Exploring the behavioural and organisational support factors associated with New Zealand athlete mental health.

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Abstract

Purpose:

This thesis explored the behavioural and organisational support factors associated with mental health in elite New Zealand athletes. While athletes are often perceived as resilient, research indicates they experience comparable mental health challenges compared to the general population. Guided by the dual continuum model, this study investigated how modifiable behaviours and perceived organisational support (POS) are associated with depression, anxiety, psychological strain, and flourishing. In addition, it examined the prevalence of these behaviours, POS, and mental health outcomes across this athletic population.

Methods:

A cross-sectional online survey was conducted with 109 New Zealand athletes. Participants completed a series of validated measures assessing mental health outcomes, sleep hygiene, food addiction, screen time, alcohol use, and multi-level POS (organisation, coach/staff, teammates/training partners). Descriptive statistics captured prevalence data, while logistic regression analyses (adjusted and unadjusted) examined associations between these variables and mental health indicators, with the adjusted models controlling for demographic and sport-related covariates.

1. Behavioural Factors Results:

Poor sleep hygiene behaviours were strongly associated with higher odds of both depression (OR = 25.67, 95% CI [4.84, 136.24], $p < .001$) and anxiety (OR = 19.82, 95% CI [3.20, 122.76], $p = .001$). Weekly binge drinking was linked to significantly lower odds of flourishing (OR = 0.03, 95% CI [<0.01, 0.30], $p = .003$). Food addiction showed some strong trends with worse mental health outcomes, although no statistically significant link was established. Meanwhile, screen time demonstrated little to no association with mental health outcomes.

2. Perceived Organisational Support Results:

No significant associations were found between POS, at any individual or collective level, and mental health outcomes after adjusting for confounders. However, the unadjusted models suggest potential significant indirect protective trends. For example, teammate-level support was

associated with increased odds of anxiety (OR = 0.18, 95% CI [0.04, 0.91], p = 0.038) and the collective POS model significantly predicted flourishing ($\chi^2(3) = 8.90$, p = .031, McFadden's pseudo-R^2 = 0.066). Descriptive data further revealed that the majority of athletes perceived high support across all three organisational levels (58.7% organisational, 75.7% coach/staff, and 72.1% teammate/training partner).

Discussion:

This research advances understanding of athlete mental health by applying a dual continuum model and exploring both behavioural (internal) and organisational (external) links. Notably, despite ongoing efforts to recruit high-level athletes, the final sample remained small and heterogeneous. This highlights common barriers to applied research within elite sport settings and limitsi the generalisability of our findings to the broader elite athlete population. Nevertheless, the findings offer meaningful, real-world insights into upstream behavioural risk factors and the potential protective role of POS. In particular, the multi-level POS scales developed for this study provide a promising tool for future research in elite sport and could support more targeted, system-level interventions.

Conclusion:

This study offers a holistic, novel approach to athlete mental health by applying a dual-continuum model with sport-specific, multi-level POS measures. Findings highlight the significant role of modifiable behaviours (e.g., sleep, alcohol) and the potential of organisational support as a meaningful lever for improving well-being in sporting environments.

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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 used artificial intelligence tools or generative artificial intelligence tools (unless it is clearly stated, and referenced, along with the purpose of use), 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.

Signed: _____

Co-authorship Contributions

STUDENT AND SUPERVISOR APPROVALS

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Furthermore, I used Perplexity as a search engine to find peer-reviewed and academically relevant articles.

Ethics Approval

The online survey for this thesis was approved by the Auckland University of Technology Ethics Committee on 05.11.2024 AUTEC Reference number 24/321.

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Chapter 1: Introduction

Mental health has become an increasingly important focus in elite sport, and although sport is often viewed as protective, elite athletes consistently report similar rates of mental ill-health to the general population, which suggests the elite environment introduces unique stressors, such as injury, performance pressure, and career instability, that may offset potential benefits. This is especially concerning given that most elite athletes in New Zealand fall within age brackets that are currently experiencing the highest rates of psychological distress nationwide.

Historically, mental health in sport has been assessed using deficit-based models that rely on clinical screening tools to detect disorders, such as anxiety and depression. While useful, these approaches often fail to capture the broader picture of athlete well-being. The dual continuum model offers a more comprehensive framework by considering both the presence or absence of mental illness and mental well-being. It recognises that athletes can be high functioning despite symptoms of mental ill-health, and, conversely, can appear mentally well in clinical terms, while actually languishing.

This thesis explores behavioural and organisational support factors associated with mental health in elite athletes in New Zealand. Specifically, it examines how sleep hygiene, technology use, food behaviours, alcohol use, and multi-level perceived organisational support (POS) relate to depression, anxiety, psychological strain, and mental well-being.

Because this thesis is being presented in a manuscript structure, some repetition exists across Chapter 2 and the subsequent manuscript introductions. Following this introduction, Chapter 2 presents a narrative literature review of the current landscape of athlete mental health and associated behavioural and systemic factors. Chapter 3 is a cross-sectional study exploring associations between selected behavioural variables and mental health outcomes. Chapter 4 focuses on POS and its association with mental health measures in the same population. Chapter 5 integrates key findings on athlete mental health with broader societal and methodological insights to highlight the need for context-sensitive support in elite sport.

Table 1: Thesis Outline

Chapter	Title	Purpose
1	Introduction	A short introduction to the thesis.
2	A review of the evidence: Exploring modifiable factors shaping mental health in elite athletes.	A narrative literature review that re-examines mental health in elite sport and explores key behavioural and organisational risk and protective factors.
3	Exploring behavioural factors associated with New Zealand athlete mental health.	The first manuscript that presents a cross-sectional study exploring behavioural factors (e.g., sleep, food, tech, alcohol) and their associations with athlete mental health.
4	Exploring how perceived organisational support is associated with New Zealand athlete mental health.	The second manuscript that presents a cross-sectional study exploring how different levels of POS (e.g., the whole organisation, coaches and support staff, teammates and training partners) are associated with athlete mental health.
5	General Discussion	Synthesises findings from both studies, linking to wider societal trends, and reflects on methodological challenges.

Chapter 2: A review of the evidence: Exploring modifiable factors shaping mental health in elite athletes.

2.1 Mental Health Landscape

Mental health has become one of the most pressing global health concerns of the 21st century. High-profile disclosures, pandemic-related stress, and growing scientific interest have highlighted the widespread burden of mental health disorders. This section outlines the global landscape of mental health, narrowing focus toward New Zealand and then elite sport, to contextualise why this issue is relevant and urgent for athlete well-being and performance.

2.1.1 Prevalence & Burden

It is estimated that more than one in four people worldwide will experience a mental health disorder in their lifetime, with approximately 3/4 of cases emerging by the mid-twenties (Kessler et al., 2007; McGrath et al., 2023; Steel et al., 2014). Depression and anxiety disorders, the two most common diagnoses, are now among the top contributors to global disability, with depression declared first overall in 2016 (World Health Organisation, 2017). Between 2010 and 2021, the burden of depressive and anxiety disorders (measured via DALYs) rose by 16.4% and 16.7%, respectively (Ferrari et al., 2024). While some researchers have linked these rises to the stress, isolation, and uncertainty brought on by the COVID-19 pandemic (Law et al., 2022; Santomauro et al., 2021), global data suggests that prevalence rates have continued to climb (Newson et al., 2024).

Younger populations seem to be disproportionately affected. In the US, between 2008 and 2018, the prevalence of anxiety in young adults (18–25) nearly doubled (Goodwin et al., 2020), while rates of depressive episodes and suicidal thoughts in adolescents also rose sharply compared to older cohorts (≥26 years old) (Twenge et al., 2019). These trends indicate that mental health challenges were already escalating among young people prior to the COVID-19 pandemic, which is a concerning pattern given that this age bracket represents a large proportion of today's elite athletes.

2.1.2 New Zealand Context

Aotearoa New Zealand reflects similar patterns. National data using the K-10, show that high or very high psychological distress more than doubled between 2011/12 and 2022/23 – from 4.6% to 11.9% (Ministry of Health, 2023). Among youth aged 18–24, the rate surged from 5.1% to 21.2%, quadrupling over the same time. While the K-10 is not a diagnostic tool, it strongly correlates with anxiety and depression (Donker et al., 2010), highlighting the rapidly growing mental health issue among younger New Zealanders.

2.1.3 Mental Health Disorders: Symptoms & Biology

Major depressive disorder (MDD) is marked by lack of enjoyment (anhedonia), feelings of worthlessness and excessive guilt, fatigue, changes in appetite or sleep, impaired concentration, and in severe cases, self-harm and suicidal ideation (American Psychiatric Association, 2022). Anxiety disorders, like general anxiety disorder (GAD), involve catastrophising, insomnia, restlessness, muscle tension, increased sweating, a racing heartrate, and avoidance behaviour (American Psychiatric Association, 2022; Mogg & Bradley, 2016). Biologically, disruptions in neurotransmitters (e.g., serotonin, dopamine), HPA axis dysregulation, genetics and inflammatory pathways are among the leading hypotheses (Dean & Keshavan, 2017; Schiele & Domschke, 2018).

2.1.4 Demographic & Behavioural Risk Factors

Risk factors vary by context but consistently include: female gender; younger age; a preexisting mental illness diagnosis; family history of mental illness; minority ethnic status; chronic stress; chronic physical health conditions; socioeconomic disadvantage; recent adverse life events; and a history of traumatic brain injury (Blanco et al., 2014; Girgus & Yang, 2015; Grant et al., 2024; Han et al., 2019; Hellewell et al., 2020; Keller et al., 2007; Mossakowski, 2008; Pollack, 2005; Ramón-Arbués et al., 2020; J. Wang et al., 2012). Australasian research echoes many of these trends (Gasteiger et al., 2021; Schofield et al., 2016; K. M. Scott et al., 2008), although New Zealand data indicate that the relationship between ethnicity, specifically Māori identity, and mental health is more complex. While Māori consistently show higher rates of psychological distress (Black et al., 2017; Ministry of Health, 2024b) they are not at elevated risk for every mental health condition (Black et al., 2017). Additionally, Baxter et al. (2006) found that after

controlling for age, sex, and socioeconomic status, differences in anxiety and depression between different ethnic groups became statistically insignificant.

Behaviourally, high alcohol or nicotine use, poor sleep hygiene, reduced physical activity, limited time outdoors, binge eating, and excessive screen time are consistently associated with increased mental health risk (Barker et al., 2025; Galper et al., 2006; J. Li et al., 2020; Masaki et al., 2022; Przybylski & Weinstein, 2017; Rosenbaum et al., 2014; Twenge & Campbell, 2019; Wicks et al., 2022). Many of these associations were reflected in Australasian studies too, with findings that smoking, increased alcohol consumption, less exercise, and decreased sleep duration were all linked to an elevated risk of mental health disorders in the general population (Gasteiger et al., 2021; Lee & Sibley, 2019; Schofield et al., 2016).

2.1.5 Link to Elite Athletes

In 2021, mental health in high-performance sport came under intense national scrutiny in New Zealand following a series of high-profile incidents that occurred within the same year. The death of cyclist Olivia Podmore, suspected to be from suicide, brought widespread attention to the psychological pressures faced by elite athletes. Moments before her passing, Podmore shared her struggles on social media, prompting an independent review of Cycling New Zealand (Dillane, 2022). Just months earlier, world champion rower Zoe McBride had announced her unexpected retirement and withdrawal from the Tokyo Olympics, citing ongoing mental health challenges as a major factor (Payne, 2021). Later that year, professional rugby player Sean Wainui also tragically died in a car crash, which was subsequently confirmed to be a suspected suicide (Leask, 2021). These cases emphasise the profound impact mental health issues can have on individuals in high-performance sport and highlight the unique stressors and risk factors that elite athletes face in relation to their mental health.

2.1.6 Prevalence of Mental Health in Athletes

Contrary to popular belief, evidence indicates elite athletes are similarly susceptible to experiencing mental health disorders compared to the general population (Golding et al., 2020; Gorczynski et al., 2017; S. M. Rice et al., 2016). Further research also shows the landscape of elite athletes' mental illness in Australia and New Zealand is not too dissimilar from global elite athlete populations either (Golding et al., 2020). Compared to the general population, Australian elite athletes report similar prevalence of moderate to severe anxiety symptoms (Du Preez et al.,

2017; Gulliver et al., 2015; McEvoy et al., 2011), and NRL players report slightly better depression scores (Du Preez et al., 2017; Farrer et al., 2016). Whereas psychological distress was slightly elevated in Australian athletes compared to the general population (Purcell et al., 2020; Slade et al., 2011), although the difference was considerably reduced when compared to people in a similar age bracket (Enticott et al., 2022).

2.1.7 Athlete-Specific Risk Factors

Several risk factors for mental ill-health in Australasian elite athletes have been identified in research. These include being under 25 years old, contemplating retirement, competing in an individual sport, being female, receiving inadequate social support, or suffering a recent injury (Beable et al., 2017; Gulliver et al., 2015; Purcell et al., 2020). These findings align with global studies (Gouttebarge et al., 2016; Yang et al., 2014) and other global research highlighted poor sleep quality, inexperience, lower competition level and poor athletic performance as additional factors affecting mental illness (Andrade et al., 2018; Guillén & Sánchez, 2009; Halvari & Gjesme, 1995; Junge & Prinz, 2019; Turner & Raglin, 1996).

Social factors, such as stigma and cultural attitudes towards mental illness, were identified as potential confounding factors in the prevalence of mental health disorders too. As studies suggested athletes may perceive disclosing this information or seeking help regarding mental health issues as a sign of weakness or worry that it could have ramifications for their salary and team selection (S. M. Rice et al., 2019; Souter et al., 2018). Hence, why it is common for athletes to publicly disclose mental health issues post-retirement (Payne, 2021).

2.1.8 Mental Health & Performance

The relevance of this issue extends beyond the obvious imperative of supporting athlete well-being – a priority that High Performance Sport New Zealand (HPSNZ) emphasises NSOs should pursue with the same dedication as they do for achieving podium success (High Performance Sport New Zealand, n.d.). Understanding the unique risk factors and prevalence of mental illness in athletes is crucial, as the literature clearly demonstrates associations between mental health disorders and detriments in key performance parameters.

For instance, both depression and anxiety disorders are associated with insomnia (American Psychiatric Association, 2022; Cai et al., 2022) and it is well established that sleep plays a pivotal role in mental and physical recovery from training and competition (Charest & Grandner, 2020;

Fullagar et al., 2023). Moreover, anxiety and depression can reduce the capacity to concentrate (American Psychiatric Association, 2022; Ressler & Nemeroff, 2001), which is vital for learning processes, skill acquisition and tactics in sport (Fullagar et al., 2023). Depression in particular, can lead to decreased energy levels and mood disturbances which could cause decrements in athletes' motivation and available energy to train (B. Smith, 2013). Additionally, whilst moderate pre-competition anxiety may enhance arousal, chronic and excessive anxiety often reduces performance (Hardy, 1990). Thus, supporting athlete mental health is not only ethically essential – it is also critical to sustaining elite performance.

2.2 Mental Well-being

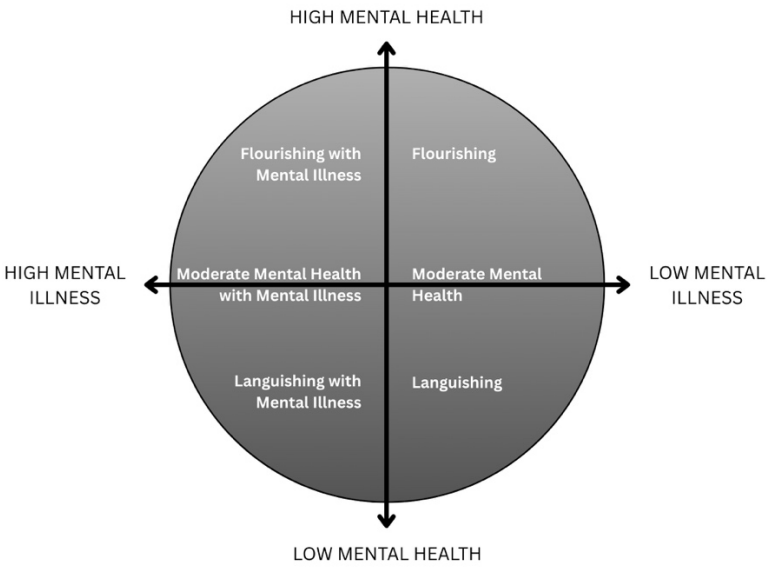
Research on mental health in sport has expanded significantly in recent years, with Kuettel and Larsen (2019) reporting that 81% of studies in their review were published between 2013 and 2018, and subsequent literature confirming continued growth in this area (e.g., Pilkington et al., 2022; C. C. Walton, Purcell, Henderson, et al., 2024). However, most of this work remains focused on mental ill-health, with comparatively little attention directed toward the promotion of positive mental well-being (Kuettel & Larsen, 2019; Schorb et al., 2025; W. Wang, Schweickle, Arnold, et al., 2025). This imbalance is further highlighted by Kegelaers et al.,(2022), who reported that 62.5% of current literature on student-athlete mental health is focussed solely on mental ill-health, compared to 22.6% on mental well-being, with even fewer analysing both (13.8%). This narrow focus on illness overlooks the broader definition of mental health outlined by the World Health Organisation (2022), which includes the capacity to handle stress, realise one's abilities, and contribute to the community. Furthermore, given the interdependence of mental health and athletic performance, it is increasingly recognised that restoring functioning alone is insufficient. As Schorb et al. (2025) contend, promoting positive mental health should be a core component of athlete care to enhance both well-being and performance.

2.2.1 A Dual Continuum Perspective

The dual continuum model of mental health, introduced by Keyes (2002, 2005) offers a more nuanced framework for understanding mental health in elite sport. It proposes that mental illness and positive mental well-being exist on two distinct yet interrelated axes, rather than as opposing ends of a single spectrum. As such, an individual can experience symptoms of mental illness while simultaneously reporting high levels of emotional, psychological, or social functioning (i.e.,

flourishing), or conversely, present with no clinical disorder but experience disengagement, stagnation, and low well-being (i.e., languishing).

Figure 1: Dual Continuum Model of Mental Health



Note. Adapted from "Mental illness and/or mental health? Investigating axioms of the complete state model of health," by C. L. Keyes, 2005, Journal of Consulting and Clinical Psychology, 73(3), p. 539. Copyright 2005 by the American Psychological Association.

Flourishing represents a state of optimal mental well-being, marked by positive emotions, a sense of meaning, strong interpersonal connections, and personal growth. It draws on multiple theoretical strands, including subjective well-being (e.g., happiness and life satisfaction), psychological well-being (e.g., autonomy, self-acceptance, purpose), and social well-being (e.g., feeling valued and contributing to community) (Lambert et al., 2015). Languishing, in contrast, reflects a deficit in these dimensions and is often described as emotional numbness, low vitality, or a lack of direction, even despite the absence of diagnosable mental illness (C. L. Keyes, 2002, 2005).

Though there are some discrepancies in how the dual continua model is interpreted (e.g., Kuettel et al., 2021) and critics (e.g., Huppert, 2014) question whether someone can truly flourish with severe mental illness impairing function, the model remains both conceptually and empirically robust (Iasiello et al., 2020). It offers a valuable framework for sport by supporting the independent but complementary goals of promoting mental well-being and addressing mental illness. A distinction particularly relevant to elite athlete populations, where individuals may experience psychological symptoms yet maintain high levels of functioning and performance.

2.2.2 Philosophical Traditions: Eudaimonia vs Hedonia

Beyond the dual continuum framework, theories of mental well-being are commonly orientated by two major philosophical traditions: hedonia and eudaimonia (Lambert et al., 2015). Hedonic well-being has an emphasis on positive affect by focussing on the pursuit of pleasure, comfort, and gratification (Huta et al., 2006). In contrast, eudaimonic well-being emphasises meaning, personal growth, and the realisation of potential, even when the process involves discomfort or effort. These are overlapping but distinctly different concepts (Lambert et al., 2015).

Moreover, a key distinction lies in the temporal nature and depth of these experiences. Hedonic well-being involves transient positive affect that typically dissipates once the pleasurable activity ends (Huta et al., 2006; Waterman et al., 2010). Individuals who predominantly pursue hedonic goals often report lower levels of life satisfaction and meaning (Huta & Ryan, 2010), as this approach is closely tied to the concept of subjective well-being (Lambert et al., 2015). In contrast, eudaimonia is not a state or a feeling but a way of life. It often requires sustained effort and engagement in challenging activities that may evoke discomfort in the short term, but contribute to greater well-being over time (E. T. Higgins, 2006; Seligman et al., 2005). Given its multi-faceted nature, eudaimonia is represented across various theoretical frameworks including self-determination theory, psychological well-being, social well-being, and humanistic theories (Lambert et al., 2015).

The concept of eudaimonia may be particularly familiar to athletes, as it reflects the pursuit of growth, purpose, and long-term fulfilment through delayed gratification. This aligns with the reality of high-performance sport, where individuals routinely place themselves in physical and mental discomfort in service of mastery and continued self-improvement. However, research suggests that an exclusive focus on eudaimonia can lead to fatigue and diminished perspective, often requiring hedonic experiences (e.g., rest, pleasure, or enjoyment) to restore balance (Huta & Ryan, 2010). Conversely, while hedonic well-being centres on positive affect and comfort, it tends to overlook deeper aspects of functioning and meaning. Reinforcing that neither perspective alone offers a complete account of well-being, and both are essential components to provide a more holistic foundation for sustained happiness and health.

2.2.3 Well-being Placed in a Cultural Context

Research increasingly emphasises that understandings of well-being should also be grounded in the values and frameworks of specific communities and cultures (Sangha et al., 2024). In

Aotearoa New Zealand, this means considering the Māori model of Hauora (Te Whare Tapa Whā), which conceptualises well-being as a whare (house) with four interdependent walls: taha tinana (physical), taha wairua (spiritual), taha whānau (social), and taha hinengaro (mental and emotional) all underpinned by whenua (land, identity, and connection to ancestry and environment). This model acknowledges that the strength of each wall is essential to the integrity of the whole, offering a culturally responsive and holistic view of mental well-being (Mental Heath Foundation of New Zealand, n.d.). Te Whare Tapa Whā, like other indigenous perspectives, challenges the common one-size-fits-all approaches prevalent in mental health research and practice (Pedrotti & Edwards, 2009; Richardson & Guignon, 2008). Furthermore, while its integrated conceptual nature may pose complexities for empirical measurement, it remains a critical interpretive lens for understanding athlete well-being in ways that are contextually meaningful and culturally respectful within Aotearoa.

2.2.4 Gaps in the Sport Mental Health Literature

Despite substantial advances in research on mental health in elite sport, Wang, Schweickle, Arnold et al. (2025) acknowledge there remains a notable gap regarding the understanding and promotion of positive mental well-being in these settings. For example, common monitoring tools like the IOC SMHAT-1 (Gouttebarge et al., 2021), only screening for symptoms of mental ill-health, overlooking those who may not meet clinical criteria but are still functioning below their potential.

Emerging evidence has begun to identify a range of protective and risk factors associated with athlete well-being. For instance, Kuettel et al. (2021) found that greater social support, adaptive coping strategies, and higher autonomy were linked to an increased likelihood of flourishing. Similarly, Wang, Schweickle, Hägglund et al. (2025) demonstrated that enhancing self-compassion and gratitude can significantly increase odds of flourishing. Qualitative findings from Lundqvist et al. (2021) further highlight the importance of balancing sport with normal life, maintaining functional social relationships, and employing positive coping strategies. In youth athletes, Gwyther et al. (2024) reported that impaired motivation and sleep, being female, and being older is associated with reduced mental well-being whilst increased autonomy was a protective factor. Moreover, Brockett et al. (2024) noted that a negative retirement experience was inversely associated with well-being.

One primary challenge in the current body of well-being research Gwyther et al. (2024) acknowledge, is the variety of measures used, each capturing different constructs and facets of mental well-being – reflecting the broad and multi-dimensional nature of well-being. These inconsistencies in findings make it challenging to compare results across studies or draw robust conclusions about the true prevalence and associated factors to well-being in elite athletes. Nevertheless, addressing well-being remains a vital aspect of athlete mental health, offering a more holistic perspective that goes beyond symptom reduction. It allows for a more comprehensive and nuanced understanding of both risk and resilience, shifting the conversation from simply reducing distress to also enhancing positive functioning. For athletes navigating high-pressure environments, this dual focus may be key to both sustained performance and personal growth.

2.3 Perceived Organisational Support

Should elite athletes be considered employees or independent contractors? This is the central question in an ongoing legal dispute between HPSNZ and The Athletes Cooperative Incorporated (TAC); a union formed by elite rowers and cyclists seeking the right to engage in collective bargaining and effectively be treated as employees. While the court initially ruled in favour of TAC, this decision has since been appealed and overturned, with further legal proceedings ongoing (Johannsen, 2025).

This evolving legal landscape has important ramifications beyond employment classification. It raises broader questions about the responsibilities of sporting organisations to support athlete well-being, particularly in environments characterised by high pressure, injury risk, and public scrutiny. A framework that may help unpack this issue is Perceived Organisational Support (POS): the degree to which an employee perceives the organisation is concerned about their well-being and values their contributions (Eisenberger et al., 1986). In traditional workplaces, higher POS is linked to improved performance, lower burnout, and enhanced mental health outcomes (Dingens, 2022; Krishnan & Mary, 2012; Mackay et al., 2023, 2024; Tamimi et al., 2023).

Organisational Support Theory (OST) helps explain how and why this is the case. According to OST, when individuals believe their organisation values them and cares about their well-being, they are more likely to feel emotionally secure, committed, and motivated to contribute in return (Eisenberger et al., 1986). This relationship is based on the principle of social exchange, the idea that people tend to reciprocate the care and investment they receive (Eisenberger et al., 1986;

Krishnan & Mary, 2012). In sport, this means athletes who perceive strong support from their teammates, coach, or wider organisation may experience better mental well-being and stronger engagement in their performance environment.

2.3.1 High POS and Mental Health Link

Higher POS has been consistently linked to improved mental health and wellbeing outcomes. For instance, individuals who report higher POS tend to experience fewer symptoms of stress, anxiety and depression (Dingens, 2022; Krishnan & Mary, 2012; Tamimi et al., 2023) and have greater positive affect and life satisfaction (Panaccio & Vandenberghe, 2009; Roemer & Harris, 2018). Notably, these associations between POS and mental well-being appear to be partly explained through organisational commitment (Panaccio & Vandenberghe, 2009) and psychological capital: a multidimensional construct that encompasses self-efficacy, hope, resilience and optimism (Luthans et al., 2015; Roemer & Harris, 2018). Beyond mental health, improving POS has been linked to a boost in performance metrics, such as enhancing employees' in-role and extra-role performance, decreasing withdrawal behaviours like absenteeism, and increasing motivation (Eisenberger et al., 1986; Krishnan & Mary, 2012; Tamimi et al., 2023).

Supporting this link to mental health, a recent report from Fire and Emergency New Zealand (FENZ) found that POS received from all 3 levels (the organisation, managers, and co-workers) were associated with increased positive well-being and reduced mental ill-health issues in employees, even after accounting for potential exposures to traumatic events (Mackay et al., 2023). Increased POS from the organisation and managers was also associated with reduced maladaptive coping mechanisms like hazardous drinking and emotional numbing. While firefighters may not be considered elite athletes and their occupational stressors differ, both operate in high pressure environments where certain demands cannot be eliminated. For athletes, factors such as injury, performance expectations, and media scrutiny are an inherent part of the high-performance environment.

2.3.2 POS in the Sporting Context

Perceived Support from the Organisation

In terms of literature that links organisational support to enhanced mental health outcomes in elite athletes, the information is scarce. Much of the existing research on POS originates from traditional workplace settings. This is an issue, as although mentioned previously, there are

parallels that can be drawn between the sporting environment and other contexts, there are also distinct differences as it relates to POS. For instance, as we established earlier the whole organisation has reduced legal obligation towards athletes due to currently viewing them as a contractor vs. an employee. According to NZ law, this means that whilst the sporting organisation still must ensure that contractors (athletes) are not exposed to unnecessary risks while performing their work, the contractor (athlete) is effectively self-employed, meaning they are responsible for managing their own mental health while at work (Health and Safety at Work Act, 2015).

That being said, there are policies and resources that have been developed by the IOC to improve the mental health support delivered to athletes by sporting organisations and ensure a psychologically safe environment. For instance, the IOC states that organisations should have a mental health action plan and an emergency action plan – which include tasks like establishing mental health KPIs, confidential referral pathways, education and training for players and coaches, and career transition programmes (International Olympic Committee, 2024).

Perceived Support from Coaches and Support Staff

Beyond formal organisational structures, coaches, trainers, and physiotherapists play a critical role in shaping athletes' perceptions of support. While they do not necessarily occupy traditional managerial positions, their frequent and influential interactions with athletes place them in key positions to influence POS. Hence why the IOC (2021) highlights that individuals in these roles have a responsibility to foster psychological safety, reduce stigma, and facilitate help seeking by understanding referral pathways and recognising signs of mental distress. These responsibilities position coaches and support staff as important contributors to the overall supportive environment that surrounds the athlete.

Research supports the importance of these relationships, showing that flourishing athletes report significantly higher perceived support from people within the organisation compared to their languishing counterparts (Kuettel et al., 2021). The quality of leader-athlete interactions, known as leader-member exchange (LMX), has also been linked to both hedonic and eudaimonic well-being when those exchanges meet athletes' emotional needs rather than remaining purely task focused (R. Martin et al., 2023). Injury is another key area where physiotherapists and trainers can influence mental health, as injuries are a known risk factor for psychological distress in athletes (Beable et al., 2017; Gouttebarge et al., 2016; Gulliver et al., 2015; Yang et al., 2014). Providing support throughout the injury process and ensuring mental as well as physical

readiness in return to play protocols can help improve overall athlete well-being (International Olympic Committee, 2021).

Perceived Support from Teammates and Training Partners

Teammates and training partners also play a critical role in shaping the perceived support environment and mental health outcomes of athletes. A theoretical model proposed by C. C. Walton et al. (2024) highlights how teammates can actively foster psychological safety and reduce stigma by showing compassion toward vulnerable peers, modelling positive coping behaviours (e.g., prioritising sleep or help-seeking), and creating an inclusive environment. Empirical evidence also supports the protective role teammates play during periods of vulnerability, such as injury. With studies reporting reduced symptoms of depression and anxiety post-injury linked to elevated social support from teammates (Covassin et al., 2014; M. Sullivan et al., 2020).

Although studies using the POS framework to specifically measure teammate support remain limited, broader literature shows that positive peer relationships contribute meaningfully to athlete well-being. In collegiate athletes, greater teammate support was linked to enhanced mental well-being and reduced depressive symptoms during the pandemic, thought to be mediated by maintenance of athletic identity (Graupensperger et al., 2020). Similarly, perceptions of received support were associated with lower burnout and higher motivation (DeFreese & Smith, 2013). These findings mirror data from other high pressure environments, such as fire-fighting, where high POS from co-workers (a parallel to teammates) was linked to reduced mental ill-health and greater positive well-being (Mackay et al., 2023). Collectively, this evidence suggests that fostering strong, supportive peer relationships in sport environments may be a practical and underleveraged strategy to enhance athlete mental health and resilience.

2.3.3 Conclusion

While sporting organisations in New Zealand currently have limited legal obligations to support athlete mental well-being, several factors highlight the importance of further investigation. These include strong IOC policy directives around psychological safety, consistent evidence linking POS to mental health outcomes across workplace levels and increased organisational scrutiny following public mental health incidents (Dillane, 2022; RNZ, 2022). Furthermore, given that many stressors are unavoidable to elite support, much like how potentially traumatic events are unavoidable to FENZ personnel, enhancing POS could offer a more practical and modifiable

external strategy through which organisations and their members can support and promote athlete well-being.

2.4 Sleep Behaviour

Sleep occupies approximately one-third of the human lifespan, a significant proportion of time during which the body enters a state of temporary paralysis and sensory downregulation. From a survival perspective, this places individuals in a uniquely vulnerable position. Therefore, since we have not evolved mechanisms to reduce or eliminate the need for it over time, this indicates sleep must serve an essential and irreplaceable purpose.

Acute sleep-deprived individuals may experience cognitive impairments such as a slowed reaction time, impaired working memory, decreased attention span, and emotional dysregulation (Csipo et al., 2021; Shao et al., 2025; Tomaso et al., 2021). For instance, real-world data shows a 16% increase in reported road accidents on the day following daylight savings in New Zealand (Robb & Barnes, 2018). Beyond these immediate effects chronic sleep deprivation is associated with a range of physiological and psychological consequences, including an increased likelihood of developing mental health disorders (P. M. Gardiner et al., 2022; Seow et al., 2020; Zhang, He, et al., 2024), a cardiovascular disease (S. Wang et al., 2022), metabolic disorders (Che et al., 2021), cancer (Shi et al., 2020), and impaired immune function (Garbarino et al., 2021).

Sleep progresses through four distinct stages, three of which are characterised by lower levels of brain activity and referred to as non-REM sleep (Patel et al., 2025). Stage 1 marks the transition from wakefulness to sleep, while during stage 2 the body continues to relax through a noticeable drop in body temperature and heart rate (Patel et al., 2025). Stage 3, or deep sleep, is important for physical restoration, such as muscle repair, tissue growth and immune system strengthening (Shakankiry, 2011). Additionally, during this stage of sleep the glymphatic system is upregulated by almost 2-fold, this anti-inflammatory process removes waste products from the brain like beta-amyloid and tau which are implicated in Alzheimer's disease (Reddy & van der Werf, 2020). The fourth stage, REM sleep, also known as dream sleep, is important for emotional processing, memory consolidation, and brain development (Knoop et al., 2021; Tempesta et al., 2018; Zhang, Pena, et al., 2024). A typical night's sleep will cycle through these stages approximately every 90 minutes with deep sleep dominating the first half of the night and REM sleep occurring more frequently in the latter half (Patel et al., 2025).

Given the important evolutionary role of sleep, the severe consequences of sleep-deprivation and the essential physiological processes that it supports, one would assume that most individuals, especially athletes, would prioritise getting the recommended amount of sleep. However, evidence suggests otherwise.

2.4.1 Epidemiology

A recent global study that used pressure sensors underneath beds to objectively measure sleep duration discovered that almost a third of people (31%) do not achieve 7-9 hours of sleep, the recommended hours of sleep for people aged between 18 to 64 (Hirshkowitz et al., 2015; Ministry of Health, 2024c; H. Scott et al., 2024). Notably, this statistic is inflated to 38–57% in self-reported global data (Tan, 2024), despite consistent evidence that people tend to overestimate the amount of sleep they get by about 30 to 60 minutes on average (Korman et al., 2024; Lauderdale et al., 2008). Moreover, a national New Zealand study by Lee and Sibley (2019), using self-reported data, revealed New Zealanders sleep duration is comparable to global patterns, with 41.5% of respondents reporting suboptimal sleep (37% < 7 hours and 4.5% >9 hours).

Sleep quality refers to the subjective and objective assessment of how well a person sleeps, encompassing factors such as sleep efficiency, ease of falling and staying asleep, daytime sleepiness and how refreshed one feels upon waking up (Nelson et al., 2022). Numerous foreign studies found that 19% – 38.2% of the general population report having poor sleep quality, indicated by scoring > 5 on the Pittsburgh Sleep Quality Index (P. Chen et al., 2024; Hinz et al., 2017; Madrid-Valero et al., 2017). This issue is further elevated given (Matricciani et al., 2017) identified indicators like increased prescription of sleep medication, that suggest sleep quality may be declining. Whereas evidence on whether sleep duration has declined over time remains inconclusive, with varying trends reported across different countries (Kohyama, 2021).

2.4.2 Link to Mental Health

The association between poor sleep and an increased risk of mental health disorders is well-documented (P. M. Gardiner et al., 2022; Seow et al., 2020; Zhang, He, et al., 2024). Furthermore, a large meta-analysis undertaken by (A. J. Scott et al., 2021) combined the results of 65 randomised controlled trials and found that improving sleep quality led to significant improvements in mental health, including reductions in symptoms of depression (effect size: -0.63), anxiety (effect size: -0.51), and stress (effect size: -0.42), highlighting a causal relationship. The authors

also reported a dose-response relationship, indicating that greater improvements in sleep quality corresponded with greater mental health benefits.

Moreover, sleep problems are frequently recognised as prevalent symptoms in mental health disorders such as Major Depressive Disorder (MDD) and anxiety disorders (American Psychiatric Association, 2022). Individuals with these conditions frequently report difficulties with falling asleep, staying asleep, poor sleep quality, nightmares, excessive daytime sleepiness, and restless or fragmented sleep (American Psychiatric Association, 2022; Staner, 2003). Therefore, this evidence supports a bidirectional relationship between mental health and sleep, with depression and anxiety both contributing to and resulting from disrupted sleep patterns.

Moreover, sleep quality plays a pivotal role in promoting positive well-being. Better sleep quality has been associated with improved emotional stability and overall life satisfaction (Lee & Sibley, 2019; Su & He, 2023). And similarly, improved self-reported sleep duration correlated with enhanced self-esteem and personal well-being (Lee & Sibley, 2019).

2.4.3 Sleep Hygiene Behaviours

Sleep hygiene behaviours refer to practices and habits that promote healthy sleep quality and quantity by establishing an environment and routines conducive to better sleep (LeBourgeois et al., 2005; J. Li et al., 2016). While there is general agreement that modifiable behaviours can significantly influence sleep outcomes (Irish et al., 2015; J. Li et al., 2016), even more than medical or environmental interventions (P. M. Gardiner et al., 2022) there is little consensus on which behaviours are more important for maintaining healthy sleep patterns.

Advantageous sleep hygiene behaviours that are thought to improve different components of healthy sleep like reducing sleep latency, increasing total sleep time, and decreasing excessive waking after falling asleep include: maintaining a consistent sleep and wake schedule, napping earlier in the afternoon and no longer than 90 minutes, reducing intake of caffeine and other stimulants, and reducing technology use before bed (AlShareef, 2022; Irish et al., 2015). Regular exercise also promotes healthy sleep (Kubitz et al., 1996), however it is still undetermined whether acute late-night exercise aids or impairs the onset of sleep (Irish et al., 2015).

2.4.4 Sleep in Athletes

Given that elite athletes tend to face elevated physical demands of training and competing compared to the general population and that evidence shows sleep plays a pivotal role in

optimising mental and physical performance, such as faster sprint and reaction times, improved decision making and enhanced recovery (Fry & Rehman, 2023; Kutscher, 2019) – it would be expected that athletes prioritise sleep and adopt positive habits and behaviours to protect their sleep quality and extend their sleep duration.

However, the literature contradicts this assumption. For example, two studies on collegiate athletes found that 38% and 50% of participants, respectively, reported getting fewer than the recommended 7 hours of sleep per night on average (Kutscher, 2019; Reardon et al., 2019). Suggesting athletes may achieve similar, if not slightly less, sleep than the general population. Furthermore, sleep quality in athletes appears to be worse compared to the general population too. Among collegiate athletes, 42% reported poor sleep quality, as measured by the PSQI (Kutscher, 2019). Alarmingly, a study of Olympic athletes reported an even higher prevalence, with 52% experiencing poor sleep quality (Halson et al., 2021).

Walsh and colleagues (2020) rationalise that these poorer sleep outcomes in athletes can be attributed to sport-specific constraints, such as the timing of training sessions and competitions, travel demands, and pre-competition anxiety. Some factors are highly modifiable and within the athlete's control, such as caffeine consumption and technology use, whereas others such as training schedules, travel, and the timing of competitions, are less directly modifiable.

These sport-specific sleep constraints can dramatically impair sleep. For example, elite swimmers, who frequently train early in the morning, averaged 1.7 hours less sleep on nights before training versus rest days (Sargent et al., 2014). Similarly, Australian Football League (AFL) players recorded 2.5 hours less sleep on competition nights compared to non-competition nights (Sargent et al., 2022). Collegiate athletes also reported their poorest sleep prior to competition, likely due to pre-competition stress or anxiety (Reardon et al., 2019). These findings illustrate that training, and competition can significantly disrupt athletes' sleep patterns.

These sleep challenges identified for elite athletes are particularly concerning in relation to their mental health given the causal relationship that exists between poor sleep and increased risk of mental health disorders, as well as poor sleep being correlated with decrements in different components of well-being like life-satisfaction and self-esteem. The increased mental health risk is further compounded by the strong correlation poor sleep has with decrements in athletic performance and injury risk (Hatia et al., 2024; Milewski et al., 2014), two other major risk factors for poor athlete mental health (Beable et al., 2017; Gulliver et al., 2015; Purcell et al., 2020; S. M. Rice et al., 2016).

Overall, the current literature signifies sleep quality and quantity as important issues within the elite athlete population worth investigating further. Additionally, the lack of data on New Zealand athletes, particularly regarding their sleep patterns, hygiene behaviours, and associated mental health outcomes, highlights the need for further research. Such research would provide critical insights into the sleep-mental health landscape of New Zealand's athletes, enabling the development of targeted interventions to support their well-being and performance.

2.5 Technology Behaviour

The first programmable electronic computer, ENIAC, occupied an entire room and was capable of completing up to 5,000 operations per second (Frieberger & Swaine, 2025). In contrast, the latest iPhone 16 can achieve 35 trillion operations per second (D. Martin, 2024), has additional features such as calling, a high-resolution camera, GPS navigation, and music – which all fits in our back pocket. Wireless connectivity now allows real-time video chats across the globe and instant sharing of photos and videos, while advancements in artificial intelligence have revolutionised access to information and productivity. The pace of technological innovation in the last decade has been extraordinary, and the advancement in the next decade is almost unimaginable. Yet this rapid innovation prompts critical reflection: have these advancements come with certain trade-offs to our mental health?

2.5.1 Epidemiology

According to global data analysed by Kemp (2024) a typical person currently spends approximately 6 hours and 40 minutes per day on the internet, with 2 hours and 23 minutes attributed to social media use. Meanwhile, Howarth (2024) reports a 13% (49-minute) increase in daily screen time from 2013-2024. However, these overall figures mask higher usage among younger individuals, with people under 30 years old reporting significantly greater time spent on social media platforms (Auxier & Anderson, 2021).

When comparing New Zealand to global trends in technology use, an Internet NZ report by Matika and Pita (2023) found that 27% of participants on average used the internet for personal purposes for over 5 hours per day. Meanwhile, 63% reported daily usage between 2 to 5 hours, and 10% used the internet for less than 2 hours per day. Social media consumption accounted for 48% of total internet use among the study's population. However, this proportion rose to 62% among younger individuals aged 18 to 29, mirroring global findings of increased social media consumption by the youth (Auxier & Anderson, 2021).

Notably, Matika and Pita (2023) reported a decline in the daily use of key social media platforms like Facebook and Instagram over the past year, suggesting a potential return to pre-pandemic usage levels. Gaming also featured prominently in New Zealand's digital activities, comprising 16% of total technology use. This activity was more prevalent among males (20%) compared to females (12%) and was most common among younger age groups, with 18 to 29-year-olds spending 22% of their time on average gaming (Matika & Pita, 2023). Additionally, an OECD (2021) report highlighted that youth in New Zealand spent on average, 7 hours more per week using digital devices at home and school than the weekly average of 35 hours for countries within the OECD. Indicating that technology use in New Zealand, particularly among younger populations, is exceeding global averages.

2.5.2 Link to Mental Health

Numerous studies indicate that the relationship between time spent on technology and adverse mental health outcomes follows a non-linear pattern, often referred to as the ‘goldilocks effect’, where both minimal and excessive use are linked to poorer mental health outcomes (Di Cara et al., 2022; Przybylski & Weinstein, 2017; Twenge, 2020; Twenge et al., 2018; Twenge & Campbell, 2019). However, several moderating factors are thought to influence this relationship. One such factor is the distinction between active and passive technology use; individuals who primarily engage in passive consumption such as scrolling or observing content but not interacting with others tend to exhibit worse mental health outcomes compared to those who use technology for social interaction and connection (Verduyn et al., 2021). The type of technology used also produces varying effects; for example, online gaming has shown a wider optimal engagement window of approximately 1-2 hours compared to smartphone use which tends to have a beneficial range of approximately 30 minutes to 1 hour (Przybylski & Weinstein, 2017).

In terms of technology’s association with specific well-being measures, research suggests that technology use has stronger effects on short-term hedonic markers (e.g., mood and affect) compared to long-term measures of eudaimonic well-being (e.g., life satisfaction) (Dienlin & Johannes, 2020). Similarly to poor mental health, procrastination and passive use of technology has been shown to have a greater negative relationship with well-being outcomes compared to more social and active use (Dienlin & Johannes, 2020).

2.5.3 Technology Use in Athletes

Current research on the direct link between technology use and elite athletes' mental health remains limited. However, a study conducted on adolescent athletes by Fiedler et al. (2023) suggest that athletic performance level may moderate the relationship between social media use and mental health indicators, reporting that higher-performing athletes experience a weaker or in some cases inverse association between social media use and stress.

Despite the limited data on the direct link between elite athlete mental health and technology use, many studies have linked types of technology use, specifically social media use, to significant risk factors for elite athlete mental health. For instance, increased nighttime social media use has been associated with reduced sleep quality and duration (Fiedler et al., 2023; Garett et al., 2018). An issue particularly relevant to the elite athletic population since research reveals that athletes were engaging with social media an hour before sleep on approximately 70% of the nights studied (Merrill & Faustin, 2023). Given that poor sleep is consistently associated with poor mental health outcomes, such as increased anxiety and depression (Dmitrzak-Weglarz & Reszka, 2018; Reardon et al., 2019), it is plausible that social media use impacts athletes' mental health via diminished sleep quality and quantity. Furthermore, suboptimal sleep is linked to decreased athletic performance and increased injury risk – both key factors associated with poor mental health outcomes in athletes (Andrade et al., 2018; Beable et al., 2017; Purcell et al., 2020; Reardon et al., 2019).

Independent of sleep, studies show that social media use before competition or training can impair attention, executive function, concentration, and memory (DesClouds & Durand-Bush, 2021; Fortes et al., 2023; Nédélec et al., 2018). These are all crucial aspects of sports performance, and thus these cognitive disruptions may cause performance decrements placing the athlete at a greater risk of having a mental health disorder.

Additionally, higher daily social media use could also be associated with additional stress and body image issues that are linked to eating disorders, independent of sporting pressures (Stoyel et al., 2021). Due to their elevated status, athletes are also more exposed to heightened criticism and negative comments from fans if they spend more time on social media. And this commentary of their performance can contribute to increased stress, anxiety, mental fatigue and cognitive load (Faustin et al., 2022; Merrill & Faustin, 2023; Nédélec et al., 2018). Likewise, they may feel more pressured to perform and feel like they have increased expectations (DesClouds & Durand-Bush, 2021; Merrill & Faustin, 2023; Nédélec et al., 2018).

While there are evident risks associated with social media use, the platform also provides tangible benefits for athletes. It offers financial opportunities through sponsorships, enhances team cohesion, and provides a means to stay connected with family and friends while traveling. Conversely, these factors can mitigate certain mental health risks, such as loneliness and financial instability (International Olympic Committee, 2021).

Therefore, while excessive technology use is linked to risk factors for athletes' mental health, such as compromised sleep and performance (DesClouds & Durand-Bush, 2021; Fiedler et al., 2023; Fortes et al., 2023; Nédélec et al., 2018), its impact seems to be dependent on individual use patterns. Social media, in particular, has the potential to either support or hinder athletes' mental health based on the way it is used.

2.6 Nutritional Behaviour

Would our ancestors recognise the food we consume today – or perhaps a better question is, do we recognise the food we consume? Emulsifiers, stabilisers, and colourings are some of the common additives in food products; designed to improve texture, taste, appearance and shelf-life. These additives are often engineered in laboratories though and undergo extensive processing, significantly altering them from their original, natural state (Kallscheuer, 2018). Since the Industrial Revolution, ultra-processed food (UPF) and sugar consumption has surged (Cole & Hopkins, 2019; Huebbe & Rimbach, 2020) and there is now a breadth of research to suggest UPF and high-sugar consumption are strongly linked to adverse health outcomes such as obesity, cardiovascular diseases, metabolic syndrome, and various types of cancers (X. Chen et al., 2020; Debras, Chazelas, Sellem, et al., 2022; Debras, Chazelas, Srour, et al., 2022; K. A. Higgins & Mattes, 2019).

Yet, consumption of these products remains high (Juul et al., 2022; Lane et al., 2024; J. Walton et al., 2023; L. Wang et al., 2021) likely due to their addictive qualities and enhanced accessibility. Research proposes that the high palatability, high-sugar content and low satiability of UPFs are key mechanisms behind persistent cravings and making them difficult to resist (Gillespie et al., 2023; Lane et al., 2024). Moreover, the rise of fast-food chains and on-demand delivery services like Uber Eats, mean UPFs are often one click away. A 2013 New Zealand study, found that 23% of participants had consumed fast food within the previous 24 hours (C. Smith et al., 2013), illustrating the high prevalence of fast-food consumption, even before Uber Eats and other similar services existed. Now Uber Eats is… reinforcing the increased widespread availability of fast-food.

Although elite athletes are often regarded as some of the most disciplined individuals, they are not exempt from experiencing pressures that lead to food cravings and poor dietary choices either (Gao & Wang, 2024). The psychological and physical stress from rigorous training, competition, and strict weight management protocols, Lundstrom et al. (2024), notes can trigger food cravings and cause lapses in dietary adherence.

2.6.1 Epidemiology

Kibblewhite (2016) estimated that the median free sugar intake for New Zealand adults was 57g/day (95% CI = 55-59g/day), representing 11.1% of total dietary energy in 2008/2009. Due to the lack of recent local data, it is unclear whether the intake is above or below the recommended thresholds of 5% or 10% of total energy, as outlined by NHS and WHO guidelines, respectively (NHS, 2023; WHO, 2015). Regardless, an increased consumption of free sugar has likely been slowed by the increase in consumption of sugar alternatives globally, such as low-calorie artificial sweeteners, which grew by 5.1% annually from 2008 to 2015 (Sylvetsky & Rother, 2016).

This trend aligns with a global shift towards ultra-processed foods in both sales and consumption, although substantial variability exists between countries and regions (Juul et al., 2022; Lane et al., 2024; L. Wang et al., 2021). In high-income countries though, Lane and colleagues (2024) report UPFs contribute between 42% (Australia) to 58% (United States) of a person's total dietary energy. Moreover, findings from L. Wang et al. (2021) and Juul et al. (2022) report an upwards trend in consumption of UPF's amongst the US population, with reported increases of 5.6% between 1999/2000 – 2017/2018 in youth and 4.5% between 2001/2002 – 2017/2018 in adults, respectively.

Lifetime prevalence of eating disorders in New Zealand were estimated to be between 1.5 - 2.1% (EDGI, n.d.). Although a recent Ministry of Health report states these statistics are outdated and the current prevalence has likely increased significantly, based on global trends (Ministry of Health, 2024a). Notably, food addiction, which is not classified as a disorder, but is another indicator of problematic eating behaviour (Kalon et al., 2016) is also showing increased global prevalence (Praxedes et al., 2022).

2.6.2 Link to Mental Health

There are well-established links between diet and mental health. For example, a significant association has been reported in multiple studies between high-sugar diets and major depression

or depressive symptoms (Knüppel et al., 2017; Westover & Marangell, 2002). This link is reinforced through two other studies that reported a proportional relationship between volume of sugar-sweetened beverages and depressive symptoms (Hu et al., 2019; Yu et al., 2015). Despite these findings, Gillespie et al. (2023) argue the relationship between sugar and mental health still remains unclear due to confounding variables, subjectivity, and potential malingering in mental health research.

82% of studies reported positive effects when broad-spectrum micronutrients were used to treat symptoms of depression, stress, and anxiety (Blampied et al., 2020). Highlighting that the addition of micronutrients in our diet has shown promise in improving mental health outcomes. Conversely, the addition of UPFs into our diet was associated with decrements in mental health outcomes, such as an increased risk of anxiety, depression, and adverse sleep related outcomes (Lane et al., 2022, 2024; Mazloomi et al., 2023). After adjusting for socioeconomic factors and health-related factors, consumption of UPFs was still strongly associated with psychological distress (Lane et al., 2023). Although in a systematic review, Mazloomi et al., (2023) found no significant link between consumption of UPFs and anxiety.

Irrespective of diet quality, a 2021 study found that participants who experienced unusually high anxiety and stress had an increased likelihood of expressing binge eating tendencies (Lim et al., 2021). Furthermore, food addiction which is a related but distinct behaviour to binge eating, was found to be significantly correlated with depression and anxiety, mean r = 0.459 (%CI = 0.358-0.550), r = 0.483 (%CI = 0.228-0.676), respectively (Burrows et al., 2018; Skinner et al., 2021), whilst also being associated with a poorer quality of life and self-esteem (Skinner et al., 2021). Which suggests that binge eating, and food addiction are clear behavioural risk factors for poor mental health outcomes and diminished mental well-being.

2.6.3 Nutritional Behaviour in Athletes

Understanding the link between mental health and diet quality or food-related behaviours is particularly relevant to elite athletes. For instance, similar to findings in the general population, Gao & Wang (2024) highlighted athletes with poor diet quality displayed elevated symptoms of both anxiety ($\beta = -0.060$, $p = 0.001$), and depression ($\beta = -0.076$, $p = 0.001$), which were mediated by sleep quality.

Moreover, a prevalent concern for athletes is relative energy deficiency in sport (RED-S). A condition arising from prolonged or severe imbalances between caloric intake relative to energy

expenditure (Pensgaard et al., 2023). Elite athletes face a heightened risk to RED-S, due to the elevated caloric demands needed to replenish energy from intensive trainings and competitions; coupled with strict diets and prolonged caloric restriction practices commonly used in high-performance environments, where maintaining or achieving a certain weight or composition offers a significant performance advantage, such as light-weight rowing or combat sports (Barker et al., 2025; Kim & Kim, 2020).

RED-S is associated with significant physiological consequences such as impairments in bone health, metabolic rate, menstrual function, immunity, protein synthesis, and cardiovascular health (Briggs et al., 2020). But studies show RED-S also being linked to athlete-specific mental health risk factors such as performance decrements and increased injury risk (Briggs et al., 2020). Research notes these factors on top of the physiological consequences may contribute to elevated anxiety and depressive symptoms (Briggs et al., 2020; Pensgaard et al., 2023).

However, evidence investigating whether anxiety and depressive symptoms are linked to problematic eating behaviours, like binge eating or food addiction, in athletes is limited (Barker et al., 2025). With the true prevalence of these behaviours in athletes also being currently unclear, given the inconsistency in findings from the limited research available. For instance, Hauck et al. (2020), reported a prevalence of 6.2% for food addiction in amateur endurance athletes. While a study on retired elite athletes found that 40.6% of participants met the criteria for food addiction (Kalkan, 2021). These uncertainties warrant the need for further research to determine the extent of food addiction and cravings among athletes and its connection to mental health outcomes.

2.7 Alcohol Behaviour

Alcohol consumption is deeply embedded in global culture through social, religious, and celebratory traditions. Archaeological evidence traces human alcohol use back to approximately 7000 BCE (Phillips, 2014). Over time, the social context and meaning of alcohol use has evolved, including within sport. For example, in the early 1900s, Tour de France cyclists consumed wine and beer during races, under the mistaken belief it enhanced performance (Trofa, 2024). This practice has since been abandoned as advancements in sports science demonstrated that alcohol significantly impairs athletic performance rather than improves it (L. D. Vella & Cameron-Smith, 2010). Nevertheless, alcohol remains intertwined with many sporting traditions such as post-competition drinks and celebratory rituals. These practices reflect the enduring cultural ties between alcohol and athletic communities.

2.7.1 Epidemiology and Demographic Patterns

In New Zealand, risky alcohol use in the general population has declined from 20.4% to 16.6% between 2018 and 2024, according to a recent report from the Ministry of Health (2024b). Among 18–24-year-olds, a demographic representing a substantial proportion of elite athletes, hazardous drinking remains the most prevalent (22.6%), but this group also experienced the largest decrease over the past five years (from 35.8%). The decline in prevalence rates is a promising trend and may indicate a shift in societal norms such as the increased availability of alternative non-alcoholic options or a reduced social pressure to drink. Additionally, this study also noted that men report higher rates of hazardous drinking than women (22.2% vs 11.2%), with men twice as likely to engage in risky alcohol use once age is adjusted for.

2.7.2 Links to Mental Health

Substantial evidence points to a strong, likely bidirectional, association between hazardous alcohol use and mental health disorders, such as anxiety and depression (J. Li et al., 2020; Puddephatt et al., 2022). Whereby alcohol could exacerbate mental health conditions, while underlying psychological distress may increase reliance on alcohol as a coping mechanism (de Boer et al., 2021; Mathew et al., 2011; Puddephatt et al., 2022). For example, Li et al. (2020) found that individuals with an alcohol use disorder had a 1.57 times increased likelihood (95% CI: 1.41-1.76) of developing depressive symptoms. While Puddephatt et al. (2022) reported individuals with a common mental health disorder had a twofold increase in the odds of reporting an alcohol use disorder (OR= 2.02, 95% CI = 1.72-2.36).

2.7.3 Athletes and Alcohol Use

According to the IOC, risky alcohol use, considered within the broader context of hazardous substance use, remains a prevalent issue in high-performance sporting environments, affected by factors such as: timing of the season, type of sport, level of competition, age, country, gender, ethnicity, sexual orientation, and motivations for use (Reardon et al., 2019). Team sport athletes, in particular, appear to be at a heightened risk of problematic alcohol behaviour compared to their counterparts in individual sports (Reardon et al., 2019). Furthermore, studies from the United States indicate that collegiate athletes participating in sports such as lacrosse, ice hockey, baseball, swimming, and wrestling report higher rates of binge drinking compared to non-athletes.

Whilst among female athletes, binge drinking behaviours are more prevalent in ice hockey, lacrosse, and swimming (Reardon et al., 2019).

Australasian studies suggest this issue is especially concerning among elite rugby players. Since adverse alcohol use in professional rugby reportedly spans 8–21% internationally (Reardon et al., 2019), but ranges from 62.8% to 68.6% in Australian rugby league (Du Preez et al., 2017), and 51.4% among New Zealand Super Rugby players (Dorfling & Fulcher, 2024). Albeit, there is some methodological variance between studies, these high prevalence rates are concerning given the previously established link between risky alcohol use and adverse mental health outcomes (J. Li et al., 2020; Puddephatt et al., 2022), and its additional negative impact on sleep (C. Gardiner et al., 2025), injury risk (Zeisser et al., 2013), recovery, and athletic performance (L. D. Vella & Cameron-Smith, 2010) – all of which may further exacerbate mental health outcomes in this population.

2.7.4 Conclusion

Risky alcohol consumption remains prevalent in elite sport, particularly in team-based environments. The complex, bidirectional relationship between alcohol use and mental health, compounded by factors such as disrupted sleep, impaired recovery, and increased injury risk, highlights the importance of addressing alcohol behaviours to support athlete mental health.

2.8 Summary

This literature review outlines the escalating burden of mental health challenges among youth populations globally and within Aotearoa New Zealand, positioning elite athletes as a population of particular concern given their demographic profile and that evidence indicates elite athletes experience comparable levels of mental health issues compared to the general population. Furthermore, emerging research has identified a range of modifiable behavioural risk factors that are highly relevant to athlete mental health, including poor sleep hygiene, binge drinking, food-related issues, and excessive screen time. These behaviours not only increase risk for depression and anxiety, but also have been found to compromise recovery, motivation, and performance.

Beyond individual behaviours, the literature also emphasises POS as an important external factor associated with athlete mental health outcomes. While much of the POS research originates from traditional workplaces, parallels in high-performance sport environments suggest that athletes' perceptions of support from different people in their organisation (e.g., coach, and/or teammates)

are linked to both mental ill-health and mental well-being outcomes. Importantly, this chapter also highlights the conceptual shift from a deficit-based focus to one that also incorporates mental well-being (e.g., the Dual Continuum Model). Together, the literature reviewed provides a robust rationale for investigating both internal (behavioural) and external (organisational) associations on mental health and well-being in New Zealand's elite athlete population.

Preface to Manuscripts

This thesis is presented in a manuscript format and comprises two related studies that draw on the same dataset of New Zealand athletes. Both manuscripts aim to investigate factors associated with athlete mental health, using the dual continuum model as a guiding framework. While they share a common methodological foundation and participant pool, each manuscript addresses a distinct focus area to allow for a more detailed and structured analysis.

This manuscript examines the associations between modifiable behavioural factors (including sleep hygiene, alcohol use, food addiction symptoms, and screen time) and mental health outcomes (depression, anxiety, psychological strain, and flourishing). The subsequent manuscript explores the role of POS at multiple levels (organisation, coach/staff, and teammates/training partners) in relation to the same mental health outcomes.

Although derived from the same survey data, the manuscripts are separated to ensure clarity, maintain thematic focus, and allow for more targeted discussion of both behavioural and structural influences on athlete mental health. Additionally, due to incomplete survey responses, there is a slight variation in sample size between the two studies. The first manuscript includes data from 109 athletes, while the second includes 104 athletes, as five participants did not complete any of the POS-related items.

Chapter 3: Exploring behavioural factors associated with New Zealand athlete mental health.

Overview

Introduction: This study investigated how modifiable behavioural factors, specifically sleep hygiene behaviours, food addiction, screen time, and binge drinking, are associated with mental health outcomes in New Zealand athletes. Guided by the dual continuum model of mental health, the study aimed to explore how these internal behaviours are linked to both mental ill-health (depression, anxiety, psychological strain) and mental well-being (flourishing).

Methods: A cross-sectional online survey was completed by 109 athletes across New Zealand. Participants reported on their mental health and behavioural patterns using primarily validated measures. Logistic regression analyses (both adjusted and unadjusted) were conducted to examine associations between behavioural variables and mental health outcomes, with the adjusted models controlling for age, gender, sport type, and recent injury status.

Results: Poor sleep hygiene was strongly associated with increased odds of depression (OR = 25.67) and anxiety (OR = 19.82). Weekly binge drinking significantly reduced odds of flourishing (OR = 0.03). Trends also indicated a possible link between food addiction and worse mental health, particularly anxiety and psychological strain, though statistical significance was not reached. Screen time showed little to no association with any mental health outcome.

Conclusion: Sleep and alcohol-related behaviours emerged as strong predictors of athlete mental health, with food addiction also showing potential relevance. In particular, the robust association between poor sleep hygiene and adverse mental health outcomes highlights the importance of athletes prioritising sleep as a modifiable behaviour, while also encouraging sporting organisations to support this through practical systemic strategies that make quality rest more attainable.

Introduction

How well do we really understand the mental health of elite athletes and the factors that shape it? In recent years, mental health has become an increasingly prominent focus within elite sport. High-profile athlete cases, combined with growing empirical evidence, have highlighted that elite athletes are not immune to psychological distress. Despite the common perception that these athletes exemplify peak physical and mental resilience, research demonstrates many experience mental health challenges. Symptoms of anxiety, depression, and psychological distress occur at rates that mirror, or in some cases slightly exceed, those observed in the general population (Gouttebarge et al., 2021; Reardon et al., 2019).

Research from Australia and New Zealand reflects similar patterns too. Australasian elite athletes report rates of moderate to severe anxiety that closely match the general population (10.1-14.6% vs 12.2%, respectively) (Du Preez et al., 2017; Gulliver et al., 2015; McEvoy et al., 2011), and in some cases, slightly lower rates of moderate to severe depressive symptoms (10.1-12.6% vs 17.5%, respectively) (Du Preez et al., 2017; Farrer et al., 2016). Psychological distress, however, appears to be slightly higher in athletes overall, though this difference is considerably reduced when compared to people in a similar age bracket (17.7% vs 15.8%, respectively) (Enticott et al., 2022; Purcell et al., 2020). These findings suggest that while elite athletes are not necessarily at greater risk across the board, they face unique pressures that may increase vulnerability in specific areas.

Beyond mental illness, Keyes (2002) has proposed a dual continuum framework to provide a more comprehensive understanding of mental health, highlighting that there are two interrelated yet distinct dimensions: mental illness (e.g., depression and anxiety) and mental well-being (e.g., emotional, psychological, and social flourishing). This framework challenges the traditional view that the absence of mental illness equates to good mental health, emphasising instead that someone may be free from clinical symptoms but still lack positive functioning, or vice versa (C. L. Keyes, 2002). Yet less research has focused on positive mental health outcomes in athletes such as positive affect, well-being and life satisfaction. While studies using frameworks like the Dual Continuum Model remain limited, particularly with Australasian athletes, Kuettel et al. (2021) reported Danish elite athletes achieved similar well-being scores (measured via MHC-SF) compared to the general population (Koushede et al., 2019).

Known Risk and Protective Factors

A growing body of research has identified a range of risk factors associated with poor mental health outcomes across Australasian elite athletes. Including demographic factors such as being under 25, being female, contemplating retirement, competing in individual rather than team sports, receiving inadequate social support, or suffering a recent injury (Beable et al., 2017; Gulliver et al., 2015; Purcell et al., 2020). Whereas studies from other parts of the world have also highlighted inexperience, lower competition level and poor athletic performance as additional factors associated with mental health disorders (Guillén & Sánchez, 2009; Halvari & Gjesme, 1995; Junge & Prinz, 2019; Turner & Raglin, 1996). Additionally, being female and increased workload (time spent at school, work and/or training) were both linked to worse mental well-being outcomes for elite athletes (Kuettel et al., 2021). These findings suggest that some athletes may be more exposed to mental health challenges based on their circumstances within the sporting environment.

More recently, attention has turned toward modifiable behavioural factors that may influence mental health in athletes. Poor sleep hygiene has been linked to heightened stress and anxiety, largely through its negative impact on sleep quality (Ali et al., 2023; Chehri et al., 2016; P. M. Gardiner et al., 2022; Seow et al., 2020; Zhang, He, et al., 2024). Technology use, particularly excessive or compulsive engagement with social media or gaming, has also emerged as a potential risk factor, with studies proposing sleep disruption, social comparison, and reduced real-world social connections as key contributing factors (Di Cara et al., 2022; Orben et al., 2024; Przybylski & Weinstein, 2017; Twenge, 2020; Twenge et al., 2018; Twenge & Campbell, 2019). Nutritional behaviours, such as food addiction or poor diet quality, have also been tied to increased symptoms of depression and anxiety across both athlete and general populations (Blampied et al., 2020; Gao & Wang, 2024; Knüppel et al., 2017; Lane et al., 2022). Similarly, harmful alcohol use has been associated with elevated risk of mental ill-health in broader community samples (J. Li et al., 2020; Puddephatt et al., 2022).

Rationale and Study Aim

Although research on elite athlete mental health has grown in recent years, several important gaps remain, particularly within the New Zealand and broader Australasian context. Most existing studies tend to focus primarily on symptoms of mental illness such as anxiety, depression, or psychological distress, with comparatively little attention given to the factors that support mental

well-being or flourishing. This narrow focus has limited our understanding of how athletes are functioning beyond the absence of clinical symptoms, and what behaviours are uniquely associated with promoting or impairing their mental well-being.

Furthermore, while there is growing international interest in modifiable behavioural factors, such as sleep hygiene, technology use, nutrition, and alcohol consumption (Reardon et al., 2019; S. M. Rice et al., 2016, 2019), most studies have examined these in isolation and focused only on negative outcomes. Few have taken an integrated approach to explore how these behaviours may cluster and interact (Gao & Wang, 2024) or whether they relate differently to both positive mental well-being and negative mental ill-health outcomes. For example, it remains unclear whether behaviours like poor sleep hygiene are more strongly associated with increased odds of anxiety compared to languishing, or whether screen time plays a unique role in mental health outcomes when behaviours like sleep hygiene and others are accounted for.

This study aims to address these gaps by exploring the associations between modifiable behavioural risk factors (e.g., sleep hygiene, technology use, food addiction, and alcohol use) and both mental illness (anxiety, depression, psychological strain) and mental well-being (flourishing) in a sample of elite New Zealand athletes. It also seeks to describe the prevalence of both mental health outcomes and behavioural risks, contributing to a more complete and practical understanding of athlete mental health in high-performance sport.

Methods

This cross-sectional study explored the relationship between behavioural characteristics (e.g., social media and gaming use, food addiction, alcohol use, and sleep habits) and mental health outcomes (depression, anxiety, sport-related psychological strain, and well-being). Data were collected through an anonymous online survey hosted on Qualtrics. The survey was open for 17 weeks, from January 20th 2025 to May 18th 2025, and participation was incentivised with an optional prize draw.

Participants

This study was originally designed to investigate mental health and well-being in elite athletes; however, recruitment challenges led to a broadening of the inclusion criteria to encompass individual sport athletes and those competing at lower levels (e.g., regional or recreational). Eligible participants were athletes based in New Zealand, aged 18 years or older, who had

competed in their sport in the past year. Age was collected in predefined bands to protect anonymity, with the most common groups being 20–24 years (32.1%) and ≥40 years (19.3%). They were recruited through digital and print advertisements shared via a social media post. A total of 163 responses were recorded in Qualtrics, of which 109 were included in the final analysis, data cleaning led to the removal of incomplete submissions and those who did not meet eligibility criteria. Completion rate was 66.9%, calculated as the proportion of participants who completed at least one of the behavioural scales. Participants competed in a total of 10 different sports, including: athletics, cricket, CrossFit, cycling, field hockey, netball, rowing, rugby union, triathlon, and ultimate frisbee.

Variables and Measures

Behavioural characteristics were measured using a variety of validated tools, with the exception of the CRAVED questionnaire, which, while not yet formally validated, is theoretically grounded in ICD-10 criteria for substance use disorders (Unwin et al., 2022). Participants reported their average daily time on social media and gaming platforms using multiple-choice time brackets, starting in 30-minute increments. For social media screen time these estimates captured use across Facebook, Instagram, Linkedin, X (twitter), Reddit, Tiktok and excluded messenger apps (e.g., WhatsApp, Telegram, Messenger, Snapchat) and other digital media (e.g., Spotify, Netflix, YouTube). Gaming screen time included time spent gaming on gaming devices such as a smartphone, Xbox, PlayStation, computer, or a Nintendo. Symptoms of addiction to social media were measured by the Bergen Social Media Addiction Scale (BSMAS), with a cut-off score of 24 indicating addiction (Luo et al., 2021). Symptoms of addictive gaming behaviours were also measured using the 10-item Gaming Disorder Test, with a cut-off score of ≥5 indicating a potential gaming disorder (Király et al., 2015).

Food addiction was assessed through the CRAVED Questionnaire, which indicates addictive behaviours towards certain foods/drinks if the participant records ≥3 symptoms in the past year (Unwin et al., 2022). Alcohol use was initially measured using the Alcohol Use Disorders Identification Test-Consumption (AUDIT-C), with cut-off scores of ≥4 for men and ≥3 for women indicating hazardous drinking. However, due to incomplete survey data on the AUDIT-C, only responses to the binge drinking frequency item (i.e., frequency of consuming 6 or more drinks on one occasion) were included in the final analysis, as a simplified but practical approach to measure risky alcohol use (Nayak et al., 2015).

Sleep quality and quantity was measured using the Sleep Screening Tool from the Sport Mental Health Assessment Tool (SMHAT-1), with a cut-off score of ≥8 indicating poor sleep quality (Gouttebarge et al., 2021). Additional specific sleep hygiene behaviours, such as napping habits, consistent sleep/wake times, and technology use before bed, were assessed using questions derived from the Sleep Hygiene Index (Mastin et al., 2006). A composite sleep hygiene score was calculated by averaging responses across the included items for each participant. As per the SHI scoring convention, higher scores reflect poorer sleep hygiene. These were then dichotomised into two categories: 'high' sleep hygiene scores (at or above the mean score) and 'low' sleep hygiene scores (below the mean score).

Mental health outcomes were measured using validated tools with specific cutoff values. Depression was measured using the PHQ-9, with scores ≥10 indicating moderate to severe depressive symptoms (Kroenke et al., 2001). Anxiety was measured using the GAD-7, with scores ≥ 10 indicating moderate to severe anxiety (Spitzer et al., 2006). Sport-related psychological strain was measured using the APSQ, with scores ≥17 indicating high to very high psychological strain (S. Rice et al., 2020). Mental well-being was assessed using the MHC-SF, which categorises participants into three groups: languishing (scores of 1 or 2 in at least one item for emotional well-being and in at least six items related to psychological and social well-being), flourishing (scores of 4 or 5 in at least one item for emotional well-being and in at least six items related to psychological and social well-being), and moderate mental health (participants not meeting the criteria for flourishing or languishing) (C. L. Keyes, 2005).

Statistical Analysis

Preliminary analyses involved calculating descriptive statistics, including frequencies and percentages, for demographic factors, mental health outcomes, and behavioural factors. Behavioural factors were categorised based on validated scoring guidelines (e.g., BSMAS ≥24 for social media addiction). Unadjusted and adjusted logistic regression models were employed to evaluate the association between behavioural factors and mental health outcomes, with the adjusted models controlling for demographic covariates (e.g., age, gender, type of sport, and serious injuries sustained). Results were presented as odds ratios (95% CI), McFadden's pseudo R^2 values for model fit, and significance levels ($p < .05$).

Results

Table 2a. Sport Demographics

Variable	Category	n	%
Total	**–**	**109**	**100**
Sport	Athletics	7	6.5
	Cricket	6	5.6
	CrossFit	18	16.8
	Cycling	10	9.3
	Field Hockey	3	2.8
	Netball	5	4.7
	Rowing	2	1.8
	Rugby Union	26	24.3
	Triathlon	17	15.9
	Ultimate Frisbee	4	3.7
	Other	9	8.4
Sport Type	Individual	53	49.5
	Team	54	50.5
Career Class	Professional	3	2.8
	Semi-professional	22	20.2
	Competitive Amateur	40	36.7
	Club Level	21	21.1
	Recreational	23	19.3
Competition Level	International	10	9.2
	Franchise	3	2.8
	Domestic	33	30.3
	International Age-Grade	4	3.7
	Domestic Age-Grade	6	5.5
	Regional	29	26.6
	Other	24	22.0

Note. n = number of participants; % = percentage of participants within each category. Career class was self-identified based on financial and professional involvement in sport. Competition level reflects the highest level at which participants currently compete. Participants were classified under “Other” sport if they were the sole respondent representing that sport.

Table 2b. General Demographics and Health Status

Variable	Category	n (%)	%
Total	**–**	**109**	**100**
Gender	Female	39	36.1
	Male	69	63.9
Ethnicity	Māori	16	14.7
	Pākeha	75	68.8
	Other	18	16.5
Age	18-19	17	15.6
	20-24	35	32.1
	25-29	18	16.5
	30-34	11	10.1
	35-39	7	6.4
	≥40	21	19.3
Serious Injuries	0	43	39.5
	1	39	35.8
	2	21	19.3
	3	6	5.5
Serious Illness	0	95	87.2
	1	8	7.3
	2	4	3.7
	3	2	1.8

Note. n = number of participants; % = percentage of participants within each category. Serious injuries and illness refer to past incidents in the last 2 years requiring more than 28 days off training or competition. Serious illness refers exclusively to physical health conditions.

Table 2a and 2b show that the final sample included 109 athletes, with a mix of individual (49.5%) and team sport participants (50.5%). Most identified as Pākehā (68.8%), male (63.9%), and were aged 20–24 (32.1%). Participants represented a range of sports, with rugby union (24.3%), CrossFit (16.8%), and triathlon (15.9%) being the most common. The majority identified as competitive amateurs (36.7%) and competed at the domestic (30.3%) or regional (26.6%) level. Serious injuries were reported by 60.5% of athletes, while serious illness was less common (12.8%).

Table 3a. Prevalence of Mental Health Outcomes

Measure	Category	n	%
MHC-SF	Languishing	10	9.3
	Moderate	33	30.6
	Flourishing	65	60.2
	Total	**108**	**100**
APSQ	< 17	42	38.5
	≥ 17	67	61.5
	Total	**109**	**100**
PHQ-9	< 10	91	83.5
	≥ 10	18	16.5
	Total	**109**	**100**
GAD-7	< 10	93	85.3
	≥ 10	16	14.7
	Total	**109**	**100**
Multiple Negative MH Outcomes	Only 1	51	46.8
	1 or more	71	65.1
	2 or more	20	18.4
	3 or more	14	12.8
	All 4	6	5.5
	Total	**109**	**100**
Anxiety + Depression	Either or	20	18.4
	Both	14	12.8
	Total	**109**	**100**
Dual Continuum Model	F + No Mental Health Disorder	62	57.4
	F + MH Disorder	3	2.8
	MMH + No MH Disorder	23	21.3
	MMH + MH Disorder	10	9.3
	L + No MH Disorder	3	2.8
	L + MH Disorder	7	6.5
	Total	**108**	**100**

Note. n = number of participants; % = percentage of participants within each category. MHC-SF = Mental Health Continuum – Short Form; APSQ = Athlete Psychological Strain Questionnaire; PHQ-9 = Patient Health Questionnaire; GAD-7 = Generalised Anxiety Disorder scale. MH = Mental Health; F = Flourishing; MMH = Moderate Mental Health; L = Languishing. A negative MH outcome was defined as meeting criteria for any of the following: PHQ-9 ≥10, GAD-7 ≥10, APSQ ≥17, or Languishing.

Table 3b. Prevalence of Behaviours

Behaviour	Category	n	%
Social Media Time	< 0.5 h	8	7.3
	0.5 - 2.0h	55	50.5
	> 2.0h	46	42.2
	Total	**109**	**100**
Video Game Time	< 0.5h	94	86.2
	0.5 - 2.0h	15	13.8
	Total	**109**	**100**
BSMAS	< 24	106	97.2
	≥ 24	3	2.8
	Total	**109**	**100**
GDT-10	< 22	33	100
	≥ 22	0	0
	Total	**33**	**100**
CRAVED-7	< 3	70	67.3
	≥ 3	34	32.7
	Total	**104**	**100**
Sleep SMHAT-1	< 8	84	80.0
	≥ 8	21	20.0
	Total	**105**	**100**
SHI Composite Score	Low (< 3)	89	84.0
	High (≥ 3)	17	16.0
	Total	**106**	**100**
Audit-C (Item 3)	Never	39	36.1
	Monthly or less	60	55.6
	Weekly or more	9	8.3
	Total	**108**	**100**

Note. n = number of participants; % = percentage of participants within each category. BSMAS = Bergen Social Media Addiction Scale; GDT-10 = Gaming Disorder Test; CRAVED-7 = Food addiction screening questionnaire; SMHAT-1 = Sleep quality scale from the IOC Mental Health Assessment Tool; SHI = Sleep Hygiene Index. AUDIT-C (Item 3) = frequency of alcohol binge drinking behaviour (≥ 6 drinks on 1 occasion).

Table 3a and Table 3b present the prevalence of mental health outcomes and health-related behaviours. 60.2% of athletes were classified as flourishing, while 16.5% and 14.7% met the clinical threshold for moderate to severe depression and anxiety symptoms respectively (PHQ-9 and GAD-7 ≥10). High levels of psychological strain (APSQ ≥17) were reported by 61.5% of participants. Regarding behavioural risk factors, 32.7% met the CRAVED-7 threshold for food addiction, 16.0% had poor sleep hygiene (SHI composite score ≥3), and 20.0% scored ≥8 on the SMHAT-1 sleep quality screening scale. Most participants reported spending between 30 minutes

to 2 hours on social media and less than 30 minutes gaming, with only 2.8% screening positive for potential social media addiction (BSMAS), while none met the criteria for gaming disorder.

Internal consistency of the mental health measures was assessed using Cronbach's alpha. All scales demonstrated good to excellent reliability within the current sample (PHQ-9 α = 0.883; GAD-7 α = 0.920; APSQ α = 0.814; MHC-SF α = 0.942). The internal consistency of relevant behavioural scales was assessed in a similar manner and all displayed acceptable to good reliability within the current sample (BSMAS α = 0.844; CRAVED-7 α = 0.809; SHI questions α = 0.724).

Table 4a. Logistic Regression of Behaviours and Mental Health (Unadjusted Model)

Measure	Predictor	MHC-SF (Flourishing)	APSQ ≥14	PHQ-9 ≥10	GAD-7 ≥10
Social Media Screen Time	< 0.5h †				
	0.5h – 2h	1.85 [0.37, 9.28]	1.92 [0.39, 9.37]		
	> 2h	0.94 [0.18, 4.90]	2.70 [0.51, 14.27]		
Gaming Screen Time	< 0.5h †				
	0.5h – 2h	0.98 [0.29, 3.27]	0.60 [0.18, 1.96]	1.05 [0.17, 6.48]	0.17 [0.02, 1.97]
Food Addiction	CRAVED Score < 3 †				
	CRAVED Score ≥ 3	1.09 [0.41, 2.90]	1.67 [0.63, 4.41]	1.00 [0.22, 4.66]	2.45 [0.57, 10.45]
SHI Composite Score	Score < 3 †				
	Score ≥ 3	0.32 [0.09, 1.06]	2.47 [0.61, 10.09]	**31.78*** [7.15, 141.32]**	**21.60*** [4.71, 99.00]**
AUDIT-C (Item 3)	Never †				
	Monthly or less	0.88 [0.34, 2.31]	1.10 [0.44, 2.78]	1.01 [0.22, 4.62]	0.42 [0.09, 1.92]
	Weekly or more	0.26 [0.05, 1.32]	1.10 [0.22, 5.47]	1.15 [0.11, 12.67]	0.19 [0.01, 3.01]

Note. Odds Ratios (ORs) are presented with 95% Confidence Intervals in brackets.
† Indicates reference category.
* p < .05, ** p < .01, *** p < .001. Bolded values indicate statistical significance.

In the unadjusted models, poor sleep hygiene (SHI ≥3) was strongly associated with elevated depression and anxiety symptoms. Athletes with high SHI scores had significantly higher odds of meeting thresholds for moderate to severe depression (OR = 31.78, 95%

CI [7.15, 141.32], $p < .001$) and anxiety (OR = 21.60, 95% CI [4.71, 99.00], $p < .001$). No other behavioural variables were significantly associated with mental health outcomes, although a few estimates suggested potentially meaningful trends. For example, higher levels of food addiction (CRAVED-7 ≥3) showed elevated odds of anxiety (OR = 2.45), and those consuming alcohol weekly or more were less likely to report flourishing (OR = 0.26), though neither result reached statistical significance.

Model fit statistics indicated that the behavioural models significantly explained variance in depression and anxiety outcomes. The unadjusted model for PHQ-9 was statistically significant ($\chi^2(5) = 31.35$, $p < .001$), with a McFadden's pseudo-R^2 value of 0.341. Similarly, the model for GAD-7 was significant ($\chi^2(5) = 27.87$, $p < .001$), with a McFadden's pseudo-R^2 value of 0.339. The model predicting flourishing (MHC-SF) was not statistically significant ($p = .147$), with a lower McFadden's pseudo-R^2 value of 0.079. Psychological strain (APSQ) also showed a non-significant model fit ($p = .325$), with a McFadden's pseudo-R^2 value of 0.059.

Table 4b. Logistic Regression of Behaviours and Mental Health (Adjusted Model)

Measure	Predictor	MHC-SF (Flourishing)	APSQ ≥14	PHQ-9 ≥10	GAD-7 ≥10
Social Media Screen Time	< 0.5h †				
	0.5h – 2h	3.40 [0.46, 24.90]	3.37 [0.36, 31.10]		
	> 2h	1.07 [0.14, 8.19]	5.85 [0.59, 57.83]		
Gaming Screen Time	< 0.5h †				
	0.5h – 2h	1.12 [0.22, 5.82]	0.93 [0.19, 4.67]	2.16 [0.23, 19.94]	0.47 [0.03, 6.98]
Food Addiction	CRAVED Score < 3 †				
	CRAVED Score ≥ 3	1.26 [0.36, 4.36]	2.93 [0.85, 10.10]	1.27 [0.19, 8.26]	3.99 [0.71, 22.54]
SHI Composite Score	Score < 3 †				
	Score ≥ 3	0.77 [0.07, 1.45]	2.02 [0.36, 11.20]	**25.67*** [4.84, 136.24]**	**19.82** [3.20, 122.76]**
AUDIT-C (Item 3)	Never †				
	Monthly or less	0.27 [0.07, 1.08]	1.20 [0.31, 4.56]	1.54 [0.21, 11.81]	0.66 [0.09, 4.68]
	Weekly or more	**0.03** [<0.01, 0.30]**	1.07 [0.09, 12.20]	4.71 [0.19, 115.06]	0.56 [0.02, 17.81]

Note. Odds Ratios (ORs) are presented with 95% Confidence Intervals in brackets. Logistic regression model was adjusted for age, gender, sport type (individual or team) and occurrence of serious injury.
† Indicates reference category.
* p < .05, ** p < .01, *** p < .001. Bolded values indicate statistical significance.

After adjusting for age, gender, sport type, and injury, two behavioural predictors showed statistically significant associations with mental health outcomes. Participants with poor sleep hygiene (SHI score ≥3) had substantially higher odds of meeting clinical thresholds for moderate to severe depressive symptoms (OR = 25.67, 95% CI [4.84, 136.24], p < .001) and anxiety (OR = 19.82, 95% CI [3.20, 122.76], p = .001). In contrast, higher alcohol use (AUDIT-C ≥ weekly) was significantly associated with 97% lower odds of flourishing (OR = 0.03, 95% CI [<0.01, 0.30], p = .003). No other behavioural variables, including screen time or food addiction, were significantly associated with any mental health outcome, though some ORs suggested potential trends.

The overall model fit was significant across all four mental health outcomes. The behavioural model predicting flourishing (MHC-SF) was statistically significant ($\chi^2(17) = 31.09$, $p = .019$), with a McFadden's pseudo-R^2 value of 0.233. Models for psychological strain (APSQ), depression (PHQ-9), and anxiety (GAD-7) were also significant ($p = .018$, .002, and .004 respectively), with McFadden's

pseudo-R^2 values of 0.234, 0.400, and 0.424, respectively. These results suggest that collectively, the included behavioural factors, particularly sleep hygiene and alcohol use, contributed meaningfully to the mental health profiles of athletes in this study.

Discussion

Sleep hygiene emerged as the most consistent and statistically robust behavioural predictor of mental health outcomes in this sample. While prior research has focused on the strong link between poor sleep quality and mental health in athletes (Shannon et al., 2025; Yan & Wang, 2025), these findings highlight a similar robust relationship with the upstream role of sleep hygiene as a protective factor against mental ill-health. Weekly binge drinking was linked to reduced flourishing, consistent with research on the impact of risky alcohol use on positive mental well-being (Lipkens & Qeadan, 2025), although in contrast to existing research, no link was established with anxiety or depression (J. Li et al., 2020; Puddephatt et al., 2022). Although food addiction and screen time were not significantly associated with mental health in this sample, small trends emerged that warrant further exploration. Ultimately, these findings support existing research by identifying sleep and alcohol use as practical targets for mental health promotion and highlight the importance of examining both mental distress and well-being through a dual continuum framework.

Sleep

Athletes with poor sleep hygiene were over 25 times more likely to report moderate to severe depressive symptoms (OR = 25.6, 95% CI [4.0, 163.4]) and nearly 20 times more likely to report moderate to severe anxiety symptoms (OR = 19.4, 95% CI [3.6, 103.2]). These large odds ratios should be interpreted cautiously however, due to the wide confidence intervals. However, the consistent direction and statistical significance across these two key mental health outcomes reinforce sleep hygiene as a potentially influential factor in athlete mental health.

This aligns with the existing literature that shows improved sleep hygiene is associated with enhanced elements of mental health such as reduced psychological distress and improved psychological well-being (Liu et al., 2024; Wahesh et al., 2023). This association is likely mediated by improvement in sleep quality which Liu and colleagues (2024) found accounted for approximately 27% of the total association between sleep hygiene and psychological stress. Other studies have reinforced this through findings that showed improving sleep hygiene habits

is linked to significant improvements in sleep quality for different populations (Ali et al., 2023; Barati & Amini, 2022; Chehri et al., 2016; Seun et al., 2018). And we know past research has established there to be a strong relationship between sleep quality and a range of mental health disorders (P. M. Gardiner et al., 2022; Seow et al., 2020; Zhang, He, et al., 2024), with strong evidence to suggest there is a bi-directional (i.e., mutually causal) relationship present (American Psychiatric Association, 2022; A. J. Scott et al., 2021; Staner, 2003). Based on the past literature and our results, this reinforces that sleep hygiene is likely a significant upstream modifiable influence on mental health through improving sleep quality.

While this study used a shortened version of the SHI, calculating a composite score from a subset of items to reduce survey fatigue, the internal consistency of these selected items remained adequate (Cronbach's alpha = 0.724), and significant associations with mental health outcomes were still found. This indicated that behaviours like consistent sleep/wake cycles, napping, and technology use before bed play a pivotal role in mental health, even when factors such as setting up the ideal environment or whether the participant exercised 1-hour before bed are excluded. The wide confidence intervals do however highlight uncertainty around the exact magnitude of these effects and reflect the modest sample size recruited. Nonetheless, findings reinforce the importance of addressing behavioural sleep practices in elite athletes as a practical and modifiable method in supporting mental health.

Binge Drinking

Frequent binge drinking was significantly associated with reduced odds of flourishing, but it was not associated with anxiety, depression, or psychological strain. Athletes who reported binge drinking once per week or more were 97% less likely to be flourishing compared to those who binge drank less frequently (OR = 0.03, 95% CI [<0.01, 0.30], p = .003). This suggests that high-frequency binge drinking may hinder the presence of optimal mental well-being, even in the absence of mental illness.

While the null findings contradict previous studies which found risky alcohol use was associated with anxiety and depression (J. Li et al., 2020; Puddephatt et al., 2022); these findings do however, illustrate the underlying concept of the dual continuum model, which proposes that the absence of mental illness does not equate to positive mental well-being or optimal functioning (C. L. Keyes, 2002). Alternatively, the lack of association with anxiety or depression could also reflect underreporting, low statistical power, or the heterogeneity of the data and individual differences

in the way alcohol-related distress manifests. Although we adjusted for sport type (team vs individual) our sample included a diverse range of sports, and patterns of alcohol use and their mental health impacts may differ considerably within these broad categories; potentially influencing the observed associations.

Alternatively, it could reflect the fact we measured binge drinking frequency vs the AUDIT-C score, due to incomplete AUDIT-C survey data. This approach limited our ability to assess broader patterns of consumption, although it still revealed a meaningful association with mental well-being. Additionally, we should note this finding does not illustrate causal influence and may in fact reinforce athletes have maladaptive coping mechanisms to deal with not flourishing that manifests in increased frequency of binge drinking. Future research should examine the longitudinal impact of alcohol use on both flourishing and distress, and consider how athlete-specific drinking norms and environments contribute to these patterns.

Problematic food behaviour

Although food addiction was not significantly associated with any of the mental health outcomes in this study, elevated CRAVED-7 scores showed a clear trend toward increased odds of moderate to severe anxiety symptoms (OR = 3.99, 95% CI [0.71, 22.54], p = .118). This pattern suggests a possible relationship between disordered eating behaviours and anxiety that may not have reached significance due to sample size limitations and heterogeneity of the data. This trend is congruent with previous literature, which has reported associations between food addiction and poor mental health outcomes, including increased depression and anxiety, and reduced psychological well-being (Burrows et al., 2018; Skinner et al., 2021).

As stated with other behavioural associations, this trend does not imply causality. Yet it is plausible that heightened stress or anxiety may increase vulnerability to food-addictive behaviours or cravings (Parylak et al., 2011), particularly for low-quality food that is high in sugar and heavily processed. These types of foods have been commonly proposed to increase cravings due to changes in dopaminergic signalling, their high palatability and low satiability (Gillespie et al., 2023; Lane et al., 2024). Furthermore, a multitude of research supports that lower overall diet quality, characterised by high sugar intake, frequent consumption of ultra-processed foods, and inadequate micronutrient intake, has been independently associated with higher rates of depression, anxiety, and psychological distress (Blampied et al., 2020; Knüppel et al., 2017; Lane et al., 2022, 2024; Mazloomi et al., 2023; Westover & Marangell, 2002). This supports the idea of

a potential negative feedback loop, where lower diet quality contributes to poorer mental health, which in turn heightens cravings for the very foods that may further impair mental health.

Future research should investigate whether diet quality moderates the relationship between food addiction and mental health in athletes. Since athletes are often incentivised to maintain higher diet quality to support performance and recovery, this may act as a protective factor against the negative psychological effects of food addiction and craving-driven eating behaviours. Exploring this relationship could offer valuable insights into how nutrition habits may buffer or exacerbate mental health issues experienced in high-performance environments.

Screen Time

Social media and gaming time were not associated with any mental health outcomes and lacked any strong trends. This finding was contrary the 'goldilocks zone' of moderate screen use (roughly 30 minutes to 2 hours per day) which previous research had suggested to be associated with more favourable mental health outcomes compared to both lower (< 30 minutes) and higher (> 2 hours) usage levels (Orben & Przybylski, 2019; Przybylski & Weinstein, 2017).

Limited statistical power may have been a contributing factor to these null findings, given that the reference group (< 30 minutes of social media use) included only 8 participants (7.3%). Additionally, as noted by Orben and Przyybylski (2020), more granular measurement of technology use, such as distinguishing between active (e.g., messaging, posting) versus passive (e.g., scrolling, watching) engagement may be required to better understand the nuanced relationship between screen time and mental health. The null findings in this study may also again reflect the broad inclusion criteria and diversity of athlete backgrounds. Since screen use patterns likely differ across age groups, competition levels, and sports. Moreover, the limited sample size further constrained our ability to detect small but potentially meaningful associations. Therefore, although no significant associations emerged, the possibility of a relationship between screen time and mental health in athletes cannot be ruled out and warrants further investigation.

Beyond methodological constraints, the absence of a clear association may reflect the dual nature of social media in elite sport. For instance, athletes may use social platforms more intentionally, to connect with friends and family while travelling, or for self-promotion purposes and building their personal brand – which may buffer against negative effects. Alternatively, their high public visibility and competitive context could amplify mental health risks such as self-comparison or exposure to negative commentary, particularly after poor performances. These opposing

influences may neutralise each other at the population level, leading to the lack of a significant relationship observed in this study.

Significant Practical Implications

Despite some uncertainty around the strength of associations, the significant findings linking poor sleep hygiene with anxiety and depression suggest that sleep-related behaviours could be a valuable target for mental health promotion within athlete support programs. This is particularly relevant given the unique and often unavoidable barriers athletes face to maintaining good sleep hygiene, such as irregular training schedules, travel demands, and competition-related stress (e.g., Halson et al., 2021; Walsh et al., 2020).

Therefore, athlete-specific and contextually relevant strategies may be more effective than generic sleep hygiene advice. For example, education around optimising nap timing and duration, managing caffeine intake or practical tools for managing pre-sleep cognitive load and arousal (such as mental decluttering techniques or structured wind-down routines) could offer meaningful support (Lastella et al., 2021; C. Li et al., 2018; Walsh et al., 2020). These strategies can empower athletes with agency to manage their sleep, even in high-demand environments.

However, just targeting individual behaviours alone may overlook broader systemic factors. Sporting organisations also have a responsibility to promote sleep-supportive environments, which extends beyond athlete education (Walsh et al., 2020). This includes minimising excessively early or late training sessions where possible to allow for adequate sleep opportunities, providing designated nap spaces or initiatives to help players to top up their total sleep, and minimising late-night cognitive demands from team meetings, film review, or communication, especially in periods of heavy travel when organisational control is greater.

Limitations

This study was limited by a relatively small and heterogeneous sample, which may have reduced the statistical power to detect significant associations, particularly for behavioural variables such as technology use. In addition to the small sample size and broad inclusion criteria, the use of self-reported measures and the cross-sectional design reduce reliability due to participant recall error and limit the ability to draw causal inferences, respectively. These factors should be considered when interpreting the findings. Future studies with larger, more targeted samples may

help clarify the associations between these specific behaviours and mental health in athlete populations.

Additionally, while the PHQ-9 and GAD-7 are validated and reliable tools commonly used in mental health research, their interpretation in elite sport may require contextual nuance. Emerging research suggests that symptoms such as low mood or anxiety may sometimes reflect normative responses to short-term competitive stress rather than clinical disorder, potentially inflating mental ill-health estimates (Oevreboe et al., 2023). Conversely, Forys and Tokuhama-Espinosa (2022) suggest these generic tools may under-report depression in athletes, as allostatic load can alter biological baselines – dampening clinical symptom expression, a phenomenon they termed 'adaptable depression'. Although the inclusion of the sport-specific APSQ aimed to address this limitation, it functions as a screening tool rather than a diagnostic measure, with over 60% of athletes in this sample exceeding its cut-off. Together, these factors highlight the need for cautious interpretation and support the development and use of context-sensitive measures and use of diagnostic interviews that can better distinguish between persistent, maladaptive distress and acute, adaptive responses such as pre-competition nerves or temporary disappointment following a loss.

Conclusion

This study suggests that most New Zealand athletes, at least in this sample, are flourishing, with rates of anxiety and depression similar to those reported in other elite sporting and general Australasian populations. Poor sleep hygiene was linked to higher odds of anxiety and depression, while binge drinking once or more per week was associated with lower odds of flourishing. Although some strong trends were observed, food addiction and screen time showed no significant associations with mental health outcomes in this sample.

Despite the study's limitations, including the inability to draw causal conclusions, one key message stands out: sleep hygiene matters. It's a modifiable behaviour that appears closely tied to athlete mental health. However, athletes often face unique pressures, like pregame anxiety, travel, and irregular training times, that make it harder to get quality sleep, even when it's clearly advantageous. This indicates more is needed than just education. Organisations and athletes should look at practical, context-specific ways to support better sleep, whether that's adjusting training times, creating digital switch-off routines, or promoting rest during travel. To make quality rest not just possible, but a priority.

Chapter 4: Exploring how perceived organisational support is associated with New Zealand athlete mental health.

Overview

Introduction: This study explored how perceived organisational support (POS) at three levels: organisation, coach/support staff, and teammates/training partners; is associated with mental health outcomes in New Zealand athletes. Grounded in Organisational Support Theory (OST) and the dual continuum model, it evaluated whether external, systemic support is associated with depression, anxiety, psychological strain, and well-being.

Methods: A cross-sectional online survey was completed by 104 New Zealand athletes. Validated mental health measures were paired with newly developed multi-level POS scales. Descriptive statistics captured prevalence data, while logistic regression analyses (adjusted and unadjusted) assessed associations between POS and mental health outcomes, with adjusted models controlling for age, gender, sport type, and recent injury status.

Results: Adjusted models showed no significant associations between POS and mental health. However, unadjusted analyses indicated potential protective effects. For example, higher teammate support was linked to lower odds of anxiety (OR = 0.18), and collective POS significantly predicted flourishing ($\chi^2(3) = 8.90$, $p = .031$). Descriptive data also showed that most athletes reported high levels of POS, especially from teammates/training partners (72.1%) and coaches/support staff (75.7%).

Conclusion: Although POS was not significantly associated with mental health after controlling for key covariates, descriptive and unadjusted results suggest it may still serve a protective role – particularly at the teammate/training partner level. The novel POS scales developed for this study offer a promising tool for future research that may help inform multi-level strategies aimed at fostering psychologically safe and supportive environments in sport.

Introduction

Elite athletes are often seen as the embodiment of resilience, but mounting evidence shows they are not exempt from mental health struggles. Research across Australia and New Zealand suggests that rates of mental health issues such as moderate to severe anxiety and depression, and elevated psychological distress in elite athletes are comparable to the general population (Du Preez et al., 2017; Gulliver et al., 2015; Purcell et al., 2020). While the elite sport environment can offer structure, purpose, and identity, it can also expose athletes to unique psychological stressors such as intense performance pressure, public scrutiny, and career instability (Beable et al., 2017; International Olympic Committee, 2021; C. C. Walton, Purcell, Pilkington, et al., 2024).

However, mental health is not simply the absence of illness. Keyes' (2002) dual continuum model reframes it as the coexistence of both mental illness and mental well-being. Under this model, flourishing includes high levels of emotional, psychological, and social functioning, while languishing reflects a state of stagnation or low functioning, not just the absence of mental illness. Although this is gaining traction, few studies in sport have explored both illness and well-being together, particularly in New Zealand athletes. Notably, a Danish study using latent profile analysis found that 64.2% of elite athletes were flourishing, 29.3% had moderate mental health, and 6.5% were languishing (Kuettel et al., 2021). However, because these profiles were based on combined measures of well-being and symptom severity, rather than treating mental illness and well-being as distinct dimensions, the study did not fully reflect the dual continuum model.

Research to date has identified several key demographic risk factors for poor mental health outcomes in athletes, including being female, under the age of 25, injured, competing in an individual sport or nearing retirement (Beable et al., 2017; Gulliver et al., 2015; Purcell et al., 2020). Behavioural risk factors such as poor sleep hygiene, excessive technology use, disordered eating, and binge drinking are also emerging areas of concern and have received more focus in recent years when it comes to the mental health of athletes (Barker et al., 2025; Dorfling & Fulcher, 2024; Fiedler et al., 2023; Gao & Wang, 2024; Kutscher, 2019; Reardon et al., 2019). However, these are more related to athletes themselves, and one often overlooked factor is the role of perceived organisational support (POS) which lies more external to the athlete.

POS refers to an athlete's belief that the people and structures around them genuinely care for their well-being and value their contribution (Eisenberger et al., 1986). POS is shaped by factors such as organisational fairness, working conditions, and supervisor support (Krishnan & Mary, 2012), and has been linked to a range of desirable outcomes. These include performance metrics

like reduced absenteeism, increased in-role and extra-role performance, enhanced motivation (Eisenberger et al., 1986; Krishnan & Mary, 2012; Tamimi et al., 2023), and improved mental health, with lower rates of burnout, stress, anxiety, and depression (Dingens, 2022; Krishnan & Mary, 2012; Tamimi et al., 2023). The effects of POS are likely moderated by employees' social exchange ideology. This refers to the extent to which they believe that organisational care should be reciprocated with loyalty, effort, and commitment (Eisenberger et al., 1986; Krishnan & Mary, 2012). POS has been widely applied across a variety of occupational contexts, including recent research in high-demand public service roles such as New Zealand firefighters (Mackay et al., 2023, 2024), where high POS was associated with both improved mental health and performance outcomes.

Therefore, the current body of research positions POS as a reliable predictor of well-being and performance in high-stress environments. Given the comparable demands faced by athletes, extending this framework to sport offers a valuable opportunity to understand how perceived support functions in competitive settings. In both traditional workplaces and sport, support can come from multiple levels: the broader organisation, direct leaders (e.g., managers or coaches/support staff), and peers (e.g., co-workers or teammates/training partners). While this structure is not unique to sport, the way support is experienced may differ due to the relational and performance dynamics of athletic environments. Emerging research has found links between support provided from coaches and teammates and reduced symptoms of distress and improved well-being outcomes (Kuettel et al., 2021). Similarly, other studies have highlighted the role of interpersonal support in mitigating the negative effects of injury and stressors in elite sport (Beable et al., 2017; International Olympic Committee, 2021; Reardon et al., 2019; C. C. Walton, Purcell, Pilkington, et al., 2024)). However, the evidence remains limited, often examining support in isolation, without applying a comprehensive POS framework. To date, no studies have explored POS specifically in athletes across multiple levels of support, or how these relate to both mental illness and mental well-being outcomes. Additionally, little is known about how New Zealand's sporting context may influence athletes' perceptions of support. Given these gaps, a more detailed and context-specific investigation is warranted.

This study aims to explore how POS at three levels (organisation, coaches/support staff, and teammates/training partners) relates to both mental illness (e.g., anxiety, depression, psychological strain) and mental well-being (flourishing) among New Zealand athletes. It also describes the prevalence of these outcomes and levels of perceived support, offering a snapshot

of the current mental health landscape and how supported athletes feel within their sporting environments.

By taking a multi-dimensional approach to both mental health and support, this study contributes to a more nuanced and comprehensive understanding of athlete mental health in Aotearoa. In doing so, it not only informs future research and athlete support strategies but also helps sporting organisations, coaches, and teammates reflect on their role in shaping the mental health landscape of high-performance sport.

Methods

This cross-sectional study examined the association between POS at three levels: coaches/support staff, teammates/training partners, and the organisation as a whole; and mental health outcomes (depression, anxiety, sport-related psychological strain, and well-being). Data were collected via an anonymous online survey hosted on Qualtrics. The survey was open for 17 weeks, from January 20th 2025 to May 18th 2025, and participation was incentivised with an optional prize draw.

Participants

This study was originally designed to investigate mental health and well-being in elite athletes; however, recruitment challenges led to a broadening of the inclusion criteria to encompass individual sport athletes and those competing at lower levels (e.g., regional or recreational). Eligible participants were athletes based in New Zealand, aged 18 years or older, who had competed in their sport in the past year. Age was collected in predefined bands to protect anonymity, with the most common groups being 20–24 years (32.5%) and ≥40 years (20.0%). They were recruited through digital and print advertisements shared via a social media post. A total of 163 responses were recorded in Qualtrics, of which 104 were included in the final analysis, data cleaning led to the removal incomplete submissions and those who did not meet eligibility criteria. Completion rate was 63.8%, calculated as the proportion of participants who completed at least one of the POS scales. Participants competed in a total of 10 different sports, including: athletics, cricket, CrossFit, cycling, field hockey, netball, rowing, rugby union, triathlon, and ultimate frisbee.

Variables and Measures

Mental health outcomes were assessed using validated tools with specific cutoff values. Depression was measured using the Patient Health Questionnaire (PHQ-9), with scores at or above 10 indicating moderate to severe depressive symptoms (Kroenke et al., 2001). Anxiety was evaluated using the Generalised Anxiety Disorder Scale (GAD-7), with scores at or above 10 indicating moderate to severe anxiety (Spitzer et al., 2006). Sport-related psychological strain was assessed with the Athlete Psychological Strain Questionnaire (APSQ), with scores at or above 17 indicating high to very high psychological strain (S. Rice et al., 2020). Mental well-being was measured using the Mental Health Continuum-Short Form (MHC-SF), which categorises participants into three groups: *languishing* (scores of 1 or 2 in at least one item for emotional well-being and in at least six items related to psychological and social well-being), *flourishing* (scores of 4 or 5 in at least one item for emotional well-being and in at least six items related to psychological and social well-being), and *moderate mental health* (participants not meeting the criteria for flourishing or languishing) (C. L. Keyes, 2005). Perceived organisational support was assessed through adapted items from validated POS scales used in the recent Fire and Emergency New Zealand Well-being studies which were reframed to target three organisational levels: the organisation as a whole, coaches and support staff, and teammates/training partners. Responses were captured on a 5-point Likert scale, ranging from 1 (“Strongly Disagree”) to 5 (“Strongly Agree”) and were categorised by calculating the mean POS score for each organisational level and then separating participants’ responses into either ‘high POS’ at or above the mean score or ‘low POS’ below the mean score.

Statistical Analysis

Preliminary analyses involved calculating descriptive statistics, including frequencies and percentages, for demographic factors, mental health outcomes, and POS levels. Chi-square tests were conducted to examine demographic group differences in prevalence for mental health outcomes and levels of POS. Unadjusted and adjusted logistic regression models were employed to evaluate the association between POS levels and mental health outcomes, with adjusted models controlling for demographic covariates (e.g., age, gender, type of sport, and serious injuries sustained). Results were presented as odds ratios (95% CI), McFadden’s pseudo R^2 values for model fit, and significance levels ($p < .05$).

Results

Table 5a. Sport Demographics

Variable	Category	n	%
Total	**–**	**104**	**100**
Sport	Athletics	7	6.9
	Cricket	6	5.9
	CrossFit	17	16.7
	Cycling	10	9.8
	Field Hockey	3	2.9
	Netball	5	4.9
	Rowing	2	2.0
	Rugby Union	24	23.5
	Triathlon	17	16.7
	Ultimate Frisbee	3	2.9
	Other	8	7.8
Sport Type	Individual	52	51.0
	Team	50	49.0
Career Class	Professional	3	2.9
	Semi-professional	21	20.2
	Competitive Amateur	39	37.5
	Club Level	21	20.2
	Recreational	20	19.2
Competition Level	International	10	9.6
	Franchise	2	1.9
	Domestic	29	27.9
	International Age-Grade	4	3.8
	Domestic Age-Grade	6	5.8
	Regional	29	27.9
	Other	24	23.1

Note. n = number of participants; % = percentage of participants within each category. Career class was self-identified based on financial and professional involvement in sport. Competition level reflects the highest level at which participants currently compete. Participants were classified under “Other” sport if they were the sole respondent representing that sport.

Table 5b. General Demographics and Health Status

Variable	Category	n	%
Total	**–**	**104**	**100**
Gender	Female	37	35.9
	Male	66	64.1
Ethnicity	Māori	13	12.5
	Pākeha	74	71.2
	Other	17	16.3
Age	18-19	15	16.5
	20-24	34	32.5
	25-29	18	15.8
	30-34	9	10.0
	35-39	7	6.7
	≥40	21	20.0
Serious Injuries	0	43	41.3
	1	36	34.6
	2	20	19.2
	3	5	4.8
Serious Illness	0	90	86.5
	1	8	7.7
	2	2	3.8
	3	4	1.9

Note. n = number of participants; % = percentage of participants within each category. Serious injuries and illness refer to past incidents in the last 2 years requiring more than 28 days off training or competition. Serious illness refers exclusively to physical health conditions.

Table 5a and 5b show that the final sample included 104 athletes, with a mix of individual (51.0%) and team sport participants (49.0%). Most identified as Pākehā (71.2%), male (64.1%), and were aged 20–24 (32.5%). Participants represented a range of sports, with rugby union (23.5%), CrossFit (16.7%), and triathlon (16.7%) being the most common. The majority identified as competitive amateurs (37.5%) or semi-professionals (20.2%) and competed at the domestic (27.9%) or regional (27.9%) level. Serious injuries were reported by 58.7% of athletes, while serious illness was less common (13.5%).

Table 6a. Prevalence of Mental Health Outcomes

Measure	Category	*n*	%
MHC-SF	Languishing	9	8.7
	Moderate	30	28.8
	Flourishing	64	61.5
	Total	**104**	**100**
APSQ	< 17	42	40.4
	≥ 17	62	59.6
	Total	**104**	**100**
PHQ-9	< 10	88	84.6
	≥10	16	15.4
	Total	**104**	**100**
GAD-7	< 10	90	86.5
	≥10	14	13.5
	Total	**104**	**100**
Multiple Negative MH Outcomes	Only 1	48	46.2
	1 or more	66	63.5
	2 or more	18	17.3
	3 or more	12	11.5
	All 4	5	4.8
	Total	**104**	**100**
Anxiety + Depression	Either or	18	17.3
	Both	12	11.5
	Total	**104**	**100**
Dual Continuum Model	F + No MH Disorder	61	59.2
	F + MH Disorder	3	2.9
	MMH + No MH Disorder	21	20.4
	MMH + MH Disorder	9	8.7
	L + No MH Disorder	3	2.9
	L + MH Disorder	6	5.8
	Total	**103**	**100**

Note. *n* = number of participants; % = percentage of participants within each category. MHC-SF = Mental Health Continuum – Short Form; APSQ = Athlete Psychological Strain Questionnaire; PHQ-9 = Patient Health Questionnaire; GAD-7 = Generalised Anxiety Disorder scale. MH = Mental Health; F = Flourishing; MMH = Moderate Mental Health; L = Languishing. A negative MH outcome was defined as meeting criteria for any of the following: PHQ-9 ≥10, GAD-7 ≥10, APSQ ≥17, or Languishing.

Table 6b. Prevalence of POS

POS Levels	Category	n	%
Organisational	Low	43	41.3
	High	61	58.7
	Total	**104**	**100**
Coach & Support Staff	Low	25	24.3
	High	78	75.7
	Total	**103**	**100**
Teammate / Training Partner	Low	29	27.9
	High	75	72.1
	Total	**104**	**100**

Note. *n* = number of participants; % = percentage of participants within each category. POS = Perceived Organisational Support.

Table 6a and 6b present the distribution of POS and mental health outcomes. Most athletes reported high support from coaches (75.7%) and teammates (72.1%), while perceived organisational-level support was slightly more balanced (58.7% high, 41.3% low). In terms of mental health, 61.5% of athletes were classified as flourishing, while 28.8% were moderate and 8.7% languishing. Subclinical psychological strain (APSQ ≥17) was reported by 59.6% of participants, while fewer athletes met the threshold for moderate to severe depression (15.4%) or anxiety (13.5%).

Internal consistency of the mental health measures was assessed using Cronbach's alpha. All scales demonstrated good to excellent reliability within the current sample (PHQ-9 α = 0.868; GAD-7 α = 0.911; APSQ α = 0.803; MHC-SF α = 0.937). The internal consistency of behavioural scales was assessed in a similar manner and all POS scales displayed excellent reliability within the current sample (Organisational α = 0.947; Coach & Support Staff α = 0.970; Teammate/training partner α = 0.930).

Chi-square analyses revealed several significant group differences. Organisational support varied by season time, with the highest proportion of athletes reporting high support during in-season (66.7%) and the lowest in post-season (40%), $X^2(3)$ 8.965, p = .030. Teammate support also differed by season timing, with 92.0% of in-season athletes reporting high support compared to 40.0% in post-season, $X^2(3) = 14.331$, p = .002. Similarly, teammate/training partner support was higher among team-sport athletes (84.0%) than individual-sport athletes (66.7%), $X^2(1) = 10.038$,

p = .002. Coach support varied by injury history, with 94.3% of athletes who had recently experienced one serious injury reporting the highest proportion of high POS, compared to 60.0% of those who had recently suffered three serious injuries, $X^2(3) = 10.089$, p = .018. Depression prevalence differed by ethnicity, with prevalence being 9.5%, 30.8%, and 29.4% for European Pākeha, Māori, and a different ethnicity than the previous two, respectively, $X^2(2) = 6.929$, p = .031. While the association between gender and depression was not statistically significant, females had a higher prevalence (24.3%) than males (10.6%), $X^2(1) = 3.400$, p = .065.

Table 7a. Logistic Regression of POS and Mental Health Link (Unadjusted)

POS Level	Predictor	MHC-SF (Flourishing)	APSQ ≥14	PHQ-9 ≥10	GAD-7 ≥10
Organisational	Low POS †				
	High POS	1.28 [0.41, 3.96]	0.56 [0.17, 1.77]	2.97 [0.50, 17.62]	1.00 [0.20, 5.17]
Coach & Support Staff	Low POS †				
	High POS	1.40 [0.38, 5.12]	1.64 [0.44, 6.08]	0.48 [0.07, 3.25]	1.54 [0.30, 7.82]
Teammate / Training Partner	Low POS †				
	High POS	2.62 [0.82, 8.35]	1.68 [0.52, 5.43]	0.46 [0.09, 2.31]	**0.18* [0.04, 0.91]**

Note. Odds Ratios (ORs) are presented with 95% Confidence Intervals in brackets. POS = Perceived Organisational Support.
† Indicates reference category.
* p < .05. Bolded values indicate statistical significance.

In the unadjusted model, POS from teammates or training partners was significantly associated with reduced odds of moderate to severe anxiety symptoms (GAD-7 ≥10), with athletes who reported high support having 82% lower odds of anxiety compared to those with low support (OR = 0.18, 95% CI [0.04, 0.91], p = 0.038). No other POS level (organisational or coach/support staff) was significantly associated with any of the mental health outcomes (flourishing, psychological strain, depression, or anxiety).

Model fit statistics were examined for each mental health outcome. The unadjusted model predicting flourishing (MHC-SF) from POS was statistically significant ($\chi^2(3) = 8.90$, p = .031), with a McFadden's pseudo-R^2 value of 0.066. In contrast, the models predicting APSQ (sport-related stress), PHQ-9 (depression), and GAD-7 (anxiety) were not statistically significant (p = .558, .483, and .094, respectively), suggesting that POS had a limited overall predictive value for these outcomes in this sample.

Table 7b. Logistic Regression of POS and Mental Health Link (Adjusted)

POS Level	Predictor	MHC-SF (Flourishing)	APSQ ≥14	PHQ-9 ≥10	GAD-7 ≥10
Organisational	Low POS †				
	High POS	1.16 [0.32, 4.23]	0.86 [0.23, 3.26]	3.50 [0.40, 30.68]	1.25 [0.17, 9.19]
Coach & Support Staff	Low POS †				
	High POS	2.55 [0.52, 12.55]	1.22 [0.24, 6.22]	0.39 [0.04, 3.83]	1.37 [0.16-11.67]
Teammate / Training Partner	Low POS †				
	High POS	2.75 [0.62,12.23]	1.04 [0.22, 4.95]	0.56 [0.07, 4.40]	0.17 [0.02-1.40]

Note. Odds Ratios (ORs) are presented with 95% Confidence Intervals in brackets. POS = Perceived Organisational Support. Logistic regression model was adjusted for age, gender, sport type (individual or team) and occurrence of serious injury.
† Indicates reference category.
* p < .05. Bolded values indicate statistical significance.

After adjusting for age, gender, sport type, and injury, the association between high teammate/training partner support and anxiety symptoms was no longer statistically significant (OR = 0.17, 95% CI [0.02, 1.40]). No significant associations were found between any POS level and flourishing (MHC-SF), psychological strain (APSQ ≥14), depression (PHQ-9 ≥10), or anxiety (GAD-7 ≥10). Despite a lack of statistical significance, several ORs suggested potentially meaningful relationships, such as higher odds of flourishing among those with high support from coaches (OR = 2.55, 95% CI [0.52, 12.55]).

The overall model fit was re-evaluated for each mental health outcome. The model predicting flourishing (MHC-SF) was no longer statistically significant (p = .165) but had a stronger model of fit with an elevated McFadden's pseudo-R^2 value of 0.134. The adjusted model predicting sport-related stress (APSQ) approached statistical significance (p = .056), with a McFadden's pseudo-R^2 value of 0.162. In contrast, models for depression (PHQ-9) and anxiety (GAD-7) were not significant (p = .506 and .347, respectively) with McFadden's pseudo-R^2 values of 0.139 and 0.178, respectively.

Discussion

While few direct associations were identified, the findings revealed meaningful patterns in how athletes perceive support and how this may relate to their mental health. In unadjusted models, teammate support was linked to lower anxiety symptoms, and overall POS significantly predicted flourishing. Although these results did not remain significant after adjusting for covariates, they align with broader research, where perceived support, particularly from peers and immediate supervisors, has been linked to better psychological outcomes (Chatzittofis et al., 2021; Dingens, 2022; Mackay et al., 2023). Moreover, athletes reported comparatively high levels of perceived support, particularly from coaches and peers, with notable variation at different levels by season timing, sport type, and injury history. This suggests that POS may operate as a dynamic, context-dependent construct shaped by situational factors, rather than a stable protective factor, reinforcing the need for flexible, context-sensitive support strategies. As one of the first studies to explore multi-level organisational support in athletes using the robust POS framework, these findings contribute to a broader understanding of how structural and relational dynamics shape mental health in sport.

Prevalence

Although not statistically significant, female athletes had more than double the prevalence of depression compared to males, reflecting trends in the broader literature (Kew et al., 2024; Mascaro et al., 2023). However, the anticipated gender gap in anxiety (Kew et al., 2024; Mascaro et al., 2023; Winther, 2023) was not observed, likely due to the broad inclusion criteria and limited statistical power in this sample. A significant difference in depression prevalence was found across ethnic groups. While there is limited research specifically examining ethnicity-based mental health disparities in athletic populations, this result is consistent with recent national data indicating that Māori are 1.4 times more likely to experience moderate to severe psychological distress than non-Māori, after adjusting for age and gender (Ministry of Health, 2024b). On the surface, the high prevalence of elevated psychological strain in this sample (59.6%) may seem unexpected, particularly as it is double the rates reported among a large sample of elite athletes (29.5%). However, this finding is less concerning since this same study found it tends to produce variable false-negatives (Anderson et al., 2023) and the sample of our study consisted predominantly of amateur athletes. Developed by the IOC, the APSQ was designed for Olympic athletes and prioritises sensitivity over specificity, it is a triage tool designed to flag a wide range

of potential concerns and ensure that at-risk athletes are not overlooked, serving as a first step to determine whether more detailed assessment using tools like the PHQ-9 is needed (Gouttebarge et al., 2021).

To date, no published studies have reported prevalence of POS within athlete populations, particularly when delineated into organisational, coach/support staff, and teammate/training partner levels. However, similar multi-level support structures have been examined in other high-performance high-stakes environments, such as the Fire and Emergency New Zealand (FENZ) well-being study by Mackay et al. (2024). Compared to FENZ employees, athletes in this study reported higher levels of perceived support from coaches/support staff, who represent the equivalent of managers in the FENZ model (75.7% vs 45.3%). Organisational support was higher among athletes (58.7% vs 14.2%), while high perceived teammate/training partner support was slightly lower than the co-worker level in FENZ (72.1% vs 82.7%). A reason for these findings could be due to greater visibility of sport administrators, more direct access to support services, or smaller organisational structures compared to large, decentralised emergency agencies like FENZ. Notably, prevalence of high perceived support from different organisational levels varied significantly by season timing, sport type, and injury history, highlighting how contextual factors influence the magnitude of POS. While direct comparisons between athletes and emergency personnel should be made with caution, this reinforces the importance of examining POS in performance-driven settings where both individual well-being and team functioning are critical.

Associations

Despite strong theoretical and empirical rationale for the benefits of POS on mental health outcomes, this study found limited direct associations between POS and mental health measures in New Zealand athletes. The only significant independent association emerged at the peer-level: athletes who perceived higher support from teammates or training partners had 82% reduced odds of experiencing moderate to severe anxiety symptoms (OR = 0.18, 95% CI [0.04, 0.91], p = 0.038). This aligns with the growing body of research indicating that peer-level support plays a key role in buffering against mental health issues like anxiety (Kuettel et al., 2021; Mackay et al., 2023). However, this effect was no longer statistically significant in the adjusted model, suggesting that demographic or contextual factors (e.g., age, gender, sport type, injury status) may influence how athletes experience or report perceived support. For instance, it is possible that the mental health status of younger athletes or those in team sports may be more sensitive to support provided by teammates or training partners.

No other independent associations between POS (at the coach/support staff or organisational level) and any mental health outcome were identified. This diverges from existing research in traditional workplace settings, which consistently links higher POS to reduced symptoms of depression, anxiety, and stress (Dingens, 2022; Krishnan & Mary, 2012; Mackay et al., 2023; Tamimi et al., 2023). Several factors may help explain this discrepancy. Firstly, athletes are often classified as contractors rather than employees in New Zealand, meaning organisational structures and obligations are fundamentally different from typical employment contexts (Health and Safety at Work Act, 2015). Secondly, the relationship between POS and mental health may be indirect, operating through mediating variables such as psychological capital, coping mechanisms and organisational commitment (i.e., boosting psychological resources (e.g., confidence, hope, effective stress management, feeling loyal or committed to the team/organisation)) which in turn promote positive mental health outcomes (Mackay et al., 2023; Panaccio & Vandenberghe, 2009; Roemer & Harris, 2018).

Another possible explanation could relate to the well-being measurement tool used. While the MHC-SF is psychometrically robust and widely validated (Lamers et al., 2011), it may lack relevance in the context of sport. Previous research suggests that the Sport MHC-SF, a version adapted to the sporting environment, may be better suited to capturing the nuances of athlete well-being (Foster & Chow, 2019). Moreover, in Aotearoa, culturally grounded well-being frameworks such as Te Whare Tapa Whā emphasise relational and spiritual dimensions, such as whānau (social connection), wairua (spirituality), and connection to whenua (land and identity), which are not explicitly captured by the universal MHC-SF. As such, the tool may fail to fully detect culturally meaningful expressions of positive functioning (well-being) among Māori and Pacific athletes. Future research should consider adapting well-being measures to better reflect both sport-specific and cultural domains that shape how flourishing is experienced and expressed.

Unlike the FENZ study by Mackay et al. (2023), the results did not detect high POS at each level to be independently associated with improved odds of positive well-being (flourishing in our study). Yet the unadjusted model predicting flourishing did reach statistical significance. Possibly suggesting a collective effect, where support across multiple levels (organisation, coach, and peer) jointly contributes to athlete well-being. This finding along with the FENZ findings, highlight the importance of multi-level support structures in shaping mental well-being. Notably, the model significance was lost in our adjusted model though, which may again reflect the moderating effects of the contextual factors we controlled for. Alternatively, the increased size of the adjusted model,

with the additional variables (covariates), was likely underpowered, given the moderate sample size, reducing its ability to detect significance (Bujang et al., 2018).

Practical Implications

Although limited, the findings offer important implications for sport organisations and support staff. The association between teammate support and reduced anxiety, albeit unadjusted, reinforces the potential value of peer-level mental health literacy and support training. Initiatives that equip athletes to better support one another (e.g., recognising distress, normalising vulnerability, modelling healthy behaviours) may provide a low-cost, high-impact intervention point (C. C. Walton, Purcell, Pilkington, et al., 2024).

Existing research indicates that perceptions of fairness, supervisor support, incentives, and working conditions can shape POS, which may in turn contribute to mental well-being by promoting resilience, self-efficacy, hope, and optimism (Krishnan & Mary, 2012; Roemer & Harris, 2018). Observational findings from a study conducted on New Zealand employees similarly showed that higher perceived managerial support was associated with better mental health outcomes and coping strategies (Mackay et al., 2023). Reinforcing that although the present study did not find direct effects of coach or organisational support, fostering psychological safety within sporting environments remains important. Educating coaches and support staff in mental health best practices, establishing clear referral pathways, and modelling constructive communication may still strengthen athletes' perceptions of support and enhance well-being (International Olympic Committee, 2021).

Furthermore, the study's broad inclusion criteria that encompasses athletes from varying competition levels, highlights the diversity of support experiences and needs within the sporting population. Since recreational athletes or those not embedded in structured high-performance environments may rely less on organisational support, and more on personal social networks outside of sport (e.g., family, friends, and partners) to buffer mental health challenges. Notably even in high performance environments though, personal social support was shown to have a stronger link to positive mental health outcomes than social support within the organisational environment (Kuettel et al., 2021). Reinforcing that all athletes, regardless of their competition level, should be encouraged to strengthen social ties outside of sport as a protective factor for their mental health.

Limitations

This study had several significant limitations. The broad inclusion criteria for instance, likely introduced heterogeneity that may have affected how POS was experienced and reported. Although a model adjusted for key factors such as age, gender, injury status, and sport type (team vs. individual), variability in contextual factors like career stage and the nature of athlete-staff relationships could still have diluted observed associations between POS and mental health outcomes. For example, athletes in individual sports may relate differently to coaches and peers compared to those in team environments, while injured athletes might engage more frequently or meaningfully with medical staff, influencing their perception of support. Combined with the modest sample size, this heterogeneity has led to the wide confidence intervals and reduced statistical power, warranting cautious interpretation of the findings.

In terms of survey design, placing the POS scales at the end of the survey may have contributed to respondent fatigue, potentially affecting the reliability of the responses. The cross-sectional nature of the study also limits causal inferences and captures only a snapshot of the POS-mental health relationship. Furthermore, categorical diagnostic cut-offs were used to identify mental health outcomes. While this approach enhanced interpretability and aligned with validated clinical thresholds (Kroenke et al., 2001; Spitzer et al., 2006), it reduced sensitivity to detecting subtle nuances in relationships that could have existed and did not fully reflect the continuum nature of mental health described in Keyes' (2002) dual model.

Additionally, while the PHQ-9 and GAD-7 are validated tools widely used in mental health research, their interpretation in elite sport contexts may require increased nuance. For example, symptoms like low mood or anxiety could reflect normal acute responses to competitive stress rather than clinical disorders, potentially inflating prevalence rates (Oevreboe et al., 2023). Conversely, some argue these generic tools may under-detect athlete distress due to biological adaptations from allostatic load dampening symptom expression – a concept termed ‘adaptable depression’ (Forys & Tokuhama-Espinosa, 2022). Although the APSQ was included to offer a sport-specific perspective, it is a screening tool and not a diagnostic measure, with a high percentage of athletes in this sample screening positive. These limitations may have affected observed associations, or lack thereof, and highlight the need for context-sensitive tools and clinical interviews to better distinguish between acute adaptive and chronic maladaptive forms of distress in sport.

Future directions

Future research would benefit from targeting more homogeneous athlete populations, such as young emerging elite athletes or team-sport environments, to reduce contextual variability and better isolate the effects of POS. For example, a more homogeneous sample would likely result in odds ratios with narrower confidence intervals, enhancing the ability to compare the strength of associations across POS levels. This, in turn, could help identify which level of support has the strongest or weakest link to specific athlete mental health outcomes, informing more targeted and prioritised intervention strategies. Investigating POS within a single sporting organisation, across its various representative teams, could also offer more granular insight into their multi-level support and generate data that is both relevant and actionable for the organisation.

Given the potential moderating role of factors like age, sport type, and competition level, future studies could also explore how POS functions differently across stages of athlete development or between individual and team-based sports. Additionally, intervention studies that aim to strengthen organisational support structures, similar to approaches trialled in emergency services (Mackay et al., 2024) could help clarify whether enhancing perceived support has a causal effect in athlete mental health and well-being.

Conclusion

This study suggests that most New Zealand athletes are flourishing, and with rates of anxiety and depression comparable to those reported in other elite sporting and general Australasian populations. In unadjusted analyses, low perceived support from teammates or training partners was associated with elevated odds of moderate to severe anxiety, and overall POS significantly predicted flourishing. However, these associations did not hold once key variables such as age, gender, injury status, and the sport type were controlled for. No significant associations were found between POS at any level and any mental health outcome in the adjusted models.

While these null findings might suggest that organisations should deprioritise their athlete support pathways, it is important to acknowledge that absence of evidence does not prove evidence of absence. The lack of significant associations likely reflects low statistical power rather than a true lack of effect. These inconsistent results do however highlight that effective athlete support likely requires a tailored, multi-level approach (addressing organisational, coach, and peers support) that is sensitive to contextual and individual differences. Considered alongside broader literature,

these findings further underline the importance for organisations to not only foster supportive team and organisational environments, but also encourage athletes to maintain and strengthen relationships outside of sport as part of a comprehensive and effective strategy for mental well-being. Larger, stratified studies are required in the future to better understand how POS functions across athlete subgroups.

Chapter 5: General Discussion

5.1 Synthesis of Findings

For our primary research question, logistic regression analyses revealed that poor sleep hygiene was significantly associated with nearly 20 times higher odds of anxiety and over 25 times higher odds of depression, while weekly binge drinking was linked to over a 95% reduction in the odds of flourishing. Although POS at any individual level or collectively was not significantly associated with mental health outcomes in adjusted models, results from unadjusted models suggested a potential collective link to flourishing and high teammate support was associated with over 80% reduced odds of anxiety; further highlighting how the contextual factors we controlled for (age, gender, sport type, and injury status) shape how perceived support relates to athlete mental health. Notably, the significant associations found across both studies were accompanied by wide confidence intervals, suggesting the magnitude of effect sizes should be interpreted with caution.

In relation to the second research question on the prevalence of behavioural risk factors and POS, several key patterns emerged across both studies. Behaviourally, approximately half of the participants (50.5%) reported spending between 0.5–2 hours per day on social media, nearly a third (32.7%) met the CRAVED-7 threshold for food addiction, and 16.0% were determined to have poor sleep hygiene. In terms of POS, the highest prevalence of high POS was reported from coaches and support staff level (75.7%), with a greater proportion of high POS being reported at each organisational level compared to low POS.

In terms of the third research question regarding mental health prevalence, 15.4–16.5% of participants screened positive for depression, 13.5–14.7% for anxiety, and 59.6–61.5% reported elevated psychological strain. Among those with anxiety or depression, two-thirds experienced both. In support of the dual continuum model, 60.2–61.5% of athletes were classified as flourishing, although a small subset (n = 3) within this group also screened positive for a mental health disorder. Similarly, 8.7–9.3% were categorised as languishing, with approximately one-third of this group (n = 3) not meeting clinical thresholds for anxiety or depression. Overall, nearly two-thirds of participants (63.5–65.1%) exhibited at least one negative mental health outcome.

Together, the findings from Chapters 3 and 4 offer a more integrated view of athlete mental health, reinforcing that both behavioural and environmental influences matter, albeit in different ways. Behavioural factors like sleep hygiene and binge drinking showed clearer, statistically significant

associations with mental health outcomes, particularly symptoms of anxiety, depression, and flourishing. These results suggest that some individual-level behaviours, may have a more proximal association with mental health. In contrast, while POS did not demonstrate strong adjusted associations, its importance may lie in more indirect or cumulative effects – particularly through the influence of peer dynamics, injury experience, or training environments (International Olympic Committee, 2021; Kuettel et al., 2021; C. C. Walton, Purcell, Pilkington, et al., 2024). Importantly, POS represents the shared responsibility of those within an athlete's micro-system to support their mental health. Offering a practical and accessible way for people close to the athlete to meaningfully support their well-being. A perspective that is starting to gain traction both in research and sport policy (High Performance Sport New Zealand, 2024; International Olympic Committee, 2021; Purcell et al., 2019; Reardon et al., 2019).

Moreover, the value of viewing mental health through a dual continuum lens became evident across both studies. While clinical rates of depression and anxiety were comparable to previous elite sport literature (Ackeret et al., 2024; Moore et al., 2025), the co-occurrence of flourishing and mental illness, and the presence of languishing without clinical symptoms, highlighted the highly complex nature of mental health (Lundqvist & Andersson, 2021) revealing important limitations to traditional deficit-based models (W. Wang, Schweickle, Arnold, et al., 2025). This nuanced view aligns with recent frameworks that advocate for mental health promotion, not just illness prevention, in sport (Kuettel et al., 2021; P. Sullivan & Celebre, 2025; Uphill et al., 2016; S. A. Vella et al., 2025; W. Wang, Schweickle, Arnold, et al., 2025).

Similarly, the subtle yet meaningful trends in POS suggest that social and structural factors play an important role in athlete wellbeing, even if their effects are harder to isolate statistically in smaller, heterogeneous samples. Notably, to the author's knowledge, this is the first known study to develop and apply multi-level, sport-specific POS measures in an athlete population. This represents a novel methodological contribution, providing a framework for future sport organisations to assess and strengthen support at structural and interpersonal levels.

Collectively, the data points to a need for multi-level strategies that promote positive mental health and prevent distress by supporting both individual behaviours (the athlete) and the microsystems (the teammates, coaches, and support staff) the athletes operate within (Purcell et al., 2019). One practical step forward may involve investigating POS within a single sporting organisation, across its various representative teams. This approach could offer more nuanced insight into how multi-level support is experienced internally and provide contextually relevant, applicable data for that

organisation. Furthermore, while these organisational and behavioural strategies are crucial, they represent only part of a much larger picture. An important dimension that remains underexplored is how broader societal, systemic, and cultural forces may be shaping the mental health landscape, not only within sport but across the wider youth population in Aotearoa.

5.2 Broader Picture

National epidemiological data from Aotearoa New Zealand show a sharp increase in psychological distress over the past decade, with rates in the general population doubling from 6.2% to 13.0% (Ministry of Health, 2024b). Young adults have been especially impacted: 18–24-year-olds were identified as currently the most distressed age-group (22.9%), and rates among 25–34-year-olds have doubled since 2019 (from 8.8% to 18.0%), representing the steepest rise in recent years. These age groups account for most of the elite athlete population in New Zealand, which is particularly concerning given that one group has the highest rates of psychological distress and the other is the fastest growing at-risk cohort.

Importantly, these patterns are not unique to New Zealand. International evidence mirrors this trajectory; for example, Twenge et al. (2019) reported sharp increases in depressive episodes among US adolescents and young adults between 2011 and 2017, particularly among females. Similarly, Keyes et al. (2019) observed a marked increase in mean depression scores among adolescents after 2012, with girls showing a much steeper increase than boys. Furthermore, the Lancet's recent mental health review underlines the wide-spread global decline in youth mental health over the past two decades, linking these patterns to broad societal changes (The Lancet Psychiatry Commission, 2024). Given these trends, it is reasonable to conclude that athletes, especially younger ones, are also impacted by the same broader societal changes driving these trends.

What societal changes might be driving these mental health trends? One likely factor is rising economic instability. Low socioeconomic status is consistently linked to worse mental health outcomes, like depression and anxiety (Kirkbride et al., 2024; Silva et al., 2016; World Health Organization, 2014). Given the post-pandemic rise in inflation and job insecurity, it is therefore unsurprising that financial uncertainty is a key stressor for youth in Aotearoa (Stubbing et al., 2023), especially since the greatest burden of economic instability is likely placed on those at the beginning of their careers who have limited financial resources compared to older cohorts.

A second factor may be the rapid development and expansion of digital technology. Numerous studies have proposed that the growing time spent on screens is deteriorating young people's mental health through mechanisms like reduced in-person interaction, increased exposure to harmful material, and elevated social comparison (Di Cara et al., 2022; Orben et al., 2024; Przybylski & Weinstein, 2017; Twenge, 2020; Twenge et al., 2018; Twenge & Campbell, 2019). Reduced in-person interaction is particularly concerning due to the established association loneliness and inadequate social support both have with various negative mental health outcomes (Holt-Lunstad et al., 2015; Jose et al., 2012; Pearce et al., 2023; Silva et al., 2016). Although the relationship is more nuanced than simply screen-time and the relationship is not uniformly negative, New Zealand's youth have also voiced personal concerns about the addictive nature of technology (Stubbing et al., 2023).

A third plausible factor: declining physical activity. Regular movement is a strong protective factor against a range of mental health issues (Belcher et al., 2021; Fu et al., 2025), yet research suggests activity levels among adolescents are falling (McAnally et al., 2018; Sport New Zealand, 2023). Some authors believe this decline to be driven by increased screen use (Priftis & Panagiotakos, 2023; Sanz-Martín et al., 2022), whereas others propose it could be from reduced access to green spaces and walkable environments (García de Jalón et al., 2021; Mytton et al., 2012). While these three factors are not exhaustive, they help illustrate the broader societal shifts shaping youth mental health, and thus athlete mental health, beyond individual behaviours or an individual's micro-system.

However, elite athletes' mental health situation may be uniquely complex. On one hand, their participation in sport offers protective factors such as physical activity, positive social connection, identity, and structure (Belcher et al., 2021; Eather et al., 2023; Fu et al., 2025; Kuettel & Larsen, 2019). On the other, elite sport can also amplify risk factors through injury, relocation, public scrutiny, career/financial uncertainty, and intense pressure to perform (Beable et al., 2017; International Olympic Committee, 2021; Winther, 2023). Many elite athletes sit within age brackets most vulnerable to mental distress and may be navigating youth-specific challenges alongside the demands of high-performance environments. This highlighted that sport may both buffer and magnify underlying risks, depending on the individual and their environment. Understanding athlete mental health, therefore, requires a dual lens, one that recognises both their shared societal context and the unique demands of the elite sporting system.

5.3 Research Journey

This section outlines the evolution of my project and the practical realities of conducting applied research in elite sport. While many of the challenges I encountered, such as athletes' demanding schedules and the stigma surrounding mental health, are well documented (e.g., Gill, 2023; Reardon et al., 2019; Tamimi et al., 2023), the process of navigating access as an external researcher added unexpected complexity. What began as a straightforward cross-sectional study became a dynamic and adaptive process shaped by shifting timelines, organisational barriers, and evolving opportunities. In the reflections that follow, I highlight the decisions, compromises, and lessons learned along the way. These insights not only contextualise the final scope of the study but also shed light on the broader challenges of bridging academic research with real-world elite sport environments.

Upon receiving ethics approval, I contacted a range of elite New Zealand sporting organisations. While some expressed interest, others declined, often citing concerns about overburdening athletes with well-being research or noting they already had internal monitoring systems and research taking place. Despite ongoing outreach efforts, participant numbers remained low. Beyond stigma or research burden, I suspect a key barrier was the lack of established trust. As external researchers with no prior relationship to the organisations or athletes, we were likely seen as disconnected from their specific context. Furthermore, although the study's anonymous design may have mitigated stigma-related barriers, it also offered no individual feedback, which possibly reduced its perceived value.

Despite these initial difficulties, two major national sporting organisations did express support for the study later in the recruitment process. Both of whom recommended shifting the focus toward younger emerging elite athletes, identifying them as a particularly vulnerable group compared to elite adults – citing reasons such as heightened career uncertainty, financial instability, and the added burden of balancing school and social demands. These risk factors are further compounded by ongoing neurodevelopment of the prefrontal cortex, a brain region crucial for emotional regulation and decision-making.

Therefore, following these discussions, I adapted the project accordingly by revising the survey language to be suitable for a younger demographic, developing consent forms, and switching to paper-based data collection for the upcoming camps. However, the extent of these changes meant my ethics amendments underwent an additional full committee review. With approval uncertain before the first camp, I proposed delivering a mental skills workshop to retain my

allocated spot and leave the door open to still collect data if the ethics was approved in time. Ultimately, delays in ethics approval and scheduling conflicts with future camps and thesis deadlines meant data collection was not feasible for either porting organisation though. So, after delivering the workshop, I returned to the original study scope, broadening the inclusion criteria to increase participant numbers to an adequate level for analysis.

In hindsight, although it was frustrating at the time, this experience underlines the challenges of conducting applied research in real-world sport settings, particularly as an outsider without established connections. While the academic rationale for the study was clear, I learnt a gap in the literature does not automatically translate into interest or perceived value from sporting organisations. For research to resonate in elite sport environments, I now understand early consultation and co-design are essential to align with the priorities of organisations and the realities athletes face.

Furthermore, throughout the recruitment process, it became evident that organisational buy-in and athlete-researcher trust are both critical elements of recruitment. For instance, despite some organisations expressing support and promoting the study internally, athlete engagement remained limited. In retrospect, attending camps or training sessions in-person would likely have improved trust and rapport, making it easier to communicate the purpose and value of the research. Likewise, while a low time commitment and full anonymity helps reduce barriers to conducting mental health research in elite athletic populations, like research burden and mental health stigma (Gill, 2023; Reardon et al., 2019; Tamimi et al., 2023), athletes and their organisations still need to perceive clear, immediate value in participating. In this case, the anonymous, cross-sectional design offered no individual feedback or actionable results, which likely reduced engagement. Providing something of practical value, such as delivering a mental skills workshop beforehand, may have offered greater incentive and helped increase participation.

Although the study did not unfold exactly as planned, the experience highlighted the importance of building trust, clearly communicating mutual value, and persisting politely in the face of setbacks. I am also grateful for the opportunities it created. Specifically, the chance to deliver the mental skills workshop, which gave me practical experience in an area I hope to pursue in the future. The project also enabled me to build meaningful connections and engage in valuable conversations with individuals in the high-performance sport sector about a topic I am passionate about and eager to continue exploring to better support athlete performance and well-being.

These conversations and consultations helped highlight several under-researched groups within elite sport that warrant further attention. One such group is emerging elite youth athletes (EYAs). Although terminology varies across the literature, in this context EYAs refers to athletes over the age of 16 who are competing at national or international age-grade level and are on the cusp of transitioning into open-age elite competition. Unlike established professionals, EYAs face a unique set of stressors that may impact their mental health, including heightened career uncertainty, the challenge of balancing sport with academic or work commitments, navigating important life transitions (i.e., loss of familiar support systems), increased performance pressure, and ongoing social, physiological, and psychological development (Ackeret et al., 2024; Purcell et al., 2022; C. C. Walton, Purcell, Pilkington, et al., 2024). Leaders at sporting organisations echoed these concerns, noting a growing need for targeted strategies that support well-being during this transition phase.

Beyond athletes, future research should also consider the mental health and support needs of coaches. Since coaches often serve as the bridge through which organisational pressures and expectations are filtered through to the athletes, playing a key role in shaping team culture and athlete outcomes. Research suggests coaches experience comparable prevalence of mental ill-health compared to athletes (Kegelaers et al., 2021; Pilkington et al., 2022) and many who are former athletes often carry competitive expectations from their playing days into their coaching roles, leading to heightened performance pressure and fear of failure (Mallett & Lara-Bercial, 2016; Olusoga et al., 2010). Similarly, referees operate under intense scrutiny with minimal resources. In tournament situations, they can endure long shifts, verbal abuse, and are expected to perform flawlessly, often without the same recognition afforded to athletes. Taken together, these areas highlight the value of broadening the scope of mental health research in sport to include all members of the performance environment, not just athletes, to develop more sustainable and supportive systems.

5.4 Conclusion

This thesis offers a comprehensive exploration of both internal behavioural and external organisational support factors associated with mental health in New Zealand athletes. Across two studies, poor sleep hygiene and weekly binge drinking emerged as significant behavioural links to worse mental health outcomes, while POS, though not statistically significant in the adjusted models, remains conceptually important as a highly modifiable lever through which sporting environments can influence mental health. By synthesising these findings, the thesis reinforces

that mental health in sport is influenced by a dynamic and complex interplay of modifiable behaviours and systemic conditions. It highlights the need for athlete support systems that address not only the reduction of psychological symptoms but also actively foster positive mental well-being, through context-sensitive and multi-level interventions. Ultimately, these insights contribute to a growing body of sport psychology literature advocating for a more holistic and proactive approach to mental health in high-performance environments.

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Appendices

Appendix A: Ethics Approval Letter

Auckland University of Technology Ethics Committee
(AUTEC)

25 October 2024

Grant Schofield
Faculty of Health and Environmental Sciences

Dear Grant

Ethics Application: 24/321 **Exploring the dual dimensions of mental health and the associated behavioural and organisational factors in elite team sport athletes.**

The Auckland University of Technology Ethics Committee (AUTEC) has reviewed your application via the minimal risk pathway and it has been approved.

This approval is for three years, expiring 24 October 2027.

Non-Standard Conditions of Approval

1. Recommend rewording the title as the word, dual is used but there are three components the study is investigating.
2. Please include the ethics approval statement on the study advertisements.
3. Revise the suggestion on the advertisement(s) that completion will inform participants about 'How their mental Wellbeing is linked to their daily behaviours and team support' since reporting will be done as an aggregate summary only, not an individual report.

Non-standard conditions do not need to be submitted to or reviewed by AUTEC unless requested but must be completed before commencing your study.

Standard Conditions of Approval

1. The research is to be undertaken in accordance with the Auckland University of Technology Code of Conduct for Research and as approved by AUTEC.
2. All public facing documents must have the AUTEC approval number and be of a high standard of spelling and grammar. Dates on the Information Sheet(s) and Consent Form(s) must be consistent.
3. Any amendments to the project must be approved by AUTEC prior to being implemented.
4. A progress report is due annually on the anniversary of the approval date.
5. A final report is due at the expiration of the approval period, or, upon completion of project.
6. Any serious or adverse events must be reported to AUTEC, this includes unforeseen issues that might affect continued ethical acceptability of the project.
7. AUTEC grants ethical approval only. You are responsible for obtaining management permission for access from any institution or organisation at which your research is being conducted and you need to meet all ethical, legal, public health, and locality obligations or requirements for the jurisdictions in which the research is being undertaken.

The application number and title need to be referenced on all correspondence related to this project.

All forms are available online http://www.aut.ac.nz/research/researchethics

For any enquiries, please contact ethics@aut.ac.nz

(This is a computer-generated letter for which no signature is required)

The AUTEC Secretariat
Auckland University of Technology Ethics Committee

Cc: fraserditchfield@gmail.com

Auckland University of Technology, Private Bag 92006, Auckland 1142, New Zealand.
E: ethics@aut.ac.nz: www.aut.ac.nz/researchethics

Appendix B: Online Survey Questions

Block 1: General Demographics

Q1. By completing this questionnaire, you are indicating your consent to participate in this research

- ☐ Yes, I understand
- ☐ No, I don't understand

Q2. What is your age?

- ☐ < 18 years old
- ☐ 18-19 years old
- ☐ 20-24 years old
- ☐ 25-29 years old
- ☐ 30-34 years old
- ☐ ≥ 40 years old

Q3. What is your ethnicity? (Please select all that apply)

- ☐ New Zealand European/Pākehā
- ☐ Māori
- ☐ Samoan
- ☐ Cook Island Māori
- ☐ Tongan
- ☐ Niuean
- ☐ Tokelauan
- ☐ Chinese
- ☐ Indian
- ☐ Fijian
- ☐ Other e.g., Dutch, Japanese (please specify)
- ☐ Don't know / prefer not to answer

Q4. Which of the following answers best describes your current living situation?

- ☐ Male
- ☐ Female
- ☐ Another gender (please specify)
- ☐ Prefer not to say

Q5. What is your current partnership status?

- ☐ I have a partner
- ☐ I do not have a partner
- ☐ Prefer not to say

Q6. How many dependent children do you have? *(A dependent child is a child or young person who primarily relies on you for care and financial support, whether they live with you or not.)*

- ☐ No dependent children
- ☐ 1 dependent child
- ☐ 2 dependent children
- ☐ 3 dependent children
- ☐ ≥ 4 dependent children
- ☐ Prefer not to say

Q7. Have you ever been diagnosed with a mental health condition (e.g., Major Depressive Disorder or General Anxiety Disorder) by a healthcare professional (e.g., doctor or psychologist) before?

- ☐ No, I have not
- ☐ Yes, I have

Q8. Are you currently or have you in the past taken any prescription medication to help manage a diagnosed mental health condition?

- ☐ No
- ☐ Yes

Block 2: Sport Demographics

Q9. Please select the name of the primary sport you compete in. *(Primary sport in this context, is the sport that you have competed at the highest level for in the past year.)*

- ☐ Athletics
- ☐ Baseball
- ☐ Badminton
- ☐ Basketball
- ☐ Cricket
- ☐ CrossFit
- ☐ Cycling
- ☐ Equestrian
- ☐ Football (soccer)
- ☐ Futsal
- ☐ Golf
- ☐ Hockey (field)
- ☐ Kī-o-rahi
- ☐ Lacrosse
- ☐ Netball
- ☐ Rowing
- ☐ Rugby League
- ☐ Rugby Sevens
- ☐ Rugby Union
- ☐ Softball
- ☐ Squash
- ☐ Surfing
- ☐ Swimming
- ☐ Tag Football
- ☐ Tennis
- ☐ Touch Rugby
- ☐ Triathlon
- ☐ Ultimate Frisbee
- ☐ Volleyball
- ☐ Water Polo
- ☐ Other (please specify)

Q10. During the past year, what is the highest level at which you have competed in your primary sport?

- ☐ Domestic National Level: Competed for a province in a New Zealand-based national competition (e.g., North Harbour Rugby or represented Waikato in the NZ Track & Field Championship).
- ☐ International Franchise Level: Competed for a New Zealand-based franchise that regularly participates in international competitions (e.g., Wellington Phoenix).
- ☐ International Level: Competed for New Zealand in international competitions (e.g., Silver Ferns or Cycling NZ).
- ☐ Domestic Age-Grade Level: Competed on at age-grade provincial level in a New Zealand-based national competition (e.g., U19 Otago Cricket Team).
- ☐ International Age-Grade Franchise Level: Competed on at an age-grade New Zealand-based franchise (e.g., Blues U20).
- ☐ International Age-grade Level: Competed for New Zealand at an age-grade international competition (e.g., U21 NZ Blacksticks or represented NZ at the World u20 Athletics Championship)
- ☐ Local Regional Level: Competed for a local New Zealand club or team that competed only within regional boundaries (e.g., Northcote Premier Rugby or regularly compete in golf tournaments)
- ☐ Other: A different level than the ones listed above.

Q11. Please select which option best represents your current situation.

- ☐ Professional athlete: You earn your primary income through contracts, sponsorships, or endorsements related to your athletic performance. Your sports career is your main professional activity.
- ☐ Semi-professional athlete: You receive partial financial support, in-kind support (e.g., accommodation), or sponsorship, but you do not rely solely on your sporting career for income.
- ☐ Competitive amateur athlete: You compete at a high level in your sport but do not receive financial compensation, sponsorship, or significant in-kind support.
- ☐ Club-Level Athlete: You participate actively in local or regional competitions and training, with your involvement in sports being central to your lifestyle—even though it is not your main source of income.
- ☐ Social/Recreational Athlete: You engage in sports primarily for enjoyment, fitness, or social interaction, competing occasionally but not at the highest levels.

Q12. What type of competitive season best describes your primary sport?

- ☐ Event-based (e.g., single competitions or tournaments throughout the year).
- ☐ Season-based (e.g., a defined competitive season with regular matches or events).
- ☐ A mix of both event-based and season-based.
- ☐ Other (please specify).

Q13. What time of the season are you currently in for your primary sport?

- ☐ Preseason.
- ☐ In Season.
- ☐ Post Season.
- ☐ Off Season.
- ☐ Other (please specify).

Q14. Do you travel domestically or overseas for competitions that require at least one night away from home? (please select one)

- ☐ Domestically.
- ☐ Overseas.
- ☐ Both.
- ☐ Neither.

Q15. In the last 6 months, how many nights have you spent away from home while traveling for your primary sport? (please select one)

- ☐ ≤ 5 nights
- ☐ 6-10 nights
- ☐ 11-20 nights
- ☐ 21-30 nights
- ☐ 31-40 nights
- ☐ > 40 nights

Q16. In the past week, how many **training sessions** and/or **games/competitions** did you have for your primary sport? (please select one)

- ☐ < 3 per week
- ☐ 3-4 per week
- ☐ 5-6 per week
- ☐ 7-8 per week
- ☐ 9-10 per week
- ☐ 11-12 per week
- ☐ ≥ 13 per week

Q17. In the past week, how many hours in total did you spend **training and/or competing** for your primary sport? (Please select one)

- ☐ < 5 hours
- ☐ 5-10 hours
- ☐ 11-15 hours
- ☐ 16-20 hours
- ☐ 21-30 hours
- ☐ > 30 hours

Q18. In the past week, how many **hours in total** did you spend **travelling to and from** trainings and/or competitions? (Please select one)

- ☐ < 1 hour
- ☐ 1-3 hours
- ☐ 3-5 hours
- ☐ 5-7 hours
- ☐ 7-10 hours
- ☐ > 10 hours

Q19. How many serious ***injuries*** within the ***past two years*** have you had? A serious injury in this context is defined as an injury that caused >28 days of time to be lost from training and competition. (Please select one)

- ☐ None
- ☐ One
- ☐ Two
- ☐ Three
- ☐ Four
- ☐ Five or more

Q20. How many episodes of serious ***illness*** within the ***past two years*** have you had? A serious illness in this context is defined as an illness that caused >28 days of time to be lost from training and competition. (Please select one)

- ☐ None
- ☐ One
- ☐ Two
- ☐ Three
- ☐ Four
- ☐ Five or more

Q21. In the last 6 months, how many ***weeks*** of training or competition have you missed ***due to injury?*** Add up all the days you couldn't train or compete because of injury, and provide the total number of weeks these days add up to. (Please select one)

- ☐ < 2 weeks
- ☐ 2-4 weeks
- ☐ 5-8 weeks
- ☐ > 8 weeks

Q22. In the last 6 months, how many ***weeks*** of training or competition have you missed ***due to illness****?* Add up all the days you couldn't train or compete because of illness, and provide the total number of weeks these days add up to. (Please select one)

- ☐ < 2 weeks
- ☐ 2-4 weeks
- ☐ 5-8 weeks
- ☐ > 8 weeks

Q23. In the past week, excluding any days worked as an athlete, how many **days** did you engage in **other paid work**? (Please select one)

- ☐ 0 days per week
- ☐ 1-2 days per week
- ☐ 3-4 days per week
- ☐ ≥ 5 days per week

Q24. In the past week, excluding any hours worked as an athlete, how many **hours** did you engage in **other paid work**? (Please select one)

- ☐ < 5 hours
- ☐ 5-10 hours
- ☐ 11-15 hours
- ☐ 16-20 hours
- ☐ 21-30 hours
- ☐ > 30 hours

Q25. In the past week, how many **hours** have you spent **travelling to and from** work? (Please select one) *Again, in this context, the term 'work' excludes the work you may do as an athlete.*

- ☐ < 1 hour
- ☐ 1-3 hours
- ☐ 3-5 hours
- ☐ 5-7 hours
- ☐ 7-10 hours

Block 3: Mental Health Measures

The next few questions focus on your mental health and wellbeing. We're interested in understanding how you've been feeling over the past month. Your responses to these questions are anonymous and will help provide a clearer picture of mental health in athletes.

Some of these questions may seem similar, but we ask them because they address different mental health challenges.

Q26. In the past month, how often did you feel...

(Please tick one box per row)

	Never	Once or twice	About once a week	About 2 or 3 times a week	Almost everyday	Everyday
happy						
interested in life						
Satisfied with life						
that you had something to contribute to society						
that you belonged to a community (like a social group or your neighbourhood)						
that our society is a good place, or is becoming a better place, for all people						
that people are basically good						
that the way our society works makes sense to you						
that you liked most parts of your personality						
good at managing the responsibilities of your daily life						
that you had warm and trusting relationships with others						
that you had experiences that challenged you to grow and become a better person						
confident to think or express your own ideas and opinions						
that your life has a sense of direction or meaning to it						

Q27. These questions concern how you have been feeling over the past 30 days. Please select the answer that best represents how you have been. *(Please tick one box per row)*

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
It was difficult to be around teammates.					
I found it difficult to do what I needed to do.					
I was less motivated.					
I was irritable, angry or aggressive.					
I could not stop worrying about injury or my performance.					
I found training more stressful.					
I found it hard to cope with selection pressures.					
I worried about life after sport.					
I needed alcohol or other substances to relax.					
I took unusual risks off-field.					

Q28. Over the last 2 weeks, how often have you been bothered by the following problems?

(Please tick one box per row)

	Not at all	Several days	More than half the days	Nearly everyday
Little interest or pleasure in doing things.				
Feeling down, depressed, or hopeless.				
Trouble falling or staying asleep, or sleeping too much.				
Feeling tired or having little energy.				
Poor appetite or overeating.				
Feeling bad about yourself - or that you are a failure or have let yourself or your family down.				
Trouble concentrating on things, such as reading the newspaper or watching television.				
Moving or speaking so slowly that other people could have noticed. Or the opposite - being so fidgety or restless that you have been moving around a lot more than usual.				
Thoughts that you would be better off dead, or of hurting yourself.				

Q29. Over the last 2 weeks, how often have you been bothered by the following problems?

(Please tick one box per row)

	Not at all	Several days	More than half the days	Nearly everyday
Feeling nervous, anxious, or on edge.				
Not being able to stop or control worrying.				
Worrying too much about different things.				
Trouble relaxing.				
Being so restless that it is hard to sit still.				
Becoming easily annoyed or irritable.				
Feeling afraid as if something awful might happen.				

Block 5: Behavioural Characteristics

The following questions are about your relationship to and use of social media (Facebook, Instagram, Linkedin, X, TikTok and the like). Choose the response for each question that best describes you.

Q30. On a typical weekday, how much time do you spend on your most common social media apps, such as Facebook, Instagram, LinkedIn, X (formerly twitter), Reddit, and TikTok? *Please exclude messenger apps (like WhatsApp, Telegram, Messenger, and Snapchat) and other digital media (such as Spotify, Netflix, and YouTube).*

- ☐ None
- ☐ < 30 mins
- ☐ 30 mins - 1 hour
- ☐ 1 hour - 1 hour 30mins
- ☐ 1 hour 30mins - 2 hours
- ☐ 2-3 hours
- ☐ 3-4 hours
- ☐ 4-5 hours
- ☐ > 5 hours

Q31. How often during the last year have you... *(Please tick one box per row)*

	Very rarely	Rarely	Sometimes	Often	Very often
...spent a lot of time thinking about social media or planned use of social media.					
...felt an urge to use social media more and more.					
...used social media to forget about personal problems.					
...tried to cut down on the use of social media without success.					
...become restless or troubled if you have been prohibited from using social media.					
...used social media so much that it had a negative impact on your job, studies, sport or training.					

The following questions are about your relationship to and use of gaming (Computer, Xbox, PlayStation, Smartphone and the like). Choose the response for each question that best describes you.

Q32. On a normal weekday, what is average daily time you spend gaming. Gaming includes: gaming on a Smartphone, Xbox, PlayStation, Computer, Nintendo and the like.

- ☐ None
- ☐ < 30 mins
- ☐ 30 mins - 1 hour
- ☐ 1 hour - 1 hour 30mins
- ☐ 1 hour 30mins - 2 hours
- ☐ 2-3 hours
- ☐ 3-4 hours
- ☐ 4-5 hours
- ☐ > 5 hours

Q33. Please answer the questions in the table below. *(Please tick one box per row)*

	Never	**Sometimes**	**Often**
When you were not playing, how often have you fantasized about gaming, thought of previous gaming sessions, and/or anticipated the next game?			
How often have you felt restless, irritable, anxious and/or sad when you were unable to play or played less than usual?			
Have you ever in the past 12 months felt the need to play more often or played for longer periods to feel that you have played enough?			
Have you ever in the past 12 months unsuccessfully tried to reduce the time spent on gaming?			
Have you ever in the past 12 months played games rather than meet your friends or participate in hobbies and pastimes that you used to enjoy before?			
Have you played a lot despite negative consequences (for instance losing sleep, not being able to do well in school or work, having arguments with your family or friends, and/or neglecting important duties)?			
Have you tried to keep your family, friends or other important people from knowing how much you were gaming or have you lied to them regarding your gaming?			
Have you played to relieve a negative mood (for instance helplessness, guilt, or anxiety)?			
Have you risked or lost a significant relationship because of gaming?			
Have you ever in the past 12 months jeopardised your school or work performance because of gaming?			

The following questions are about different use of substances, such as vaping and alcohol. Choose the response to each question that best describes you.

Q34. Have you ever tried an electronic cigarette or vaping device, even just a puff or ‘vape’?

- ☐ No
- ☐ Yes

Q35. How often do you now use electronic cigarettes or vaping devices?

- ☐ I don’t use them now
- ☐ At least once a day
- ☐ At least once a week
- ☐ At least once a month
- ☐ Less often than once a month

Q36. How often do you smoke?

- ☐ I don’t smoke
- ☐ At least once a day
- ☐ At least once a week
- ☐ At least once a month
- ☐ Less often than once a month

Q37. How often did you have a drink containing alcohol in the past year?

- ☐ Never
- ☐ Monthly or less
- ☐ 2 or 4 times a month
- ☐ 2 to 3 times per week
- ☐ 4 or more times a week

Q38. How many drinks did you have on a typical day when you were drinking in the past year?

- ☐ None
- ☐ 1 or 2
- ☐ 3 or 4
- ☐ 5 or 6
- ☐ 7 to 9
- ☐ 10 or more

Q39. How often did you have 6 or more drinks on 1 occasion in the past year?

- ☐ None
- ☐ Less than monthly
- ☐ Monthly
- ☐ Weekly
- ☐ Daily or almost daily

Have you ever CRAVED certain foods or drinks? This is a questionnaire to assess whether you experience cravings for foods or drinks that might make it difficult for you to sustain changes to your diet.

Q40. Spend a few minutes thinking about any foods or drinks you struggle to control your intake of. Include foods and drinks that occupy your mind. Write a list of these foods and drinks in the text box below:

Q41. Have you ever...

	YES: In the past month	YES: In the past year	YES: More than one year ago	NO: Never
had such a strong desire or sense of compulsion at the thought of having these foods or drinks that you could not resist the urge to consume them?				
noticed that you need to consume increasing amounts of these foods or drinks to get the same effect compared to when you first had them?				
noticed that you neglect planning activities because you are too tired, sick or preoccupied due to having too much of these foods or drinks?				
consumed more of these foods or drinks than you intended on more than one occasion?				
experienced at least two of the following withdrawal symptoms when you cut down or stopped consuming these foods or drinks? (Headache, Nausea or vomiting, Anxiety, Depressed or low mood, Irritability, Shakes, Sweating, Heart Racing /Palpitations, Fast or shallow breathing, Diarrhoea or constipation, Sleep disturbance or vivid dreams)				
continued to consume these foods or drinks despite you or someone else believing that difficulties with weight gain, diabetes, memory, concentration, anxiety, unexplained mood swings, depression, panic attacks or other physical or mental health problems could be due to your consumption of these foods or drinks				

The following questions relate to your sleep habits. Please select the best answer which you think represents your typical sleep habits over the recent past.

Q42. During the recent past, how many hours of actual sleep did you get at night? (This may be different than the number of hours you spent in bed.)

- ☐ 5-6 hours
- ☐ 6-7 hours
- ☐ 7-8 hours
- ☐ 8-9 hours
- ☐ More than 9 hours

Q43. During the recent past, how satisfied / dissatisfied are you with the quality of your sleep?

- ☐ Very satisfied
- ☐ Somewhat satisfied
- ☐ Neither satisfied nor dissatisfied
- ☐ Somewhat dissatisfied
- ☐ Very dissatisfied

Q44. During the recent past, how long has it usually taken you to fall asleep each night?

- ☐ ≤ 15 minutes
- ☐ 16-30 minutes
- ☐ 31-60 minutes
- ☐ > 60 minutes

Q45. During the recent past, how often do you have trouble staying asleep?

- ☐ Never
- ☐ Once or twice per week
- ☐ Three or four times per week
- ☐ Five to seven days per week

Q46. During the recent past, how often have you taken medicine to help you sleep (prescribed or over the counter)?

- ☐ Never
- ☐ Once or twice per week
- ☐ Three or four times per week
- ☐ Five to seven days per week

Q47. Below you will find a list of statements. Please rate how true each statement is for you.

	Very rarely	Rarely	Sometimes	Frequently	Always
I take daytime naps lasting two or more hours.					
I go to bed at different times from day to day (more than ±1 hour variation).					
I get out of bed at different times from day to day (more than ±1 hour variation).					
I think, plan, or worry when I am in bed.					
I use alcohol, tobacco, or caffeine within 4 hours of going to bed or after going to bed.					
I do something that may wake me up before bedtime (e.g., play video games, use social media, watch action TV shows, movies).					
I go to bed feeling stressed, angry, upset, or nervous.					

Block 6: Perceived Organisational Support

For the following section, please refer to the highest competitive team and organisation you were a part of in your primary sport over the last year.

Q48. Please indicate how much you agree or disagree with the following statements about support from the organisation/club using the choices below.

In this context the organisation/club refers to the organisation or club you compete under. For a national team this may be the NSO for your sport (e.g., NZ Rugby Union), for a regional team it may be the RSO (e.g., North Harbour Rugby), it could also be a franchise (e.g., Blues) or a local club (e.g., Takapuna Rugby Club).

	Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree
My sports organisation/club values my contribution to its success.							
My sports organisation/club strongly considers my goals and values as an athlete.							
Help is available from my sports organisation/club when I have a problem.							
My sports organisation/club really cares about my well-being.							
My sports organisation/club cares about my overall satisfaction in my role.							
My sports organisation/club takes pride in my sporting accomplishments.							
My sports organisation/club is willing to extend itself in order to help me perform to the best of my ability.							
My sports organisation/club cares about my opinions.							

Q49. Please indicate how much you agree or disagree with the following statements about your coach and support staff support using the choices below.
In this context coaches and support staff include head coaches, assistant coaches, team manager, trainers, physiotherapists, mental skills coaches, team doctor and those in similar supporting roles.

	Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree
My coaches and support staff really care about my well-being.							
My coaches and support staff are supportive of my goals and values as an athlete.							
My coaches and support staff care about my overall satisfaction in my role.							
My coaches and support staff are willing to offer assistance, to help me perform to the best of my ability.							
Help is available from my coaches and support staff when I have a problem.							
My coaches and support staff are complimentary of my accomplishments as an athlete.							

Q50. Please indicate how much you agree or disagree with the following statements about your teammate support using the choices below.
In this context teammates include all the other players in your wider training squad.

	Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree
If I received recognition for my accomplishments, my teammates/training partners would be happy for me.							
My teammates feel the coaches made the right decision in selecting me in the team or my training group feels the coaches are right to invest in me.							
My teammates/training partners believe I am doing an excellent job.							
If I were to be dropped from the team or did poorly in a competition, my teammates/training partners would be sympathetic.							
My teammates/training partners believe I am making important contributions to the organisation/club.							
My teammates/training partners really care about my well-being.							

Appendix C: Team-Sport Specific POS scales

Q1. Please indicate how much you agree or disagree with the following statements about support from the organisation using the choices below.

In this context the organisation refers to the organisation you compete under. For a national team this may be the NSO for your sport (e.g., NZ Rugby Union), for a regional team it may be the RSO (e.g., North Harbour Rugby) or it could also be a franchise (e.g., Blues).

	Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree
My sports organisation values my contribution to its success.							
My sports organisation strongly considers my goals and values as an athlete.							
Help is available from my sports organisation when I have a problem.							
My sports organisation really cares about my well-being.							
My sports organisation cares about my overall satisfaction in my role.							
My sports organisation takes pride in my sporting accomplishments.							
My sports organisation is willing to extend itself in order to help me perform to the best of my ability.							
My sports organisation cares about my opinions.							

Q2. Please indicate how much you agree or disagree with the following statements about your coach and support staff support using the choices below.
In this context coaches and support staff include head coaches, assistant coaches, team manager, trainers, physiotherapists, mental skills coaches, team doctor and those in similar supporting roles.

	Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree
My coaches and support staff really care about my well-being.							
My coaches and support staff are supportive of my goals and values as an athlete.							
My coaches and support staff care about my overall satisfaction in my role.							
My coaches and support staff are willing to offer assistance, to help me perform to the best of my ability.							
Help is available from my coaches and support staff when I have a problem.							
My coaches and support staff are complimentary of my accomplishments as an athlete.							

Q3. Please indicate how much you agree or disagree with the following statements about your teammate support using the choices below.
In this context teammates include all the other players in your wider training squad.

	Strongly disagree	Moderately disagree	Slightly disagree	Neither agree nor disagree	Slightly agree	Moderately agree	Strongly agree
If I received recognition for my accomplishments, my teammates would be happy for me.							
My teammates feel the coaches made the right decision in selecting me in the team.							
My teammates believe I am doing an excellent job.							
If I were to be dropped from the team, my teammates would be sympathetic.							
My teammates believe I am making important contributions to the team.							
My teammates really care about my well-being.							