Fear of crime: Gender differences in New Zealand

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Abstract

This thesis centres around the investigation of gender differences in fear of crime. International studies have identified that the fear of crime presents a substantially greater problem for women when compared to men. No New Zealand empirical studies have focused their investigation on gender differences in fear of crime. This thesis targets this research gap, using descriptive statistics, ordinary least squares (OLS) and ordered probit modelling, and Blinder-Oaxaca modelling to analyse gender differences in fear of crime. Descriptive statistics and statistical tests are initially utilised to identify trends in fear of crime and relevant covariates. Subsequently, OLS and ordered probit models are estimated for males and females for 2014 and 2018. This allows for the analysis to focus on gender differences and intertemporal differences. Furthermore, Blinder-Oaxaca modelling is utilised to determine whether characteristics or coefficient effects drive the gender gap in fear of crime. Results will further our understanding of whether the fear of crime gap is driven by the dispersion of covariates between males and females or the efficiency at which males and females can convert changes of characteristics into reductions in fear of crime. OLS results show that variables which are positively correlated with fear of crime include: migrant status, education, general trust, health, discriminatory sentiment, having a dependent child, material well-being, feelings of loneliness, and feelings of anxiety. In contrast, variables negatively correlated with fear of crime include: neighbourhood incivilities and being married. Positive results indicate that an increase in the independent variable will ultimately result in 'better' fear of crime scores. Results from the Blinder-Oaxaca model indicate that the fear of crime gap that exists between males and females is primarily due to the coefficient effect.

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Attestation of Authorship

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

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Disclaimer and acknowledgement

These results are not official statistics. They have been created for research purposes from the Integrated Data Infrastructure (IDI), which Statistics New Zealand carefully manages. For more information about the IDI, please visit https://www.stats.govt.nz/integrated-data/

Stats NZ provided access to the data used in this study under conditions designed to affect the security and confidentiality provisions of the Data and Statistics Act 2022. The results presented in this study are the work of the author, not Stats NZ or individual data suppliers.

The results in this paper have been confidentialised to protect groups from identification. Careful consideration has been given to the privacy, security, and confidentiality issues associated with using administrative and survey data in the IDI. Further detail can be found in the Privacy impact assessment for the Integrated Data Infrastructure available from www.stats.govt.nz.

Chapter 1: Introduction

1.1. Background and problem statement

Internationally, research on gender differences in reported fear of crime has been an area of growing research focus. However, New Zealand has yet to investigate this issue thoroughly. Although fear of crime was conceptualised in the 1960s (Ferraro & LaGrange, 1987), it remains a present socio-economic issue within modern society. Research has found that harbouring a high fear of crime has a wide array of negative impacts on individuals. These range from physical functioning and behaviour (Meyer & Post, 2008; Pearson & Breetzke, 2014) to social cohesion (Hale, 1996; Hunter & Baumer, 1982; Covington & Taylor, 1991; Ambrey et al., 2014) and life satisfaction (Adams & Serpe, 2000; Cohen, 2008). Therefore, minimising the negative impacts of fear of crime is vital.

Fear of crime has spill-over effects into various domains of New Zealand's well-being (McLeod, 2018). Significant New Zealand-based contributions have been made by Pearson and Breetzke (2014), who identified a significant negative impact of fear of crime on mental and physical well-being. Additionally, Pearson and Breetzke (2015) found that fear of crime is greatest in affluent Christchurch neighbourhoods. Additionally, their findings indicated that affluent neighbourhoods are significantly more likely to have greater ethnic homogeneity and lower crime levels. Aside from the contributions of these authors, New Zealand-based fear of crime literature remains limited. The results of McLeod (2018), discussed in detail within Chapter 1.3., indicate that fear of crime still presents a current New Zealand issue, with prevalent gender differences.

Official New Zealand statistics also support the existence of gender disparities within fear of crime. Using 2014 General Social Survey (GSS) data, the New Zealand Social Report (Ministry of Social Development, 2016) notes that 35.2%[1] of females reported feeling unsafe or very unsafe walking alone in their neighbourhood after dark, compared with 9.2% of males. Beyond the identification of differences in fear of crime across gender, age, and ethnicity, no

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[1] Please note that these percentages vary slightly to those reported within this thesis due to differing rounding upon the release of data from the Statistics New Zealand data lab. Additionally, a slightly larger sample size is used within this thesis compared to the total GSS as those who answer 'do not know' or refuse to answer are dropped from the dataset.

thorough investigation was conducted by the Ministry of Social Development. Additionally, the Ministry of Justice (2020) publish fear of crime statistics and fact sheets online which broadly detail what fear of crime is, and how it is measured. Currently, no New Zealand study comprehensively investigates gender differences in fear of crime or its determinants using the methodology presented within this thesis.

Given the negative spill-over effects of fear of crime into other well-being domains and the apparent lack of New Zealand-based research, this thesis attempts to further the current understanding of the factors influencing New Zealand's gender differences in fear of crime.

1.2. Defining and measuring fear of crime: an overview

An exact definition of fear of crime remains unclear (Ferraro & LaGrange, 1987). This sentiment is still echoed in current literature, as many studies use a variety of slightly different measures of fear of crime. These fear of crime measures can range from general cognitive perceptions of safety within an individual's neighbourhood to affective worry of possible victimisation by specific types of crime.

This thesis defines fear of crime as a primarily cognitive assessment of safety within an individual's neighbourhood. As further detailed in Chapter 4.3.1., fear of crime will be measured using the GSS question, which asks respondents, "thinking about crime, how safe or unsafe do you feel walking alone in your neighbourhood after dark?" Any consideration of potential victimisation is expected to pertain to interpersonal victimisation from a stranger. No specific victimisation type can be captured within this measure as it is not specified within the GSS. There is a distinct possibility that men and women will consider different types of potential crimes within their respective assessments. Unfortunately, this cannot be controlled for within this thesis. Additionally, affective elements which may bias judgements are limited as this measure does not use strongly affective words such as 'fear' and 'worry', instead asking, 'how safe or unsafe do you feel…'. Subsequently, there is no concern that this question will sway a particular emotion response.

Assessing fear of crime within the above question constitutes the most widely used fear of crime measure across international research due to prevalence within national surveys (Ferraro & LaGrange, 1987). Although imperfect, this allows for consistent comparison with previous international studies.

1.3. Motivation

Despite New Zealand males being more likely to be a victim of crime, females possess a greater fear of crime when compared to males (McLeod, 2018). Moreover, New Zealand is generally well-regarded as a safe and peaceful country internationally. The Global Peace Index ranks New Zealand as the second safest country based on an index measure which captures social safety and security through various key factors, including ongoing international conflict, societal safety and security, and militarisation (Institute for Economics and Peace, 2021:11). Despite this, New Zealanders' subjective feelings of safety indicate that many New Zealanders fear for their safety within their own neighbourhoods. A recent New Zealand Treasury report by McLeod (2018) showed that safety, as a well-being domain, had large gender-based inequalities. Within the safety domain, measures for fear of crime, victimisation andneighbourhood incivilities are included. This domain-based measure does not allow for comprehensive conclusions surrounding a particular component, as correlations were primarily analysed between domains. However, discussions did note that fear of crime appears to have the largest gender disparity compared to other measures within the safety domain. This indicates that gender inequality in fear of crime is a significant issue in New Zealand, with no current empirical investigation forthcoming.

The publication of the New Zealand Treasury's Living Standards Framework, alongside the initial report by McLeod's (2018) report, raises the potential of significant gender disparities relative to fear of crime. These disparities are yet to be comprehensively investigated within a New Zealand context, presenting a unique opportunity for the current thesis.

1.4. Contributions of this study

This thesis contributes to the literature in several ways. First, there is a current need for New Zealand-based fear of crime literature to better understand how New Zealand could potentially approach this issue. While some New Zealand-based studies investigate fear of crime, there is yet to be a study investigating the full range of determinants of New Zealand's fear of crime. This is further discussed in Chapter 2.5.2.

Second, the current understanding of fear of crime research is broadened by investigating how determinants of fear of crime vary over time and between genders. Both crime and fear of crime have been present issues within recent New Zealand media coverage, indicating the importance of this issue to New Zealanders. At the time of this thesis's submission, no New Zealand studies have analysed, in detail, the determinants of male and female fear of crime.

Third, this thesis introduces a methodological approach which has yet to be utilised within fear of crime research. Whilst Blinder-Oaxaca decomposition analysis is common in labour economics; it is the first time[2] this has been used in fear of crime literature. Blinder-Oaxaca decomposition will be utilised within this thesis to assess whether characteristic or coefficient effects drive the mean gender gap in fear of crime. Characteristic effects will show what portion of the gender gap in fear of crime is affected by distributional differences in characteristics between males and females. Coefficient effects will show how males and females differ in their efficiency of converting changes in characteristics to reductions in fear of crime. Coefficient effects sometimes termed the 'unexplained effect', may be influenced by factors which the model cannot explain. As all variables included are motivated by past literature findings, estimates can be used to assess the existence of the risk perception theory, personality differences, the shadow hypothesis and the vulnerability theory. These theories are hypothesised to contribute to females' higher levels of fear of crime.

The findings of this thesis may be of interest to New Zealand institutions such as the New Zealand Treasury, New Zealand Ministry for Women and New Zealand Ministry of Social Development.

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[2] To this authors knowledge, at time of submission.

1.5. Research questions

The central research question is: Does fear of crime significantly differ by gender in New Zealand, and if so, why?

To answer this broader question, a sub-series of research objectives will be addressed:
1. First, identify which gender appears to fear crime more, on average, in 2014 and 2018, respectively.
2. Second, examine and compare the determinants of fear of crime in the two time periods for the subsample of males and females.
3. Third, decompose the gender fear of crime gap in the two time periods to determine the following:
   a. if there is a statistically significant gender fear of crime gap in New Zealand and whether the size of this gap has changed from 2014 to 2018,
   b. whether the gender fear of crime gap can be explained by the differences in characteristics or coefficient effects, and
   c. whether the explanation for the gender fear of crime gap (i.e. differences in characteristics or coefficient effects) has changed over time.

1.6. Research design and methodology

In order to examine gender differences in fear of crime, this thesis employs New Zealand GSS survey data, which Statistics New Zealand collects. The GSS is a unique nationally representative household survey in New Zealand that incorporates consistent questions requesting individuals to subjectively rate their fear of crime in each survey year, thus making it possible to examine changes in fear of crime over time. Moreover, the GSS holds a rich collection of possible covariates, which tend to be consistent across sample periods.

To address the first research objective stated in Chapter 1.5, descriptive statistics are used to analyse and compare fear of crime and its determinants. This basic analysis will be performed for 2014 and 2018 across pooled and male and female samples. Note that a 'pooled' sample is pooled with respect to gender. Following this, one-way analysis of variance (ANOVA) tests

will be used to analyse group differences in fear of crime. To address the second research objective, ordinary least squares and ordered probit regression analyses will be conducted to identify the determinants of male and female fear of crime in New Zealand for 2014 and 2018. To address the third research objective, this thesis employs a linear Blinder-Oaxaca model to decompose the gender fear of crime gap in 2014 and 2018. Additionally, the thesis determines the characteristics and coefficient components of the gender fear of crime gap for 2014 and 2018. These effects will be compared between sample periods to assess how these effects have changed over time.

1.7. Organisation of this thesis

The rest of this thesis is structured as follows. Chapter 2 contains the literature review, whereas Chapter 3 describes the methodology used. Chapter 4 outlines the data and variables, while Chapter 5 discusses key results. The thesis concludes in Chapter 6.

Chapter 2: Literature Review

2.1. Defining and measuring fear of crime

2.1.1. Defining fear of crime

Fear of crime has divergent definitions across empirical literature. Within the context of this thesis, fear of crime is defined as a cognitive judgement that tends to capture a general assessment of safety specific to one's neighbourhood (Ferraro & LaGrange, 1987; Rountree & Land, 1996). It is noted that fear of crime measures may also capture an emotional reaction to a perceived threat of becoming a victim of violent crime (Garofalo, 1981; Warr & Stafford, 1983; Box, Hale & Andrews, 1988; Curiel & Bishop, 2018).

Understanding the measurement of fear of crime requires a fundamental understanding of three key facets; cognitive, affective or behavioural (Gabriel & Greve, 2003; Golovchanova et al., 2021). Rountree and Land (1996) emphasise that past studies investigating fear of crime often do not identify the cognitive, affective, and behavioural aspects associated with a given fear of crime measure. Moreover, some past researchers fail to consider that cognitive, affect and behaviour aspects are not mutually exclusive. A comprehensive fear of crime measure should combine cognitive, affective and behavioural facets where possible (Mesch, 2000; Gabriel & Greve, 2003; Zhang, 2021).

Ferraro and LaGrange (1987) define cognitive fear of crime as a rational assessment of the risk of victimisation within a specific situation. Situational assessments typically specify a situation which could be deemed threatening, such as safety within a neighbourhood or specified area. Cognitive fear of crime assessments can capture considerations of potential criminal victimisation within a given situation (Gabriel & Greve, 2003). Ferraro and LaGrange (1987) deem that cognitive fear of crime provides a rational evaluation of the risk of victimisation based on personal knowledge of an area or situation, devoid of emotional effects. Practically, it is difficult to separate situational judgement from emotion when assessing safety, as fear is innately involved.

Affective fear of crime captures emotional responses to possible crimes. These are often negative, such as worry or fear. To capture these emotions, fear of crime questions will often

use emotionally loaded words to elicit a response from an individual that reflects a negative affective emotion. Garofalo (1981) suggests that the use of the word "worry" may lead individuals to consider the loss of something, such as theft of property, whilst terms such as "afraid" will tend to have a stronger link with violent crimes. Clark (2004) argues that affective fear of crime represents a crime phobia, arguing that affective words such as 'afraid' and 'fear' capture irrational and inflated emotional responses. However, if desired, fear of crime can be effectively captured without using affective words. Alternatively, Gabriel and Greve (2003) suggest that affective and cognitive fear of crime measures can be combined through the use of cognitive structural assessment alongside specific affective words or phrasing.

Behavioural fear of crime assesses physical responses such as self-protective measures or avoidant behaviour that results from fear. Greater fear may lead to avoidant behaviour (Meyer & Post, 2008; Yuan & McNeeley, 2018), but this is often difficult to assess accurately with current data. Meyer and Post (2008) found that individuals tend to avoid being out late at night, especially in public areas which pose greater threats – such as car park buildings. Liska, Sanchirico and Reed (1988) drew attention to the fact that it is difficult to assess the direction of causality between fear of crime and altered behaviour as it may be a cause or consequence of having high levels of fear.

2.1.2. Measuring fear of crime

Measuring fear of crime has proven to be complex and often vague, leading academics to highlight the need for more precise and expansive measurements (Taylor & Hale, 1986; Ditton et al., 1999; Smith & Hill, 1991). Traditionally, fear of crime has been measured by asking an individual to rate how afraid they felt walking alone around the area at night (or during the day). The use of 'the area' (or 'this area', referring to the area surrounding the respondent at the time of the interview) provides a vague assessment of the cognitive situation. Additionally, this measure was also flawed as negative affective words are thought to bias individuals towards considering the potential of violent crimes such as robbery, assault, and rape (Gabriel & Greve, 2003). Modern measures now typically specify the respondent's neighbourhood as a cognitive situation, which each respondent is logically assumed to be relatively well informed on. Additionally, measures of fear of crime typically now use less

negatively biased affective words such as 'how safe, or unsafe do you feel…' rather than 'do you feel afraid when…'. This shift in phrasing avoids biasing the respondent towards a more fearful answer than they may have otherwise indicated.

Cognitive based assessments of fear of crime which assess feelings of safety within a given situation at a specified time of day, present the most popular and consistent measure across survey data. These assessments are most often given on a Likert scale where individuals may rate their safety from very unsafe to very safe. Farrall et al. (1997) critique the Likert assessment of fear of crime, stating that "*a simplistic, numerical answer to a general closed question cannot hope to represent the breadth of experience and feelings about crime experienced by most people*" (see p. 661). This is true; however, this assessment style is typically one of the only viable fear of crime-related questions available within national surveys. Although far from a perfect measure of fear of crime, this typically presents the only consistent measure, allowing for comparison between countries and over time periods. Additionally, the ordinal rating scale is simplistic and easy to understand.

Additionally, some survey measures have more expansive fear of crime measures which assess fear concerning potential victimisation, as specified within a given question. Few national surveys have expanded their fear of crime measures, with many relying on the classic assessment of how safe or unsafe an individual feels walking around their neighbourhood at night. The assessment style may also be applied to different situations, such as at home, on public transport etc. Whilst this provides a limited measure to assess fear of crime, it does benefit from comparability across countries over time. Despite this, past research has repeatedly stressed the need to expand these assessments within National Social Surveys to allow for a more robust assessment of fear of crime (Box, Hale & Andrews; 1988; Farrall et al., 1997; Pain, 2000; Gabriel & Greve, 2003). This sentiment is echoed within this thesis. Gabriel and Greve (2003) suggest that surveys should add a measure within their current assessment of fear of crime, which asks an individual how often they experience feelings of fear in certain situations or how often individuals are in these situations to allow for more detailed analysis.

Although often the only viable measure, assessments of feelings of safety when walking alone after dark within your neighbourhood prove somewhat problematic. It is a common assumption that individuals consider their self-perceived risk of victimisation within this situation. Victimisation is usually not specifically mentioned, nor is a specific type of victimisation. However, it is rational that individuals may consider this to some degree. Ferraro and LaGrange. (1987) argue that the use of classic Likert scale assessments of fear of crime inhibits individuals from forming accurate qualitative distinctions between their feelings about specific crimes, forcing a generalised response which cannot be applied to particular types of crime. Some survey measures distinctly capture particular crime types, but this is yet to be standard within current survey data.

2.2. Fear of crime in the context of well-being economics

Traditionally in economics, a society's success has been measured by gross domestic product (GDP) or similar income-based measures. Economic growth indeed raises living standards. However, GDP cannot be used as an all-encompassing unit of national development, as a nation's well-being is dependent on more than just its wealth (Diener, Diener & Diener, 1995; Oswald, 1997; Layard, 2005; Fleurbaey, 2009; Aristei & Bracalente, 2011, Mankiw, 2012). Initial warnings against using the GDP as a measure of well-being go as far back as 1934. Economist Simon Kuznets warned that "*the welfare of a nation can scarcely be inferred from a measurement of national income*" (Kuznets, 1934, see p. 7). That which makes life worthwhile is not measured by GDP beyond the ability to meet basic needs.

Well-being may be measured either subjectively or objectively. Diener (1984) proposes that subjective well-being comprises three unique components: life satisfaction and positive and negative affect. This is expanded by Diener et al. (1999), who add satisfaction in specific life domains as a fourth measure of subjective well-being. Kahneman and Kreuger (2006) explain that subjective measures are important in capturing an individual's lived experiences and perspectives as they value them. In contrast, objective well-being captures aspects of an individual's life circumstances and well-being which are easily observable and measurable. Objective measures are often derived or easy to verify, meaning they are typically factually

informed and unbiased. However, objective measures do not consider what an individual might see as optimal or provide information on how they may assess any given situation.

The importance of subjective well-being has been repeatedly stressed across previous research (Maasoumi, 1986; Diener & Suh, 1997; Cummins et al., 1996; Maasoumi, 1999; McGillivray, 2005; Neckerman & Torche, 2007; Fleurbaey, 2009; Aristei & Bracalente, 2011; Bleys, 2012; Deaton, 2013; Munda, 2015; Medcalfe, 2018). Well-being may also be measured through a multi-dimensional approach which combines subjective and objective measures. Whilst such multi-dimensional measures differ in their selected domains, these may commonly include areas such as: income, education, safety, mental health, physical health, material well-being, life satisfaction, and civic engagement (Stiglitz, Sen, & Fitoussi, 2009; Deaton, 2013; Medcalfe, 2018). Researchers may include a mixture of subjective ordinal and objective measures within this approach. The New Zealand Treasury aimed to do this with its Living Standards Framework (see McLeod, 2018).

Fear of crime is considered in the safety domain as part of a multi-dimensional measure of well-being (Cummins et al., 1996; Smyth, Nielsen & Zhai, 2010; McLeod, 2018). As such, there are links between well-being and fear of crime through aspects of safety. Fear of crime threatens personal safety, as differences between perceived and desired safety negatively affect various domains of well-being, including; physical and mental well-being (Stafford, Chandola & Marmot, 2007; Pearson & Breetzke, 2014); quality of life (Hale, 1988; Stafford, Chandola & Marmot, 2007) and life satisfaction (Diener et al., 1999; Hanslmaier, 2013). Notably, the direction of causality between well-being and fear of crime is difficult to determine. Fear of crime certainly influences well-being, but well-being may also influence fear of crime.

2.3. Defining the fear of crime paradox in relation to gender

Past fear of crime literature has been heavily centred around the risk-fear paradox. This paradox suggests that those with the highest victimisation rates are generally the least afraid. In contrast, those with the lowest victimisation rates are typically the most afraid. Findings consistently indicate that women possess a greater fear of crime, despite typically having a

lower victimisation rate across all crime types, excluding sexual and domestic violence (Balkin, 1979; Hale, 1996; Holloway & Jefferson, 1997; Ferraro & LaGrange, 1989; Skogan, 1986; Lee, 2007; Chockalingam & Srinivasan, 2009; Lawton & Clark, 2015). Moreover, past research has indicated that gender is the single strongest determinant of fear of crime (Maxfield, 1984; Ditton & Farrall, 2000; Cops & Pleysier, 2011; Snedker, 2012).

Central to identifying what may drive this paradoxical gender difference in fear of crime is the identification of covariates which may significantly influence male and female fear of crime in varying ways. This identification is a central aim of this thesis. There is yet to be definitive agreement amongst researchers as to a 'perfect' way to capture the gender differences in fear of crime. Past findings which indicate potential covariates to be used within this thesis will be discussed in Chapter 2.5. Besides easily observable covariates, there are also potential unobservable differences. Risk perception is a core component of cognitive fear of crime (Ferraro & LaGrange, 1987). It is difficult to identify whether women or men misperceive risk or to what degree the risks they may face differ. The shadow hypothesis, which states that their fear of rape influences female fear of crime, could justify the idea that women face different risks. Thus, this may indicate a varying sensitivity to specific crime types between men and women. This idea is supported by Lawton and Clark (2015), who found high correlations between the reported rate of rape and women's fear of crime. Additionally, sensitivity to risk may inflate female fear of crime due to a perceived vulnerability. However, this sensitivity is difficult to assess empirically or to compare across individuals reliably.

To some degree, there is potential that the affective emotions specified within fear of crime questions may upwards bias responses. Moreover, this bias may vary between men and women. Recent research from Weigard, Loviska and Beltz (2021) tracked daily positive emotions of 142 men and women over 75 days. Results indicated that men's and women's emotional stability and fluctuations were relatively consistent using assessments of daily emotions filled in by respondents each evening. These findings are partially supported by Almeida and Kessler (1998), who found women's higher daily psychological distress is explained by a greater number of high-stress events than males. After controlling for this difference in hierarchical linear models, men and women are found not to differ in reported daily psychological distress. However, research also finds that women have significantly

greater variability when assessing negative emotions than their male counterparts (Neiss & Almeida, 2004; Wang, Hamaker & Bergeman, 2012). The inconsistency in past findings makes it difficult to definitively say precisely how differences in expressed negative affect may impact fear of crime assessments. Despite this, there remains a distinct possibility that women may react more extremely to words such as fear, which may – in part – place an upwards bias on their fear of crime assessments where negative affective words are used.

2.4. Underlying theory relating to fear of crime

Across current literature, the key theories behind what may drive fear of crime amongst women are the risk perception theory, personality differences, the shadow hypothesis and the vulnerability theory. Beyond these popular theories, many additional social and demographic covariates affect fear of crime, which will be discussed in Chapter 2.5. Aspects of these theories can be captured within observed survey variables. However, for the most part, these theories cannot be captured empirically and will thus fall within the error term of any estimated regression models. Nevertheless, it is still important to discuss them within the context of this thesis.

2.4.1. Risk perception theory

One existing theory is that women report a higher fear of crime due to greater risk sensitivity. Women are believed to misperceive an actual risk of victimisation, overestimating their level of risk - which in turn inflates fear (Garofalo, 1979). Levels of 'actual' risk within fear of crime studies are often assessed using official crime rates. Reported crime rates within studies often under-account for, or cannot account for, crimes such as sexual assault and domestic violence – both of which are more prolific for women than for men. It is widely theorised that women typically underreport incidences of sexual violence (Ruch, 1992; Allen, 2007; Hlavka, 2014) and domestic violence (Anderson, 1997; Parish et al., 2004). Although data are unattainable, it is likely that the unreported victimisation of women would significantly affect fear of crime analysis.

Equally, it is argued that men may also misperceive risk to some degree, discounting their fear of crime due to social norms (Goodey, 1994; Smith & Torstensson, 1997; Sutton & Farrall,

2005). Men may exhibit an emotional and behavioural insensitivity to the perceived probability of victimisation. Furthermore, there is arguably a societal expectation for men to hold a higher emotional resilience in light of negative situations. Smith and Torstensson (1997) hypothesise that men possess a higher degree of invincibility due to a perception of anatomical dominance, potentially leading them to undervalue their actual risk of victimisation. Findings from hierarchical regression analysis indicate that men perceive less risk than women relative to an actual crime rate.

Realistically, it is impossible to determine the exact degree to which males and females may misperceive risk. Nonetheless, this is a factor within the fear of crime literature which must be acknowledged.

2.4.2. Personality differences

Past research has attributed personality differences as an influence in differing assessments of fear of crime between women and men. Scott (2003) proposes that women have been raised with increased social awareness around their vulnerabilities, thus creating a higher fear of crime. Burt and Estep (1981) investigate the impacts of childhood and young adolescence on forming ideas surrounding sexual vulnerability. A sample of 201 young boys and girls was analysed to assess their current and retrospective childhood fears, where significant differences were found in the young females' concerns about sexual attacks. This finding indicates that women have made them aware of sexual vulnerabilities from a young age, which supports the theory that young girls are raised to be more fearful and risk-averse than young boys. Mehta and Bondi (1999) acknowledge that whilst this is a valid theory, it provides a static standpoint that suggests that attitudes and ideas are learned only before adolescence and are then set for adult life. Attitudes and identities of individuals are intrinsically variable across adult life.

Ellis and Renouf (2018) test the effects of personality and past victimisation in predicting fear of crime. Psychological data is acquired from 301 participants, with covariates which capture personality, including honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness to experience. These measures are recorded using the HEXACO personality structure, which assesses each personality aspect across a total of 100

ordinal questions which ask a respondent to rate whether they strongly agree through to strongly disagree. Additionally, anxiety is measured separately using the State-Trait Anxiety Inventory, comprised of 40 questions which measure general (trait) and circumstantial (state) anxiety. Results from block-wise regression analysis reveal several interesting findings. Firstly, fear of crime positively correlated with levels of emotionality and anxiety. Emotionality is used within this study to capture levels of emotional stability, where higher scores of emotionality indicate a greater propensity to experience fear of physical dangers and have greater anxious tendencies. Thus, these correlations mean that those who score higher on the emotionality scale experience greater fear of physical dangers. Thus, those who tend to experience greater levels of emotionality and anxiety generally also report higher levels of fear of crime.

Additionally, fear of crime is negatively correlated with honesty and humility, indicating that those who tend to be less pretentious and deceitful generally report lower levels of fear of crime. This is attributed towards a sense of self-importance. Ellis and Renouf's (2018) most notable finding is that the personality measures discussed above have greater cumulative predictive power on fear of crime than previous victimisation.

Evidence supports the idea that men are more likely to give a socially desirable response when evaluating their fear of crime. Sutton and Farrall (2005) use Scotland's survey data to analyse the relationships between fear of crime, gender, and socially desirable responses. The authors constructed a measure named the 'lie scale', which consisted of 48 yes/no questions, where the yes response was socially desirable but also highly unlikely to be true. Fear indexes were constructed for pooled crime types and stratified into three categories: burglary, assault, and vandalism. Correlations between the lie scale and fear of crime measures are analysed using Spearman correlations, with separate estimates for male and female subgroups. Results show that men's fear of crime is inversely related to the lie scale, indicating that men have higher tendencies to provide a socially desirable response rather than an accurate response. No significant relationship was found for female respondents. This supports the idea that men may downplay their fear of crime due to a sense of bravado amongst other perceived social pressures. Although difficult to measure with current New Zealand data, there is the potential that women under-report certain crimes and men under-report their fear of crime. This under-reporting may be partially to blame for the paradoxical difference between male and female differences in victimisation rates and fear of crime.

2.4.3. Shadow hypothesis

The shadow hypothesis stipulates that the high fear of crime amongst women reflects the impact of the fear of sexual assault on the fear of violent crime (Ferraro, 1996; Riggs & Cook, 2015). The shadow hypothesis is tested by Ferraro (1996) by including and excluding sexual violence as a dependent variable in each crime-type regression. Results showed that fear of sexual violence has a significant effect on the fear of murder, fear of robbery and fear of burglary models. This leads Ferraro (1996) to label sexual violence as a 'master offence', indicating that women consider sexual violence as potentially accompanying other types of victimisation. This conclusion is supported by Stanko (1995: 3), who states that women primarily possess a "fear of men's violence", which emphasizes acts of sexual and domestic violence where perpetrators are often male.

Fetchenhauer and Buunk (2006) use data from Dutch high school students to predict the effect of fear of sexual violence on other fear of crime measures. Different fear of crime models is estimated for offence types with and without fear of sexual violence as an independent variable in the model. The authors hypothesise that for sexual violence to govern women's higher fear of crime, it should significantly affect crimes such as assault, robberies or burglaries, where it is logical that sexual violence may be a subsequent risk. Across crimes such as car theft, which logically don't carry a heightened risk of sexual violence, there should not be an expected correlation between fear of sexual violence and fear of alternative crimes. Results for fear of assault, fear of robbery and fear of burglary models support the findings of Ferraro (1996). However, Fetchenhauer and Buunk (2006) argue that to test this theory truly, models which include fear of sexual violence must be estimated for non-criminal forms of fear which are not naturally linked to sexual violence. Models for fear of car theft and other kinds of physical injuries were estimated to test this, revealing that fear of sexual violence was also a significant predictor in these models. Due to this, it was concluded that the findings of Ferraro (1996) could not firmly support the hypothesis that women are more fearful of potential victimisation due to fear of sexual violence. Furthermore, models that utilised a combined general fear of crime measure that collated all criminal and non-criminal crime types revealed that fear of sexual violence was significantly related to the general fear of crime for both males and females (Fetchenhauer & Buunk, 2006).

2.4.4. Vulnerability theory

Women's increased fear of crime may also stem from anatomical differences, which contribute to increased feelings of vulnerability (Warr, 1984; Warr, 1987). Women may believe they will be unable to defend themselves if needed or may fear that they would face a tougher recovery after an attack compared to their male counterparts. Killias and Clerici (2000) show vulnerability to be significantly correlated with fear of crime; however, there is a weak association between vulnerability and gender. Thus, gender could not be said to mediate the relationship between vulnerability and fear of crime. However, vulnerability can be captured in many ways, and this relationship may depend on how vulnerability is measured.

The vulnerability theory was also tested by Fetchenhauer and Buunk (2006), who investigated the hypothesis that women possess a greater fear of crime due to physical weaknesses. Gender differences in fear of particular events are tested to determine whether events, such as car accidents, where physicality does not factor in, show fewer gender differences. Results indicate that women still possess a significantly greater fear of non-criminal events where physicality should not factor into the risk of victimisation. Thus, these findings contradict the vulnerability theory, instead lending greater support to a potentially higher sensitivity to risk amongst women.

2.5. Empirical literature review on gender differences in fear of crime

2.5.1. International Literature

International literature has repeatedly indicated that gender is the strongest predictor of fear of crime (Snedker, 2012). Beyond the theories behind fear of crime, aforementioned in Chapter 2.4, there are many factors which can be perceived to convey a risk of crime which could plausibly influence fear of crime. Furthermore, many of these indicators potentially influence men and women differently, providing insight into what may influence gender differences in fear of crime. Although New Zealand studies have yet to estimate fear of crime

covariates extensively, several international studies provide findings which motivate the inclusion of independent covariates.

2.5.1.1. Demographic measures

Past research has shown that age often also follows the risk-fear paradox, with older individuals generally reporting higher fear of crime whilst facing statistically lower victimisation rates (Clemente & Kleiman, 1976; Ferraro & Lagrange, 1992; Greve, 1998; Hale, 1996; Pantazis, 2000; Chadee & Ditton, 2003; Easton, 2013).

Racial analysis of fear of crime presents a complicated relationship between fear of crime and race. Some studies have identified minority races as having a lower fear of crime (Smith & Hill, 1991; Chadee, 2003), whilst some find a higher fear of crime among minority races (Skogan & Maxfield, 1980; Ortega & Myles, 1987; Covington & Taylor, 1991). There is no clear-cut explanation for why these results tend to differ, but variation may arise due to present country and culture-specific ethnic influences.

Mesch (2000) finds that mothers' fear of crime is partly attributable to their fear of their dependent children becoming victims of sexual assault. Using European Social Survey data, Hanley and Ruppanner (2015) demonstrate that single and divorced women exhibit a higher fear of crime than those who are married or in a de facto partnership. This is supported by Braungart, Braungart and Hoyer (1980), who find that fear of crime is highest among unmarried people. Mugford (1984) notes that for elderly age groups, fear of crime is relatively comparable between married women and women who have never married.

Labour force status, income, and education measures are utilised to capture socio-economic wealth effects by showing how social vulnerability may influence fear of crime differently amongst men and women. Those who are unemployed spend a disproportionately larger time in public spaces than those employed, which may lead to more opportunities for criminal behaviour (Braithwaite & Biles, 1979). Moreover, crime may be more prolific in areas where unemployed and low-income individuals are in higher concentration (Pantazis, 2000). Nonetheless, findings regarding the relationship between various socio-economic wealth measures and fear of crime vary. Most empirical findings report that a lower education level

correlates with increased fear of crime (Smith & Hill, 1991; Hale, 1996; Reese, 2009), whilst others find that fear of crime tends to be higher amongst the highly educated (Donnelly, 1989; Sookram, Saridakis & Mohammed, 2011). Sookram et al. (2011) equate a positive correlation between fear of crime and education to recent increases in media coverage of violent murders and kidnappings, as those who to more educated tend to be more attentive to the news. Similarly, most studies report that a lower income level is associated with higher fear of crime (Baumer, 1978), whilst some report a positive relationship (Hernández, Dammert & Kanashiro, 2020). Furthermore, Kujala, Kallio and Niemelä (2019) show that those with a worse level of material deprivation tend to report a worse fear of crime.

Through being unemployed or having a lower income or education, those with a worse level of social vulnerability tend to be more exposed to crime. It would make logical sense for individuals with a lower income or education to report a worse fear of crime due to increased exposure to crime. Visser, Scholte and Scheepers (2013) show that relationships between fear of crime and education or income may depend on how fear of crime is assessed. These authors assess fear of crime and feelings of unsafety as separate measures. Feelings of unsafety were measured by asking respondents how safe they felt walking alone in this area after dark. Their fear of crime measure sums up two separate questions, which asked respondents how often they worry about a home burglary or becoming the victim of violent crime. Income and education are shown to have different relationships with each measure. Within the fear of crime model, results are inconclusive for both income and education. However, within the feelings of unsafety model, results indicate that those with more resources tend to show greater feelings of safety than those with fewer resources.

2.5.1.2. Past victimisation

Past victimisation is perhaps an obvious potential determinant of fear of crime; however, previous literature has revealed a complex relationship. Victimisation can be defined as the suffering of a violent or property crime at the hand of an aggressor (Noble & Jardin, 2020). Across past research, the relationship between victimisation rates and fear of crime has often been inconclusive or contradictory. Many studies report an inverse relationship between victimisation and fear of crime, meaning that those who have not been victims of crime have a higher fear of crime when compared to previous victims (Balkin, 1979; Skogan, 1986;

Chockalingam & Srinivasan, 2009). Balkin (1979) explains this as potentially due to several individuals within any given sample who possess 'pure fear', which captures non-victims with a very high level of fear due to vulnerability. This poses a similar paradox to the one between the risk-fear paradox, which typifies other demographic indicators such as gender and age. Despite never being victimised, these individuals report very high levels of fear, which is not necessarily irrational (Balkin, 1979). Additionally, Balkin (1979) finds that respecifying models assessing the relationship between fear of crime and victimisation yield varying results, noting that the correct specification is unclear. In contrast, Noble and Jardin (2020) find no significant correlation between fear of crime and victimisation but report that a more complex analysis reveals noticeably complicated patterns within specific victimisation types.

Previous literature has highlighted the effects of the hedonic treadmill, a theory that states that positive and negative life events have transitory effects on well-being as people often adapt to adversities (Brickman & Campbell, 1971; Diener, Lucas & Scollon, 2009). Norris and Kaniasty (1994) show this theory may also apply to victimisation, finding that the effect of victimisation on multiple measures of well-being and emotional distress tends to lessen over time. Respondents were interviewed initially following victimisation, then three more times at approximately 3-, 9- and 15 months following victimisation. The authors noted substantial improvements between 3 and 9 months, whilst improvements between 9 and 15 months were minimal. Thus, victims are likely to adapt and adjust as time goes on, thus decreasing the portion of their fear of crime which is informed by previous victimisation. This is supported by the findings of Janssen, Oberwittler and Koeber (2021), who find adaptive improvement in feelings of neighbourhood unsafety for property victimisation and repeated violent victimisation. Here, neighbourhood safety is measured as a combination of how safe an individual would feel walking alone in their neighbourhood after dark or during the day.

2.5.1.3. Neighbourhood Incivilities

Fear of crime has been consistently linked to neighbourhood factors as well as measures of social cohesion, which has well-established influences on perceptions of social decay within societies (Skogan & Maxfield, 1980; Skogan, 1986; Box et al., 1988; Donnelly, 1989; Bennett & Flavin, 1994; Ferrero, 1995; Hale, 1996; Tyler et al., 1997; Gabriel & Greve, 2003; Jackson, 2004; Valera & Guàrdia, 2014). Neighbourhood incivilities account for instances where social

behaviour deviates from socially agreed-upon norms or moral rules, such as drug or alcohol problems, vandalism, harassment etc. These incivilities can elicit a perceived erosion of social values, which may inform an individual's fear of crime. Jackson (2004) notes that those generally more anxious or more prone to worrying are more likely to perceive neighbourhood incivilities as threatening and unpredictable, thus carrying risk. This risk may be interpretable as an increased risk of potential victimisation, as greater levels of incivilities primarily occur in neighbourhoods with more prevalent crime (Donnelly, 1989; Hale, 1996). As women tend to be more risk-averse (Watson & McNaughton, 2007; Borghans et al., 2009), neighbourhood incivilities could be hypothesised to impact women's fear of crime more greatly than men. Although, evidence from Carcach et al. (1995) suggests that levels of neighbourhood incivilities have a great impact on male fear of crime when compared to females

2.5.1.4. Migrant status and discrimination

Migrancy is included as a measure of social vulnerability for those who were not born in New Zealand. The vulnerability theory proposes that social groups who perceive themselves as vulnerable are likely to report a greater fear of crime (Skogan & Maxfield, 1980; Ferraro & LaGrange, 1987; Hale, 1996; Rountree & Land, 1996). Migrancy is a form of social vulnerability that may drive fear of crime (Visser, Scholte & Scheepers, 2013).

Quillian and Pager (2001) suggest that migrancy affects fear of crime by creating a perceived ethnic threat to those born in the home country. This hostility may make migrants afraid of retaliation or hate crimes, manifesting in their fear of crime assessments. Most fear of crime research investigates the effects of migration on the fear of crime of those born in the home country. Bove, Elia and Ferraresi (2021) find that increased migrancy does not correlate with increased crime rates but is significantly correlated with increased worry about crime across multiple measures. Worry about crime is measured using two variables; firstly, whether the fight against crime is the country's priority; secondly, reported concerns of increasing crime rates of immigrants. Contrarily, Visser et al. (2013) find the opposite, concluding that an increase in the migrant population causes no significant increase in fear of crime.

Whilst past research has focused on the effects of migrancy on non-migrants' fear of crime, little evidence exists which assesses how those who immigrate assess their own fear of crime.

This poses the need to identify whether migrants themselves possess a higher fear of crime, as this has not been clearly identified within past research findings.

There is a complex history of discrimination within New Zealand, and internationally that exhibits the presence of engrained systematic and social discrimination. Discrimination may influence fear of crime in several ways: for those who experience it and those who believe there is a threat posed by those who are different.

Skogan (1995) reviews the findings of several U.S. based studies, noting that evidence supports a significant relationship between whites' fear of crime and their proximity to blacks. Whites with a stronger belief in societal segregation appear to have a worse fear of crime. Moreover, whites currently living closer to blacks tend to hold a lower level of prejudice compared to those who live further away.

Ramirez (2015) seeks to estimate crime policy support as a joint function of racial discrimination and fear of crime. Within this study, the authors label fear of crime as 'crime concern'. The focus of this study is to assess attitudes towards preventative and punitive policy support. Crime concern is measured on a scale of three components: how much respondents worry about crime, whether they believe it is increasing, and fear of neighbourhood crime. Perceptions of discrimination are measured as an index of responses to whether there is equal opportunity for fair and equal treatment from the police, prosecutors, or judges. Ramirez (2015) includes controls for victimisation, gender, religion, education, income, inner-city residency, partisanship, ideology, the respondent's criminal past, and region. Although key modelling results are not relevant here, pre-modelling analysis indicates a strong relationship between crime concerns and perceived discrimination. Therefore, it is worthwhile to test within this thesis.

2.5.1.5. General trust

Trust is strongly indicated across the literature as having an integral impact on fear of crime estimations (Garofalo, 1981; Hale, 1996; Walklate, 1998; Weitzer & Charis, 2004; Gray, Jackson & Farrall, 2011). Trust is typically measured with a Likert scale which asks an individual to rate their trust in 'most' people within a country or a specific community. Thus, trust is

captured in a generalised way where individuals are free to consider interpersonal relationships as they see fit. It is consistently found that higher levels of trust help to reduce the fear of crime (Walklate, 1998; Gray, Jackson & Farrall, 2011).

2.5.1.6. General health

Past research has shown that increased physical and mental illness significantly increases fear of crime (Geis & Ross, 1998; Stafford, Chandola & Marmot, 2007; Jackson & Stafford, 2009; Lorenc et al., 2012; Pearson & Breetzke, 2014). Pearson and Breetzke (2014) provide the only New Zealand study to analyse the impact of fear of crime on mental and physical well-being. The authors use GSS data from 2012 alongside some supplementary Census measures. Their results indicate that fear of crime is negatively and significantly associated with both mental and physical well-being across all models. Conclusions indicate that fear of crime was negatively associated with mental and physical well-being. Although, the correlations identified by Pearson and Breetzke (2014) may suffer from reverse causality issues.

Any health measures can be linked to fear of crime under the vulnerability theory. Box et al. (1988) relate vulnerability to feelings of a physical, emotional or economic inability to protect oneself and a perceived ability to recover if attacked. Thus, physical or mental health conditions that may inhibit a range of motion or mental processing could increase fear of crime through a heightened perception of vulnerability.

2.5.1.7. Anxiety

Initially, fear of crime research discussed fear of crime and anxiety as synonymous ways to describe the fear of crime. Some studies tend to use anxiety about crime and fear of crime interchangeably to mean the same thing (Lotz, 1978; Hough, 1995). Walklate (1998) established that although related, fear of crime and anxiety cannot be used synonymously. However, Holloway and Jefferson (1997) explain that although fear and anxiety are not synonymous, there are rational links between the two. Zhang (2021) explains that anxiety, as a capture of everyday worries, is related to fear of crime through the effect that anxiety has on risk perception.

Past fear of crime literature has highlighted the impacts of anxiety and other insecurities in driving fear of crime. In discussing pitfalls of past studies, Holloway and Jefferson (1997) provide a discussion emphasising empirical links between fear of crime and anxiety. This discussion is rooted in the understanding that threats to oneself innately generate anxiety, although no results or correlations are presented to justify this theory. Dammert and Malone (2003) utilise Chilean data to investigate why Chile has a comparatively high fear of crime and low crime rates. Their authors argue that Chilean's fear of crime is driven by various economic, political, and social insecurities. Thus, anxieties from various other aspects of life may affect worse fear of crime outcomes.

Ellis and Renouf (2018) examine aspects of various emotions to assess correlations with fear of crime. These include emotional measures for anxiety, among other emotional indicators. Anxiety is captured using the State-Trait Anxiety Inventory, a popular psychological method to separate state and trait anxiety. Both are measured using a 20-question scaled measure. State anxiety shows how an individual feels right now in response to a given situation. In contrast, trait anxiety represents a more generalised level of anxiety that is not situation specific. The key difference is that state anxiety may be fleeting, whereas trait anxiety presents a more permanent problem. Ellis and Renouf (2018) find significant positive correlations between both state and trait anxiety and fear of crime. This indicates that those with higher anxiety also tend to report higher levels of fear of crime. Additionally, lower fear of crime scores was associated with feelings of self-importance.

2.5.1.8. Emotional measures

Ellis and Renouf (2018) stress the importance of including personality measures, such as honesty-humility, emotionality, extraversion, agreeableness, conscientiousness, and openness. Higher levels of emotionality are found to be significantly correlated with increased fear of crime. Therefore, measures that capture an individual's emotional assessments of a given situation are potentially relevant to fear of crime. Additionally, Guedes, Domingos and Cardoso (2018) find that neuroticism positively correlated with the fear of crime.

Personality differences which may affect fear-based judgement are primarily cemented during an individual's upbringing (Cops & Pleysier, 2011; Grasmick et al., 1996). In families

with large power differences, i.e. the father has a far higher social or financial status when compared to the mother, there may be greater effects of learned vulnerability ((Fetchenhauer & Buunk, 2006)). It is noted by Fetchenhauer and Buunk (2006) that this may teach daughters to be more careful, submissive, and fearful, whilst boys tend to learn to be assertive and risk-taking.

2.5.2. New Zealand literature

Currently, empirical New Zealand-based research centred around fear of crime has been limited, with no evident focus on gender inequalities, leaving many research opportunities.

Pearson and Breetzke (2015) examined the neighbourhood predictors of fear of crime using Christchurch data from the GSS and New Zealand Census. Hierarchical regression modelling revealed that fear of crime was greatest in neighbourhoods with higher affluence, ethnic homogeneity, and residential stability. Separate models were estimated for crime types, revealing small effect size differences between crime types. Interestingly, the associated crime levels of these neighbourhoods were lower relative to other neighbourhoods. These results support the existence of the fear of crime paradox within New Zealand, but no investigation into gender differences is conducted within this study.

In a separate paper, Pearson and Breetzke (2014) investigate the importance of fear of crime on mental and physical well-being. Here, the authors use data from the 2012 New Zealand GSS with some supplementary measures from the New Zealand Census on various well-being indicators. Modelling physical and mental well-being separately showed that increased fear of crime was significantly associated with lower physical and mental well-being. 'Actual' or objective crime rates obtained from New Zealand police were not significantly associated with either physical or mental well-being measures.

New Zealand research in fear of crime has yet to extensively examine which variables are associated with gender differences in fear of crime. Likewise, no previous study[3] has attempted to use Blinder-Oaxaca decomposition methods to separate mean gender differences in fear of crime into characteristic and coefficient effects. These insights will

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[3] To this authors knowledge at time of submission.

ideally aid in furthering public policy discussions for the betterment of all New Zealanders. Furthermore, this benefit targets not only women's fear of crime but also men's fear of crime.

Chapter 3: Research methodology

3.1. Introduction

Chapter 3 will cover the methodological approach utilised to present results in Chapter 5. Additionally, it is noted that data and variable information are discussed in Chapter 4.

3.2. Descriptive analysis

The first research objective, as outlined in Chapter 1.5, is to identify which gender appears to fear crime more, on average. This can be achieved through descriptive analysis to analyse and compare males' and females' mean fear of crime. This can be done for the 2014 and 2018 survey periods and compared across these time periods. Additionally, the frequency distribution of Likert fear of crime responses will be discussed to gain more insight into changes within the distribution of fear of crime for males and females over time.

Initially, two-sample tests with equal variance (t-tests) are used to indicate whether there are significant group differences in fear of crime between gender and migrant groups. Although inappropriate for interpretation with ordinal data, the t-test is used to provide an indication of significance. Based on the results of the significance, effect size tests are used to show whether the difference in fear of crime between male and female subgroups is significant.

Additionally, results are reported and interpreted for Cohen's D. As outlined by Cohen (1992), Cohen's D is a statistical test which allows for the testing of mean differences between groups to estimate the effect size. This test is appropriate for use with a variable which contains ordinal categories. Cohen's D provides an indicator of how many standard deviations difference there is between male and female fear of crime means. This estimate shows whether a sample-based mean difference is likely consistent with population values. Effect sizes are deemed to be small (d = 0.2), medium (d = 0.5) or large (d=0.8) based on benchmarks which were initially outlined in Cohen (1988).

3.3. Ordinary least squares and ordered probit modelling

To answer the second research question, Ordinary Least Squares (OLS) and ordered probit models will be used to examine and compare the determinants of fear of crime in 2014 and 2018. Standard OLS methods are most frequently used to model the determinants of fear of crime (Balkin, 1979; Liska, Lawrence & Sanchirico, 1982; Grinshteyn, Muennig & Pabayo, 2019; Zhang, 2021). Zhang (2021) states that separate regressions for genders are best used to assess gender differences rather than adding gender as an independent covariate within a pooled model. Modelling separately for males and females allows the identification of differences in how these coefficients may vary between males and females. Additionally, ordered probit models are often used within the fear of crime literature to examine social and economic factors which impact fear of crime (for ordered probit examples, see; Vilalta (2011) or Sookram, Saridakis and Mohammed (2011). Additionally, Fox, Nobles & Piquero (2009) and Reese (2009) estimate ordered logit models to investigate various aspects of fear of crime.

The decision to use OLS alongside an ordered probit model is based on the findings of Ferrer-i-Carbonell and Frijters (2004). Estimating both OLS and ordered probit allows for a comparison of whether the coefficient estimates are similar in sign and significance across both models. If the signs and significance shown in ordered probit are replicated within OLS models, then it is appropriate to interpret OLS results. Combining OLS with ordered probit modelling is also suggested by Zavoina and Mckelvey (1975) to be the most appropriate way of comparing the effects of covariates on an ordinal dependent variable. Typically, OLS is used as a benchmark model alongside an ordered probit model, as will be done within this thesis. This is a method which has been utilised in past fear of crime literature (Vilalta, 2011; Sookram, Saridakis & Mohammed, 2011), as well as across general well-being literature (Powdthavee, 2005; Cohen, 2008; Kuroki, 2013; Cheng, 2014; Sulemana, 2015).

Many studies, including this thesis, choose to interpret only the OLS results (Kuroki, 2013; Sulemana, 2015; Arrosa & Gandelman, 2016; Montgomery, 2016). Direct interpretation of OLS results is appropriate where OLS coefficients are similar in sign and significance to coefficient estimates derived from ordered probit models (Greyling, 2018; Ferrer-i-Carbonell & Frijters, 2004; Kuroki, 2013; Sulemana; 2015).

3.3.1. Ordinary Least Squares

The thesis first estimates the determinants of fear of crime for males and females in 2014 and 2018, respectively, using OLS. The generic OLS model is estimated as follows:

$$FoC_i = \beta_0 + \beta_1 X_1 + \varepsilon_i$$

where FoC_i represents the fear of crime of individual i, β_1 is a vector of coefficients to be estimated, X_1 is a vector of demographic and socio-economic variables, β_0 is the intercept and ε_i is the error term capturing all variances in the dependent variable not explained by the model.

3.3.2. Ordered probit

Following the work of Long and Freese (2006), the ordered probit regression model is estimated as follows:

$$FoC_i^* = \beta_1 X_1 + \varepsilon_i$$

Where FoC_i^* is the unobserved latent variable, fear of crime, captured on a 5-point Likert scale, X_1 is a vector of demographic and socio-economic covariates, β_1 is a vector of coefficients to be estimated and β_0 and ε_i are the intercept and stochastic error terms, respectively.

Fear of crime is considered a latent variable as it cannot be directly observed, as is well explained by Smith and Patterson (1985). Subjective fear of crime assessments is inferred from patterns captured by manifest variables, where manifest variables are directly observed and measured.

The ordered probit regression model is estimated by relating the observable dependent variable, which in this case is a discrete indicator of fear of crime (FoC_i), to the unobserved latent variable (FoC_i^*), representing an individual's (*i*) real level of fear of crime. Thus, the

observed response categories are linked to the latent variable by the following measurement model:

$$FoC_i = m \; if \; \tau_{m-1} \leq y_i^* < \tau_m$$

$$for \; m = 1 \dots J$$

where J is the total number of ordinal categories or responses, m. Therefore, if we extend this to the GSS fear of crime question with 5 ordinal responses (m), it can be defined as follows:

$$FoC_i$$

$$= \begin{cases} 1 \rightarrow Very \; unsafe & if \; \tau_0 = -\infty \leq y_i^* < \tau_1 \\ \qquad\qquad \vdots & \vdots \\ 5 \rightarrow Very \; safe & if \; \tau_4 \leq y_i^* < \tau_5 = \infty \end{cases}$$

The reader should please note that to code in accordance with other measures within the model, fear of crime is coded in a worst-to-best fashion; fear of crime ranges from very unsafe (1) to very safe (5). Very unsafe indicates the worst outcome, and very safe indicates the best outcome. Any results will be interpreted with reference to this order of ordinal response categories.

In line with existing studies, a selection of covariates are included, which past literature indicates to be important predictors of fear of crime. The motivation for the variables included in the models is discussed in Chapter 2.5. Additionally, the coding of all variables is outlined in Chapter 4.3. Notably, this thesis incorporates two different dimensions, gender and time. This allows gender and temporal aspects of fear of crime to be analysed. The advantage of this is that it allows the identification of covariates which have become more or less important in explaining the differences in fear of crime of the respective gender groups at two points in time.

3.4. Diagnostic tests

This section will outline statistical tests used to assess the presence of heteroscedasticity, multicollinearity, and endogeneity. These tests are conducted to detect any potential problems which may require correction. Results for the corresponding tests are reported along with the OLS results (Table 4) and in the Appendix.

3.4.1. Test for heteroskedasticity

Equal variance is an important assumption of the classical linear regression model, requiring error terms to be homoscedastic (Gujarati & Porter, 2009). If heteroscedasticity is present and left untreated, inferences become misleading as they will be biased and skewed in the presence of non-constant error terms. If heteroskedasticity is present, this will need to be corrected to ensure all estimates are computed with robust standard errors.

Within this thesis, heteroscedasticity will be tested using the Breusch-Pagan test. This test will be run for both males and females in 2014 and 2018. Results are presented in Table B in the Appendix. Results across models show significant test results, indicating the presence of heteroskedastic error terms. These are controlled for within the models, all estimated with robust error terms.

3.4.2. Test for multicollinearity

Another important assumption of the classical linear regression model is that there is no multicollinearity among the regressors (Gujarati & Porter, 2009). Perfect multicollinearity exists when the regression model has perfect or exact linear relationships among some or all variables. If imperfect multicollinearity exists, estimates of one or more independent covariates will be imprecise, as multicollinearity leads to large standard errors. These large standard errors affect the validity of the coefficient estimates produced by the model. Such models can produce coefficient estimates that are not statistically significant due to a multicollinear relationship. Moreover, coefficients affected by multicolinearity may show a reversal of the sign of their coefficient estimate.

Testing for multicollinearity is performed through the use of correlation matrices and variance inflation factor (VIF) tests. Correlation matrices allow testing the 1:1 relationship between every independent covariate included within a model to identify high correlations. If any relationship exceeds a threshold of ±0.7, this will raise concerns about a potential multicollinear relationship. No correlations above 0.7 were found within any model's relative correlation matrix. A VIF test assesses independent variables for multicollinearity in a regression model, providing values for each, which are used to assess the strength of colinear relationships. All VIF test results are reported in Table C in the Appendix. Unsurprisingly, age and age squared show a high correlation. This is expected as they are functions of each other. No other variables reported within the VIF Table warrant cause for concern.

3.4.3. Test for endogeneity

The endogeneity assumption states that independent covariates should not be highly correlated with the error term (Gujarati & Porter, 2009). Some common causes of endogeneity include omitted variable bias, wrong functional form, errors-in-variables bias, and simultaneous causality bias. The presence of endogeneity within a linear model causes estimates to be biased. The Durbin-Wu-Hausman test will be utilised within this thesis to test for whether income is an endogenous, or exogenous variable. This test has a null hypothesis that the regressor is exogenous. Results of this test are reported in Table 4 alongside OLS results. The results indicate no endogeneity problems, as no test is significant at a 5% level. Additionally, although rudimentary, saving residuals and correlating these within a correlation matrix with all other variables revealed no correlations of concern between the error term and variables included within this thesis.

3.5. Blinder-Oaxaca decomposition

The Blinder-Oaxaca decomposition technique will be used to answer the third research objective by decomposing the gender fear of crime gap in 2014 and 2018.

Originally developed by Blinder (1973) and Oaxaca (1973), the Blinder-Oaxaca model is used extensively in economic inequality analysis. However, it is yet to be applied to the fear of

crime literature. Blinder-Oaxaca decomposition uses a multiple regression approach to identify whether the gender gap in fear of crime is attributable to a characteristic or coefficient effect. The characteristic effect is the 'explained' effect, which shows the portion of the fear of crime gap attributed to group differences in observed characteristics. The coefficient effect is the 'unexplained effect', which indicates the portion attributed to group differences in the "returns" to these characteristics.

The Blinder-Oaxaca decomposition model is commonly used in studies to identify labour market discrimination by analysing the wage gap between two groups (Cotton, 1988; Neuman & Oaxaca, 2003; Longhi, Nicoletti & Platt, 2013; Caraballo-Cueto & Segarra-Almestica, 2019). Jann (2008) explains that this technique is popularly used to decompose mean differences in log wages between two interest groups, such as gender or race. Moreover, Blinder-Oaxaca decomposition has experienced recent growth in popularity within areas of economic-based research, such as well-being studies (Skoufias & Katayama, 2011; Rossouw & Greyling, 2020; Rossouw & Greyling, 2021) and health studies (Jiménez-Rubio & Hernández-Quevedo, 2011; Cai, Coyte & Zhao, 2017; Cartwright, 2021). In contrast to previous uses of Blinder-Oaxaca modelling, this thesis regresses the self-reported fear of crime ratings on several covariates that are well-known determinants of fear of crime within existing literature.

There are alternative methods of decomposition, however Blind-Oaxaca presents the most viable within the context of this thesis. The findings of Machado and Mata (2005); Albrecht, Bjorklund and Vroman (2003); and Melly (2005) present examples of a decomposition of changes in outcome differentials into an explained and unexplained component using a quantile distribution. However, quantiles are of little relevance here. Therefore, the Blinder-Oaxaca technique represents the most appropriate model within this thesis. This decomposition method will be used to compare male and female differences in mean fear of crime, allocating these mean differences into an explained and unexplained component.

The Blinder-Oaxaca decomposition stems from a linear OLS regression equation and is defined as follows:

$$FoC_m = \beta_0 + \beta_m X_m + \varepsilon_m$$

$$FoC_f = \beta_0 + \beta_f X_f + \varepsilon_f$$

where FoC_m and FoC_f denote the outcome variable, which is the self-reported fear of crime of males and females, respectively. Vectors of parameters are represented by β_m and β_f, which show separate vectors for male (m) and female (f) subgroups, respectively. X_m and X_f are vectors of covariates relative to male and female subgroups, and ε is the error term that follows a normal distribution (0,σ_ε) for both males and females.

The gender fear of crime gap is then calculated as the difference in mean outcomes between males and females. It can therefore be defined using the following equation:

$$\overline{FoC_f} - \overline{FoC_m} = (\bar{X}_f)\hat{\beta}_1 - (\bar{X}_m)\hat{\beta}_m$$

where $\overline{FoC_m}$ represents the average expected level of fear of crime for males, and $\overline{FoC_f}$ represents the average expected level of fear of crime for females. $\overline{FoC}$ represents the difference between these two subgroups and is equal to the difference in the mean vector of parameters ($\boldsymbol{X}$) and the estimated returns ($\boldsymbol{\beta}$) for both groups. To decompose the gender fear of crime gap into two components, the equation can be rewritten as follows:

$$\overline{FoC}_f - \overline{FoC}_m = \underbrace{(\bar{X}_f - \bar{X}_m)'\hat{\boldsymbol{\beta}}_f}_{\Delta X} + \underbrace{\bar{X}'_m(\hat{\boldsymbol{\beta}}_f - \hat{\boldsymbol{\beta}}_m)}_{\Delta \beta}$$

The first term to the right of the equals sign represents the explained component ($\Delta \boldsymbol{X}$), while the second term represents the unexplained component ($\Delta \boldsymbol{\beta}$). The former is commonly referred to as the characteristic effect (i.e. differences in characteristics), and the latter is the coefficient effect (i.e. differences in coefficients).

Additionally, it is noted that decomposition results are sensitive to the choice of the reference group (Madden, 2010). Within the Blinder-Oaxaca models estimated in this thesis, females are chosen as the reference group as they are assumed to have higher levels of fear of crime based on the indications outlined by McLeod (2018).

Chapter 4: Data and descriptive statistics

4.1. Introduction

Chapter 4 will introduce the data used within this thesis, highlight variable coding, and provide descriptive statistics. Details are provided on how the data was obtained and treated prior to modelling.

4.2. Data

Statistics New Zealand provides data used within this thesis. Data is extracted and confidentialised using Statistics New Zealand's Integrated Data Infrastructure (IDI). The IDI connects data across numerous government agencies, linking individuals anonymously via unique identifier codes. These unique identifiers provide a data spine for additional datasets to be linked. This allows the same individual to be confidentially linked across any datasets in which they may appear. Additionally, this measure ensures that each observation within any dataset is unique. Singular datasets can also be extracted from the IDI using these unique identifiers to maintain the anonymity of observations whilst ensuring each observation is unique.

The data for this study draws from the New Zealand General Social Survey (GSS), which biennially surveys approximately 8,000 individuals within New Zealand. This survey serves as New Zealand's official well-being survey. Interviews are conducted face-to-face, with interviews lasting an average of 45 minutes.

Statistics New Zealand gathers GSS data through a biennial cross-sectional fair and random sampling criteria, selecting participatory households across New Zealand. Each New Zealand household has a known and equal chance of being selected during each sample period. Possible respondents must be over the age of 15, and thus any inferences from the results of this study may only be externally applied to those over the age of 15. Unfortunately, the most recent 2020 sample was delayed until June 2022 due to COVID-19-related issues. This release was too late for the timeline of this thesis. Due to this restriction, the included years will thus be 2014 and 2018. The analysis of the 2020 dataset is recommended for future studies.

Using GSS data, fear of crime and relevant covariates can be observed over time. For each individual (i), we observe a fear of crime outcome (Y) in a given time (t), denoted Y_{it}. For each individual, we observe a set of covariates. The 2014 and 2018 surveys are selected due to changes in questions between 2012 and 2014. Thus, 2014 and 2018 provide the largest viable sample gap, maintaining consistency in survey questions. Although there may be some repeated individuals who are included in the 2014 and 2018 GSS, these are likely to be rare. Due to the large sample sizes and random sampling method, these samples are fairly comparable over demographic measures, as seen in Table 1 in Chapter 4.4.

All OLS and ordered probit models are estimated as a pooled sample and for each gender separately. These are estimated for 2014 and 2018 for comparison. Additionally, Blinder-Oaxaca models are estimated for 2014 and 2018 using pooled samples. In 2014, data were obtained for 3,765 males and 4,701 females for a total sample size of 8,466. In 2018, data were obtained for 3,786 males and 4,596 females for a total sample size of 8,382. The law of large numbers assumption dictates that sample averages converge upon population averages under large sample sizes. Resampling will naturally give varied sample averages, but these should not significantly deviate from true population values. Under this assumption, random sampling methods such as those employed to gather GSS data should obtain a nationally representative sample, aiding in the findings' external validity.

4.2.1. Acknowledgement of data limitations

As with any research study, some methodological difficulties are involved in analysing fear of crime. Survey data is infamous for containing a limited – and often rigid – range of questions. The GSS is no exception to this. The GSS contains the best and most current New Zealand well-being data alongside a large range of demographic and social indicators. Therefore, it provides the best opportunity to assess fear of crime, focusing on well-being and other social indicators.

The omission of relevant variables is a small but potential issue within these models. Predominantly, most measures outlined in Chapter 2.5. can be included based on variables provided within the GSS. However, some observable and unobservable variables are omitted

from these models. Whilst unobservable variables cannot be controlled for in the models, some observable variables cannot be accounted for. For example, the GSS provides measures of mental and physical health. Pearson and Breetzke (2014) show the importance of these measures, which they include from earlier versions of the GSS. However, between 2014 and 2018, these measures completely changed in scale and are not comparable. This means that general health is included in the models rather than separate mental and physical health measures.

Additionally, unobserved variables are also assumed to impact the fear of crime based on the theories outlined in Chapter 2.4. It would be ideal to account for the inclination to give socially desirable responses through a lie scale, which Guedes et al. (2018) used to adjust for gender differences in fear of crime responses. However, this measure is not yet available in New Zealand datasets. Moreover, measures of sexual assault or fear specific to sexual assault would greatly aid the analysis of gender differences in fear of crime as this would allow a more specific analysis of the shadow hypothesis.

4.3. Selection of variables

4.3.1.   Dependent variable: fear of crime

Within the OLS, ordered probit and Blinder-Oaxaca models, fear of crime is used as the dependent variable. Across both models, fear of crime is coded in a homogenous way. Fear of crime is measured as an unobserved latent variable of fear of crime captured on an ordinal 5-point Likert scale. Fear of crime will take identical form across OLS, ordered probit and Blinder-Oaxaca models. The specification of each model is explained in detail in Chapters 3.3 and 3.5. This measure will follow the traditional assessment of how safe an individual feels walking in their neighbourhood after dark. The GSS question, "thinking about crime, how safe or unsafe do you feel walking alone in your neighbourhood after dark?" will be used to measure fear of crime. Respondents may answer; very safe, safe, neither safe nor unsafe, unsafe or very unsafe.

As is often the case with ordinal measures, fear of crime is not normally distributed. This violates an assumption of linear regression models and requires further investigation to ensure valid estimates. Bond and Lang (2019) consider how distributional assumptions affect the reporting of ordinal variables. In their case, the variable of interest is life satisfaction, which suffers from similar problematic skews as fear of crime. They propose that the interpretation of ordinal ranks requires the assumption that scores are considered equally across different individuals. For example, an ordinal fear of crime score of 2, which indicates an 'unsafe' response, means the same thing to different respondents. It is not possible to test whether individuals report fear of crime in the same way. Following Jia and Smith (2016), it is important to test whether the cardinality assumption affects the results. This test involves the comparison of equivalent OLS and ordered probit models. Suppose OLS and ordered probit regressions produce similar signs and significance values across covariates. In that case, OLS regression results may be deemed appropriate for interpretation, as was also shown by Ferrer-i-Carbonell and Frijters (2004).

4.3.2. Independent covariates.

All 2014 and 2018 models are estimated with a range of covariates motivated by past findings outlined in Chapter 2.5.1. Descriptive statistics can be seen in Table 1 for all independents included across models. Additionally, the outline of GSS questions used is provided in Table A in the Appendix. All variables are coded in a worst-to-best fashion, i.e. the lowest value of each variable indicates the most "negative" value, whilst the highest value indicates the most "positive" value. This excludes binary dummy measures. All additional independent variables are motivated by past research and are thus discussed in the literature review in Chapter 2.5.

All models' observations are assessed and compared based on time and gender. Within the OLS and ordered probit modelling, separate models are estimated for males and females for 2014 and 2018. Results are compared by gender group and intertemporally across the two observation periods. Likewise, the Blinder-Oaxaca model is conducted by decomposing the mean difference in genders for 2014 and 2018.

4.3.2.1. Demographic variables

Demographic variables are discussed within the literature review in Chapter 2.5.1.1. Demographic variables are included for age, ethnicity, income, education, marital status, dependent children, labour force status and regional indicators. Age is included as a continuous numerical measure ranging from 15 until the maximum, alongside a measure for age-squared to model the effects of age more accurately in case of a non-linear relationship between age and fear of crime. Ethnicity measures include dummies for European, Māori, Pasifika, Asian and other ethnicities. The European group is the reference group for the results of the various ethnic groups to be compared. The 'other' group includes a range of minority ethnicities, including Middle Eastern, African, Latin American, and more.

Gender indicates sex as either female or male. Income is included as an individual measure. Income is treated as continuous[4] and comprised of income brackets predetermined within the GSS. These categories are outlined in Table A in the Appendix. Education is treated as continuous but includes a range of categories pre-specified within the GSS, as seen in Table A. Marital status is recorded using a dummy which captures whether a respondent is 'unpartnered' or 'partnered'. 'Child' captures having one (or more) dependent child(ren) living in the household. These children may be over or under 18 but must be classified as a legal dependent in relation to the respondent. Labour force status is captured through three separate dummies, which measure whether someone is employed, unemployed or not in the labour force. The employed group is the reference group for the other two employment status dummies. Regional indicators are included as separate dummies for Auckland, Wellington, Northland, the rest of North Island, Canterbury and the rest of South Island regions. For these regions, Auckland is used as the reference group.

4.3.2.2. Previous victimisation

The motivation for the inclusion of previous victimisation is outlined in Chapter 2.5.1.2. The question posed within the GSS specified that no personal details would be asked about the

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[4] For robustness, models are tested with income and education as an integer. No differences in sign and significance for income or education estimates are found to the models presented here.

crime. It is also outlined that crimes include damage to personal property, theft, assault, and threats. Past victimisation is constructed as a dummy which indicates whether an individual has been a victim of a crime within the previous 12 months. A dummy value of 1 indicated previous victimisation within the 12 prior months, whereas 0 indicates no victimisation. Twelve months presents a relatively appropriate period to record previous victimisation, which is consistent across past literature (Skogan, 1986; Gray, Jackson & Farrall, 2008; Gray, Jackson & Farrall, 2011; Lee, Jackson & Ellis, 2020). Additionally, respondents may adapt to previous victimisations beyond this point, as shown by Janssen, Oberwittler and Koeber (2021).

4.3.2.3. Neighbourhood incivilities

The motivation for including neighbourhood incivilities is outlined in Chapter 2.5.1.3. Neighbourhood incivilities are measured as a count variable which tallies the number of incivilities indicated by the respondent. A larger count will indicate more incivilities, whereas a value of 0 indicates no incivilities. Incivilities include noisy neighbours, vandalism, burglary, assaults, harassment, drug use, alcohol abuse, dangerous driving and another category where respondents can add options.

4.3.2.4. Migrant Status

The motivation for the inclusion of migrant status is outlined in Chapter 2.5.1.4. Migrant status is measured as a dummy variable indicating whether a respondent was born in New Zealand. A value of 1 represents that the individual was not born in New Zealand and was a migrant, whereas a value of 0 represents an individual born in New Zealand. As the GSS only randomly samples residents, only those who are permanently or semi-permanently living in the country are captured.

4.3.2.5. Discrimination measures

Discrimination measures are included based on motivation outlined in Chapter 2.5.1.4. Discrimination is included within all models in two ways, with each measure aiming to capture

a different aspect of discrimination. Firstly, perceived discrimination is subjectively captured by asking respondents whether they have been discriminated against within the last 12 months.

Secondly, discriminatory sentiment is captured by asking a respondent to assess how comfortable or uncomfortable they would feel if a new neighbour was of a different race, religion or sexuality. This measure aims to capture elements of self-assessed discrimination towards others and may capture a differing fear of the minorities who appear as 'other'. Although not mutually exclusive, there is an expectation that there will be little overlap between these measures as they capture different aspects of discrimination.

Correlation matrix results show a small correlation of 0.0133 within the 2014 model and -0.0483 within the 2018 model between discrimination measures, indicating no multicollinearity issues. A moderately positive and negative correlation between these measures indicates little crossover between measures. 'Discriminated against' captures discrimination experienced by a respondent, which likely comes primarily from minorities. A discriminatory sentiment most likely arises amongst majority groups who possess a greater uncomfortability with those who are part of the specified minority groups.

4.3.2.6. General trust

The motivation for the inclusion of a trust measure is discussed within Chapter 2.5.1.5. This measure of trust captures general trust in New Zealanders, asking respondents to rate their trust in "most people in New Zealand' on a 0-10 scale. A value of 0 indicates complete distrust, and a value of 10 indicates complete trust.

4.3.2.7. General health

The motivation for the inclusion of general health is discussed in Chapter 2.5.1.6. Due to inconsistency in the measurement of physical and mental health measures between the 2014 and 2018 GSS, these were unable to be reliably included or interpreted within models. Therefore, the best available health measure asks respondents to rate their general health. It is assumed general health may take into account physical and mental health. Ratings are on a 1-5 ordinal scale where 1 indicates poor health and 5 indicates excellent health.

4.3.2.8. Anxiety

The motivation for the inclusion of anxiety is discussed in Chapter 2.5.1.7. Anxiety is proxied by an individual's subjective assessment of how often they feel calm, with anxiety assumed as the antithesis of feelings of calm. For example, if one feels 'calm none of the time', it is assumed they must feel anxious all the time. As this is a proxy measure, results from this term will be interpreted with caution. Thus, anxiety is measured by an ordinal rating from 1-5, where 1 indicates calm none of the time (anxious all of the time) and 5 indicates calm all of the time (anxious none of the time).

4.3.2.9. Loneliness

Unfortunately, emotionality and personality differences are hard to measure unless psychological data is available. GSS data allows for the inclusion of a measure which captures feelings of loneliness. Other emotional measures are inconsistent across the 2014 and 2018 GSS and cannot be included. The variable is assessed on an ordinal 1-5 scale ranging from feeling lonely all the time to none of the time.

4.4.   Descriptive statistics of the selected variables

This section presents the descriptive statistics of the selected variables for the pooled and male and female samples in 2014 and 2018, respectively, summarised in Table 1.

Descriptive statistics reveal a greater number of females than males within both samples. In 2014, 55.5% of the sample was female compared to 45.5% male. In 2018, 54.8% of the sample was females, compared to 45.2% of males.

Differences in victimisation rates between males and females appear to indicate that males face a higher level of victimisation than females. In 2014 males reported a 14.8% victimisation rate, compared to 12.2% of females. This difference is slightly less in 2018, with 13.4% of males reporting previous victimisation, compared with 12.2% of females. Across both years, males appear to have a slightly higher victimisation rate.

The distribution of ethnicity frequencies highlights a slight over-representation[5] of Europeans, which is persistent across all gender and time variations of the model. For example, official 2018 statistics estimate (Environmental Health Indicators, 2018) 70.2% of the total New Zealand population are Europeans, which is lower than the 74.7% within the 2018 pooled model. Overall, it appears that the Māori, Pasifika, Asian, and other ethnicities are all slightly underrepresented within the 2014 and 2018 models. For example, Māori had an estimated population average of 16.5% for 2018 (Environmental Health Indicators, 2018), while model estimates range from 12.2%-14.4% across 2018 models. Although notable, these differences are arguably not too drastic and are always likely to arise during random sampling.

Regional indicators show a fairly even spread across years and between genders. Higher portions of the sample come from Auckland, which makes sense given that Census statistics show that approximately one-third of the New Zealand population resides in Auckland (Statistics New Zealand, 2018). Across other regions, all models have a fairly reasonable spread of frequency. These frequencies vary between 2014 and 2018, with the most notable difference being the Northland regional group. In particular, Northland made up 15% of the pooled sample in 2014 and 11.5% of the pooled sample in 2018. However, 11.5% of the sample is already over-representative of the actual population percentage, so this should present no issue in relation to a reduction in the Northland region percentage between sample years.

Education categories show slight differences between sample years, with frequency percentages for each qualification category reported in Table 1. NCEA level 1 appears to be the most common highest level of qualification for the pooled and male and female samples in both years. Following this, NCEA level 2, trade certificate or diploma, and teacher's diploma also represent popular levels of educational attainment with some slight gender differences. For example, 18.6% of the 2014 male sub-sample obtained a trade certificate, diploma, or level 5 certificate compared to 6.9% of 2014 females. This is similar in 2018, with data showing

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[5] To this authors knowledge, the GSS data did not include weights within SQL with which ethnicity could be adjusted by to align with population averages. As these differences are not drastically different, this should not cause substantial issues with ethnicity predictions. Additionally, in a more multicultural country it may be inappropriate to assume there is one homogenous ethnic effect for those who are mixed race, therefore, individuals may identify as more than one ethnicity.

that 18.5% of the male-sub-sample obtained a trade certificate, diploma, or level 5 certificate compared to 8.5% of females.

Income differences reveal, unsurprisingly, that males are more frequently represented among most higher earning categories than their female counterparts. For example, 12% of males in 2014 earned over $150,000 compared with 9.7% of females. In 2018, 19.1% of males earned over $150,000 compared with 15% of females.

Most people are employed, 62% in the pooled 2014 model and 65.5% in the 2018 model. This portion is higher in males, 69.1% in 2014 and 72.4% in 2018, than for females, 56.3% in 2014 and 59.4% in 2018. Overall, the 2014 level of unemployment is shown to be 3.9%, which slightly decreased to 3.2% in 2018. Similarly, unemployment is slightly higher among females, 4% in 2014 and 3.5% in 2018, compared to 3.7% in 2014 and 2.8% for 2018 males.

In the 2014 pooled sample, 34.1% were not in the labour force, compared with 31.5% in the 2018 pooled sample. This portion appears to be slightly higher amongst female sub-samples, 39.6% in 2014 and 37% in 2018, compared to males, who make up 27.3% in 2014 and 24.8% in 2018. The gender difference in the measure, which captures those not in the labour force, is unsurprising as it is likely that a greater portion of stay-at-home parents are mothers.

Table 1: Descriptive statistics

Variables	2014			2018		
	Pooled sample N= 8,466	**Male** N = 3,765	**Female** N = 4,701	**Pooled sample** M = 8,382	**Male** N = 3,786	**Female** N = 4,596
	Mean/Freq %	**Mean/Freq %**	**Mean/Freq %**	**Mean/Freq %**	**Mean/Freq %**	**Mean/Freq %**
Gender						
Female	55.5% (0.5)	-	-	54.8% (0.5)	-	-
Male	44.5% (0.5)	-	-	45.2% (0.5)	-	-
Ethnicity						
European	77.3% (0.42)	77.4% (0.42)	77.2% (0.42)	74.7% (0.43)	75% (0.44)	74.3% (0.43)
Māori	14.4% (0.35)	13.6% (0.34)	15.1% (0.36)	13.4% (0.34)	14.4% (0.33)	12.2% (0.35)
Pasifika	5.7% (0.23)	5.5% (0.23)	5.8% (0.23)	6.1% (0.24)	6.4% (0.25)	5.8% (0.23)
Asian	7.9% (0.27)	8% (0.27)	7.8% (0.27)	11.1% (0.31)	10.5% (0.32)	11.8% (0.31)
Other ethnicities	1.7% (0.13)	2% (0.14)	1.5% (0.12)	3.2% (0.18)	2.6% (0.19)	3.9% (0.16)
Age	49.2 (18.89)	48.5 (18.62)	49.9 (19.08)	49.3 (18.65)	49.2 (18.33)	49.4 (18.91)
Age squared	2779.4 (1932.04)	2694.2 (1878.40)	2849.6 (1971.55)	2777.8 (1903.54)	2751.2 (1852.23)	2801.5 (1944.56)
Employment status						
Employed	62.0% (0.49)	69.1% (0.46)	56.3% (0.50)	65.3% (0.48)	72.4% (0.45)	59.4% (0.49)
Unemployed	3.9% (0.19)	3.7% (0.19)	4% (0.20)	3.2% (0.18)	2.8% (0.16)	3.5% (0.18)
Not in the labour force	34.1% (0.47)	27.3% (0.45)	39.6% (0.49)	31.5% (0.46)	24.8% (0.43)	37% (0.48)
Previous victimisation						
Victim	14% (0.35)	14.8% (0.36)	12.2% (0.34)	12.7% (0.33)	13.4% (0.34)	12.2% (0.33)

Non-victim	86% (0.35)	85.2% (0.36)	87.8% (0.34)	87.3% (0.33)	86.6% (0.34)	87.8% (0.33)
Migrant status						
Migrant	23.9% (0.43)	24.9% (0.43)	23.1% (0.42)	27.5% (0.45)	29% (0.45)	26.3% (0.44)
Non-migrant	76.1% (0.43)	75.1% (0.43)	75.9% (0.42)	72.5% (0.45)	71% (0.45)	73.7% (0.44)
Regions						
Auckland	23.3% (0.42)	23.5% (0.43)	23.1% (0.42)	27.2% (0.44)	27.8% (0.45)	26.7% (0.44)
Wellington	12.4% (0.33)	12.5% (0.33)	12.4% (0.33)	11.4% (0.32)	11.7% (0.32)	11.2% (0.32)
Northland	15.0% (0.36)	14.8% (0.35)	15.2% (0.36)	11.5% (0.32)	10.6% (0.31)	12.2% (0.33)
North Island	19.5% (0.40)	19.5% (0.40)	19.6% (0.40)	24.4% (0.43)	23.6% (0.42)	25% (0.43
Canterbury	15.6% (0.36)	15.4% (0.36)	15.7% (0.36)	12.8% (0.33)	13.7% (0.34)	12% (0.33)
South Island	14.2% (0.35)	14.4% (0.35)	14% (0.35)	12.8% (0.33)	12.7% (0.33)	12.9% (0.34)
Education						
NCEA level 1	21.9% (0.41)	20.6% (0.40)	23% (0.42)	16.6% (0.37)	16.1% (0.37)	17% (0.38)
NCEA level 2	11.1% (0.31)	9.7% (0.30)	12.2% (0.33)	9.2% (0.29)	8.3% (0.28)	9.9% (0.30)
NCEA level 3	7.7% (0.27)	7.5% (0.26)	7.9% (0.27)	8% (0.27)	6.6% (0.25)	9.1% (0.29)
NCEA level 4	7.4% (0.26)	6.9% (0.25)	7.8% (0.27)	8.7% (0.28)	8.4% (0.28)	8.9% (0.29)
Trade certificate, diploma or level 5 certificate	12.1% (0.33)	18.6% (0.39)	6.9% (0.25)	13% (0.34)	18.5% (0.39)	8.5% (0.28)
Advanced trade certificate	4.5% (0.21)	5.6% (0.23)	3.6% (0.19)	6.7% (0.25)	7.8% (0.27)	5.8% (0.23)
Diploma or level 6 certificate	7.0% (0.25)	4.8% (0.21)	8.7% (0.28)	7.1% (0.26)	5.5% (0.23)	8.4% (0.28)
Teacher's certificate or diploma	11.3% (0.32)	10.5% (0.31)	12% (0.32)	13.4% (0.34)	12.2% (0.33)	14.4% (0.35)

Nursing diploma	4.8% (0.21)	4.2% (0.20)	5.3% (0.22)	6.1% (0.24)	5.1% (0.22)	7% (0.25)
Bachelor's degree	2.9% (0.17)	2.9% (0.17)	2.8% (0.16)	4.2% (0.20)	4.7% (0.21)	3.7% (0.19)
Bachelors' hons	0.8% (0.09)	1.1% (0.10)	0.5% (0.07)	1.0% (0.10)	1.4% (0.12)	0.8% (0.09)
Master's degree	3.7% (0.19)	3.1% (0.17)	4.2% (0.20)	4.1% (0.20)	3.5% (0.18)	4.6% (0.21)
PhD	4.8% (0.21)	4.5% (0.21)	5.2% (0.22)	2.0% (0.14)	2.1% (0.14)	2.0% (0.14)
General health						
Poor (1)	4.4% (0.20)	4.0% (0.20)	4.6% (0.21)	3.4% (0.18)	2.9% (0.17)	3.7% (0.19)
Fair (2)	12.1% (0.33)	11.2% (0.32)	12.8% (0.33)	12.4% (0.33)	12.5% (0.33)	12.4% (0.33)
Good (3)	27.9% (0.45)	28.7% (0.45)	27.2% (0.44)	31.3% (0.46)	31.4% (0.46)	31.2% (0.46)
Very good (4)	37.2% (0.48)	36.9% (0.48)	37.3% (0.48)	37.8% (0.48)	38.5% (0.49)	37.3% (0.48)
Excellent (5)	18.5% (0.39)	19.1% (0.39)	18.0% (0.38)	15.2% (0.36)	14.8% (0.36)	15.5% (0.36)
General health, mean (mode)	3.53 (4)	3.56 (4)	3.52 (4)	3.49 (4)	3.50 (4)	3.48 (4)
Dependent children						
No dependent child	68.3% (0.47)	71.7% (0.45)	65.6% (0.48)	69.5% (0.46)	71.9% (0.47)	67.5% (0.45)
Dependent child	31.7% (0.47)	28.3% (0.45)	34.4% (0.48)	30.5% (0.46)	28.1% (0.47)	32.5% (0.45)
Marriage status						
Not partnered	47.9% (0.50)	42.1% (0.49)	52.6% (0.50)	45.7% (0.50)	39.7% (0.49)	50.6% (0.50)
Partnered	52.1% (0.50)	57.9% (0.49)	47.4% (0.50)	54.3% (0.50)	60.3% (0.49)	49.4% (0.50)
Discriminated against						
No	83.0% (0.38)	85.5% (0.35)	81.1% (0.39)	82.7% (0.38)	85.4% (0.35)	80.6% (0.40)
Yes	17.0% (0.38)	14.5% (0.35)	18.9% (0.39)	17.3% (0.38)	14.6% (0.35)	19.4% (0.40)
Discriminatory sentiment						
Very uncomfortable (1)	2.1% (0.14)	2.5% (0.16)	1.8% (0.13)	0.5% (0.07)	0.5% (0.07)	0.5% (0.07)

Uncomfortable (2)	10.8% (0.31)	11.4% (0.32)	10.4% (0.31)	3.1% (0.17)	3.8% (0.19)	2.4% (0.15)
Neither comfortable nor uncomfortable (3)	16.4% (0.37)	15.8% (0.36)	16.9% (0.37)	10.0% (0.30)	9.5% (0.29)	10.4% (0.31)
Comfortable (4)	42.8% (0.49)	44.5% (0.50)	41.4% (0.49)	39.1% (0.49)	40.8% (0.49)	37.6% (0.48)
Very comfortable (5)	27.9% (0.45)	25.8% (0.44)	29.6% (0.46)	47.4% (0.50)	45.4% (0.50)	49.1% (0.50)
Discriminatory sentiment, mean (mode)	3.83 (4)	3.8 (4)	3.86 (4)	4.3 (5)	4.27 (5)	4.32 (5)
Neighbourhood incivilities						
0	44.9% (0.50)	45.3% (0.50)	44.7% (0.50)	42.4% (0.49)	43.2% (0.50)	41.8% (0.49)
1	24.1% (0.43)	24.4% (0.43)	23.8% (0.43)	24.5% (0.43)	25.9% (0.44)	23.4% (0.42)
2	12.5% (0.33)	11.8% (0.32)	13.1% (0.34)	14% (0.35)	13.7% (0.34)	14.2% (0.35)
3	8.0% (0.27)	8.3% (0.28)	7.7% (0.27)	8.6% (0.28)	7.7% (0.27)	9.3% (0.29)
4	4.4% (0.21)	4.4% (0.21)	4.4% (0.21)	4.7% (0.21)	4.1% (0.20)	5.3% (0.22)
5	2.7% (0.16)	2.4% (0.15)	2.9% (0.17)	2.4% (0.15)	2.3% (0.15)	2.5% (0.16)
6	1.5% (0.12)	1.5% (0.12)	1.6% (0.12)	1.2% (0.15)	1.2% (0.11)	1.2% (0.11)
7	0.9% (0.10)	1.1% (0.10)	0.8% (0.09)	0.9% (0.09)	0.6% (0.08)	1.1% (0.10)
8	0.9% (0.09)	0.8% (0.09)	0.9% (0.10)	0.7% (0.08)	0.6% (0.08)	0.8% (0.09)
9	S	S	S	0.6% (0.08)	0.7% (0.08)	0.6% (0.07)
Neighbourhood incivilities, mean (mode)	1.27 (0)	1.26 (0)	1.28 (0)	1.33 (0)	1.27 (0)	1.39 (0)
Lonely						
All of the time (1)	1.6% (0.12)	1.5% (0.12)	1.6% (0.12)	0.7% (0.09)	0.7% (0.08)	0.7% (0.09)
Most of the time (2)	2.7% (0.16)	2% (0.14)	3.2% (0.17)	2.7% (0.16)	2.2% (0.15)	3.1% (0.17)
Some of the time (3)	11.5% (0.32)	9.6% (0.29)	13% (0.34)	13.5% (0.34)	11.1% (0.31)	15.4% (0.36)

A little of the time (4)	23.2% (0.42)	20.4% (0.40)	25.5% (0.44)	23.4% (0.42)	20.8% (0.41)	25.5% (0.44)
None of the time (5)	61.1% (0.49)	66.5% (0.47)	56.8% (0.50)	59.8% (0.49)	65.2% (0.48)	55.3% (0.50)
Lonely, mean (mode)	4.39 (5)	4.48 (5)	4.33 (5)	4.39 (5)	4.48 (5)	4.31 (5)
Anxiety						
All of the time (1)	1.8% (0.13)	1.6% (0.12)	1.9% (0.14)	10.4% (0.31)	9.5% (0.29)	11.2% (0.32)
Most of the time (2)	7.6% (0.26)	6.2% (0.24)	8.7% (0.28)	10.4% (0.31)	8.9% (0.28)	11.6% (0.32)
Some of the time (3)	22.5% (0.42)	20.2% (0.40)	24.4% (0.43)	24.8% (0.43)	24.1% (0.43)	25.3% (0.43)
A little of the time (4)	56.2% (0.50)	58.7% (0.49)	54.2% (0.50)	46.6% (0.50)	48.4% (0.50)	45.1% (0.50)
None of the time (5)	12.0% (0.32)	13.5% (0.34)	10.8% (0.31)	7.8% (0.27)	9.2% (0.29)	6.8% (0.25)
Anxiety, mean (mode)	3.69 (4)	3.37 (4)	3.63 (4)	3.31 (4)	3.39 (4)	3.25 (4)
Life satisfaction						
0	0.6% (0.08)	0.6% (0.07)	0. 6% (0.08)	0.4% (0.07)	S	0.5% (0.07)
1	0.4% (0.06)	S	0.5% (0.07)	0.3% (0.06)	S	S
2	0.7% (0.09)	S	0.8% (0.09)	0.5% (0.07)	S	S
3	1.4% (0.12)	1.4% (0.12)	1.5% (0.12)	1.4% (0.12)	1.5% (0.12)	1.3% (0.11)
4	1.9% (0.14)	1.9% (0.13)	2% (0.14)	2.1% (0.14)	2.1% (0.14)	2% (0.14)
5	7.8% (0.27)	7.7% (0.27)	7.8% (0.27)	7.6% (0.26)	7.7% (0.27)	7.5% (0.26)
6	7.0% (0.26)	6.7% (0.25)	7.3% (0.26)	7.2% (0.26)	7.5% (0.26)	7% (0.25)
7	18.1% (0.38)	18.6% (0.39)	17.7% (0.38)	19.1% (0.39)	19.2% (0.39)	19% (0.39)
8	27.8% (0.45)	28.9% (0.45)	26.9% (0.33)	30.2% (0.46)	31.4% (0.46)	29.1% (0.45)
9	15.6% (0.36)	15.3% (0.36)	15.9% (0.37)	14.2% (0.35)	13.2% (0.34)	15% (0.36)
10	18.6% (0.39)	18% (0.38)	19.2% (0.39)	17% (0.38)	16.1% (0.37)	17.8% (0.38)
Life satisfaction, mean (mode)	7.71 (8)	7.71 (8)	7.71 (8)	7.68 (8)	7.63 (8)	7.72 (8)

Life is worthwhile						
0	0.3% (0.06)	S	S	0.3% (0.05)	S	S
1	S	S	S	S	S	S
2	0.5% (0.07)	S	0.5% (0.07)	0.3% (0.06)	S	0.3% (0.06)
3	0.7% (0.08)	0.9% (0.08)	0.6% (0.08)	0.7% (0.08)	0.7% (0.08)	0.7% (0.08)
4	1.4% (0.12)	1.5% (0.11)	1.4% (0.12)	1.3% (0.11)	1.4% (0.12)	1.3% (0.11)
5	5.3% (0.22)	5.4% (0.21)	5.2% (0.22)	5.0% (0.22)	5.3% (0.22)	4.8% (0.21)
6	5.5% (0.23)	5.6% (0.22)	5.4% (0.23)	6.1% (0.24)	6.9% (0.25)	5.3% (0.22)
7	16.1% (0.37)	17.3% (0.36)	15.1% (0.36)	17.0% (0.38)	18.8% (0.39)	15.4% (0.36)
8	27.8% (0.45)	30.0% (0.45)	26.1% (0.44)	28.2% (0.45)	29.4% (0.46)	27.2% (0.45)
9	15.9% (0.37)	15.6% (0.39)	16.2% (0.37)	17.2% (0.38)	16.0% (0.37)	18.1% (0.39)
10	26.3% (0.44)	23.0% (0.44)	29.0% (0.45)	23.9% (0.43)	20.8% (0.41)	26.4% (0.44)
Life is worthwhile, mean (mode)	8.1 (8)	8.01 (18)	8.17 (8)	8.07 (8)	7.95 (8)	8.17 (8)
Income (EBIT)						
Loss of income	S	S	S	S	S	S
Zero income	0.4% (0.06)	S	S	0.4% (0.05)	S	S
$1-$5000	0.3% (0.05)	S	S	0.3% (0.06)	S	S
$5,001-$10,000	0.7% (0.08)	0.6% (0.07)	0.8% (0.09)	0.5% (0.06)	S	S
S$10,001-$15,000	3.2% (0.18)	2.7% (0.16)	3.6% (0.19)	1.8% (0.07)	1.5% (0.14)	2% (0.17)
$15,001-$20,000	6.6% (0.25)	4.5% (0.21)	8.2% (0.27)	4.1% (0.13)	3% (0.22)	5% (0.19)
$20,001-$25,000	8.1% (0.27)	5.3% (0.22)	10.4% (0.30)	6.1% (0.20)	3.9% (0.27)	7.9% (0.14)
$25,001-$30,000	4.3% (0.20)	3.3% (0.18)	5.2% (0.22)	3.5% (0.24)	2% (0.21)	4.7% (0.15)
0,001-$35,000	6.0% (0.24)	6% (0.24)	6% (0.24)	3% (0.18)	2.4% (0.18)	3.5% (0.20)

$35,001-$40,000	3.5% (0.18)	3.2% (0.18)	3.7% (0.19)	4.8% (0.17)	4.4% (0.22)	5.2% (0.26)
$40,001-$50,000	8.0% (0.27)	9% (0.29)	7.2% (0.26)	7.1% (0.21)	7.5% (0.25)	6.7% (0.26)
$50,001-$60,000	7.4% (0.26)	7.4% (0.26)	7.5% (0.26)	7.5% (0.26)	7.5% (0.26)	7.4% (0.26)
$60,001-$70,000	6.9% (0.25)	7.6% (0.26)	6.4% (0.24)	6.8% (0.25)	7.3% (0.24)	6.4% (0.38)
$70,001-$100,000	17.8% (0.38)	19.6% (0.40)	16.3% (0.37)	16.9% (0.37)	17.4% (0.37)	16.6% (0.42)
$100,001-$150,000	16.1% (0.37)	18.1% (0.38)	14.5% (0.35)	20.4% (0.40)	23.2% (0.38)	18.1% (0.39)
$150,001+	10.7% (0.31)	12% (0.33)	9.7% (0.30)	16.9% (0.37)	19.1% (0.36)	15% (0.39)
Material well-being index	13.8 (5.25)	14.6 (4.97)	13.2 (5.38)	13.9 (5.01)	14.7 (4.79)	13.2 (5.08)
General trust						
0	1.5% (0.12)	1.5% (0.12)	1.4% (0.12)	1.5% (0.12)	1.4% (0.12)	1.5% (0.12)
1	0.8% (0.09)	0.8% (0.09)	0.8% (0.09)	0.7% (0.08)	0.5% (0.07)	0.8% (0.09)
2	1.8% (0.13)	1.9% (0.14)	1.8% (0.13)	1.7% (0.13)	1.6% (0.12)	1.8% (0.13)
3	2.9% (0.17)	2.9% (0.17)	2.9% (0.17)	2.9% (0.17)	2.6% (0.16)	3.1% (0.17)
4	3.4% (0.18)	3.2% (0.18)	3.6% (0.19)	3.8% (0.19)	3.9% (0.19)	3.7% (0.19)
5	13.9% (0.35)	13.5% (0.34)	14.2% (0.35)	13.7% (0.34)	12.5% (0.33)	14.6% (0.35)
6	10.4% (0.31)	10.2% (0.30)	10.5% (0.31)	11.2% (0.32)	10.5% (0.31)	11.8% (0.32)
7	23.2% (0.42)	23.8% (0.43)	22.8% (0.42)	23.8% (0.43)	24.6% (0.43)	23.1% (0.42)
8	27.5% (0.45)	27.4% (0.45)	27.6% (0.45)	27% (0.44)	27.7% (0.45)	26.3% (0.44)
9	10.1% (0.31)	10.6% (0.31)	9.7% (0.30)	10.1% (0.30)	10.5% (0.31)	9.9% (0.30)
10	4.6% (0.21)	4.3% (0.20)	4.7% (0.21)	3.8% (0.19)	4.2% (0.20)	3.5% (0.18)
General trust, mean (mode)	6.78 (8)	6.79 (8)	6.76 (8)	6.75 (8)	6.83 (8)	6.68 (8)

Standard deviation is reported in brackets next to all estimates.

'S' represents values which have been suppressed due to Statistics New Zealand rounding rules.

Health measures reveal differences in how males and females report health, with females more likely to report both poor and excellent health. In contrast, males appear more likely to report fair and good health. For example, 4.6% of the 2014 female sub-sample reported poor health, compared with 4% of the male sub-sample. In 2018, 3.7% of the female sub-sample reported poor health, compared with 2.9% of the male sub-sample.

The distribution of discriminatory sentiment indicates notable differences between the 2014 and 2018 samples. Within the 2014 sample, both males and females appear to be more likely to indicate feeling very uncomfortable or uncomfortable with neighbours of a different race, religion, or sexuality. In 2018, discriminatory sentiment was notably higher for males and females, indicating a 'better' response. Here, a better response corresponds to greater feelings of comfortability with a neighbour who is of a different race, religion, or sexuality.

Feelings of anxiety, overall, appear to increase between 2014 and 2018. Women appear more likely to report feeling anxious. For example, in 2014, 1.9% of females reported feeling anxious all the time, compared to 1.6% of males. In 2018, 11.2% of females reported feeling anxious all the time, compared to 9.5% of males. This presents a striking shift which may indicate that individuals feel more comfortable reporting feelings of negative mental health in 2018 than previously. Although, there may also be something unobserved behind this difference. Such a difference indicates the need for caution within the interpretation of model estimates pertaining to this measure. Additionally, it is noted that in both 2014 and 2018, females were more likely to report feeling anxious most of the time and some of the time than their respective male subgroups.

Overall, we can see that gender differences seem to emerge across a range of covariates. An array of relationships appears to be present amongst the covariates included within this thesis. For some measures, such as previous victimisation, women appear to be better off, although this difference is smaller in 2018 than in 2014. There are also measures where men appear to be better off, such as income, employment, and feelings of anxiety.

Additionally, there are several measures where there is too much variation between categories to make a conclusive decision, such as education, health, feelings of loneliness, feelings of anxiety, and number of neighbourhood incivilities. Amongst such measures, more complex trends are likely to be identified during modelling.

Further descriptive analysis will be performed in Chapter 5, which presents a preliminary examination into fear of crime and gender differences in order to assess trends between genders and years.

Chapter 5: Empirical results

5.1. Introduction

Chapter 5 addresses the three main research objectives and is structured as follows: Chapter 5.2. discusses t-tests and ANOVA estimates and identifies which gender group had a relatively higher fear of crime in 2014 and 2018 using descriptive analysis. Chapter 5.3. examines the determinants of fear of crime for males and females in the two time periods. Chapter 5.4. decomposes the gender fear of crime gap into the explained and unexplained components for the two time periods and examines changes over time.

5.2. Descriptive analysis

Following Chapter 4.4., which provided initial descriptive statistics of all relevant covariates, the first research objective will be assessed using t-tests and one-way analysis of variance (ANOVA) tests. Firstly, t-tests are executed to compare the two groups' mean differences in fear of crime. These are performed for gender and migrant status for 2014 and 2018. Cohen's D tests are used to evaluate effect size for significant indications. Secondly, ANOVA tests are performed in groups based on age, region, ethnicity and sampling period. This will allow the assessment of distributional differences in the mean scores within these groups.

5.2.1. Testing gender differences within the fear of crime measure

Gender differences in the fear of crime measure are investigated using; t-tests. Cohen's D, and ANOVA estimates. Results for t-tests and Cohen's D calculations are presented in Table 2, whereas results for ANOVA tests are presented in Table 3.

Table 2: T-tests for gender and migrant groups

Two sample t-tests with equal variances						
		t-statistic	Significance	Mean difference	Standard error difference	Cohen's D
2014	Females	39.719	0.0000	0.8839	0.022253	0.860***
	Migrants	-3.574	0.004	-0.1015	0.0284	-0.091***
2018	Females	38.080	0.0000	0.8271	0.021721	0.827***
	Migrants	-5.489	0.0003	-0.1434	0.026117	-0.133***

Source: Author's calculations based on the GSS datasets

As presented in Table 2, both gender and migrant groups have significant mean differences between groups. Both group t statistic estimates are significant at a 1% level. These t-test statistics and significances prompt the use of Cohen's D to estimate effect size.

As is outlined in Cohen (1988), the effect size can be classified as small (d= 0.2), medium (d=0.5) or large (d=0.8). Although, these are implied to provide rough benchmark values rather than hard cut-off points. As the key variable of interest within this study, gender is naturally included in these tests. Migrant status is tested and included within Cohen's D effect size calculations as a matter of comparison to gender effect sizes, but also to assess the effect size of migrant and non-migrant fear of crime. The Cohen's D values for gender are 0.860 for 2014 and 0.827 for 2018. These indicate a large effect size for both samples, slightly decreasing between 2014 and 2018. Effect sizes for migrant status are -0.091 for 2014 and -0.133 for 2018. These indicate a small effect size for both samples, slightly increasing between 2014 and 2018.

Table 3 shows that all ANOVA tests, which compared the mean fear of crime between groups to determine whether there is evidence which supports significantly different means between at least two groups of interest. Results show that for all groups, except for ethnicity, the ANOVA estimates are significant at a 1% level. For regions and age groups, this indicates that at least two groups have statistically significantly different fear of crime means. Testing for differences between sample years also reveals a statistically significant difference in mean fear of crime associated with the two sample years.

Additionally, Bartlett's test for equal variance is provided in Table 3. These tests show significant results across all years and groups at a 1% level. Bartlett's test has a null hypothesis of equal variance across groups and an alternative hypothesis of unequal variance. A significant value indicates a significant difference in the variances of the tested groups within the relative ANOVA test, i.e. unequal variance.

Table 3: ANOVA results for age, ethnicity, region, and sampling period groups

Group variable		Sum of squares	Mean square	F stat	P stat	eta squared	Bartlett's test for equal variance
Regions	Between groups	127.67	25.53	21.19	0.0000	0.006	30.39***
	Within groups	20642.86	1.21				
	Total	20770.53	1.21				
Age	Between groups	303.37	50.56	42.31	0	0.015	42.51***
	Within groups	20467.16	1.20				
	Total	20770.53	1.21				
Ethnic groups	Between groups	5.76	1.44	1.19	0.3136	0.0003	33.26 ***
	Within groups	20764.76	1.21				
	Total	20770.53	1.21				
Sample years	Between groups	36.93	36.93	30.51	0	0.002	9.22***
	Within groups	20914.24	1.21				
	Total	20951.16	1.21				

Source: Author's calculations based on the GSS datasets

5.2.2. Comparisons of mean fear of crime between females and males

In addition to t-tests and ANOVA estimates, this thesis further addresses the first research objective by comparing the mean fear of crime scores by gender and year. Figure 1 presents the mean fear of crime scores by gender and year. It should be noted that statistically, fear of crime cannot have a mean value because it is a discrete and ordinal variable; therefore, it can only have a modal class (i.e., level of fear of crime that appears most frequent/often which is discussed and elaborated on in figure 2. Despite this, the mean fear of crime scores is included as they present a different picture to that shown in Figure 2.

Figure 1 presents the mean fear of crime for males and females in 2014 and 2018. Regardless of its simplicity, the figure provides meaningful results as it shows that in 2014 females reported a distinctly lower mean fear of crime score than males (specifically, 2.966 for females and 3.852 for males). As fear of crime is coded in a worst-to-best fashion, the lower average of females' fear of crime indicates a 'worse' fear of crime, whilst the relatively higher male mean fear of crime score represents a comparatively 'better' fear of crime.
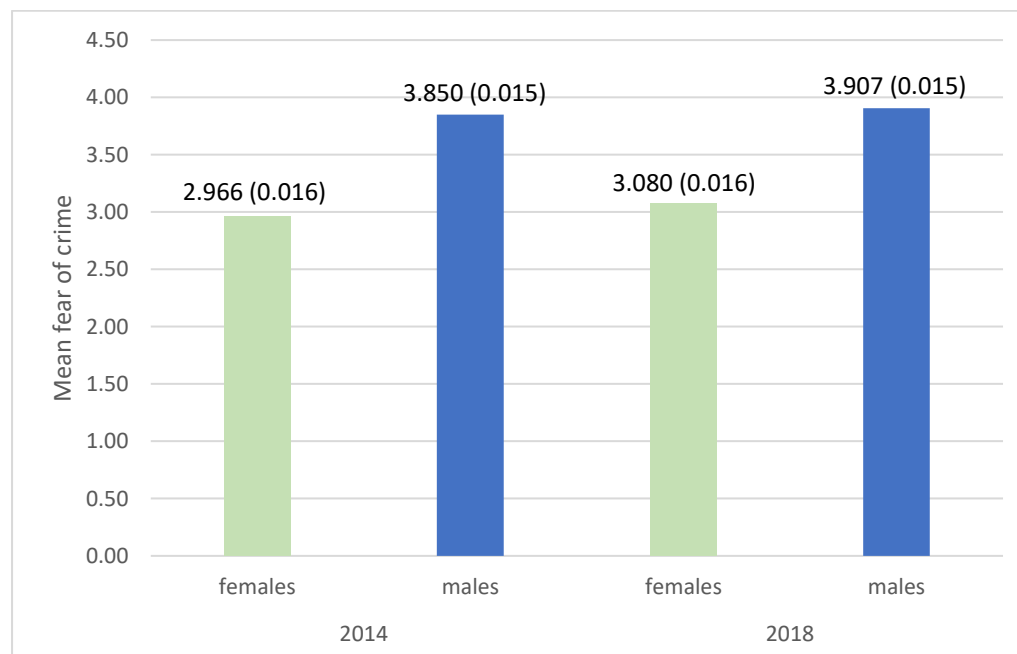
Source: Graph produced by the author based on GSS datasets

**Figure 1: Mean fear of crime score by gender and year**

Once again, in 2018, the mean fear of crime score was distinctly lower for females than for males (specifically, 3.080 for females and 3.909 for males). Again, this indicates that females had a 'worse' average fear of crime compared with mean male scores. Compared to 2014,

the results presented in figure 1 indicate an improvement for both males and females between 2014 and 2018. Comparing the 2014 male mean fear of crime to the 2018 male mean reveals a 1.46% increase from 2014 to 2018. Conversely, comparing the 2014 female mean fear of crime to the 2018 female mean reveals a 3.83% increase from 2014 to 2018. As an increase represents a 'better' average fear of crime score, this shows an improvement for both males and females between 2014 and 2018. This difference in mean values between 2014 and 2018 is notably larger for the female group.

The average fear of crime score was approximately 23% lower for men than women in 2014. This difference was slightly reduced in 2018, where the average fear of crime score is approximately 21.2% lower for men than women. This finding is in line with previous studies that also find women report higher levels of fear of crime than males (Balkin, 1979; Hale, 1996; Holloway & Jefferson; 1997; Ferraro & LaGrange, 1987; Skogan, 1986; Chockalingam & Srinivasan, 2009).

Furthermore, significance levels reported in Table 2 and Table 3 indicate that the mean difference in the mean fear of crime score between males and females is significant at a 1% level for 2014 and 2018.

Figure 2 displays the distribution of the dependent fear of crime variable by gender for 2014 and 2018 in New Zealand. Within this figure, labels present the distribution of fear of crime scores (expressed in percentage frequencies) for both males and females in 2014 and 2018.
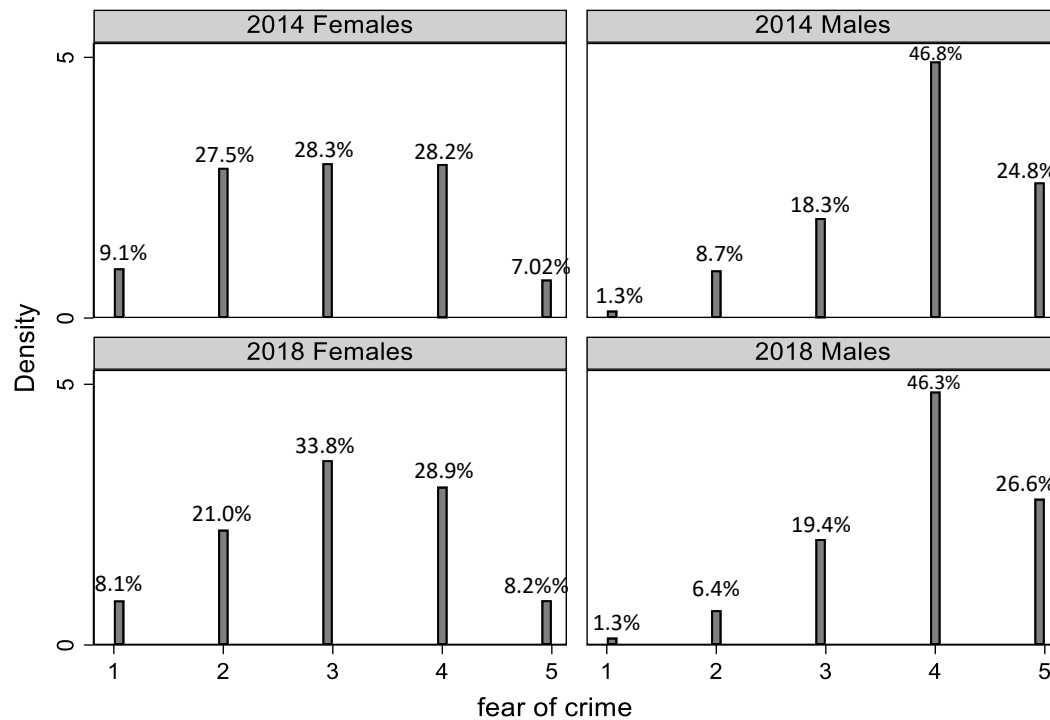
Source: Produced by the author based on GSS datasets.

Figure 2: Fear of crime distribution of responses in 2014 and 2018

In line with several studies (Yavuz & Welch, 2010; Pánek, Ivan & Macková, 2019), the distribution of fear of crime approximates a bell-curve shape for females across 2014 and 2018. For males, distribution in both years appears to show a left skew. These results are also consistent with the above studies as males are more likely than females to have a greater clustering around responses which indicate feeling 'safe' or 'very safe'.

Furthermore, the distribution of modal responses shows that female modes are lower, indicating a tendency towards reporting 'worse' fear of crime responses. Gender-based frequency distributions for modal categories can be seen figure 2. Within the female-only model, the modal fear of crime was 3 in 2014 and 2018, showing no change between sample years. Within the male-only model, the modal fear of crime was 4 in 2014 and 2018, showing no change between sample years.

Interestingly, in 2014 and 2018, a larger portion of women reported feeling 'very unsafe' or 'unsafe'; however, there is also a slight decrease in frequency per cent between sample years. In particular, 9.1% of females reported feeling very unsafe in 2014, whilst 8.1% reported feeling very unsafe in 2018. In comparison, only 1.3% of males reported feeling very unsafe

in 2014 and 2018. Similarly, 27.5% of females in 2014 reported feeling unsafe, and 21% of females reported feeling unsafe in 2018. In comparison, 8.7% of males reported feeling unsafe in 2014, decreasing to 6.4% of males who reported feeling unsafe in 2018. For those that feel neither safe nor unsafe, there appears to be an increase in the frequency percentage for both males and females between 2014 and 2018. In 2014, 28.3% of females reported feeling neither safe nor unsafe, which increased to 33.8% for females in 2018. Likewise, in 2014, 18.3% of males reported feeling neither safe nor unsafe, which increased to 19.4% for males in 2018. Moreover, males appear to more frequently report feeling safe or very safe when compared to females. In particular, in 2014, 46.8% of males reported feeling safe, slightly decreasing to 46.3% in 2018. In comparison, only 28.2% of females reported feeling safe in 2014, slightly increasing to 28.9% in 2018. Lastly, in 2014 24.8% of males reported feeling very safe, which increased to 26.6% in 2018. In comparison, only 7% of females reported feeling very safe in 2014, increasing to 8.2% in 2018.

Overall, these trends in frequency indicate two key findings. Firstly, women are far more likely to report fear of crime responses indicating a 'worse' fear of crime, i.e., feeling very unsafe or unsafe. Likewise, men are more likely to report fear of crime responses which indicate a 'better' fear of crime, i.e., feeling very safe or safe. Secondly, for both males and females, there is an increasing trend across 'good' indications of fear of crime between 2014 and 2018. This improvement in fear of crime presents a unique opportunity to compare covariates between 2014 and 2018 to explain what may have caused this increase.

5.3.   OLS and Ordered Probit results.

To investigate the determinants of fear of crime for males and females, the thesis uses OLS and ordered probit models. The intention of estimating models across genders and years is to analyse which covariates affect male and female fear of crime, with special attention on whether these change across years. Descriptive statistics indicate two key findings. Firstly, females appear to be far more likely to report feeling 'very unsafe' or 'unsafe' when compared to males. Secondly, for both males and females, there appears to be some improvement to mean fear of crime scores between 2014 and 2018. This should produce interesting findings if covariates change in sign or significance between 2014 and 2018. Additionally, it is noted

that results present correlations and not causal estimates. Please also note that individual estimates are interpreted with ceteris-parabus implied to avoid repetition.

All models are estimated with robust standard errors due to identified heteroscedasticity issues. As is reported in Table 4, all models have a Prob > F or Prob > Chi value, which indicates significance at a 1% level. A significant result across all models indicates that the models are well-fitted with independent variables that have a jointly significant relationship with the outcome measure, fear of crime. R-squared is also reported in Table 4 for all models to further evaluate the performance of OLS and ordered probit models. R-squared is used to assess goodness of fit, showing the portion of variance within the dependent variable, which is explained by the independent variables (Gujarati & Porter, 2009). R-squared and Pseudo R-squared values range from 0.1249 to 0.2915 across OLS models and 0.0459 to 0.1157 across ordered probit models. These values are fairly comparable to those found across previous OLS estimations (Gabriel & Greve, 2003; Alper & Chappell, 2012; Sulemana, 2015; Zhao, Lawton & Longmire, 2015), as well as previous ordered probit models (Asencio et al., 2014; Sulemana, 2015).

As fear of crime, and all independent variables, are coded in a worst-to-best fashion, the reader should note that a positive correlation indicates that as an independent variable of interest increases, fear of crime score increases; meaning that it lessens or approaches a more favourable fear of crime indication. Likewise, a negative correlation indicates that as an independent variable of interest increases, fear of crime decreases; therefore, it worsens.

Across OLS and ordered probit models, results are reported for pooled and male and female-only models. The discussion will be focused on comparing the determinants of male and female models. It is noted that as the pooled sample combines males and females, these estimates will lie in between these two subsamples. As is outlined in Chapter 3.3, OLS and ordered probit sign and significance are similar across model years. Because of this, OLS results will be interpreted within this Chapter for the sake of simplicity. Regardless, both OLS and ordered probit models are reported in Table 4. As it is complex to interpret the size of the coefficient, OLS findings will be interpreted based on sign and significance to indicate the relationship between the covariates and fear of crime.

Table 4: OLS and ordered probit results

Variable	2014						2018					
	OLS			Ordered probit			OLS			Ordered probit		
	Pooled N=8,466	Male N=3,765	Female N=4,701	Pooled N=8,466	Male N=3,765	Female N=4,701	Pooled N=8,382	Male N=3,786	Female N=4,596	Pooled N=8,382	Male N=3,786	Female N=4,596
Gender, male is the reference group												
Female	-0.8408*** (0.02)	-	-	-0.9417*** (0.03)			-0.7762*** (0.02)	-		-0.8871*** (0.03)		
Ethnicity, European is the reference group												
Māori	0.1783*** (0.03)	0.1280*** (0.05)	0.2199*** (0.05)	0.1990*** (0.04)	0.1624*** (0.06)	0.2303*** (0.05)	0.2603*** (0.03)	0.1727*** (0.05)	0.3188*** (0.05)	0.3002*** (0.04)	0.2387*** (0.06)	0.3357*** (0.05)
Pasifika	0.0285 (0.05)	-0.1035 (0.07)	0.1242 (0.08)	0.0313 (0.06)	-0.1187 (0.09)	0.1300 (0.06)	0.1105*** (0.05)	0.1249** (0.06)	0.0833 (0.07)	0.1206*** (0.05)	0.1527* (0.08)	0.0872 (0.07)
Asian	-0.2297*** (0.04)	-0.3671*** (0.06)	-0.1040* (0.06)	-0.2847*** (0.05)	-0.4888*** (0.07)	-0.1176* (0.06)	-0.1834*** (0.04)	-0.2526*** (0.05)	-0.1228*** (0.06)	-0.2210*** (0.04)	-0.3340*** (0.06)	-0.1334** (0.06)
Other	-0.0421 (0.08)	-0.0404 (0.11)	-0.0704 (0.11)	-0.0484 (0.09)	-0.0421 (0.13)	-0.0741 (0.12)	0.1465*** (0.06)	0.1027 (0.07)	0.1816* (0.10)	0.1731*** (0.07)	0.1456 (0.10)	0.1897* (0.10)
Age	0.0255*** (0.00)	0.0268*** (0.00)	0.0245*** (0.00)	0.0287*** (0.00)	0.0341*** (0.00)	0.0254*** (0.00)	0.0231*** (0.00)	0.0324*** (0.00)	0.0148*** (0.00)	0.0275*** (0.00)	0.0432*** (0.01)	0.0158*** (0.00)

											-	-
Age squared	-0.0003***	-0.0003***	-0.0003***	-0.0004***	-0.0004***	-0.0003***	-0.0003***	-0.0004***	-0.0002***	-0.0003***	0.0005***	0.0002***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Employment status, employed is the reference group												
Unemployed	0.0319	0.0105	0.0354	0.0218	0.0009	0.0269	0.0409	0.0202	0.0544	0.0470	0.0421	0.0491
	(0.06)	(0.08)	(0.08)	(0.07)	(0.10)	(0.09)	(0.06)	(0.09)	(0.08)	(0.07)	(0.12)	(0.09)
Not in labour force	-0.0499	-0.0612	-0.0461	-0.0540	-0.0607	-0.0527	-0.0452	-0.1116**	-0.0201	-0.0471	-0.1299**	-0.0207
	(0.03)	(0.05)	(0.04)	(0.03)	(0.06)	(0.04)	(0.03)	(0.05)	(0.04)	(0.03)	(0.06)	(0.04)
Victim	-0.0238	-0.0193	-0.0207	-0.0284	-0.0240	-0.0238	0.0063	0.0203	-0.0122	0.0097	0.0252	-0.0134
	(0.03)	(0.04)	(0.05)	(0.04)	(0.05)	(0.05)	(0.03)	(0.04)	(0.05)	(0.04)	(0.06)	(0.05)
Migrant	0.1201***	0.1144***	0.1222***	0.1458***	0.1632***	0.1316***	0.1143***	0.0188	0.1925***	0.1326***	0.0357	0.2019***
	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.04)	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.04)
Education	0.0067**	0.0033	0.0090**	0.0065*	0.0035	0.0085*	0.0116***	0.0203***	0.0059	0.0133***	0.0268***	0.0061
	(0.00)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)	(0.01)	(0.00)	(0.01)	(0.01)
Regions, Auckland is the reference group												
Wellington	0.1610***	0.2839***	0.0587	0.1869***	0.3650***	0.0530	0.1202***	0.1361***	0.1019*	0.1522***	0.1994***	0.1128**
	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.06)
North Island	0.0756**	0.1284***	0.0276	0.0883***	0.1679***	0.0246	-0.0231	0.1000***	-0.1174***	-0.0063	0.1555***	-0.1179***
	(0.03)	(0.05)	(0.05)	(0.04)	(0.06)	(0.05)	(0.03)	(0.04)	(0.04)	(0.03)	(0.05)	(0.05)
Northland	-0.0027	0.1431***	-0.1232**	0.0024***	0.1776***	-0.1340**	0.0700*	0.1142***	0.0316	0.0958**	0.1678***	0.0420
	(0.04)	(0.05)	(0.05)	(0.04)	(0.06)	(0.05)	(0.04)	(0.05)	(0.05)	(0.04)	(0.07)	(0.06)

Canterbury	0.1282*** (0.03)	0.1925*** (0.05)	0.0737 (0.05)	0.1598*** (0.04)	0.2645*** (0.06)	0.0764 (0.05)	0.0176 (0.04)	0.1106*** (0.05)	-0.0569 (0.05)	0.0342 (0.04)	0.1671*** (0.06)	-0.0581 (0.05)
South Island	0.2401*** (0.03)	0.2906*** (0.05)	0.1996*** (0.05)	0.2766*** (0.04)	0.3744*** (0.06)	0.2056*** (0.05)	0.1580*** (0.04)	0.2514*** (0.05)	0.0763 (0.05)	0.2074*** (0.04)	0.3623*** (0.06)	0.0914* (0.06)
general trust	0.0715*** (0.01)	0.0579*** (0.01)	0.0831*** (0.01)	0.0797*** (0.01)	0.0694*** (0.01)	0.0894*** (0.01)	0.0465*** (0.01)	0.0478*** (0.01)	0.0474*** (0.01)	0.0529*** (0.01)	0.0598*** (0.01)	0.0503*** (0.01)
Neighbourhood incivilities	-0.1258*** (0.01)	-0.1113*** (0.01)	-0.1359*** (0.01)	-0.1394*** (0.01)	-0.1358*** (0.01)	-0.1430*** (0.01)	-0.1243*** (0.01)	-0.1218*** (0.01)	-0.1265*** (0.01)	-0.1377*** (0.01)	-0.1476*** (0.01)	-0.1330*** (0.01)
Health	0.0469*** (0.01)	0.0458*** (0.02)	0.0485*** (0.02)	0.0555*** (0.01)	0.0652*** (0.02)	0.0507*** (0.02)	0.0749*** (0.01)	0.0700*** (0.02)	0.081*** (0.02)	0.0871*** (0.01)	0.0953*** (0.02)	0.0857*** (0.02)
Discriminated against	-0.0048 (0.03)	-0.0066 (0.05)	-0.0055 (0.04)	-0.0041 (0.03)	0.0054 (0.06)	-0.0118 (0.05)	-0.0172 (0.03)	0.0169 (0.04)	-0.0225 (0.04)	-0.0184 (0.03)	0.0270 (0.05)	-0.0249 (0.04)
Discriminatory sentiment	0.1005*** (0.01)	0.0988*** (0.02)	0.1031*** (0.02)	0.1178*** (0.01)	0.1286*** (0.02)	0.1119*** (0.02)	0.0957*** (0.01)	0.1207*** (0.02)	0.0827*** (0.02)	0.1172*** (0.02)	0.1651*** (0.02)	0.0890*** (0.02)
Child	0.0748*** (0.03)	0.0848** (0.03)	0.0610* (0.04)	0.0870*** (0.03)	0.1067** (0.05)	0.0649* (0.03)	0.0148 (0.03)	0.0111 (0.04)	0.0079 (0.04)	0.0148 (0.03)	0.0137 (0.05)	0.0067 (0.04)
Married	-0.1075*** (0.03)	-0.1047*** (0.03)	-0.1149*** (0.04)	-0.1261*** (0.03)	-0.1344*** (0.04)	-0.1204*** (0.03)	-0.0734*** (0.03)	-0.0996*** (0.03)	-0.0558 (0.04)	-0.0912*** (0.03)	-0.1395*** (0.04)	-0.0593 (0.04)
Income	0.0074* (0.00)	0.0064 (0.01)	0.0069 (0.01)	0.0079* (0.00)	0.0080 (0.01)	0.0070 (0.01)	0.0020 (0.00)	0.0045 (0.01)	-0.0004 (0.01)	0.0025 (0.00)	0.0059 (0.01)	-0.0002 (0.01)

Life satisfaction	-0.0025 (0.01)	0.0027 (0.01)	-0.0036 (0.01)	-0.0031 (0.01)	0.0024 (0.01)	-0.0044 (0.01)	0.0135* (0.01)	0.0000 (0.01)	0.0232** (0.01)	0.0137 (0.01)	-0.0014 (0.01)	0.0233* (0.01)
Life worthwhile	-0.0021 (0.01)	0.0212* (0.01)	-0.0190* (0.01)	-0.0010 (0.01)	0.0278* (0.01)	-0.0203* (0.01)	-0.0107 (0.01)	-0.0067 (0.01)	-0.0114 (0.01)	-0.0087 (0.01)	-0.0025 (0.01)	-0.0106 (0.01)
Material well-being	0.0184*** (0.00)	0.0159*** (0.00)	0.0193*** (0.00)	0.0206*** (0.00)	0.0197*** (0.00)	0.0202*** (0.00)	0.0101*** (0.00)	0.0083** (0.00)	0.0093** (0.00)	0.0119*** (0.00)	0.0116** (0.00)	0.0098** (0.00)
Lonely	0.0485*** (0.01)	0.0570*** (0.02)	0.0434** (0.02)	0.0567*** (0.01)	0.0742*** (0.02)	0.0460** (0.02)	0.0442*** (0.01)	0.0518*** (0.02)	0.0393** (0.02)	0.0500*** (0.02)	0.0687** (0.02)	0.0415** (0.02)
Anxiety	0.0183 (0.01)	0.0303 (0.02)	0.0035 (0.02)	0.0217 (0.02)	0.0394 (0.03)	0.0039 (0.02)	0.0353*** (0.01)	0.0334** (0.01)	0.0370** (0.02)	0.0394*** (0.01)	0.0412** (0.02)	0.0388** (0.02)
Cons	1.8938*** (0.13)	1.6627*** (0.19)	1.2418*** (0.18)				2.1055*** (0.14)	1.7829*** (0.20)	1.5794*** (0.19)			
Cut 1				-0.2294 (0.15)	0.2776 (0.25)	0.3432 (0.19)				-0.3025 (0.15)	0.4206 (0.20)	0.0971 (0.25)
Cut 2				0.8633 (0.15)	1.3727 (0.24)	1.4458 (0.19)				0.6049 (0.15)	1.3049 (0.20)	1.0155 (0.25)
Cut 3				1.6554 (0.15)	2.1742 (0.25)	2.2421 (0.19)				1.5303 (0.15)	2.2195 (0.20)	1.9570 (0.25)
Cut 4				2.9473 (0.15)	3.5668 (0.25)	3.4231 (0.19)				2.7865 (0.16)	3.5919 (0.20)	3.0973 (0.25)
Observations	8,466	3,765	4,701	8,466	3,765	4,701	8,382	3,786	4,596	8,382	3,786	4,596

Hausman P value	0.0585	0.2514	0.1924				0.6025	0.3921	0.9606			
R squared or Pseudo R squared	0.2915	0.1875	0.159	0.1157	0.0781	0.0593	0.2568	0.1649	0.1249	0.1024	0.0707	0.0459
Prob chi 2 or Prob > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Source: author's own calculations using GSS data.

*** = 1% significance ** = 5% significance * = 10% significance

SE are reported in brackets

5.3.1. Key OLS results across demographic indicators

Demographic measures present moderately consistent correlations across models. For both males and females, being of the Māori ethnicity group correlates with a significantly increased fear of crime score compared to the European reference group. This increase indicates that fear of crime tends to be 'better' amongst Māori when compared to the European reference group. This relationship is significant at a 1% level across males and females for 2014 and 2018. Statistics published by the Ministry of Social Development (2016) note that based on 2014 victimisation rates, Māori is the most victimised ethnic group. It is perhaps the case that, amongst some cultures, those who face higher exposure to actual crime may have lessened sensitivity to crime. However, this hypothesis is impossible to test. In contrast, Asian ethnicity results indicate that being of Asian ethnicity correlates with a significant decrease in fear of crime. This decrease shows that those of Asian ethnicity generally report a 'worse' fear of crime scores compared to the European reference group. This is significant for males in 2014 and 2018 at a 1% level. For females, this estimate was significant at a 10% level in 2014 and a 5% level in 2018.

Additionally, 2018 results also present a significant positive correlation for females in the other ethnicity, respective to the European reference group, which is significant at a 10% level. This increase indicates that fear of crime tends to be 'better' amongst females from other ethnicities compared to the European female reference group. As the other ethnicity captures a range of ethnicities, this provides no straightforward interpretation other than an indication that females in a range of small minority ethnicities are likely to be significantly better off in comparison to European females. This result will likely be varied within ethnicities; however, they do not hold the predictive power to be separated within this thesis. Additionally, it is interesting to note that the other ethnicity estimate for females in 2014 is negative but not significant. Moreover, being a male in the 2018 Pasifika ethnicity group correlates with a significantly increased fear of crime score compared to the European reference group. This increase indicates that fear of crime tends to be 'better' amongst Pasifika males compared to the European male reference group. This prediction is significant at a 5% level. 'Better' fear of crime amongst Māori, Pasifika and other ethnicities, with reference to the European base group, supports the findings of Smith and Hill (1991) and Chadee (2003). However, those of Asian minority group reporting a 'worse' level of fear of

crime when compared to a European reference group also has support across previous literature (Skogan & Maxfield, 1980; Ortega & Myles, 1987; Covington & Taylor, 1991; Skogan, 1995). There are currently no New Zealand-based studies investigating ethnic differences in fear of crime scores, so there are no appropriate New Zealand comparison studies.

Age[6] coefficients across models show a positive relationship between age and fear of crime scores, consistent for females and males between 2014 and 2018. This positive relationship indicates that generally, as age increases, so does fear of crime scores. This positive increase translates to a 'better' fear of crime rating, indicating lower levels of fear associated with increasing age. Moreover, age-squared[7] is significantly negatively associated with fear of crime, indicating this positive relationship between age and fear of crime will generally reduce over an individual's lifespan. These age correlations are also reported by Reese (2009), who finds the existence of a U-shaped relationship between age and fear. Reese (2009) states that their results indicate that the young and elderly exhibit the highest levels of fear compared to those who are more middle-aged. For both age and age-squared terms, estimates for males and females are significant at a 1% level within the 2014 and 2018 samples.

Regional indicators show varying results for males and females across 2014 and 2018. Overall, regional estimates appear to be more strongly predictive of male fear of crime when compared to female fear of crime.

Being in the Wellington region is positively correlated with fear of crime scores, indicating that those in Wellington report 'better' fear of crime scores with respect to the Auckland reference group. This result is significant for males in 2014 and both males and females in 2018. Both 2014 and 2018 male estimates are significant at a 1% level, whilst the finding for females in 2018 is significant at a 10% level. Similarly, being in the Northland region is positively correlated with fear of crime scores for males in 2014 and 2018, showing that males in Northland report 'better' fear of crime scores with respect to the Auckland reference group. For 2014, this is significant at a 1% level, and for 2018 this is significant at a 10% level.

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[6] Models were also run with age as a 10-year categorical, but these findings had inconsistent significance. As such, age is included as a continuous measure alongside an age squared term.

[7] Analysing age in 10-year categories revealed that the positive effects of age appear to peak within the 45-54 year age group and become negative thereafter.

Interestingly, the Northland group are negatively correlated with fear of crime scores for females in 2014, indicating that females in Northland during 2014 reported 'worse' fear of crime scores compared to the Auckland reference group. This finding is significant at a 5% level. Being from the North Island group – which includes the North Island except for Auckland, Wellington, and Northland - shows a positive correlation with fear of crime scores for males in 2014 and 2018, with respect to the Auckland reference group. These findings are significant at a 1% level for 2014 and a 5% level for 2018. This finding is again reversed for North Island females in 2018, showing a negative correlation, which indicates that North Island females generally report a 'worse' fear of crime than the Auckland reference group in 2018. This finding is significant at a 1% level.

The South Island group showed a positive correlation for males in 2014 and 2018 and females in 2014. All respective estimates are significant at the 1% level. This indicates that those in the South Island region - which includes the South Island except for Canterbury - generally report 'better' fear of crime scores with respect to the Auckland reference group. The Canterbury males group shows a positive correlation for 2014 and 2018, with respective 1% and 5% significance levels. This indicates that males in Canterbury generally report 'better' fear of crime scores with respect to the Auckland reference group in 2014 and 2018.

To summarise, across all regional groups, males in both 2014 and 2018 consistently and significantly reported higher fear of crime with respect to the Auckland reference group in all other areas of interest. The results for females are a little more varied, with some regions returning significant findings for only one of the sample years. Overall, regional estimates present curious findings indicating the need for policymakers to investigate how fear of crime may vary across regions. This variation may be linked to differences in types of crimes which are more popular within specific regions, among a range of other factors.

Income and household demographic controls for income, education, employment status, marriage and dependent children present an array of findings. Many of these measures provide assessments of levels of socio-economic indicators which may affect fear of crime scores which should be controlled for regardless of significance. Education shows a positive correlation for 2014 females and 2018 males. Respectively, these are significant at the 5% and 1% levels. These positive correlations support the findings of past literature (Smith & Hill,

1991; Hale, 1996; Reese, 2009), which finds that those with higher education generally report 'better' fear of crime scores.

Interestingly, income is consistently not significant for males and females within both sample years. This is surprising as income is likely to be positively correlated with education. Smith and Hill (1991) also find no significant relationship between fear of crime and income whilst reporting that those with higher education are more likely to report being fearful. Moreover, Dammert and Malone (2003) estimate two separate models for fear of violence and fear of assault or robbery. Findings indicate that income is significantly and positively correlated with fear of assault and robbery but not significantly correlated with fear of violence.

It could be hypothesised that material well-being is correlated with the income measure; however, correlation matrices show a correlation of 0.2943 within the 2014 pooled model and 0.2364 within the 2018 pooled model. Female and male correlation estimates for income and material well-being were relatively comparable to the pooled correlations.

It is interesting to note that employment status indicators remain, for the most part, not significant across all models. The one exception is that not being in the labour force is significantly and negatively associated with fear of crime for males in 2018. This estimate is significant at a 5% level but remains not significant across other models. Statistics New Zealand (2016) outlined that those who are not in the labour force could be: retired, students not engaged in the labour market, parents engaged in full-time care of their children, and individuals who are permanently unable to work due to illness or disability. Moreover, key findings from the 2016 Household Labour Force Survey present that "*Men were more likely than women to have been doing free-time activities, study or training, or 'own care due to sickness/injury/disability' as their main activity*" (Statistics New Zealand, 2016, see p. 1).

Being married is significant and negatively correlated with fear of crime scores, indicating that married people tend to report a 'worse' fear of crime score. This finding implies that married people generally have a lower fear of crime score, which indicates that they tend to experience a 'worse' fear of crime. These marriage estimates are significant at a 1% level for 2014 males, 2014 females, and 2018 males. This finding is inconsistent with past findings, which found that those who are unpartnered or divorced exhibit higher levels of fear (Hanley & Ruppanner, 2015; Braungart, Braungart & Hoyer, 1980). The breadth of these findings is

currently limited as not many studies have included a marital status dummy. Although contradictory, this finding expands on current knowledge of the relationship between fear of crime and marital status. Since we cannot assume the direction of causality, it is potentially the case that those with a higher fear of crime outside of marriage are also more likely to get married. Moreover, as this fear of crime measure specifically captures fear of crime whilst walking alone through one's neighbourhood, it could be assumed to capture aspects of perceived interpersonal violence risks. It is, therefore, unlikely to capture aspects of domestic violence that may inflate fear of crime amongst married women compared to unmarried women. We know from Stanko (1995) that women primarily possess a 'fear of men's violence', which emphasizes acts of *sexual and domestic violence* where perpetrators are often male. Additionally, this finding is consistently negative for both men and women.

Surprisingly, having a dependent child is significantly and positively correlated with fear of crime scores for only males in 2014 at the 5% level[8]. Males with a dependent child tend to report a 'better' fear of crime score than those who do not have a dependent child living with them. Again, this result contradicts the findings of Mesch (2020) and is thus interpreted with caution. As this finding is only significant for males in 2014 and remains not significant across other models, this may imply some uncontrolled complexity to this measure within a New Zealand context. For example, the age and gender of the dependent child could have varied effects within this relationship. Perhaps, through reverse causality, those who generally feel less fearful are more likely to feel comfortable bringing children into the world. However, this cannot be verified within this thesis.

It is interesting to note that the victimisation dummy indicated no significant relationship for males or females in either sample period. This result is consistent with Pearson and Breetzke's (2014) findings, who substituted the victimisation rate obtained through the GSS for official police crime rates. Additionally, this finding is consistent with international research (Garofalo, 1979; Hale, 1996).

Despite some variation from past research findings within these household demographic relationships, they still all represent important demographic controls which were ultimately still necessary within all models.

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[8] A note that marital status and dependent child dummies were triple checked against data dictionaries for the GSS.

5.3.2. Key OLS results for covariates of interest

The most novel finding comes from the measure that captures discriminatory sentiment. This variable was included to assess whether being discriminatory towards others affected one's fear of crime scores. This was included due to a hypothesis that majority groups tend to find minority groups threatening, which may have translated to fear of crime. Additional to this measure, a dummy that captured being personally discriminated against was included to see if the inverse was true. Perhaps those who are discriminated against feel a greater fear due to their personal experienced discrimination. Being personally discriminated against did not significantly impact fear of crime scores for males or females in 2014 and 2018. However, discriminatory sentiment positively correlated with fear of crime scores for males and females in 2014 and 2018. This result is highly significant across all models at the 1% level. This finding indicates that those who generally report feeling more comfortable with neighbours of a different race, religion, or sexuality than the respondent will generally have higher fear of crime scores. Higher fear of crime scores indicates a 'better' fear of crime. Conversely, those who hold more discriminatory sentiment toward those different to them in race, religion, or sexuality will generally report higher levels of fear. This finding is novel and has yet to be reported in current fear of crime literature[9].

Neighbourhood incivilities are shown to be negatively associated with fear of crime scores, indicating that those who report a greater number of neighbourhood incivilities generally report a 'worse' fear of crime score, indicating that they hold a higher fear. This result is consistent for males and females in 2014 and 2018, with all results significant at a 1% level. This finding is unsurprising and is consistent with past research, highlighting the detrimental impacts that high levels of neighbourhood incivility can have on fear of crime (Skogan, 1986).

General trust presents a positive relationship for males and females in 2014 and 2018, a consistent finding across past literature (Garofalo, 1981; Hale, 1996; Walklate, 1998; Weitzer & Charis, 2004; Gray, Jackson & Farrall, 2011). This indicates that individuals with a higher general trust tend to report 'better' fear of crime scores which indicates that they possess less fear. This result is significant at a 1% level for all models.

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[9] To this authors knowledge, at time of submission. Some past research has captured personally experienced discrimination as was recorded in the dummy, but discriminatory sentiment has yet to be associated with fear of crime from an empirical standpoint.

Interestingly, migrant status results indicate a significant positive correlation for females in 2014 and 2018 and males in 2014. For all three findings, estimates are significant at a 1% level. Across the literature, most studies investigate migrancy from the perspective of non-migrants rather than assessing how migrant status may affect migrants themselves. It was initially hypothesised that migrant status might cause a 'higher' fear of crime under the vulnerability principle (Skogan & Maxfield, 1980; Ferraro & LaGrange, 1987; Hale, 1996; Rountree & Land, 1996). However, past research has often not investigated migrant vs non-migrant fear of crime, so there are few comparable findings. The findings presented in this thesis indicate that migrants generally report 'better' fear of crime scores than New Zealand-born, non-migrant respondents. It is perhaps the case that migrants, especially those who come here seeking Asylum, may see New Zealand as comparatively more peaceful and safer than the countries they emigrate from. Comparatively, those born in New Zealand may no longer recognise the general peace and safety that it holds compared to many other countries (Institute for Economics and Peace, 2021).

A measure of general health provides a positive relationship for males and females within the 2014 and 2018 samples. This signals that those who generally report 'better' health also report 'better' fear of crime scores. Estimates for health are significant at a 1% level for all models. These estimates are consistent with past literature (Geiss & Ross, 1998; Stafford, Chandola & Marmot, 2007; Lorenc et al., 2012; Pearson & Breetzke, 2014). In particular, this finding is consistent with New Zealand research performed by Pearson and Breetzke (2014), who investigated the relationship between fear of crime and physical and mental well-being. As was previously mentioned, separate mental and physical health measures could not be used within this thesis due to a change within these measures between the 2014 and 2018 GSS samples. Pearson and Breetzke (2014) obtained their findings using older GSS samples prior to this change in the health module.

Separate emotionality measures are included for feeling lonely and anxious. These measures present interesting results within the models. Feeling lonely is positively correlated with fear of crime scores across males and females for 2014 and 2018, indicating that feeling less lonely is generally correlated with higher, or 'better', fear of crime scores. This result is significant at a 1% level for males in both samples and a 5% level for females in both samples. Feeling less anxious correlates positively with fear of crime scores for females and males in 2018, showing

that feeling less anxious is generally correlated with higher or 'better' fear of crime scores. This result was not significant across males and females in 2014. Descriptive statistics did show a notable jump in 'higher' anxiety levels reported in 2018 compared to 2014, so this result isn't entirely surprising, although the general shift in anxiety levels is surprising. There is no obvious event or change which could have caused this shift in anxiety levels between 2014 and 2018.

Well-being measures include life satisfaction, feeling life is worthwhile and material well-being. Life satisfaction is only significant and positively correlated with fear of crime scores for females in 2018[10]. This indicates that greater life satisfaction is generally correlated with higher, or 'better', fear of crime scores. Similarly, feeling as though life is worthwhile positively correlates with fear of crime in 2014 for males and females. This estimate shows that a greater level of feeling as though life is worthwhile is generally correlated with higher or 'better' fear of crime scores. Estimates for feelings of whether life is worthwhile were only significant for males and females in 2014 at a 10% level. These estimates are not significant for both males and females within the 2018 model.

More consistent results for material well-being are found across models. Material well-being broadly captures deprivation levels. Material well-being shows a consistent positive relationship for males and females across 2014 and 2018. This result was significant at a 1% level for male and female sub-samples in 2014 and a 5% level for the male and female sub-samples in 2018. This estimate indicates that 'better' rankings of material well-being, as determined by the Ministry of Social Development's produced index measure, are positively correlated with fear of crime. This finding is consistent with Kujala et al. (2019), who also report a positive relationship between material deprivation and fear of crime.

To summarise, these covariates place great importance on social and community factors in determining fear of crime. These include measures such as trust and neighbourhood incivilities. This is a finding that has wide support in past literature (Skogan & Maxfield, 1980; Skogan, 1986; Box et al., 1988; Donnelly, 1989; Ferrero, 1995; Hale, 1996; Tyler et al., 1997; Gabriel & Greve, 2003; Jackson, 2004). Additionally, material well-being improvements benefit both male and female fear of crime scores across all models. The positive correlation

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[10] For robustness, models were estimated with life satisfaction without 'life is worthwhile' or material well-being but this did not improve significances across models.

identified between discriminatory sentiment and fear of crime scores is novel, which adds to the understanding within the existing literature. The importance of social and community-based measures makes sense as the fear of crime measure cognitively captures a situation of neighbourhood fear of crime. Respondents naturally consider community aspects when considering their fear within their own neighbourhood.

Outside of demographic variables, there is little variation in the sign and significance of estimates across males and females. These estimates appear to affect male and female fear of crime similarly. However, future research should focus on the variation that may exist within the covariates, which are indicated here to affect male and female fear of crime significantly.

5.4. Blinder-Oaxaca results

To answer the third research objective, Blinder-Oaxaca models are used to separate the gap in fear of crime means for New Zealand males and females into characteristic (explained) effects and coefficient (unexplained) effects. The results of this model are presented in Table 5. This decomposition model is run separately for 2014 and 2018,

For this decomposition, females are chosen as the reference group across both years as they are assumed to have higher levels of fear of crime based on the New Zealand Treasury's well-being framework report (McLeod, 2018). Additionally, this indication is consistent with male and female means presented in figure 1. Demographic measures are included as controls alongside the variables of interest. These variables are identical to those included within OLS and ordered probit models. Details on the coding of the dependent and independent variables are outlined in Chapter 4.3.

Table 5: Blinder-Oaxaca decomposition results

Blinder-Oaxaca decomposition		
	2014 **N = 8,466**	**2018** **N = 8,382**
Males	3.8497 *** (0.015)	3.9066 *** (0.015)
Females	2.9658 *** (0.016)	3.0795 *** (0.016)
Difference	0.8839 *** (0.022)	0.8271 *** (0.022)
Characteristics	0.0433 *** (0.012)	0.0461 *** (0.012)
Coefficients	0.8445 *** (0.023)	0.7749 *** (0.023)
Interaction	-0.0038 (0.013)	0.0038 (0.014)

Source: author's calculations based on GSS datasets. *** = significant at 1% ** = significant at 5% * = significant at 10%

SE is presented in brackets

Table 5 presents the results[11] of the Blinder-Oaxaca models. In 2014, the mean male fear of crime value was 3.8518, whilst the mean female fear of crime was 2.9662. Therefore, the mean difference between genders in 2014 was 0.8856, or a difference of 29.8%. In 2018, the mean male fear of crime value was 3.9086, and the mean female fear of crime value was 3.0795. The mean difference between genders in 2018 was 0.8291, or a difference of 22.4%. There has been a noticeable reduction in the mean differences between males and females from 2014 to 2018. All mean estimates are significant at a 1% level. Likewise, both mean difference estimates are also significant at greater than 1%. The means identified in Table 5 are consistent with those presented in Table 4.

The following descriptions of characteristic and coefficient effects are informed by those outlined in Rossouw and Greyling (2020) and Rossouw and Greyling (2021).

The characteristic effect is the 'explained' effect, which shows the portion of the fear of crime gap between males and females attributed to group differences in observed characteristics. This effect captures to what degree the dispersion of characteristics between genders drives the gender gap in fear of crime.

The coefficient effect is the 'unexplained effect', which indicates the portion attributed to group differences in the "returns" to characteristics. This effect arises from differences in how

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[11] Means presented within this table are rounded as per outputting guidelines provided by Statistics New Zealand. Mean fear of crime estimates are reported consistently across tables and models throughout this thesis.

the characteristics within the model are associated with fear of crime. This estimate reveals the level of fear of crime differences which would persist even if females could achieve equal mean levels of characteristics to that of males. It is important to note that this only refers to the assessed characteristics included within this model.

Characteristic and coefficient estimates are provided in Table 5. In 2014, the characteristic estimate showed that if females had a set of characteristics (or endowments) equal to those in the male group, the mean fear of crime of females could decrease by 0.0431. In 2018, the characteristic effect estimates showed that if females had a set of characteristics equal to those in the male group, the mean fear of crime of females could decrease by 0.0459. Estimates for 2014 and 2018 are both significant at a 1% level. For 2014, the coefficient effect is estimated to explain 0.8436 of the mean gap in male and female fear of crime. Within the 2018 model, this is slightly lower at 0.7752. Estimates for 2014 and 2018 are both significant at a 1% level.

It is evident that the coefficient effects are the primary driver of the gender gap in fear of crime in New Zealand for both years. Moreover, there is a notable drop in the coefficient effect estimate between 2014 and 2018. This is consistent with the mean fear of crime values presented in figure 1, which showed that the fear of crime improved for both males and females between 2014 and 2018 - with a notably greater comparative improvement for females.

This estimate indicates differences in the efficiency with which males and females can convert changes in characteristics into reductions in fear of crime. As coefficient effects pertain to the 'unexplained' differences in the gender gap in fear of crime, this presents an interesting analysis. The four key theories behind what may drive fear of crime amongst women are the risk perception theory, personality differences, the shadow hypothesis and the vulnerability theory. The risk perception theory attributes women's misperceptions of risk to a higher risk sensitivity when compared to males. Personality differences pertain to the differences in male and female personalities, which affect a broad set of aspects within their lives. These pertain to differences in how males and females tend to be raised, which may affect how they make normative judgements. The shadow hypothesis attributes female fear of crime to a fear of sexual violence, where the fear of sexual violence is alleged to work as a 'master offence', which inflates women's fear of all crimes. The vulnerability theory aligns women's higher fear

of crime with anatomical differences wherein women tend to be physically weaker than males. These four theories are outlined in further detail within Chapter 2.4. While existing research supports these theories, they are often difficult to quantify or model with certainty.

All four theories constitute aspects that impact fear of crime that cannot be captured or controlled for within any of the models presented within this thesis. Thus, it is hypothesised that as these unobservable effects are captured within the error term, they are likely also to be captured within the 'unexplained' coefficient effects estimates. These theories outline unobservable aspects which drive fear of crime which affect males and females differently. These also likely impact how males and females can convert changes in characteristics into reductions in fear of crime, thus influencing the coefficient effects, which primarily drive the gender differences in the mean fear of crime gap. This could, therefore, indicate that the risk perception theory, personality differences, the shadow hypothesis and the vulnerability theory are key influencers of gender differences in the mean fear of crime gap.

Chapter 6: Conclusion

This thesis has expanded New Zealand's fear of crime literature in several ways. First, the descriptive analyses revealed that fear of crime generally improved between 2014 and 2018. Subsequent OLS modelling revealed a range of variables significantly influencing the fear of crime of females and males. This thesis represents the first attempt to empirically assess the determinants of fear of crime for males and females. Following OLS modelling, Blinder-Oaxaca models were estimated for 2014 and 2018 to investigate whether characteristic or coefficient effects influence the mean fear of crime gap between males and females. Across international literature, this model has not yet been utilised to analyse mean differences in fear of crime between genders.

Within this thesis, a variety of significant determinants of male and female fear of crime were identified through OLS modelling. The analysis compared results across genders as well as intertemporally between 2014 and 2018 samples. The results of these models indicated the following variables had a statistically significant positive effect on fear of crime for both males and females: general trust, health, discriminatory sentiment, material well-being, education, being a migrant, living with a dependent child, loneliness and feelings of anxiety. Due to the worst-to-best coding of fear of crime, increases in these variables are associated with an increase in fear of crime, where an increase indicated 'better' fear of crime scores. These OLS estimates were predominantly consistent in their significance across genders and years; however, some were only significant for one gender or one sample year. Further details can be found in Chapter 5.3.

On the other hand, the following variables had a statistically significant negative effect on fear of crime for both males and females: neighbourhood incivilities and being married. Due to the worst-to-best coding of fear of crime, increases in these variables are associated with a decrease in fear of crime, where a decrease indicated 'worse' fear of crime scores. Primarily, these estimates carried their sign and significance between genders and years; however, some variables showed slight variation across either gender or year. These details are noted within Chapter 5.3.

Novel results were obtained for discriminatory sentiment, a variable which has not yet been tested in past studies. OLS results indicated that this measure was positively correlated with

fear of crime for both males and females within both sample periods. This indicates that increases in discriminatory sentiment increase fear of crime for both males and females. Increases in discriminatory sentiment indicate increased 'comfortability' with a new neighbour who may be of a different race, religion, or sexuality. Moreover, as fear of crime is coded in a worst-to-best fashion, a decrease in discriminatory sentiment is correlated with 'better' fear of crime scores.

Blinder-Oaxaca results indicated that the coefficient effect contributes significantly more to the mean fear of crime gap than the characteristic effect. The coefficient effect captures the 'unexplained' portion of the model, thus indicating those factors which influence the gap and are not captured within the characteristics effect of the model. Therefore, this finding supports the unobservable effect of the risk perception theory, personality differences, the shadow hypothesis and the vulnerability theory on gender differences in fear of crime.

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Appendix

Table A: Dependent and Independent Variables

Variable name	General Social Survey questions used	Response options	Coded as
Fear of crime	Thinking about crime, how safe or unsafe do you feel walking alone in your neighbourhood after dark?	Very unsafe, Unsafe, Neither safe nor unsafe, Safe, Very safe.	Ordinal, ranging from very unsafe to very safe
Female	Is the respondent male or female?	Male Female	Dummy, where 1 represents females, and 0 represents males.
Ethnicity (European)	which ethnic group(s) does the respondent belong to?	New Zealand European ethnicity	Dummy, where 1 represents European respondents and 0 non-European
Ethnicity (Māori)	which ethnic group(s) does the respondent belong to?	Māori ethnicity	Dummy, where 1 represents Māori respondents and 0 non-Māori
Ethnicity (Pasifika)	which ethnic group(s) does the respondent belong to?	Pasifika Ethnicity	Dummy, where 1 represents Pasifika respondents and 0 non-Pacifica
Ethnicity (Asian)	which ethnic group(s) does the respondent belong to?	Asian Ethnicity	Dummy, where 1 represents Asian respondents and 0 represents non-Asians.
Ethnicity (other)	which ethnic group(s) does the respondent belong to?	Other ethnicities	Dummy where 1 indicates respondents belong to other

			ethnicities not listed and 0 otherwise.
Age	What is the respondent's age?	Respondents indicated a year value.	Categorical
Age squared	What is the respondent's age? (squared)	This the above age measure squared	Quadratic, a square of the age measure
Labour force status	Three separate dummies are used to assess labour force status	Employed Unemployed Not in the labour force	Separate dummy variables.
Victimisation	I am now going to ask you a general question about crime. I will not be asking you for details of what might have happened to you. Crime includes damage to personal property, theft, assault, and threats. In the last 12 months, were any crimes committed against you?	Yes No	Dummy variable. 1 if answered yes, 0 if no.
Migrant	Was the respondent born in New Zealand?	1. Yes 2. No	Dummy, where 1 indicates migrant status and 0 indicates those born in New Zealand
Auckland Region	Obtained through Statistics New Zealand 'regional group code', assesses where the respondent currently resides.	Auckland, Wellington, Northland, rest of North Island, Canterbury or rest of South Island	Dummy, where 1 indicates Auckland resident and 0 otherwise
Wellington Region	''	''	Dummy, where 1 indicates Wellington resident and 0 otherwise
Northland Region	''	''	Dummy, where 1 indicates Northland resident and 0 otherwise
Rest of the North Island Regions	''	''	Dummy, where 1 indicates the rest of

			North Island aside from Auckland, Wellington and Northland and 0 otherwise
Canterbury	"	"	Dummy, where 1 indicates Canterbury resident and 0 otherwise
Rest of the South Island Regions	"	"	Dummy, where 1 indicates South Island aside from Canterbury and 0 otherwise
Education	what is your highest completed qualification?	1. National Certificate level 1 2. National Certificate level 2, 3. National Certificate level 3, 4. National Certificate level 4, 5. Trade Certificate, Diploma or Certificate level 5, 6. Advanced Trade Certificate, 7. Diploma or Certificate level 6 8. Teachers Certificate / Diploma, 9. Nursing Diploma, 10. Bachelor Degree, 11. Bachelor Hons, 12. Postgraduate Certificate / Diploma, Master's Degree,	Categorical, 1-13

		13. PhD	
Trust in all of New Zealand	And now a general question about trust. Where zero is not at all and ten is completely, in general, how much do you trust most people in New Zealand?	0-10, 0 indicates trust not at all; 10 indicates trust completely.	Categorical, 0-10
Trust in police	Where zero is not at all, and ten is completely, how much do you trust the police?	0-10, 0 indicates trust not at all; 10 indicates trust completely.	Categorical, 0-10
Trust in the media	Where zero is not at all, and ten is completely, how much do you trust the media?	0-10, 0 indicates trust not at all; 10 indicates trust completely.	Categorical, 0-10
Neighbourhood incivilities	The next question is about anti-social behaviour in your neighbourhood. Looking at showcard 39 and thinking about the last 12 months, have any of these things been a problem in your neighbourhood? You can choose as many as you want.	1. noisy neighbours / loud parties 2. vandalism / graffiti 3. burglary / break-ins 4. assaults 5. harassment 6. people using or dealing drugs 7. people being drunk in a public place 8. dangerous driving 9. any other problems - please state	Count based on how many problems indicated
Health	in general, would you say your health is excellent, very good, good, fair or poor?	1. Poor 2. Fair 3. Good 4. Very good 5. Excellent	Ordinal measure ranging from poor through to excellent
Perceived discrimination	In the last 12 months, have you been discriminated against?	Yes No	Dummy variable, 1 if the respondent answers yes, 0 if no.
Discriminatory sentiment	how would you feel if you had a new neighbour who ... - was a different religion to you?	Very uncomfortable Uncomfortable Neither comfortable nor uncomfortable	Ordinal categorical from very uncomfortable to very comfortable.

		was a different sexual orientation to you? - was a different ethnicity to you?	Comfortable Very comfortable.	
child	Is there a dependent child living within your household?	1. Yes 2. No	Dummy; 1 if yes, 0 If no
Married/legally partnered	Are you legally partnered or unpartnered?	1. Partnered 2. Not partnered	Dummy: 1 if married, 0 if not
Loneliness	People who have contact with family and friends can still feel lonely sometimes, while those who have little contact may not feel lonely at all. In the last four weeks, how much of the time have you felt lonely?	1. All of the time 2. Most of the time 3. Some of the time 4. A little of the time 5. none of the time	Ordinal measure ranging from lonely all the time through to lonely none of the time.
Anxiety (proxied from calm GSS measure)	The next few questions are about how you feel and how things have been with you during the past four weeks. How much of the time have you felt calm and peaceful?	1. None of the time (anxious all of the time) 2. A little of the time (anxious most of the time) 3. Some of the time (anxious some of the time) 4. Most of the time (anxious a little of the time) 5. All of the time (anxious none of the time)	Ordinal measure, ordered from calm none of the time (anxious all of the time) through to calm all of the time (anxious none of the time)

In addition to the response options listed, respondents could refuse to answer or respond 'I don't know'. These responses were removed during the data cleaning processes.

Table B: Heteroskedasticity tests

	2014			2018		
	Pooled sample	Males	Females	Pooled sample	Males	Females
chi2(1)	185.14	153.5	4.31	159.71	84.22	3.73

Prob > chi2	0	0	0.0379	0	0	0.0533

Table C: VIF estimates

Variable	2014			2018		
	Pooled sample	Males	Females	Pooled sample	Males	Females
Age squared	39.59	40.23	40.15	39.27	41.02	38.99
Age	35.81	36.64	35.85	35.98	37.55	35.5
Life satisfaction	2.03	1.99	2.09	1.79	1.84	1.77
Income	1.98	1.88	2.03	1.89	1.8	1.93
Not in the labour force	1.85	2.05	1.72	1.78	1.97	1.68
material well-being	1.77	1.64	1.83	1.62	1.56	1.62
Life is worthwhile	1.68	1.71	1.66	1.53	1.65	1.45
Rest of North Island	1.64	1.65	1.64	1.6	1.6	1.61
Northland	1.54	1.52	1.56	1.38	1.35	1.4
Canterbury	1.53	1.51	1.54	1.37	1.39	1.37
Rest of South Island	1.52	1.52	1.53	1.41	1.42	1.42
Migrant	1.51	1.51	1.52	1.56	1.54	1.59
Married	1.46	1.53	1.49	1.49	1.49	1.53
Trust in NZ	1.41	1.4	1.43	1.39	1.39	1.41
Wellington	1.39	1.4	1.39	1.3	1.31	1.3
Asian	1.38	1.37	1.4	1.5	1.5	1.53
Health	1.34	1.35	1.34	1.31	1.32	1.32
Child	1.32	1.41	1.31	1.36	1.34	1.41
Anxiety	1.32	1.27	1.36	1.29	1.26	1.31
Education	1.26	1.27	1.27	1.3	1.29	1.32
Lonely	1.21	1.2	1.22	1.24	1.2	1.27
Māori	1.21	1.19	1.23	1.21	1.2	1.22
Neighbourhood incivilities	1.2	1.18	1.23	1.19	1.17	1.22
Pasifika	1.18	1.15	1.21	1.19	1.2	1.21

Discriminated against	1.15	1.15	1.15	1.14	1.12	1.15
Unemployed	1.13	1.12	1.14	1.09	1.1	1.1
Discriminatory sentiment	1.11	1.1	1.13	1.1	1.1	1.11
Victim	1.1	1.1	1.11	1.08	1.08	1.09
Female	1.08	-	-	1.1	-	-
Other ethnicity	1.02	1.02	1.02	1.03	1.04	1.03

The author notes that these values are not in numerical order for each year as the order varied slightly for each year due to STATA presenting VIFs in a largest-to-smallest numerical order for each model.

Source: author's calculations based on GSS datasets.