting complaining criticising capitalising gas lighting
Communication content and motivation	uncertainty disclosure confiding reassurance seeking reassurance giving approval seeking problem-solving decision-making reasoning advice giving advice seeking asking questions confession gratitude expression acceptance expression validation expression empathy expression admiration expression bids for connection emotion disclosure cognitive disclosure self-disclosure expressing needs expressing dreams self-promotion passive aggressive openness to compromise openness to influence over protection dismissiveness controlling manipulation bullying misunderstanding disagreement conflict of interest encouragement
Body language	body posture facial expression rolled eyes frowning

	tone of voice open or closed body language calm or agitated body language eye gaze physiological synchrony

10. Conflict Factors

Conflict factors were grouped as conflict behaviours, negative expression, and conflict repair. These are shown in Table J.

Table J: Grouping the conflict factors

GROUPS	CONFLICT FACTORS
Typically constructive conflict behaviours and attitudes	negotiation listening to understand confrontation assertiveness in addressing concerns careful honesty helpful anger concessions perspective taking acknowledging partners' point of view tenderness reparation compromise apology openness to influence forgiveness conflict repair proactivity
Typically non-constructive conflict behaviours and attitudes	minimising undermining dismissiveness invalidation blame resistance to influence disregard abusiveness derogation provocation counter-arguing derailment maladaptive anger aggression listening to build one's defence turning against turning away negativity reciprocation irritated tone harsh tone moodiness personal attack

	discouragement putdowns disrespect insulting demeaning patronising defensiveness demand/withdraw manipulation arguing about facts belligerence annoyance escalated tone interruptions justifications serial arguments criticism uptightness denial disapproval threats retribution hostility violence

11. Relationship Behaviour Factors

Relationship behaviours factors were grouped as physical affection and sexual behaviours, commitment behaviours, and relationship maintenance behaviours including affirmation and support. While sexual communication and affection had been included in the communication graph, communication didn't cover the whole gamut of sexual behaviours. Additionally, there are other relationship behaviours that seemed to fit more comfortably into this group than in the other groups, such as relationship maintenance behaviours. As this category was created after completing the network model graphs a new investigation was made of the affection/sexual behaviour aspect of relationship behaviours and this can be viewed at www.relationship-science.com. Relationship behaviour factors are shown in Table K.

Table K: Grouping the relationship behaviours factors

GROUPS	RELATIONSHIP BEHAVIOURS FACTORS
Physical affection and sexual behaviours	physical affection cuddles and kisses sexual intimacy sexual frequency orgasm sexual satisfaction

	sexual communication appearance anxiety body satisfaction pornography use
Commitment behaviours	relationship investment relationship uncertainty/certainty exclusion of attractive alternatives perseverance deception dishonesty betrayal of loyalty expectations secrecy infidelity attractive alternative
Maintenance behaviours	support affirmation appreciation generosity gift giving thoughtfulness attentiveness helpfulness collaboration in life responsibilities cooperation shared housework shared childcare communal goal setting playfulness fun shared leisure shared exercise shared experiences time together accommodation of each other's needs/desires unforgiveness too forgiving

Appendix 13. Examples of the Micro-Models

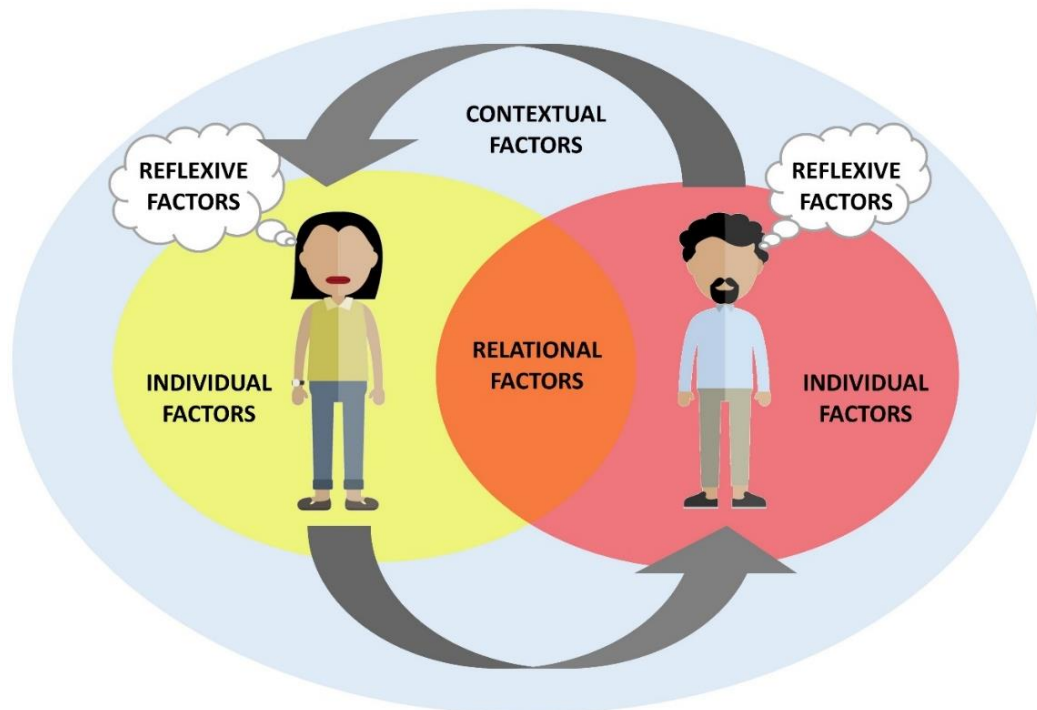


Figure A: Humans in context:

Relationships occur between reflexive human beings who dwell in shifting social contexts, inner and outer realities exist and impact the relationship

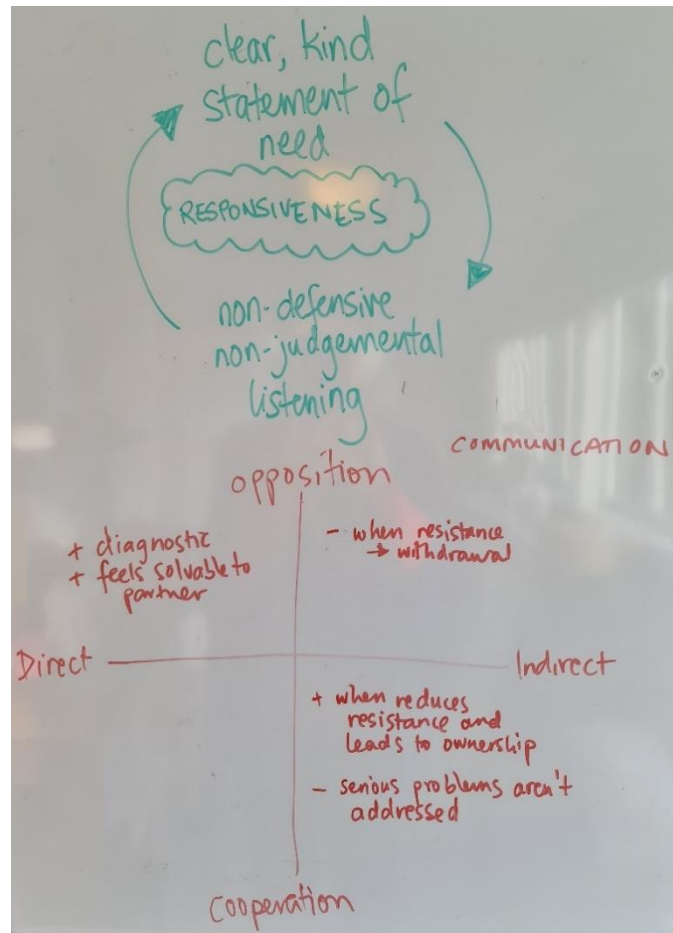


Figure B: Example of whiteboard diagramming

Modelling different theories from the literature

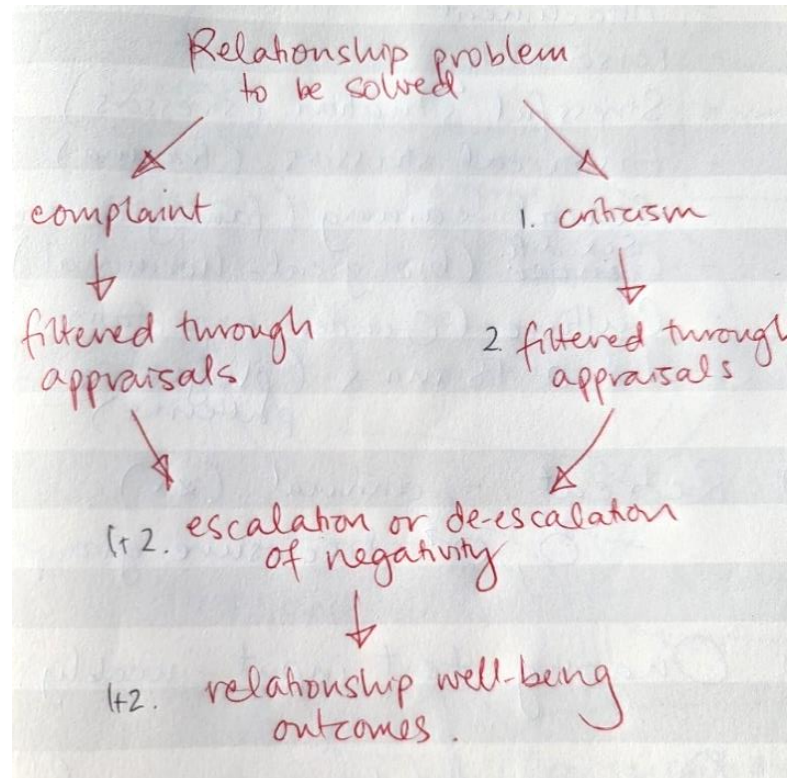


Figure C: Example of journal diagramming

Modelling relationship processes

Appendix 14: Diagramming Example of Threat as a Central Factor in Responsiveness

In reviewing the literature, it was noted that many researchers viewed threat avoidance as an influence on responsiveness. Perceived threats to survival (whether proximate or distant to actual survival risk) lead to increased vigilance and avoidance behaviours. Vigilance and avoidance have a significant and accruing impact upon individual physiological, emotional, cognitive, and behavioural responsiveness in a partnership, and this significantly influences relationship well-being outcomes. The nature of these responses is, in turn, influenced by individual differences. Figures A-E reflect my exploration of these relationships.

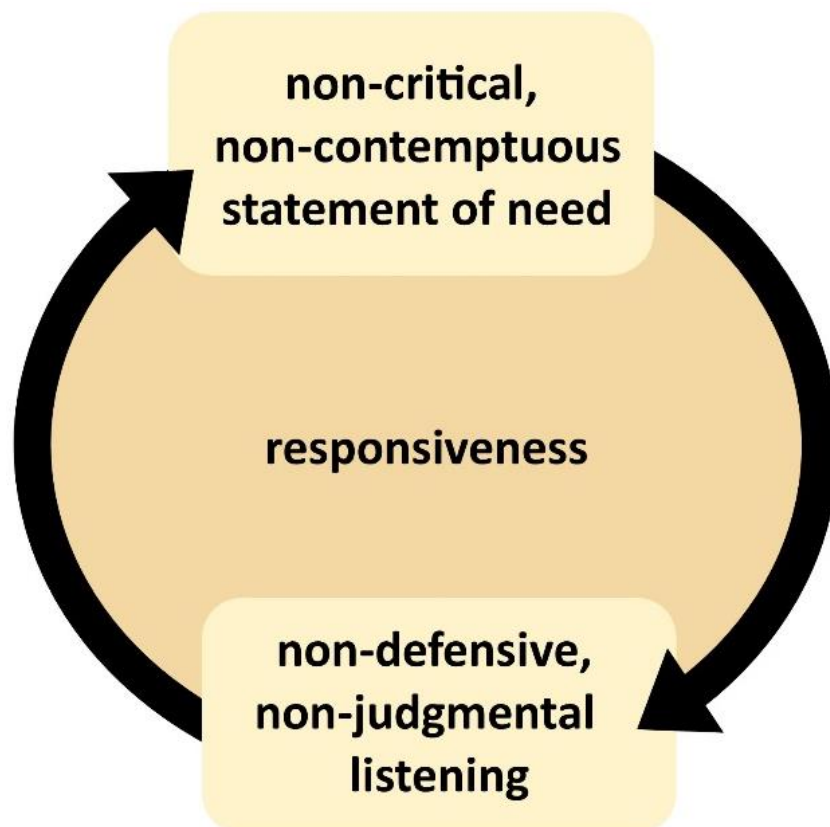


Figure A. Responsiveness micro-model

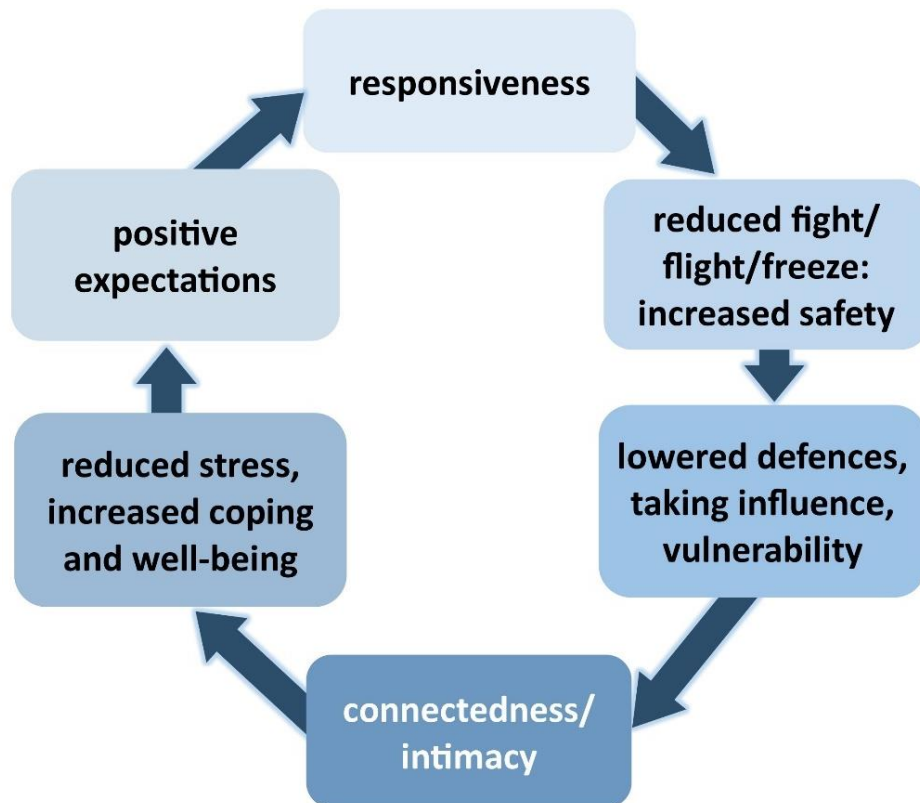


Figure B. The responsivity loop (responsiveness)

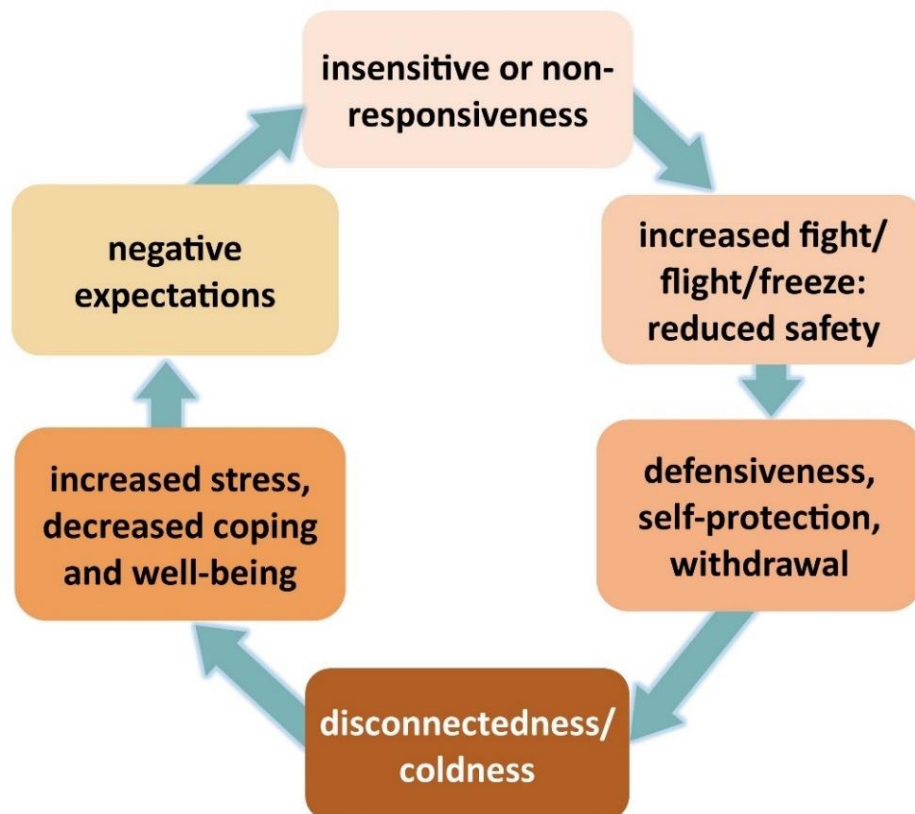


Figure C. The responsivity loop (unresponsiveness)

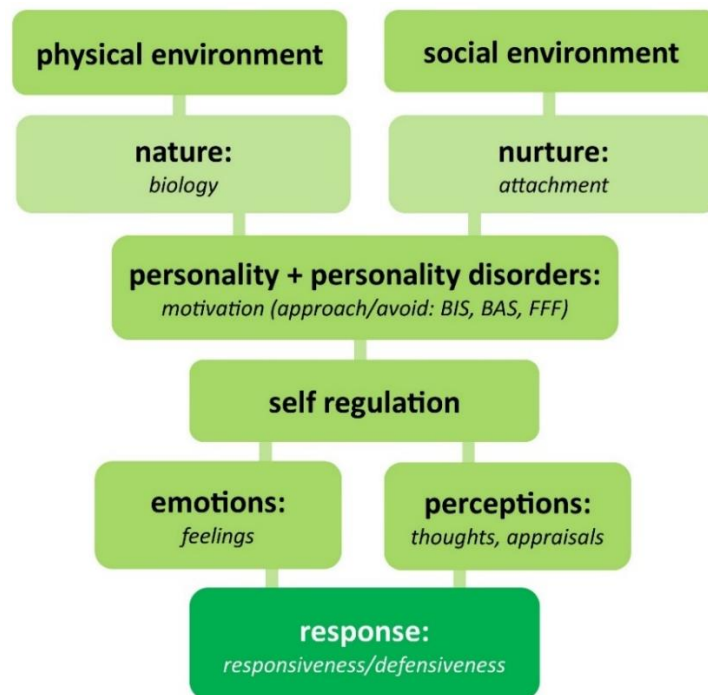


Figure D. Influence tree leading to responsiveness or defensiveness

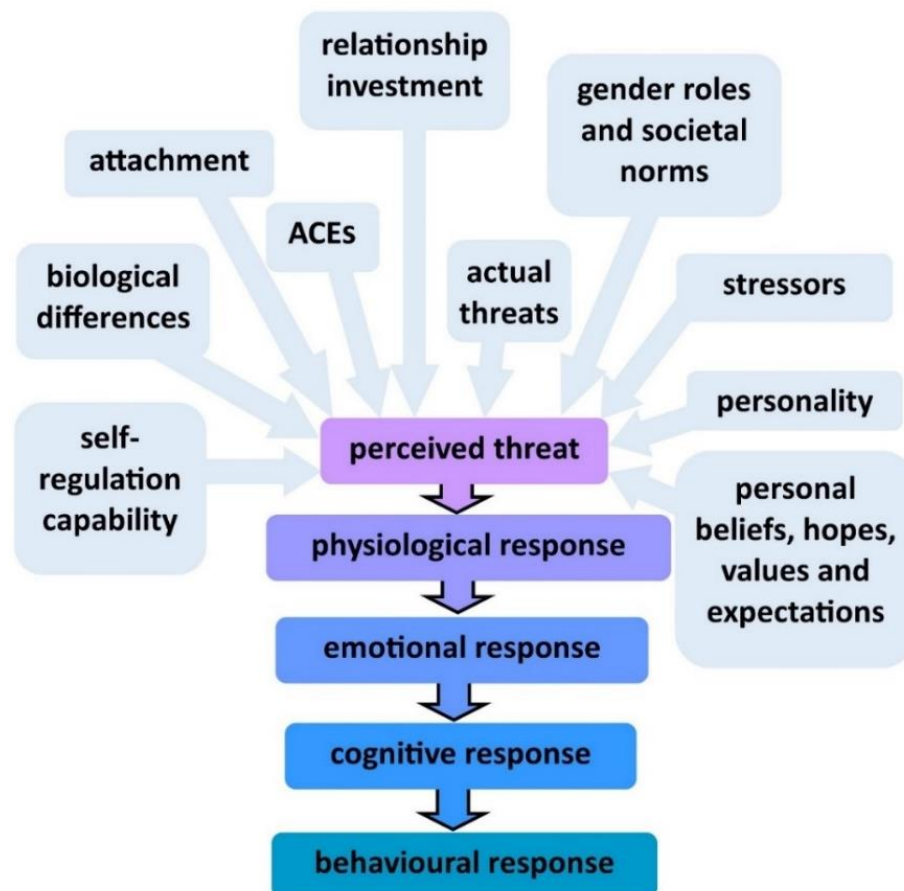


Figure E. Influence tree leading to responsiveness or defensiveness

Appendix 15: Chat GPT's Answer to My Question: "What are the Key Factors Contributing to Satisfying Couple Relationships According to Scientific Research?"

"There is a large body of research on what factors contribute to a satisfying couple relationship. Some of the key factors that have been identified include:

- **Communication:** Effective communication is crucial for a satisfying couple relationship. This includes being able to express one's needs and desires, as well as being able to listen and understand the perspective of one's partner.
- **Trust:** Trust is essential for a satisfying couple relationship. This means being able to rely on one's partner, and feeling confident that they will be faithful, honest, and supportive.
- **Commitment:** A strong commitment to the relationship can help to foster feelings of security and stability, which are important for a satisfying couple relationship. This may involve a willingness to work through challenges and to make sacrifices for the sake of the relationship.
- **Love and affection:** Feelings of love and affection are crucial for a satisfying couple relationship. This includes expressing love through physical affection, such as hugging, holding hands, and kissing, as well as through verbal affirmations and acts of love and kindness.
- **Shared values and goals:** Having shared values and goals can help to create a sense of unity and purpose within a couple relationship. This may involve having similar views on important issues, such as family, career, and personal growth.
- **Flexibility and adaptability:** The ability to adapt to change and to be flexible in the face of challenges is important for a satisfying couple relationship. This may involve being open to trying new things and finding ways to compromise.
- **Conflict resolution:** The ability to effectively resolve conflicts is crucial for a satisfying couple relationship. This may involve being able to communicate openly and honestly, to listen to one another's perspective, and to find ways to compromise and move forward.
- **Support and affection:** Receiving support and affection from one's partner is important for a satisfying couple relationship. This may involve offering emotional support during difficult times, as well as physical affection, such as hugging, holding hands, and kissing.
- **Sexual satisfaction:** Sexual satisfaction is an important aspect of a satisfying

couple relationship. This may involve having a healthy and satisfying sex life, as well as feeling comfortable and secure in one's sexual expression.

- Physical and emotional intimacy: Physical and emotional intimacy are important for a satisfying couple relationship. This may involve being able to share one's thoughts and feelings with one's partner, as well as engaging in activities that foster a sense of closeness and connection.

Overall, a satisfying couple relationship is one that is characterized by effective communication, trust, commitment, love and affection, shared values and goals, flexibility and adaptability, conflict resolution, support and affection, sexual satisfaction, and physical and emotional intimacy. By cultivating these factors, couples can build strong, healthy, and satisfying relationships."

Chat GPT's Supplied References:

Communication:

- "The role of communication in romantic relationships: An attachment perspective" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)
- "Communication in marriage" by Mark D. Knapp and Anita L. Vangelisti (Handbook of communication and social interaction skills, 2008)

Trust:

- "Trust in romantic relationships" by K. Daniel O'Leary (Journal of Social and Personal Relationships, 2000)
- "The role of trust in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)

Commitment:

- "The role of commitment in relationship maintenance" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)
- "Commitment in romantic relationships" by Sabrina L. Braun, et al. (Journal of Social and Personal Relationships, 2014)

Love and affection:

- "Love and affection in intimate relationships" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)
- "The role of love and affection in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)

Shared values and goals:

- "The role of shared values and goals in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)
- "Shared values and goals in romantic relationships" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)

Flexibility and adaptability:

- "The role of flexibility and adaptability in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)
- "Flexibility and adaptability in intimate relationships" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)

Conflict resolution:

- "The role of conflict resolution in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)
- "Conflict resolution in intimate relationships" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)

Support and affection:

- "The role of support and affection in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)
- "Support and affection in intimate relationships" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)

Sexual satisfaction:

- "The role of sexual satisfaction in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)
- "Sexual satisfaction in intimate relationships" by K. Daniel O'Leary and Elizabeth D. Powers (Journal of Social and Personal Relationships, 2002)

Physical and emotional intimacy:

- "The role of physical and emotional intimacy in relationship satisfaction" by J. Kenneth Davidson and Deborah A. Weston (Journal of Social and Personal Relationships, 2002)
- "Physical and emotional intimacy in intimate relationships" by K. Daniel

O'Leary and Elizabeth D. Powers

I asked Chat GPT to critique what it had written, and it gave this response:

“There are a few areas where the essay could be improved:

- The essay could benefit from more in-depth analysis and discussion of each factor. While the essay provides a brief overview of each factor, it would be helpful to delve deeper into the specific ways in which each factor contributes to a satisfying couple relationship, and to provide more detailed examples and research to support these points.
- The essay could also benefit from a more diverse range of research sources. While the references provided are certainly relevant and credible, relying on only a few sources may limit the scope and depth of the analysis. Incorporating a wider range of research from different disciplines and perspectives could help to provide a more nuanced and comprehensive understanding of the topic.
- It would also be helpful to contextualize the research within the broader literature on couple relationships. The essay could explore how the identified factors compare to or intersect with other factors that have been identified as important for satisfying couple relationships, and how they may vary depending on the specific context or cultural background of the couple.

Overall, the essay does a good job of outlining the key factors that contribute to a satisfying couple relationship but could be strengthened by providing more in-depth analysis and a wider range of research sources, and by contextualizing the research within the broader literature on couple relationships.”

Appendix 16. Chat GPT's Explanation Regarding How it Can be Used for Couples' Therapy

"ChatGPT is a state-of-the-art natural language processing model developed by OpenAI that has the potential to revolutionize the field of mental health by providing automated counseling services. One area where ChatGPT can be particularly useful is in couples therapy, which is a form of psychotherapy that focuses on improving communication and resolving conflicts between romantic partners. In this paper, we will explore how ChatGPT can be utilized in couples therapy and discuss its potential benefits and limitations.

Benefits of using ChatGPT in Couples Therapy: One of the key benefits of using ChatGPT in couples therapy is that it can provide a safe and confidential space for partners to express their thoughts and feelings without fear of judgment. Couples may be more likely to open up to a machine than to a human therapist, especially if they have trust issues or feel uncomfortable discussing sensitive topics face-to-face. Another benefit of using ChatGPT in couples therapy is that it can provide immediate feedback and support to partners. The model can analyze the text input and provide personalized suggestions for how couples can improve their communication or resolve conflicts. This can be especially useful in situations where partners are unable to see a therapist in person or need immediate support outside of regular therapy sessions.

ChatGPT can also be programmed to provide psychoeducation and skill-building exercises to couples. For example, it can offer strategies for active listening, conflict resolution, and emotional regulation. These tools can be used to help couples develop better communication skills and strengthen their relationship.

Limitations of using ChatGPT in Couples Therapy: While there are many potential benefits to using ChatGPT in couples therapy, there are also some limitations to consider. One of the main limitations is that the model is currently unable to provide the same level of empathy and emotional support that a human therapist can. Partners may feel disconnected or frustrated if they perceive that the machine is not understanding their emotions or responding appropriately.

Another limitation of using ChatGPT in couples therapy is that it is only as effective as the data it is trained on. The model's responses may be biased or inaccurate if it

has not been trained on diverse and representative data. Additionally, the model's responses may not be tailored to the specific needs and preferences of each individual couple.

Conclusion: In conclusion, ChatGPT has the potential to be a valuable tool in couples therapy by providing a safe and confidential space for partners to express themselves, offering personalized feedback and support, and providing psychoeducation and skill-building exercises. However, it is important to recognize that ChatGPT has some limitations, including its inability to provide the same level of emotional support as a human therapist and its reliance on training data. Further research is needed to fully understand the benefits and limitations of using ChatGPT in couples therapy and to develop best practices for its use.”