

OFFENDING OUTCOMES FOR MĀORI AND NON-MĀORI, AN INVESTIGATION OF  
ETHNIC BIAS IN THE CRIMINAL JUSTICE SYSTEM: EVIDENCE FROM A NEW  
ZEALAND BIRTH COHORT

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## ABSTRACT

Māori have been overrepresented in the New Zealand criminal justice system for decades. Māori are significantly more likely to be disadvantaged by risk factors which are linked to criminal offending behaviours. Overseas research suggests that there may be a bias from officials against minority groups within criminal justice systems around the world, in which minorities are more likely to be arrested or receive harsher sentences given equivalent behaviour. However, limited research on this issue has been conducted in New Zealand. The current study updates Fergusson, Horwood and Lynskey (1993) who found that Māori/Pacific Island children were 2.9 times more likely than Pākehā children to come to the attention of the Police. The present study used the same longitudinal sample as the 1993 study, followed from adolescence through to age 35 (N = 995). The present study examined the associations between rates of offending and ethnicity (Māori versus non-Māori) both before and after controlling for disadvantageous social, family and individual risk factors which have previously been linked to offending behaviours. Specifically, the study investigated whether there is any evidence of an ethnic bias against Māori within the criminal justice system after controlling for these factors. Generalised estimating equation (GEE) models were fitted to repeated measures data to examine the strength of the associations between Māori ethnicity and rates of offending. The GEE models were then extended in a series of adjustments to control for social, family and individual risk factors, and again to include self-reported rates of violent, property and other offences. Results found that Māori offend at a significantly higher rate compared to non-Māori, and that even when known risk factors of offending and self-reported rates of offending were controlled for, a small residual bias was evident. Although results were not statistically significant after adjusting for risk factors, the consistency of the results (with several different measures showing similar trends) suggests that there may be an ethnic bias against Māori within the criminal justice system. These findings may aid in addressing the issue of Māori being overrepresented and consequently reduce the number of Māori in the New Zealand criminal justice system.

## CHAPTER ONE

### 1. INTRODUCTION

#### *1.1. Overview and Rationale*

For many decades now, Māori have been over-represented in the New Zealand prison population (Department of Corrections, 2007). For the last 16 years on record, Māori have made up over half of the prison population (Statistics New Zealand, 2015). In 2014, Māori had 4,275 in prison, which contributed to 55.8% of the total number of those incarcerated. Is it possible that a minority group in New Zealand society is a majority group in the New Zealand criminal justice system? It seems obvious that the answer to this question might state that Māori simply offend more than other ethnic groups. Though this may be true to some extent, there is evidence which suggests that there may be a negative bias from officials in the criminal justice system against Māori (Fergusson, Horwood & Lynskey, 1993; Department of Corrections, 2007). Expanding on the work of Fergusson et al. (1993) based on the Christchurch Health and Development Study, this thesis uses the most recent data with the same birth cohort and aims to explore the differences in rates of offending between Māori and non-Māori by developing a statistical model which compares rates of official charges and convictions, before and after adjustment for social, family and individual risk factors and self-reported rates of offending. This thesis also explores whether the discrepancies between the comparative rates of offending by Māori and non-Māori could possibly suggest evidence of an ethnic bias from officials in the criminal justice system, while controlling for known risk factors of offending.

This research is important for several reasons. Should we find evidence of bias from officials against Māori in the criminal justice system, then this may help to explain why Māori are consistently over-populating New Zealand courts and prisons. Moreover, the existence of such a bias would represent a serious and significant issue for the country as a whole.

This chapter will present an overview of New Zealand's bicultural society, the New Zealand criminal justice system and the rates and patterns of offending in New Zealand. This is followed by a review of the research literature, suggesting reasons for differences of offending in New Zealand, potential bias in New Zealand against Māori, as well as bias against other minority groups in criminal justice systems overseas. These concepts, the links between them and findings from other research in these areas provide the background and rationale for the current study. Finally, this chapter will discuss relevant findings from the Child Health and Development study, including a closer review of the Fergusson et al. (1993) paper, which this thesis plans to extend.

### ***1.2. Differences between Māori and non-Māori in New Zealand Society***

New Zealand society was formed following the Treaty of Waitangi, an agreement signed in 1840 between the British Crown and representatives of the indigenous Māori people. Within this agreement, Māori agreed to accept the sovereignty of the Crown in return for full rights of British citizenship, while the Crown accepted to preserve the traditional rights and ownership of the Māori people. However, after the signing of the Treaty of Waitangi, the Māori people experienced a progressive process of colonization, which led to an increasing alienation of Māori from their traditional lands, waters and resources, an increasing urbanization of Māori, and a general decline of Māori culture and language in New Zealand over the past century (McLean, 2015).

Extensive research has shown that New Zealand Māori are at a disadvantage in many measures of health and wellbeing in comparison to New Zealand European (Pākehā) (Bramley, Hebert & Tuzzio, 2005). One of New Zealand's largest unresolved problems is the ethnic disparities in outcomes of Māori and Pākehā (Gracey & King, 2009). Māori are more likely to have negative outcomes in: health (Mason, Stefanogiannis, Templeton & Weerasekera, 2012),

economic status (Chapple, 2000; Statistics New Zealand, 2007), educational achievement (Education Counts, 2010; Marie, Fergusson & Boden, 2014) and criminal justice (Department of Corrections, 2007; Marie, 2010; Workman, 2011). In terms of morbidity and mortality data, ethnic surveillance studies show that from prenatal development, through adulthood and old age, a pattern of lower health status for Māori persists across the lifespan (Ministry of Health & Statistics New Zealand, 2009). Māori also have lower life expectancies and receive lower incomes than non-Māori (Marie, Fergusson & Boden, 2014). Māori people are over-represented in the lowest 25% of incomes, which has not improved in the last decade (Statistics New Zealand, 2015).

In particular, the over-representation of Māori involved in crime is of concern. Although Māori make up approximately 12.7% of the general population of New Zealand over the age of 15, more than 40% of police apprehensions are Māori, more than 50% of the male prison population are Māori, and more than 60% of the female prison population are Māori. Moreover, Māori have the highest recidivism rates amongst offenders (Department of Corrections, 2013; New Zealand Police, 2012). To illustrate the prison population figure, the rate of incarceration for New Zealand's non-Māori population is around 100 per 100,000. If that rate applied to Māori, the number of Māori in prison at any one time would be less than 650. However, there are currently over 4,200 Māori imprisoned in New Zealand (Statistics New Zealand, 2015). Supplementary to these statistics, a review conducted by the Department of Corrections (2007) shows evidence that over 16,000 Māori males between the ages of 20 and 29 years have a record of having been imprisoned one or more times. This number makes up over 30% of all Māori males within the age range, in comparison to Pākehā males between 20 and 29 years, who have a figure of 10%.

Needless to say, the effects on racial harmony are detrimental for a country that once agreed to build a society based upon equality between Māori and Pākehā. These figures have

been interpreted by some individuals in New Zealand society who accuse the justice system of being severely racist and damaging to the interests and well-being of Māori; for example, some have labelled Māori to be intrinsically “criminally inclined” (Department of Corrections, 2007).

### ***1.3. An Overview of Offending in New Zealand***

New Zealand’s prison population has gradually been rising over time. In June 2012, there were 8,618 people serving time in correctional facilities, of which 8,091 were male and 527 were female. Ten years prior, the prison population was 6,048 prisoners, of which 5,773 were male and 275 were female. The most concerning fact, is that even as the prison population rises, Māori continue to make up approximately 50% of the prison population (Statistics New Zealand, 2012). In addition, research has confirmed that Māori are more likely to be reconvicted and re-imprisoned following community-based sentences and on release from prison in comparison to other groups (Nadesu, 2008; Nadesu, 2009; Spier 2002; Department of Corrections, 2009). This trend has essentially become accepted as normal for people of New Zealand, as Māori have made up the majority of the incarcerated population for more than three generations. Statistics show that in the 1920s, Māori contributed 4% to the New Zealand prison population, yet by the 1940s this figure had reached 15%. During the 1950s and the 1960s, there was reported a sevenfold increase in the number of Māori who were convicted and sent to prison, approximately four times more than non-Māori (Sibley & Liu, 2007). Since then, Māori have continued to be over-represented in the New Zealand prison population.

Table 1 below shows that at 30 June 2012, Māori contributed to 51 percent of the total prison population (4,391). European prisoners made up 33 percent (2,835), and Pacific peoples accounted for 12 percent (1,006) of the total (Statistics New Zealand, 2012).

Table 1

*Ethnicity of Prisoners in New Zealand Prisons as of June 2012*

Ethnicity	Female		Male		Total	
	N	%	N	%	N	%
Māori	304	58	4087	51	<b>4391</b>	<b>51</b>
European	163	31	2672	33	<b>2835</b>	<b>33</b>
Pacific Peoples	24	5	982	12	<b>1006</b>	<b>12</b>
Asian	17	3	218	3	<b>235</b>	<b>5</b>
Other/unknown	19	4	132	2	<b>151</b>	<b>2</b>
<b>Total</b>	<b>527</b>	<b>100</b>	<b>8091</b>	<b>100</b>	<b>8618</b>	<b>100</b>

The New Zealand Census in 2013 recorded that 15.6% of the population (692,300 out of 4,442,100) identified as Māori. The most recent data available on the offending rates in New Zealand reveal that Māori criminal behaviour patterns are consistent with the previous statistics. According to Statistics New Zealand (2015), for the calendar year of 2014, 45.9% of police apprehensions occurred for Māori (71,621 of 156,029). Furthermore, for the year of 2014, 55.8% of the imprisonment population were Māori (4,275 of 7,662) while the 57.2% of those in remand were Māori. All in all, these latest offending statistics are consistent with previous years, showing that Māori constantly have higher rates of being apprehended and convicted, which suggests the need to investigate possible explanations of why Māori are so overpopulated in the criminal justice system.

#### ***1.4. Possible explanations of the Differences in Rates of Offending for Māori and non-Māori***

There have been many studies in New Zealand which have investigated the ethnic disparities in offending outcomes. Research by O'Malley (1973) carefully examined the Magistrates Court

data, which showed much higher rates of convictions for Māori compared to Pākehā. He argued that these higher crime rates were due to a range of factors including culture conflict, recent urbanization, low socio-economic status, high-risk behaviours and selective processing by control agencies. He found that Māori, in comparison to Pākehā, were disadvantaged in the justice system. In comparison to Pākehā, Māori were nearly half as likely to have legal representation in court, more likely to “appear” guilty because of fear and uncertainty that was potentially misinterpreted as guilt by Pākehā, and less likely to appeal a guilty verdict.

The Māori Perspective (He Whaipāanga Hou) holds a view which suggests historical and structural factors have severely disrupted Māori social organisation, which has diminished the well-being of Māori over time and consequently led to the overrepresentation of Māori among those who commit crime (Jackson, 1987, 1988; Smith, 1999). Briefly, the root of this theory is that the higher rates of offending by Māori can be explained by constitutional and historical factors such as colonisation, urbanisation and institutional racism which have disrupted social organisation for Māori. Consequently, Māori wellbeing has been affected and in turn these factors place Māori at an increased risk of offending and being classified as offenders. Duncan (1971) analysed the records of arrest and charges of Māori in 1966 and established that the higher rates of involvement in crime by Māori and Pacific people was due to the result of migration (Māori from country areas to urban, Pacific from their island nations to New Zealand). Unfortunately, he predicted wrongly that the differences between Māori and Pākehā would fade in the coming generations.

Duncan’s chapter in “Racial Issues in New Zealand” in 1972 explained a broad representation of the mechanisms by which the large differences in crime rates between Māori and Pākehā arise. He suggested for the first time in New Zealand literature that the differences may be due to a bias in the criminal justice processes. *“A continuing cycle of negative evaluation of a minority, that minority’s reaction to such an evaluation, and the subsequent reinforcement*

*of that evaluation, all combine to make a Police ideal of impartiality almost impossible to maintain... it is a small wonder that a disproportionate number of Polynesians appear in the courts and penal institutions” (Duncan, 1972, p. 39 – 40).*

On behalf of the Joint Committee on Young Offenders (JCYO), Fergusson, Donnell and Slater (1974) conducted research on a cohort of male offenders born in 1957. They found that higher rates of offending by Māori could be explained by socio-economic disadvantage and suggested that cultural values towards property and the effects of urban displacement may be key factors. Complimentary to Duncan’s findings in 1966, a later report by Fifield and Donnell (1980) on behalf of the JCYO presented a striking increase during the late 1960s to early 1970s in Māori youth offending compared to non-Māori. The report is largely focused on socio-economic explanations. This theory has developed over time to be known now as the Socio-economic Perspective, an explanatory model which attempts to account for the greater number of offenders among Māori. This explanation suggests that the differences in offending by Māori and non- Māori are influenced by the relative socio-economic disadvantage experienced by Māori. It is well known that Māori children are more likely to be raised in homes and environments that have more of a social and economic disadvantage, and in consequence of this, the disadvantages are related to an increased vulnerability to offending (Fergusson, Horwood & Lynskey, 1993). Sheerin and Barnett (1978) suggested that areas with high proportions of non-Europeans (mostly Māori and Pacific Islanders) were associated with higher crime rates. Sheerin and Barnett set out to investigate the relationship between crime rates and city size in New Zealand and concluded that ethnicity was one of the best predictors for most types of crime.

The Labelling Theory may contribute to an explanation for high offending rates by Māori. The Labelling Theory describes how the self-identity and behaviour of individuals may be determined or influenced by the terms used to describe or classify them. For example, if one was to engage in offending behaviours, they may be labelled as criminal. Once labelled, an

individual is considered criminal and may be excluded by other societal groups. It is common to incorporate the label into their own self-concept and change their social identity (Paternoster & Iovanni, 1989). As Māori are often labelled as criminal due to their overrepresentation in the criminal justice system, others who identify as Māori may begin to act criminal and continue offending due to this stigma assumed from society.

Despite public attention since the early 1980s to the fact that Māori's overrepresentation in the criminal justice system was at a level that was deemed "considerable and ongoing" (McIntosh & Radojkovic, 2012; Quince, 2007), the Māori prison population has still been unable to be reduced by any margin. More recent publications have built on the previous theories and agree that there are multiple pathways that lead Māori to offending, which derive from the early theories such as O'Malley (1973) cited above, as well as theories which incorporate loss of Te Ao Māori, loss of land, language and Tikanga - all historical processes which have framed modern Māori identity (Durie, 2005). These pathways are steered from what are identified as risk factors of offending.

Identifying offending risk factors is crucial to understanding why an individual may decide to commit an offence. Loeber, Farrington and Petechuk (2003) have recognised that there are some disparities between risk factors of early childhood delinquency and offending compared to those who offend later on. They explain that risk factors for offending at a young age are more likely to be biological, individual and family factors, and that no single risk factor can explain offending behaviours alone. The greater the number of risk factors, (e.g., poor parental supervision paired with low academic achievement) or the greater the number of risk factor domains (e.g., risk in the family and the school), the greater the likelihood of early-onset offending (Loeber & Farrington, 1998; Stouthamer-Loeber et al., 2002). Particular risk factors, such as aggressiveness and a child's level of impulsivity or sensation seeking may be an outcome of numerous factors among genetics and childhood environments over a number of years.

Evidence suggests that aggression may be the best indicator of childhood offending up to 12 years. For example, physical aggression evaluated by kindergarten teachers is the best predictor of later self-reported violent delinquency (Haapasalo & Tremblay, 1994; Tremblay et al., 1994). In addition, an Oregon study found that antisocial behaviour (such as aggression), evaluated by parents, teachers, peers, and the children themselves, was the best predictor of age at first arrest, compared with other factors such as family disadvantage, parental monitoring, and parental discipline (Patterson, Crosby & Vuchinich, 1992).

The Department of Corrections (2007) have summarized the following factors for explanations as to why young people are more likely to engage in criminal behaviour. Extensive research has supported a wide array of these risk factors of offending (Haapasalo & Tremblay, 1994; Tremblay et al., 1994; McLaren, 2000; Wundersitz, 2010; Belknap & Holsinger, 2006; Sampson & Lauritsen, 1994; Loeber, 1990; Patterson, Crosby & Vuchinich, 1992; Herrenkohl et al., 2000; Loeber & Farrington, 1998; Stouthamer-Loeber et al., 2002), which include:

***Family structure, context and processes.*** For example, being born to young mothers, having little to no family stability, family environments involving common violence and conflict, being exposed to violence/harsh punishment.

***Individual characteristics of the developing child and adolescent.*** For example, factors which may affect an individual's neurological development as a child, and psychological temperament.

***Educational participation, engagement and achievement.*** For example, a significant amount of absence from school, leaving school early, and failing to achieve qualifications.

***Developmental disorders.*** For example, the emergence of conduct disorder, early onset of antisocial behaviour, and substance abuse during adolescence including alcohol and other drugs.

For each of the above risk factors of offending, Māori are overrepresented on every factor of disadvantage, and once combined, may contribute to the explanation of why Māori have such higher rates of offending behaviours compared to non-Māori. (Department of Corrections, 2007). Many overseas authors have reported similar conclusions with other ethnic minorities, which confirm the findings by the 2007 report by the Department of Corrections. They argue that the main cause of ethnic minority peoples over-representation in offending is due to their over-representation in numerous social indicators which have been linked to criminal offending (Weatherburn, Snowball & Hunter 2008; Snowball & Weatherburn 2008; Weatherburn, Snowball & Hunter 2006; Dickson-Gilmore & La Prairie 2005; Pratt 2004; Broadhurst 2002; Hunter 2001; Doone 2000; La Prairie 1999a; Cole et al., 1995; Hazlehurst 1995; Munro & Jauncey 1990). In Canada, for example, La Prairie (1999) argued that the biggest issue for the over-representation of Aboriginal persons in the criminal justice system is that a much larger number of Aboriginal people are at the lowest level of the socioeconomic scale and that risk factors are unevenly distributed. Similarly in Australia, the Royal Commission of Inquiry to Aboriginal Deaths in Custody (RCADIC) found that the over-representation of Aboriginal people in the criminal justice system is due to underlying problems in regards to social and economic deprivation (Broadhurst, 2002). Walker and McDonald (1995, p6) have therefore stated that, “one cannot help but conclude that the principal causal factor of indigenous over-representation in prison is the generally low status of the indigenous community in Australia”.

### ***1.5. The New Zealand Criminal Justice System***

It is understood that there is an element of built-in discretion in regards to decision making by those working for the criminal justice system. Police officers are required to apply judgement to decide whether or not to detain a person for questioning. If an individual is apprehended for a potential offence, the Police need to decide whether they will go ahead and arrest them. Following this, they need to decide whether they will proceed to prosecution. Once prosecuted,

the court may or may not convict. Once an individual has been convicted, the decision on appropriate sentencing options is made by a judge of the Court (Department of Corrections, 2007). As illustrated above, decisions need to be made by officials at every step of the criminal justice process; however, Māori tend to be more inclined to advance further into the criminal justice system and be dealt with more severely than non-Māori. The Department of Corrections (2007) suggested the “amplification explanation”, which proposes that Māori who offend, or are suspected of offending, are subject to different possibilities of discharge from, or continuation within the criminal justice system compared to non-Māori, which results in Māori “accumulating” in the system in larger numbers.

### ***1.6. Defining Prejudice, Racism and Bias***

The terms ‘prejudice’, ‘racism’, and ‘bias’ are used throughout the next section, and for clarification purposes will be defined here. In many of the research literatures reviewed for this thesis, these terms are often used as if they hold similar meanings, however it should be remembered there are important differences between each of the definitions.

***Prejudice*** is defined as “adverse judgements or opinions not based on reason, knowledge, or experience, but on the irrational suspicion and/or hatred of other groups” (Wilbanks, 1987, p13).

***Racism*** refers to “the practice of classifying people according to certain physical differences and then believing these differences indicate biological and social superiority and inferiority” (Spoonley, 1994, p174). It is also linked to power, insofar as racism typically arises when a group both holds beliefs about another group, and has the power to discriminate against them (Mann 1995; Spoonley, 1995; Cole et al., 1995).

***Bias*** can be referred to as the “inclination of prejudice for or against one thing or person” (Soanes & Stevenson, 2006). In the literature the term “bias” is most often used in American

studies and regularly refers to the translation of prejudicial attitudes into action, typically through adverse decision making (see, for example, Mann 1995, 1993). There is also a tendency in the United States to use the term in relation to individual decision making rather than organisational or institutional practices (Cunneen, 2006).

### ***1.7. Evidence of Bias Against Māori in the New Zealand Criminal Justice system***

There is much discussion from the media, researchers and government agencies regarding Māori over-representation in the criminal justice system. However, police interactions with Māori and whether any bias in policing may contribute to high incarceration rates for Māori has received little attention. The bias argument suggests that Māori are treated unfairly through interactions with police, with police being more likely to arrest or unfairly treat a Māori offender as opposed to a non-Māori offender. This may result in distrust by Māori towards the police and the criminal justice system as a whole.

Māori are victims of prejudiced policing, which has lead Māori to distrust the New Zealand police (Tauri, 2005). A report by Maxwell and Smith (1998) endeavoured to understand the differences in policing Māori offenders. Their findings, from self-reports of 737 police officers, indicated that at least two thirds of police officers in the study had heard other police officers use racist language about suspects or offenders who were Māori. The authors also found that one third of police officers had a higher tendency to suspect Māori of an offence, and nearly half reported that police officers were more likely to pull over a vehicle registration if a Māori person was seen to be driving a “flash” vehicle. However, the study is limited by the fact that all information gathered was by self-report, which leaves the possibility that some officers may have completed the questionnaire in order to present favourably to the nature of the study. Nevertheless, the report concluded that prejudicial beliefs were not uncommon within the police.

Furthermore, Police tend to actively 'profile' offenders to resolve crime, indirectly and probably unconsciously. Because Māori are so highly represented in the criminal justice system, it is possible that police may conduct ethnicity-based profiling which might reinforce police officers to look closely at ethnicity as a characteristic. In addition, police may be drawn to specific offenders already known to them, producing a cause and effect motion, whereby police become acquainted with particular people and areas by history of offending or offences, which inevitably influences police attentiveness. This may aid in the explanation of why Māori have higher rates of recidivism. (Latu & Lucas, 2008).

More recently, evidence has emerged which suggests that the ethnic disproportion in correctional facilities may be due to bias from officials. The Department of Corrections (2007) has examined the issue of the disproportionate representation of Māori and has identified two significant causes. They have suggested (as mentioned previously) that there are a range of developmental and early-life environmental risk factors that lead to offending. Each of these factors are associated with a developmental pathway that increases the risk of criminal behaviour and Māori are more likely to be exposed to this range of risk factors (Department of Corrections, 2007).

The second causal factor suggested by the Department of Corrections is that there may be a bias within the New Zealand criminal justice system, such that any offending by Māori have more severe consequences than for Pākehā, which has resulted in the increase of convicted Māori individuals. The report suggests that there may be systematic factors which operate during the criminal justice process which make it more likely for Māori to be apprehended, arrested, charged, convicted or imprisoned, resulting in a larger number of Māori compared to any other ethnicity in the criminal justice system. This explanation proposes that despite the high rate of criminal behaviour by Māori, any offence that has been committed is subject to systematic processes that make it more likely for Māori to be apprehended and dealt with more severely.

The bias argument has derived from evidence of the Police apprehension figures which show higher numbers of Māori than non- Māori. Similar rates of ethnic disproportion are recorded in prosecution, conviction, sentencing and reconviction figures.

### ***1.8. Evidence of Bias Against Minority Groups in Overseas Criminal Justice Systems***

Māori are not the only ethnic minority group to make up a large percentage of prison populations. Many overseas researchers have looked into bias within criminal justice systems as a possible explanation of why minority groups so largely contribute to the offending populations. Although researchers have agreed that there is evidence of bias, there appears to be controversy on what causes the ethnic disparity, particularly given the numerous and varied decision points in the criminal justice system, which include: a police officer's decision to arrest, a prosecutor's decision to charge, a prosecutor's decision to offer a plea, a jury's verdict, and the sentence imposed by a judge.

Particular sub-groups in the United Kingdom may be more vulnerable to Police stopping and checking. Many arrests are made from stopping and checking individuals in public places, and could therefore contribute to bias in the criminal justice system. For example, police suspicion is often prompted by a number of factors, such as: appearances (being of younger age, wearing certain types of clothing and head gear, particular hairstyles and ethnicity); behaviour (suspicious activity and observed offending, type of car driven); as well as time and place (individuals in strange locations at odd times, and officer expectations about where and when people are suspicious). Research conducted in the United Kingdom found that ethnicity influenced a Police officers' decision to stop and question possible offenders. Quinton, Bland and Miller (2000) found that police officers in the United Kingdom had a strong perception that black or Asian people driving an expensive car would be stopped more often, because of a stereotype among police officers that people from minority ethnic groups were not in jobs in which would allow them to drive an expensive car. The study showed that there seemed to be a

strong element of negative racial stereotyping from the police, and observation from members of the public found police officers to be negatively biased to minority groups. This research is in line with that of Young (1994), who stated that police working knowledge is ethnically biased and police are more inclined to stop and search ethnic minority groups. Young (1994) found that there was a variation in the quality and quantity of suspect description between offences based on the ethnicity of the offender. Young concluded there was a bias from police in the United Kingdom.

One study in the United States found that African-American male drivers were more likely to be stopped by the Police relative to other groups (Lundman & Kaufman, 2003). Their research showed that citizens were aware of this bias against African-American drivers, reporting that police make more stops to this ethnic group, and that African-American drivers were significantly less likely than white men to report that the police had a genuine reason for making the traffic stop, suggesting that police may make their decision to stop individuals based on their skin colour. They also concluded that African-American men were significantly less likely than white men to report that the police had acted 'properly' during the traffic stop, emphasizing the presence of special problems related to the encounters between police and citizens of colour.

Further to Lundman and Kaufman's research in 2003, another USA study three years later also investigated police bias by way of traffic stops. Grogger and Ridgeway (2006) constructed a method to test for bias from police which exploits the unpredictability in the visibility of driver race between daylight and darkness. As driver visibility is limited during darkness, it is difficult for police to use race as a criterion in traffic stops. Hence, differences in the race distribution of stops between darkness and daylight may show evidence of racial profiling from police. The authors applied the test to data from Oakland, California, looking at police stops during hours of darkness and concluded that there was no racial profiling of black

drivers. However, a major limitation of this study included the fact at the time of making police stops, streetlights in urban locations enhanced the visibility of the race of the drivers. Research by Horrace and Rohlin (2015) aimed to refine this study, and in fact found evidence of black drivers being profiled by police. Horrace and Rohlin (2015) carried out the same study as Grogger and Ridgway (2006), but controlled for night time lighting (such as street lights). The authors concluded that the odds of a black driver being stopped by police increased by 15% during daylight compared to darkness.

Evidence of bias against minority groups has been found in the Australian criminal justice system. Aboriginal people, like Māori, are significantly over-represented in all aspects of the Australian criminal justice system. For example, Harding, Broadhurt, Ferrante and Loh (1995) found that Aboriginal people contributed to 2.7% of the Western Australian population in 1993, but accounted for 20% of all arrests. In addition, 44.1% of Aboriginal juvenile offenders had received a detention sentence, compared with only 26.5% of non-Aboriginal juvenile offenders. Further research has found that indigenous defendants in New South Wales (NSW) appear in court on criminal charges at a rate which is 13 times higher than that of non-Indigenous (Snowball & Weatherburn, 2008). In addition, a convicted Aboriginal offender with no previous record of imprisonment is 2.5 times more likely to be imprisoned in NSW than a convicted non-Aboriginal offender (Snowball & Weatherburn, 2008).

Snowball and Weatherburn (2008) recognized the need to show the ethnic disparities in treatment from officials after taking into account the factors which courts must consider when making a decision on whether to convict. Prior to this study, no Australian research had investigated whether racial differences in the risk of adult imprisonment persist after controlling for legal factors. Snowball and Weatherburn (2008) observed a total of 93,130 adult offenders who had been dealt with in the NSW courts from 2001 through to 2004, and found no difference between Aboriginal and non-Aboriginals in the likelihood of imprisonment after controlling for a

range of sentence-relevant factors, including: a) the nature of the principal offence, b) the plea to the principal offence, the number of prior convictions, the number of concurrent offences and c) whether the offender had previously received a suspended sentence or sentence of periodic detention from a previous offence. Results suggested that the difference between Aboriginal and non-Aboriginal offenders in the likelihood of receiving a conviction was attributable to the following factors: Aboriginal offenders tend to have much longer criminal records; are more likely to be convicted of a serious violent offence; more likely at any given court appearance to be convicted of multiple offences; more likely to have breached a previous court order; and are more likely to have re-offended after being given an alternative to full-time imprisonment, such as periodic detention or a suspended sentence. However, Snowball and Weatherburn's (2008) study was not without limitations. Firstly, they observed only offenders who had some form of legal representation. Secondly, the study was based on defendants that had not previously been sentenced to prison. It could be possible that racial bias in sentencing may be more likely to exist when offenders have been previously convicted or imprisoned. Lastly, the researchers only observed the main effects. Had these factors been controlled for, the study may have had different outcomes.

Weatherburn, Fitzgerald and Hua (2003) investigated the high rate of Aboriginals in prison. Their study showed that on average, Aboriginal offenders tend to have longer histories of offending. Through self-reported involvement in crime, data revealed that Aboriginals reported a much higher rate of involvement in crime than non-Aboriginals, and a significantly higher frequency of crime by Aboriginal people across most crime categories. However, the authors chose to conclude that the differences between Aboriginal and non-Aboriginal arrest and conviction rates were due to the simple fact that Aboriginal people have a higher involvement in crime.

Research regarding racial bias within sentencing in the USA has been ongoing, with research regarding this issue dating back to the 1930s. Between 1930 and 1960, significant disparities in sentencing outcomes for white and minority defendants are recorded, which was widely viewed as evidence of racial discrimination in sentencing (Spohn, 2000). Racial discrimination in sentencing caused public concern and consequently played a large role in shaping reforms which were designed to limit judicial discretion in sentencing during the 1970s and 1980s.

Much of the early research on racial bias in sentencing was later found to be methodologically flawed, often missing basic controls for relevant legal factors, such as the seriousness of the offence and prior criminal records of individuals (Hagan, 1974; Hagan & Bumiller, 1983; Kleck, 1981). Consequently, the National Research Council Panel on Sentencing concluded that the process of sentencing in the US does not hold any discrimination towards minority groups (Blumstein et al., 1983, p. 93). However, later research has since dismissed this conclusion. Steffensmeier, Ulmer and Kramer (1998) argued that race is most likely to influence the sentencing process when a judge lacks important information on the main sentencing concerns, such as an offender's liability or the dangerousness they may pose on the public. In circumstances such as these, factors such as age, gender and race have come to be treated by the courts as predictors of liability and dangerousness to the public. In support of this view, Steffensmeier et al. (1998) found a strong interaction effect between race and age on sentencing, with young black males being much more likely to be imprisoned compared to any other age or race. Furthermore, Steffensmeier and Demuth (2000) observed the impact of race sentencing outcomes for various types of offences. Their results found that Hispanic offenders convicted of drug offences were treated in a much harsher manner compared to white offenders convicted of drug offences, even after controlling for various other relevant legal factors. Demuth and

Steffensmeier (2004), Spohn and Holleran (2000), Steen et al., (2005); Ulmer and Johnson (2004) and Zatz (2000) have all reported similar findings.

Various other studies have found that offenders who are of a minority group (in particular, black defendants) are given longer sentences, and sentenced to the death penalty more often than White defendants (Austin & Allen, 2000; Mustard, 2001; Williams & Holcomb, 2001). Austin and Allen (2000) observed the number of defendants who were sent to the Pennsylvania Department of Corrections between 1991 and 1995. The authors wanted to inspect whether the disparate ratio of minorities to Whites in the Pennsylvania prison system was due to differential crime rates or to racial discrimination within the justice system. Using arrest rate as a representation for rate of crime commission, they found that the arrest rate explained only 43% of the disproportionality in commitment rate, and suggested that race was influencing the likelihood that a defendant would be convicted and sentenced. Drug offences were a large part of the disproportion. However, the arrest rate explained 70% of the disproportionality in commitment rate when drug offence decisions were excluded from the analysis.

Similar to findings by Austin and Allen (2000), Mustard (2001) used a cohort of 77,256 defendants who were sentenced in USA federal courts. His data showed that Black and Hispanic defendants were sentenced to longer periods than White defendants, even after controlling for seriousness of the crime. However, the majority of these effects were confined to cases where judges departed from the federal guidelines. Not surprisingly, there were fewer discrepancies in cases where judges did in fact follow the guidelines correctly. Other researchers have carried out archival studies, including many capital cases in a range of places, including Philadelphia, Georgia and Nebraska (Baldus, Pulaski, & Woodworth, 1983; Baldus, Woodworth, Grosso, & Christ, 2002; Baldus, Woodworth, Zuckerman, Weiner, & Broffitt, 1998). Baldus and his colleagues have discovered that Black defendants are four times more likely to receive the death penalty than White defendants (Baldus et al., 1998). In line with the above findings, the study

found that race of the defendant and victim race interact, such that Black defendants tend to receive considerably longer sentences than White defendants when the victim of the crime is White (Baldus et al., 1983; Baldus et al., 2002). However, it should be noted that there are other studies which have not found a main effect for defendant race. For example, Williams and Holcomb (2001) found that defendant race did not predict death sentences in Ohio between the years 1981 and 1994.

Many researchers have stated that there is an obvious discriminatory treatment towards minority groups in the criminal justice system (e.g., Alexander & Gyamerah, 1997). Regardless of the fact that there are a number of decision points within the justice system in which unfair treatment could occur, the majority of empirical research has been focused on jury decision making (Pfeifer, 1990). Hence, there is a large amount of research conducted on the decision making of “mock” jurors. Many of these studies have found that Black defendants are treated significantly more severely than White defendants, particularly in cases which involve murder or rape (Sommers & Ellsworth, 2001). However, other studies have findings which are inconsistent with the above, where White defendants were being treated more severely than Black defendants (Poulson, 1990). To add to the confusion, several other studies have indicated that the ethnicity or race of a defendant did not have an effect on juror decision making (Pfeifer & Ogloff, 1991; Williams & Holcomb, 2001)

There have been two meta-analyses which have investigated the literature on racial bias (Mazzella & Feingold, 1994; Sweeney & Haney, 1992). While both of these meta-analyses had the same intentions of covering the literature which entails racial bias in jury decision making, each came to different conclusions. Sweeney and Haney (1992) included 14 studies, with 19 effect sizes, involving 2,836 participants. The analysis focused on racial bias, defined as the disparate treatment of Black defendants, in sentencing decisions made by White mock juror participants. Sweeney and Haney (1992) found a small, but significant, effect of racial bias ( $d =$

.17) across studies, suggesting that the White participants were more likely to give Black defendants lengthier sentences than White defendants. The authors also examined the possible influence of several moderator variables including: the region the study was conducted in (South versus not South); the type of crime (rape versus not rape); the type of sample (student versus community); the year the study was published; the method of conveying defendant race (pictures versus words); whether the study specifically mentioned the participants' race; and whether the victim's race was specified. Race of the participant and victim moderated the racial bias effect, such that studies specifying the race of the participants and those stating the race of the victim had larger effect sizes than those that did not state these details.

The second meta-analysis involved a much larger examination of extra-legal factors that may influence juror decisions (Mazzella & Feingold, 1994). As well as examining race, Mazella and Feingold (1994) also investigated physical attractiveness, socioeconomic status, and gender of the defendant and victim. It should be noted that the implied definition of racial bias depended upon by the authors was any kind of negative treatment of the minority (Black) defendant. The analysis included 29 studies, with 63 effect sizes, involving 6,709 participants. In contrast to the Sweeney and Haney (1992) meta-analysis, Mazzella and Feingold included studies that involved Black participant jurors and an analysis of verdict decisions. Overall, they did not find a significant effect of racial bias on either judgments of guilt ( $d = .01$ ,  $k = 21$ ,  $N = 3,486$ ) or sentencing decisions ( $d = .06$ ,  $k = 27$ ,  $N = 4,045$ ). Regardless of these non-significant effect sizes, Mazzella and Feingold found significant heterogeneity of effect sizes across studies indicating that certain variables might be moderating the effect. The author's moderator analysis showed that the type of crime had an important role in decision making, as Black defendants were given longer sentences for crimes of negligent homicide, while White defendants were given longer sentences for crimes of fraud. In addition, the authors found that although victim

race influenced sentencing decisions (i.e., defendants were given longer sentences for crimes against White victims than crimes against Black victims), it did not influence guilt decisions.

Since these meta-analyses, researchers have further examined the existence of bias in the criminal justice system, as well as the degree to which bias may be moderated by particular variables which had not been used in earlier studies. For example, a major criticism of previous research on jury decision-making is that the studies often used student populations (as opposed to community members) and often failed to inform the mock jurors of relevant legal instructions before making a verdict (Pfeifer, 1990). In addition, other researchers have stated that mock jurors will show a racial bias only in situations which are ambiguous, and that these situations mostly occur when the mock jurors are not informed of the relevant legal standards (Pfeifer & Bernstein, 2003; Pfeifer & Ogloff, 1991, 2003; Stephan & Stephan, 1986). These arguments may lead to the hypothesis that the racial bias effect, which has been seen in juror decision making studies, may not be evidence enough when more ecological methods are employed.

Morrison (2009) conducted a comprehensive review which summarised all the international and New Zealand research findings on bias against ethnic minority groups at various stages of the criminal justice system. The review focused on research regarding identifying and responding to bias. In regards to identifying bias in the criminal justice system, the author reviewed the key decision points for an offender, which include when to: stop and search, arrest, charge, prosecute, convict, sentence and award parole over the last 40 years. The main findings of the review revealed that while there is a large amount of international published research, there is very limited research which has been conducted in New Zealand. However, the findings do not appear to have one direct answer on the nature and extent of a racial bias operating against ethnic minority groups and indigenous people. There are extensive differences between the literatures regarding how to define the problem, how to measure it and what should be done to address it. Nonetheless, the research reviewed by Morrison (2009) has confirmed

there is some bias against minority groups in the criminal justice system. Differences in the levels of over-representation tend to vary across different discretion points and were inconsistent by gender, age, offence type and location. Morrison's review also showed that legal factors such as the seriousness of the offence, the strength of evidence and extra-legal factors (such as socioeconomic status) mostly account for the differences between various ethnic groups.

How to respond to bias is equally important as detecting it. Morrison (2009) found that there was limited research available both overseas and in New Zealand on how to best address respond. Responding to bias has mostly focused on addressing the contributor to ethnic disproportionality. These responses can be described in three categories: responses targeted at reducing offending and re-offending (differential involvement), responses addressing process-related factors within the criminal justice system associated with direct or overt forms of bias (direct discrimination), and responses focused on the role of neutral legislation, policies, and decision making criteria which result in differential outcomes (indirect discrimination). However, there are a number of problems across each of these responses, such as failure to fully acknowledge the link between colonisation, structural disadvantage and ethnic disparities in the criminal justice system, as well as funding issues. Morrison (2009) concludes that further research is necessary to remove the gaps in current knowledge of ethnic disparities in the New Zealand justice system, and we require a deeper understanding of the processes which contribute to disparate criminal justice outcomes in order to explain why disparities arise.

Overseas researchers have investigated the presence of bias from officials from a different perspective. The rationale for these studies is that if police do show bias, it may be due to generalized societal stereotypes which those in majority groups hold for the minority group cultures. The 'shooter bias paradigm' emerged from the notion that when police are at the scene of a crime, they are often required to make split-second decisions on whether to use force (Correll, Park, Judd & Wittenbrink, 2002). Indeed, international media has highlighted recent

cases in which police officers have shot innocent members of minority groups, without knowing for certain whether or not they were a threat. For example, following the London bombing attacks, a British police officer shot dead a Brazilian man who *looked* like a Muslim. Research proposes that there may be a bias for white people to shoot unarmed black suspects or members of minority groups more often than unarmed white suspects. These findings in laboratory studies have been conducted internationally with various cultures, with trained police officers as well as with college students role-playing as police officers (Correll, Urland & Ito, 2006; Correll et al., 2007; Plant, Goplen & Kunstman, 2011; Miller, Zielaskowski & Plant, 2012; Unkelbach, Goldenberg, Muller, Sobbe & Spannaus, 2010).

Overall, shooter bias paradigm research has revealed two main findings, the first being that cultural stereotypes (such that black men are dangerous) tend to influence people's snap judgements. The second finding is that people believe that the world is dangerous, and consequently tend to have a bias against anyone who is in a different ethnic group from themselves (Correll, Urland & Ito, 2006; Correll et al., 2007; Plant, Goplen & Kunstman, 2011; Miller, Zielaskowski & Plant, 2012; Unkelbach, Goldenberg, Muller, Sobbe & Spannaus, 2010). These findings are important as they suggest that there may be a societal prejudice engrained in all of us, regardless of any professional training. Future research might explore whether teaching people about racial bias and its implications might reduce the shooter bias. No research into the shooter bias paradigm in New Zealand has been conducted thus far.

### ***1.9. The Christchurch Health and Development Study***

The Christchurch Health and Development Study (CHDS) is a longitudinal research which has been in existence for over 35 years. The study began with a cohort of 1,265 children born in the Christchurch (New Zealand) urban region during mid-1977. The cohort has been studied from infancy into childhood, adolescence and adulthood. In addition, it is the only study

in New Zealand which has attempted to statistically model ethnic differences in rates of offending outcomes and examine the issue of bias within the justice system.

Fergusson, Horwood and Lynskey (1993) examined different categories of offences which also indicated that Māori are over-represented in apprehensions and convictions for crimes of violence, dishonesty and administrative offences. Fergusson and his colleagues showed within the CHDS cohort that at age 15 years, on the basis of police contact statistics, Māori/Pacific Island children offended at about 1.7 times the rate of Pākehā children, but when compared on the basis of Police contact statistics these children were 2.9 times more likely to have come to the attention of Police. The differences between self/parental reported offending and rate of Police contact could not be explained by the fact that Māori /Pacific Island children offended more often or committed different types of offences than Pākehā children. The analysis suggested that Māori/Pacific Island children were 2.4 times more likely to come to the attention of Police than Pākehā children with an identical self/parental report of offending (Fergusson, Horwood & Lynskey, 1993), suggesting that some type of bias may be present in offending statistics based on police reports.

Fergusson, Swain-Campbell and Horwood (2003) examined the associations between the self-reported use of cannabis, and the arrest and conviction for cannabis related offences. Fergusson and his colleagues collected information from a sample of 983 individuals within the cohort on cannabis use, arrests and convictions over the period from age 16 to 21 years. The results revealed that by the age of 21, over two thirds of the cohort had used cannabis at least one time, with 5% using cannabis over 400 occasions. Of those who were cannabis users, 3.6% had been convicted and 5.1% had been arrested for a cannabis-related offence. There was a strong link between the extent of cannabis use and risks of arrest/conviction: over one quarter of those using cannabis on more than 400 occasions had been arrested or convicted for a cannabis related offence compared to those who use cannabis on less than ten occasions. Most interestingly,

Māori individuals who had a previous arrest record for an offence, and those who reported involvement in violent/property offending, were more likely to be arrested or convicted than other members of the cohort who recorded having the same level of cannabis use. Findings showed that independently of self-declared cannabis use, Māori were more likely to be arrested and convicted for cannabis use when compared with Pākehā. This is consistent with the labelling theory perspective, and suggests a bias from New Zealand Police. Subsequent to this finding, a report by the New Zealand Human Rights Commission stated “there is evidence of bias at different points throughout the system from apprehensions to sentencing, which notably contributes to the higher rates of Māori and Pacific imprisonment” (2012, p. 34).

### ***1.10. Summary***

The mounting evidence from overseas research has quite clearly established a reasonable cause for concern regarding bias in the criminal justice system against minority groups. Based on the findings of the above literature, this bias has been found at various stages in the criminal justice system, from police deciding when to make traffic stops and when to arrest, through to juries and judge’s decision making on whether to sentence or convict an offender. New Zealand research has identified potential explanations of why Māori offend at a higher rate compared to non-Māori. These explanations include disadvantages in family structure, individual characteristics, educational achievement and developmental disorders (Department of Corrections, 2007; Haapasalo & Tremblay, 1994; Tremblay et al., 1994; McLaren, 2000; Wundersitz, 2010; Belknap & Holsinger, 2006; Sampson & Lauritsen, 1994; Loeber, 1990; Patterson, Crosby & Vuchinich, 1992; Herrenkohl et al., 2000; Loeber & Farrington, 1998; Stouthamer-Loeber et al., 2002). As Māori have a concerning contribution to the prison population, this review of the literature indicates that it is necessary to investigate whether a bias from officials may exist in New Zealand, especially given the fact that as of yet, there is extremely limited research on this issue in our country.

### ***1.11. The Current Study***

Both of the CHDS studies mentioned at the end of this review are consistent with the view that there is a bias in the New Zealand criminal justice system. However, other findings of bias in New Zealand are limited. The current study examines the same longitudinal cohort as part of the Christchurch Health and Development Study (CHDS) used by Fergusson, Horwood and Lynskey (1993) and Fergusson, Swain-Campbell and Horwood (2003), aged from adolescence through to 35 years. In particular, this study investigates whether there is evidence of bias from officials against Māori in the New Zealand criminal justice system. In order to achieve this, we develop statistical models to examine ethnic disparities in rates of official contacts. These models also examine the extent to which associations between Māori ethnicity and rates of official contacts are maintained after controlling for social, family and individual risk factors of offending, and again to include self-reported rates of offending. Evidence of bias will be observed by the residual Incidence Rate Ratio (IRR) after accounting for all risk factors and self-reported offending. The risk factors in the model will include: socio-demographic disadvantage, family dysfunction, parental adjustment issues, child abuse, conduct problems, cognitive ability, being male, leaving school without qualifications and having affiliations with deviant peers. The current study has three main aims:

Aim One: To examine ethnic differences in rates of official contacts for Māori and non-Māori.

Aim Two: To explore possible processes that will explain ethnic differences in rates of official contacts, including social, family and individual risk factors to examine the extent to which any residual association will be consistent with bias.

Aim Three: To explore possible processes that will explain ethnic differences in rates of official contacts, including social, family and individual risk factors, as well as self-reported

rates of offending to examine the extent to which any residual association will be consistent with bias.

Consistent with the findings from the Fergusson, Lynskey and Horwood (1993), the hypotheses for the present study are as follows:

Hypothesis One: Māori will have significantly higher rates of official contacts compared to non-Māori. This hypothesis is based on the findings of the 1993 study, where Māori/Pacific Island children were 2.9 times more likely than Pākehā children to come to the attention of the Police. Additionally, Statistics New Zealand (2015) reported that Māori consistently make up around 50% of the prison population for at least the last two decades. We hypothesize that in this sample, Māori will have higher rates of official contact (charges and convictions), self-reported contacts (arrest and convictions), and rates of self-reported offending (property, violent and other) over all age intervals from adolescence through to 35 years.

Hypothesis Two: After controlling for social, family and individual risk factors which have previously been linked to offending, Māori will still have a significantly higher rate of official contacts compared to non-Māori.

Hypothesis Three: Māori will have a higher rate of official contacts compared to non-Māori, after controlling for social, family and individual risk factors, as well as self-reported property, violent and other offences. Previous research found that even after controlling for self-reported rates of offending and external risk factors of offending, Māori/Pacific Island children still had rates of police contacts that were 1.6 to 1.7 times higher than non-Māori (Fergusson, Lynskey and Horwood, 1993).

## CHAPTER TWO

### 2. METHOD

#### *2.1. Data Source*

The participants were members of the Christchurch Health and Development Study (CHDS). The CHDS is a longitudinal study of 1265 children born in 1977 in the Christchurch, New Zealand urban region. The sample for this study was recruited over a 4 month period during 1977 by contacting mothers of all live-born children giving birth in public and private maternity hospitals. Of the 1,310 mothers contacted, 97% agreed to participate.

This sample has been assessed at birth, four months, annually from 1 – 16 years, at 18, 21, 25, 30 and 35 years. Data on the participants were collected from interviews, parental reports, teacher questionnaires, standardised tests and official records (Fergusson, McLeod & Horwood, 2015). All phases of the study have been approved by the Regional Health and Disability Ethics Committee. All aspects of the data collection are subject to the signed consent of research participants. The analyses for this study are based on a sample of 995 participants. This figure represents the participants for whom data were available on measures of ethnicity and criminal behaviour patterns up to age 35 years. This sample represents 78.7% of the original 1,265 cohort.

#### *2.2. Procedure*

The CHDS has collected data from several sources and is based on a multiple informant model. The main sources of data relevant to this particular study include:

- *Parental interviews* (birth – 16 years). These took place with the child's mother, or in situations of single-parent families with a male parent, the child's father, at the child's home. Interviews were generally around one hour duration and were administered by

trained interviewers. Interview topics spanned a variety of issues relevant to the child's health and family functioning. In the parent interviews, the parental report data was the primary source of information on measures of family, social and economic background, child behaviour and childhood family functioning.

- *Participant interviews* (age 8 – 35 years). Beginning at age 8, sample members were questioned about a range of issues relevant to their stage of development, up to age 16. Interviews were typically brief (20 minutes to an hour). From age 18 onwards the participants became the primary informant and the interviews were of 1 – 2 hours duration. In the present investigation, participant interview data was the source for information on self-reported and official judicial contacts over the period from adolescence to age 35 years. It was also the source for some measures of childhood family functioning.
- *Psychometric testing* (age 8 – 13 years). Trained psychometric testers administered a range of individual tests of achievement, including the measure of cognitive ability used in the present analysis.
- *Teacher reports* (age 6 to 13 years). Teacher reports on child social adjustment and academic achievement were obtained by supplying all class teachers of CHDS children with a set of standardised questionnaires. Compliance was high with completed questionnaires being available for 98% of children in any given year.
- *Official records* (birth – 35 years). Data on officially recorded charges and convictions were obtained from the New Zealand Ministry of Justice records. The above data were supplemented by official records, including health information documented in GP and hospital records, and recorded contacts with the police or criminal justice system of particular relevance to the current investigation.

## **2.3. Measures**

### **2.3.1. Outcome Measures**

The primary outcome measures for this investigation relate to participant contacts with the official justice system. The following measures were available for counts of official judicial contacts.

#### *(a) Officially recorded charges and convictions*

At each assessment from age 18 to 35 years, participants were asked to provide a signed consent for the access to official records of police or judicial contacts from records held by the Ministry of Justice. Official records were obtained for a total of 872 participants which is 87.6% of the 995 participants included in the present study. The discrepancy between the 995 and the 872 is due to the fact it was not possible to obtain signed consent for a minority of the sample who were residing overseas. The data files obtained from the Ministry of Justice included details of all charges laid up to age 35. Each offence was recorded by the date the offence was made, the type and description of the offence and details of any received convictions and sentencing outcomes. For the purposes of the current study, we focus specifically on the number of charges laid and the number of convictions recorded for each participant.

#### *(b) Self-reported arrests and convictions*

Parallel to the above collection of official record data, at each assessment from age 18 to 35 participants were also questioned concerning any official police or judicial contacts over the period since the previous assessment. The information collected included details of reason for contact, arrest, court appearance, convictions received, and other sentencing outcomes. This information was obtained for each 12 month period since the previous assessment. For the purposes of the present analysis, data were obtained on the numbers of self-reported arrests and numbers of convictions received. This information was available for

each 12 month period from age 16 - 17 to age 34 - 35 years. Participants were classified as having been arrested/convicted if they reported being arrested by the police or being convicted of any offence in court at any time from age 18 – 35 years. 21.2% of the sample reported at least one arrest or court conviction.

### ***2.3.2. Ethnicity***

The ethnicity of the sample was identified at age 14 years by the individual's parents on the basis of their response to the question, "Which of these categories best describes your child's cultural identification?" extracted from the 1996 New Zealand Census. Individuals in this study were classified as Māori if the parent's response indicated that their child's ethnicity was Māori or part Māori. Participants were classified as non-Māori if the parent's response indicated that their child's ethnicity was European/Pākeha or any other ethnicity. By this measure of ethnicity, 9.8% of the sample were identified as being of Māori ethnicity and 90.2% of the sample were identified as non-Māori.

For the purposes of supplementary analysis, an alternative measure of ethnicity was used. At either ages 21 or 25 years respondents were asked about their ethnic identification and cultural participation (Broughton, Fergusson, Rimene, Horwood, & Sporle, 2000). On the basis of this questioning, 12.9% of the participants in this study self-identified as New Zealand Māori, with 51.5% reporting sole Māori identity and 48.5% reporting Māori ethnic identity plus identity with another ethnic group. For the purposes of the present analysis all those reporting Māori ethnicity were classified as Māori.

### ***2.3.3. Self-reported Offending***

At ages 15 and 16, sample members were questioned about their involvement in criminal offending behaviours in the previous 12 months using the Self-report Early Delinquency Scale (SRED) (Moffitt & Silva, 1988) to both parents and children. At ages 21, 25, 30 and 35 years,

similar information were obtained using the Self Report Delinquency Inventory, SRDI (Elliott & Huizinga, 1989), supplemented by custom-written survey items to assess the frequency of offending behaviours for each 12 month period since the previous assessment. This information was used to classify participants on three measures reflecting the extent and nature of offending for each 12 month period from age 14-15 to 34-35 years. These measures were the total number of offences reported by the participant in each of the following areas:

- (a) *Violent Offences*, including assault, fighting, use of a weapon, use of force, threatening behaviour, cruelty to animals and related offences.
- (b) *Property Offences*, including vandalism, fire setting, breaking and entering, vehicle conversion, shoplifting and other theft, possession of stolen goods and related offences.
- (c) *Other Offences*, including raising a false alarm, unruly behaviour, public drunkenness, providing false information, selling illegal drugs, offences against the cause of justice, failure to obey a court order, and other non-violent or non-property offences.

#### **2.3.4. Covariate Factors**

As mentioned in the introduction, previous literature has identified links between a range of disadvantaged socio-demographic, childhood and individual factors and offending behaviours. In addition, many of these risk factors have been strongly correlated with Māori ethnicity, hence including the following covariate factors in the present study. To assess the extent of exposure to adverse childhood and family circumstances, a series of variables was selected from the database of the study spanning four domains of functioning: family socio-economic disadvantage; family dysfunction; parental adjustment; and child abuse. Following measures of child and family adversity, measures of individual characteristics and behaviour were also included in the analysis. These include: cognitive ability, conduct problems, leaving school with no qualifications and associations with deviant peers.

In order to reduce the dimensionality of the analysis and to provide more robust measures of functioning within each domain, prior to analysis the variables in each domain were combined using a simple points score to represent the number of disadvantages experienced by the child within each area of functioning.

***(a) Measures of child and family adversity***

*Socio-demographic*

*Maternal age.* The mother's age was recorded in whole years at the birth of each sample member. The mean maternal age at first childbirth was 25.8 years (SD = 4.9), with maternal ages ranging from 15 to 47 years.

*Maternal education.* Maternal education levels were assessed at the participant's birth using a 3-point scale: 1 = *mother lacked formal educational qualifications (had not graduated from high school)* (51.0%); 2 = *mother had secondary-level qualifications (had graduated from high school)* (30.3%); 3 = *mother had tertiary-level qualifications (had obtained a university degree or tertiary technical qualification)* (18.6%). The mean maternal education level of this sample was 1.68 (SD = .77).

*Family living standards (0 – 10 years).* Each year, a global assessment of the material living standards of the family was obtained via interviewer rating. Ratings were made on a 5-point scale that ranged from 1 = *very good* to 5 = *very poor*. These ratings were averaged over the 10-year study period to obtain an overall assessment of family living standards during childhood. The mean standard of living for this sample was 2.9 (SD = 0.4).

*Family socioeconomic status (at birth).* This was assessed at the time of the participant's birth using the Elley-Irving (Elley & Irving, 1976) scale of socioeconomic status for New Zealand. This scale classifies socioeconomic status into six classes on the basis of paternal occupation, whereby 1 = *professional* (10.8%), 2 = *managerial* (9.4%), 3 = *clerical* (24.3%), 4 =

*technical or skilled* (28.5%), 5 = *semiskilled* (14.2%), and 6 = *unskilled or unemployed* (12.8%).

The mean family socioeconomic status of this sample was 3.65 (SD = 1.45). An account of the construction and validity of this scale is provided by Elley and Irving (1976).

*Average family income (0 – 10 years)*. At each year, estimates of the family's gross annual income were obtained from parental report. These income estimates for each year were recoded into decile categories, and the resulting measures were then averaged over the 10-year period to produce a measure of the family's averaged income decile rank. The average family income for this sample was 5.1 (SD = 2.1).

To create a socio-demographic risk score, these data were classified into dichotomous variables and then calculated by adding together the five indicators and rating the overall score on a 5 point scale: 0 = *low level of disadvantage* to 5 = *high level of disadvantage*. These variables have been used in previous literature as indicators of socio-economic disadvantage (Desai & Alva, 1998; Gaemmaghami et al., 2013; Scharte & Bolte, 2013).

#### *Family Dysfunction*

*Single parent family (0 – 16 years)*. This measure was based on whether the child entered a single parent family at birth. In this sample, 92.3% of the members were born into two parent families and 7.7% of the sample were born into single parent families.

*Childhood parental change(s) (0 – 16 years)*. Comprehensive data on the child's family placement and changes of parents were collected at annual intervals from birth to age 16. To assess the extent of parental change, a measure of the child's exposure to parental change was constructed by counting the number of changes of parents (0 – 16 years). Parental change was defined as a parent: leaving the home as a result of separation/divorce/death, entering the home due to reconciliation/re-partnering, fostering, or any other change in the custodial parents. The

mean number of changes of parent in this sample (up to age 16 years) was 1.18 (SD = 2.43), with the range from 0 – 27.

*Inter-parental violence (0 – 16 years).* At age 18, sample members were questioned with eight items derived from the Conflict Tactics Scale (Straus, 1979) to assess the extent to which they had witnessed incidents of physical violence or serious threats of physical violence between their parents prior to age 16. The eight items used included: (1) threaten to hit or throw something; (2) push, grab, or shove other parent; (3) slap, hit or punch other parent; (4) throw, hit, kick or smash something (in other parent's presence); (5) kick the other parent; (6) choke or strangle other parent; (7) threaten other parent with a knife, gun or other weapon; (8) call other parent names or criticize other parent (or put other parent down). Separate questioning was conducted concerning violence initiated by either parent. This information was used to construct two scale scores representing the extent of mother-initiated and father-initiated violence. The reliabilities of these scales ranged from  $\alpha = 0.77$  to  $\alpha = 0.86$  (Fergusson & Jakobsen, 1998). For the purposes of the present analysis the mother and father scales were combined to create an overall measure reflecting the extent of inter-parental violence initiated by either parent during childhood ( $\alpha = 0.88$ ). The sub-score of inter-parental violence actions ranged from 8 – 24 with a mean of 9.2 (SD = 2.3).

*Quality of parental attachment.* When sample members were aged 15 years, the Inventory of Parent and Peer Attachment (IPPA) (Armsden & Greenberg, 1987) was used to assess adolescents' perceived attachment to their parents. This instrument consisted of three subscales measure parental communication, trust, and alienation. Examples of scale items include "I tell my parents about my problems and troubles" and "My parents help me to understand myself better". All items were rated on a three point Likert scale ranging from *doesn't apply* (0) to *definitely applies* (2). The parental attachment scale used in this analysis did not differentiate between sample members' maternal and paternal attachments. A total parental

attachment score was computed by first reverse scoring the alienation sub-scale and then subtracting the trust and communication sub-scale scores. The coefficient alpha for the parental attachment scale was .87. The IPPA has good test-retest reliability and predictive validity, with the perceived quality of attachment to parents being positively correlated with self-esteem, psychological well-being, family functioning, and adolescent seeking of proximity to both mothers and fathers in times of need (Armsden & Greenberg, 1987; Nada-Raja et al., 1991; Paterson et al., 1995). The mean level of quality of parental attachment in this sample was 72.7 (SD = 8.7), with the range from 0 – 84.

A family-dysfunction score was developed by adding together the above measures. Ratings were made on a point scale that ranged from 0 = *low level of family dysfunction* to 4 = *high level of family dysfunction*.

#### *Parental Adjustment Problems*

*Parental criminality.* When sample members were aged 15 years, their parents were questioned as to whether any parent had a history of criminal offending. A dichotomous measure was used to indicate whether or not the parent had a history of offending. Based on this information, sample members were coded as follows: 0 = *no history of parental criminality*; or 1 = *history of criminality for at least one parent*. On the basis of this questioning, 13.3% of the sample was classified as having parental history of criminality.

*Parental alcohol problems.* When sample members were aged 15 years, their parents were questioned as to whether any parent had a history of alcohol or alcohol dependence. These reports were combined to form a dichotomous measure of whether or not the young person's parent reported experiencing alcoholism or problems with alcohol. Based on this questioning, sample members were coded as follows: 0 = *no history of parental alcoholism/alcohol problems*;

or 1 = *history or alcoholism/alcohol problems for at least one parent*. On the basis of this questioning, 12.1% of the sample were classified as having parental history of alcohol problems.

*Parental illicit drug use.* When sample members were aged 11 years, information was obtained from parents as to whether any parent had a history of illicit drug use, including cannabis. Based on this questioning, sample members were coded as follows: 0 = *no history of parental illicit drug use*; or 1 = *history of illicit drug use for at least one parent*. On the basis of this questioning, 24.9% of the sample was classified as having a parental history of illicit drug use.

For the purpose of data display, the above measures were combined and then classified into four groups ranging from those with the highest score of parental adjustment problems to those with the lowest score. An overall index of parental adjustment was created by summing the three measures for each sample member to produce a count of the number of parental adjustment problems reported.

### *Child Maltreatment*

*Parental use of physical punishment.* At ages 18 and 21, sample members reported on the extent to which their parents used physical punishment during their childhood (prior to age 16 years). If applicable, separate ratings were made for mother figures and father figures. These ratings were then combined into a single four-point scale of parental physical punishment/maltreatment based on the most severe rating at either the 18- or 21- year interview: 0 = *parents never used physical punishment* (4.5% of sample); 1 = *parents seldom used physical punishment* (78.0%); 2 = *at least one parent regularly used physical punishment* (11.2%); 3 = *at least one parent used frequent or severe punishment or treated the participants in a harsh/abusive manner* (6.4%) (Fergusson & Lynskey, 1997). Ratings for both parents (if available) were combined into a single rating at each age by classifying the participants into one

of the four groups based on the greatest level of exposure to physical punishment reported for either parent. The mean level of childhood physical punishment/maltreatment in this sample was 1.2 (SD = .61).

*Childhood sexual abuse.* Childhood exposure to sexual abuse was assessed at age 18 and 21. Sample members were questioned about their exposure to any forms of childhood sexual abuse prior to age 16; if anyone had ever attempted to involve them in any of the following 15 sexual activities against their will. These activities included: (a) non-contact episodes involving indecent exposure, public masturbation or unwanted sexual propositions; (b) episodes involving sexual contact in the form of sexual fondling, genital contacts or attempts to undress the respondent; and (c) episodes involving attempted or completed vaginal, oral or anal intercourse. Sample members who reported an incident of abuse were then questioned in depth about the context of the abuse including: the frequency of abuse episodes, the characteristics of the perpetrator(s), abuse disclosure and related factors (Fergusson, Horwood, & Lynskey, 1996; Fergusson, Lynskey, & Horwood, 1996). Using these data, participants were classified into one of four exposure groups reflecting the extent/severity of childhood sexual abuse reports: 0 = *no sexual abuse* (85.9%); 1 = *non-contact sexual abuse only* (2.7%); 2 = *contact sexual abuse not involving attempted or completed sexual penetration* (5.1%); 3 = *attempted or completed sexual penetration including vaginal, oral and anal intercourse* (6.3%). This classification was based upon the most severe form of childhood sexual abuse reported at either age 18 or 21. The mean level of childhood sexual abuse experienced in this sample was .32 (SD = .83).

The validity of this repeated measures assessment of reported parental use of physical punishment and childhood sexual abuse has been examined in previous papers using both a latent class analysis (Fergusson, Horwood, & Woodward, 2000), and a structural equation model designed to estimate the effects of current mental state on the reporting of parental use of physical punishment and childhood sexual abuse (Fergusson, Horwood, & Boden, 2011). These

analyses showed that the effects of the respondents' current mental state on their reporting of parental use of physical punishment and childhood sexual abuse were negligible, and that the retrospective reports of childhood physical and sexual abuse have good validity as a measure of parental use of physical punishment and childhood sexual abuse (Fergusson et al., 2011; Fergusson et al., 2000).

To develop a child abuse score, these measures were dichotomized, combined and then classified into 3 groups where 0 = *no parental use of physical punishment or childhood sexual abuse* (62.1%); 1 = *at least one count of parental use of physical punishment OR childhood sexual abuse* (18.3%); 2 = *at least one count of parental use of physical punishment AND childhood sexual abuse* (2.9%). The mean level of childhood abuse in this sample was .29 (SD = .53). An overall index of childhood abuse exposure was obtained by scoring a point for each type of abuse (physical, sexual) reported by the young person.

***(b) Measures of individual characteristics and behaviour***

*Gender*

Gender was recorded at the time of birth. Of the 995 participants in this current study, 52.2% were female and 47.8% were male.

*Cognitive Ability (8 – 9 years)*

An assessment of child cognitive ability at ages 8 and 9 years used the revised Wechsler Intelligence Scale for Children (Wechsler, 1974) which assessed both verbal and performance IQ. The reliabilities of this scale, assessed using split half methods were .93 at age 8 and .92 at age 9. For the purposes of the present analysis the total IQ scores were averaged over the 8 and 9 years and averaged to provide an IQ score of 102.9 (SD = 14.2) with the range from 35 to 144.5.

### *Conduct Problems (7 – 9 years)*

When sample members were ages 7, 8, and 9 years, parental and teacher reports of the child's tendencies to disruptive, oppositional and conduct-disordered behaviours were obtained using an instrument that combined items from the Rutter (Rutter, Tizard, & Whitmore, 1970) and Conners (1969, 1970) parent and teacher questionnaires. The selected items spanned a range of behaviours relating to disobedience and defiance of authority, fits of temper and irritability, aggression or cruelty towards others, destruction of property, lying, stealing and other similar behaviours, with these items being scored on a 3-point scale from *not at all* (0) to *a great deal* (2). Confirmatory factor analysis of the selected items for each source (parents, teachers) suggested that, in each case, the items could be scaled as unidimensional scales representing the extent of child conduct problems as reported by parents and teachers (Fergusson & Horwood, 1987). Scale scores representing the extent of disruptive, oppositional or conduct disordered behaviour at age 7, 8 and 9 years were created by summing parental and teacher items scores for each child at each age. These scales were then averaged over the 3-year period to provide an overall measure of the extent of conduct problems in middle childhood. The reliability of this scale, assessed using coefficient alpha was .97. For the purposes of data display this scale was classified into four groups ranging from those with conduct problems in the least disturbed 50%, to those in the most disturbed, 10%. The mean conduct problems score over the 3 year period in this sample was 51.9 (SD = 7.9).

### *Deviant Peer Affiliations (16 years)*

At age 16 years sample members were questioned on a series of items concerning the extent to which their best friend and other friends used tobacco, alcohol or illicit drugs, truanted or broke the law (Fergusson et al., 1996). This information was used to derive a scale measure reflecting the extent to which the young person was reported affiliating with delinquent or

substance using peers. The reliability of this scale was  $\alpha = 0.87$ . The mean deviant peer affiliations score for this sample was 5.57 (SD = 2.29), with the range from 2 – 12.

#### *Leaving school without qualifications*

At ages 18 and 21, sample members were questioned regarding their educational history, including the attainment of high school qualifications. Under the system of educational qualifications as it applied for this sample, students could attain a range of high school qualifications, including: School Certificate, a national series of examinations attempted by most students in year 11; Sixth Form Certificate (year 12); Higher School Certificate (approximately equivalent to high school graduation in the US and University Bursary (year 13). For the purposes of this study, participants who reported leaving school by age 18 having attained at least one pass grade in one School Certificate subject, or attaining any higher school qualification were classified as leaving school with qualifications. A total of 19.2% of sample members met this criterion. This rate is comparable to reported rates of attainment of high school qualifications for New Zealand as a whole (Ministry of Education, 2002).

#### **2.4. Data Analysis**

This section describes the statistical methods used in this research. The section begins with a brief overview of the general analysis approach used throughout the thesis. This is then followed by a detailed description of the specific analysis strategies used in each section of the results. All analyses were conducted using the Statistical Package for the Social Sciences 20.0 (IBM, SPSS, 2011). The analysis approach adopted the following general principles:

##### *Summary statistics*

Standard tabular methods (e.g. means, standard deviations, percentages, rates) are used to summarise characteristics of the data, either for the sample as a whole or stratified by ethnicity

(Māori/ non-Māori). Lifetable analysis and graphical methods are used to estimate and display the cumulative probabilities of official contact (charges/ convictions) to age 35 years.

For all measures of offending and official judicial contact the summary statistic of choice is the rate per 100, which can be interpreted as the mean number of offences or official contacts (charges, convictions, arrests) per 100 people, and its associated standard deviation. Rates per 100 may be reported either as lifetime or, more usually, for a series of age intervals over the period from adolescence to age 35 and/or pooled over these same intervals.

#### *Assessing the strength of associations*

The primary focus of the analysis is on ethnic (Māori/non-Māori) differences in rates of offending/official contact. The key statistic used as a summary effect size measure for ethnic differences is the Incidence Rate Ratio (IRR) and its associated 95% confidence interval. The IRR provides a measure of the relative rate of offending/official contact for Māori compared to non-Māori, with values greater than one indicating higher rates of offending amongst Māori. See below for a description of the derivation of the IRR.

Either the point biserial or the product moment correlation coefficient ( $r$ ) is used to summarise the strength of the associations of the measures of social, family and individual risk factors with (a) ethnicity, and (b) rates of official contact.

#### *Testing the statistical significance of associations*

Bivariate comparisons on childhood social, family and individual characteristics by ethnicity are tested for statistical significance using either the chi square test for comparison of percentages or the t-test for independent samples for comparison of means. The log-rank test is used to test the significance of ethnic differences in the cumulative probability of official contact.

Associations between measures of offending/official contact and other variables

(ethnicity; social, family and individual covariates) are modelled using negative binomial regression methods in which the logarithm of the rate of offending/official contact is modelled as a function of the predictor variable(s) and the statistical significance of an association is evaluated on the basis of the test of significance of the regression parameter associated with the predictor variable of interest (see below). Negative binomial regression provides a useful form of analysis in the context of over-dispersed count data, and particularly the context of zero-inflated Poisson data, in which the distribution of a count outcome (e.g. number of convictions, number of arrests) has more zeroes and greater variance than would be expected for a standard Poisson distributed count variable (Greene, 1994).

#### *Modelling repeated measures data*

The core of the analysis involves developing regression models in which the rates of offending/official contact assessed repeatedly over a series of age intervals spanning the period from adolescence to age 35 are modelled as a function of ethnicity and/or other factors. This is achieved by using Generalised Estimating Equation (GEE) (Li, 2006; Liang & Zeger, 1986; Zeger & Liang, 1986) methods to fit population averaged negative binomial regression models to the repeated measures data on offending/official contacts.

Generalised Estimating Equation (GEE) methods provide a useful mechanism for modelling repeated measures data on the association between an outcome variable (e.g. official charge or conviction) and an exposure variable (e.g. Māori, non-Māori). The GEE framework enables the development of regression models in which the repeated measures data are combined over assessments to provide an estimate of the pooled association between the outcome and the exposure. The advantage of the GEE method is that we were able to use all obtained observations for each time, even in the presence of missing data. In addition, we can take into account the fact that the repeated assessments for any participant are correlated over time. Rates

of offending were expressed as rates per 100 people to summarise all offending outcomes throughout the analysis.

To illustrate the application of the GEE framework in the context of the present analysis, Equation 1 below shows the model equation for a negative binomial regression model in which the logarithm of the rate of an offending outcome  $Y_{it}$  (e.g. official charges, official convictions, self-reported arrests, and self-reported convictions) for the  $i$ th participant assessed in the  $t$ -th time interval is modelled as a function of an exposure variable  $ETHNICITY_i$ , a dichotomous (0/1) measure of Māori ethnicity for the  $i$ th participant.

The model was of the fitted form:

$$\text{Log}(Y_{it}) = \beta_0_t + \beta_1 \text{ETHNICITY}_i \quad (1)$$

In this model the parameter  $\beta_0_t$  represents a time dynamic intercept term that takes into account time dynamic changes in the rate of offending over the assessment periods. The parameter  $\beta_1$  represents the impact of Māori ethnicity on the rate of offending pooled over the repeated assessments. This parameter is assumed to be constant over time (although this assumption can be tested). The ratio of the regression parameter  $\beta_1$  to its standard error provides a  $t$ -statistic for testing the statistical significance of the association between ethnicity and rates of offending. An estimate of the effect size (the Incidence Rate Ratio – IRR) for the impact of ethnicity on rates of offending can be derived from the fitted model as follows:  $\text{IRR} = \exp(\beta_1)$  where  $\exp$  is the base of natural logarithms, with a 95% confidence interval given by  $\exp(\beta_1 \pm 1.96 \text{SE}_{\beta_1})$ , where  $\text{SE}_{\beta_1}$  is the standard error of the parameter.

In fitting the model it is necessary to make assumptions about the nature of the correlation structure of the repeated assessments of the outcome  $Y_{it}$  over assessment interval. All models fitted in this research assume an unstructured correlation matrix, that no constraints are applied to the structure of this correlation matrix - all correlations are free to vary over time.

In the remainder of this section we describe in more detail the specific analyses applied in each section of the Results.

#### ***2.4.1. Chapter 3 Analysis***

To observe the lifetime probability of being charged or convicted for each ethnicity, lifetable estimates (Cox, 1972) of cumulative probability of official charges and convictions for Māori and non-Māori were calculated to observe the differences between ethnicity (Figure 1). Tests of significance were conducted based on a log rank test (Harrington & Fleming, 1982).

To calculate the lifetime rates of official charges and convictions laid per 100 people by ethnicity and offence type (Table 2), the bivariate analyses involved chi square tests to ascertain the rates for each type of offence in the two populations (Māori and non-Māori). Negative binomial regression was used to show whether the differences between ethnicity and the offending outcome was statistically significant, and to calculate the Incidence Rate Ratio (IRR) between Māori and non-Māori.

To observe the mean rates of official contact per 100 people for a series of age intervals and lifetime up to age 35 years (Table 3), negative binomial regression was applied to the repeated measures data to show whether the differences between ethnicity and the offending outcome for each age interval was statistically significant, and to calculate the IRR between Māori and non-Māori. The negative binomial regression model was also fitted to the self-reported rates of arrests and convictions data (Table 4), and to the self-reported offending by offence type data (Table 5).

#### ***2.4.2. Chapter 4 Analysis***

The core of the analysis was reported in Chapter 4. These analysis involved comparisons of Māori and non-Māori differences in rates of offending classified over age intervals by type of offence.

To begin the analysis of Chapter 4, the first step was to examine ethnic differences in 9 known potential risk factors of offending (Table 6). These measures included: socio-demographic risk score, family dysfunction score, parental adjustment problems, child maltreatment, being male, low IQ, conduct problems, leaving school with no qualifications and having deviant peer affiliations. The differences were observed by calculating the mean and standard deviation (for continuous measures) or the percentage rate (for the two dichotomous measures of IQ and leaving school without qualifications) of each risk factor for both ethnicities, and the associations were tested for significance by a t-test for independent samples or chi square test of independence. A Pearson correlation ( $r$ ) was calculated to summarize the strength of each association between ethnicity and risk score.

For the next stage of analysis, the associations between each of the offending outcome variables and each of the risk factors were closely examined (Table 7). This analysis included calculating the mean and standard deviation (or the percentage rate for dichotomous measures) of the number of official contacts, official charges, self-reported arrests and self-reported convictions for each level of disadvantage (from low to high) for each risk factor. The associations were tested for significance by a t-test for independent samples or chi square test of independence. A Pearson correlation ( $r$ ) was calculated to summarize the strength of associations between offending outcomes and each risk factor at each level of disadvantage.

The next stage of the analysis involved using a Generalized Estimating Equation (GEE) (Li, 2006; Liang & Zeger, 1986; Zeger & Liang, 1986) and negative binomial regression which was fitted to the repeated measures data. To provide a measure of effect size, we move to the Incidence Rate Ratio (IRR) which is the main unit of currency used in this analysis. To summarise the strength of the association between ethnicity and offending rates is given by the IRR (and corresponding 95% CI) of offending for Māori compared to non-Māori which can be

calculated from the fitted model as follows:  $IRR (95\% CI) = e^{\beta \pm 1.96 (SE \beta)}$  where  $SE \beta$  is the estimated standard error of the parameter  $\beta$  in Equation 1.

The GEE approach pooled the repeated measures on each offending outcome (official charge, official conviction, self-reported arrest, self-reported conviction) for each of the 5 age intervals (<16, 16 – 20, 21 – 24, 25 – 29, 30 – 34 years) to produce an estimate of the population averaged effect for ethnicity on each offending outcome. This analysis examined the associations between ethnicity and offending outcomes, accounting for the 9 potential risk factors of offending (Tables 8 & 9). These were: socio-demographic disadvantage, family dysfunction, parental adjustment problems, child maltreatment, being male, low IQ, conduct problems, leaving school with no qualifications and having deviant peer affiliations. This analysis:

- i. Tested the significance of the association between ethnicity, measures of offending outcomes accounting for measures of social, family and individual risk factors
- ii. Estimated the strength of the association using Beta coefficient (and Standard Error), with IRR also calculated (using standard 95% confidence intervals).

The fitted model was an extension of the model in Equation 1 and was of the form:

$$\text{Log}(Y_{it}) = \beta_0 + \beta_1 \text{ETHNICITY}_i + \sum \beta_k Z_k \quad (2)$$

where  $\log(Y_{it})$  was the logarithm of the rate of official contact (official charges, official convictions, self-reported arrests, and self-reported convictions) for the  $i$ th individual in time period  $t$ ;  $\text{ETHNICITY}_i$  was a dichotomous measure of Māori ethnicity; and  $Z_k$  were the measures of social, family and individual covariates. In this model, the coefficient  $\beta_1$  represents the effect of Māori ethnicity on the rate of official contact over and above the rate predicted by the covariates; and the adjusted IRR  $e^{\beta_1}$  gives an estimate of the existence of bias in rates of official contact over and above what would be expected on the basis of the social, family and individual covariates.

The next stage of the analysis involved adjusting the associations between ethnicity, offending outcomes and social, family and individual risk factors to include measures of self-reported violent, property and other offences (Tables 10 & 11). This analysis involved extending the GEE model above to include self-reported offending. In order to stabilise the variance in self-reported data when fitting the model, the measures of self-reported violent, property and other offences were classified on an ordinal scale from 0 to 5, where 0 represented 0 offences, 1 represented 1-2 offences, 2 represented 3 – 9 offences, 3 represented 10 – 29 offences, 4 represented 30 – 49 offences and 5 represented 50+ offences.

The fitted model was of the form:

$$\text{Log}(Y_{it}) = \beta_0t + \beta_1 \text{ETHNICITY}_i + \sum \beta_k Z_k + \beta_2 \text{VIOL}_{it} + \beta_3 \text{PROP}_{it} + \beta_4 \text{OTHER}_{it} \quad (3)$$

where  $\log(Y_{it})$  was the logarithm of the rate of official contact (official charges, official convictions, self-reported arrests, self-reported convictions) for the  $i$ th individual in time period  $t$ ;  $\text{ETHNICITY}_i$  was a dichotomous measure of Māori ethnicity; and  $Z_k$  were the set of social, family and individual covariates and  $\text{VIOL}_{it}$ ,  $\text{PROP}_{it}$  and  $\text{OTHER}_{it}$  were the number of self-reported violent, property and other offences reported during the time period  $t$ .

The supplementary analysis involved four stages. The first stage was to apply the models used above to an alternative measure of ethnicity (measured at ages 21 and 25). This stage involved fitting the unadjusted and fully adjusted models used above with ethnicity measured in adulthood as opposed to at age 14.

The second stage of the supplementary analysis was to explore the role of cultural identification (Table 13). This involved fitting the fully adjusted model to examine the associations between an alternative measure of ethnicity (measured as Sole Māori or Māori + other ethnicity) and rates of each of the four offending outcomes.

The next stage of the supplementary analysis involved calculating the associations between ethnicity (measured at ages 21 and 25), official contacts, age and gender. This analysis involved extending the fitted GEE model to include tests of multiplicative interaction between ethnicity, age and gender.

The final stage of the analysis was to test for consistency in the associations between ethnicity and rates of official contacts by types of offending. This involved extending the fitted GEE model to Violent, Property and Other offence types for ethnicity measured at age 14 and ethnicity measured at age 21/25 (Table 14).

## CHAPTER THREE

### 3. RESULTS

#### *3.1. Introduction*

Official New Zealand statistics consistently show that Māori offend at a much higher rate in comparison to non-Māori. In this chapter, we will examine the associations between ethnicity and three types of offending reports, including officially reported rates of charges and convictions, self-reported rates of arrests and convictions, and self-reported rates of offending. Officially recorded rates of offending have been provided by the New Zealand Ministry of Justice, including charges and convictions over the life course up to 35 years for 8 major offence categories. Self-reported rates of arrests, convictions and offending are reported over five age intervals, from adolescence through to age 35 years. Lastly, the dual associations between ethnicity and gender are reported.

#### *3.2. Ethnic Differences in Officially Recorded Contacts*

In this section, we will explore the differences between Māori and non-Māori in terms of rates of official contact with the justice system. Figure 1 shows the lifetime probability (as a percentage) of being (a) charged or (b) convicted of an offence as recorded in the Ministry of Justice records for both Māori and non-Māori. The figure is based on a sample of 872 individuals who gave consent to accessing Ministry of Justice records. The figure shows clear differences in the offending trajectories of both groups. Māori were more likely to enter the criminal justice system and showed an earlier onset than non-Māori.

Overall, the lifetime probability for Māori to receive one or more official charges was 34.9% in comparison to 24.0% for non-Māori. The difference was statistically significant as shown in a log rank test ( $\chi^2(1) = 5.8, p < .05$ ). Similarly, for the lifetime probability of official

convictions, the comparisons between Māori and non-Māori show a similar trend, 31.3% versus 20.9%, (log rank test  $\chi^2(1) = 5.7, p < .05$ ).

*Figure 1. Lifetime Probability (%) of being Charged or Convicted for Māori and non-Māori*

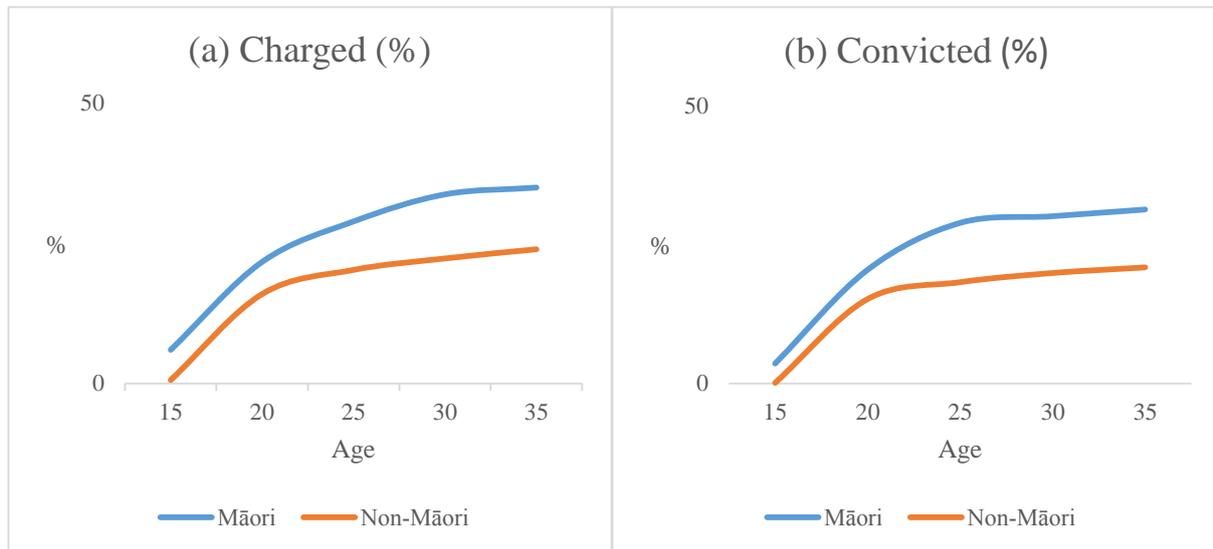


Table 2 shows the associations between ethnicity (Māori and non-Māori) and official charges and convictions over the life course up to 35 years for the 8 major offence categories as per the New Zealand Ministry of Justice classification. The table is based on the same sample of 872 individuals. The table shows, for each type of offence, the mean and standard deviation of the number of official charges and convictions expressed as the rate (per 100 people) for Māori and non-Māori. The association between ethnicity and official charges was tested for statistical significance using negative binomial regression, and the strength of each association is summarised by the incidence rate ratio (IRR) and corresponding 95% confidence interval.

Examination of the table shows there is a highly consistent pattern in which Māori had higher rates of official contacts across all offence types. For official charges, the IRR ranged between 2.9 to 12.1 and for convictions the IRR ranged between 2.8 to 11.1. In all cases these associations were highly significant.

Table 2

*Mean (SD) Lifetime Rates of Official Charges and Convictions laid per 100 people to age 35 years by Ethnicity and Offence Type*

Type of Offence	Māori (N=83)		Non-Māori (N=789)		<i>p</i>	IRR (95% CI)
	Mean (rate per 100)	(SD)	Mean (rate per 100)	(SD)		
<b>Official Charges</b>						
Violent	112	(450)	22	(199)	<.001	5.1 (3.6 – 7.2)
Against A Person	44	(230)	3	(43)	<.001	12.1 (7.1 – 20.7)
Property	419	(1157)	70	(567)	<.001	5.9 (4.6 – 7.8)
Drug	59	(179)	15	(106)	<.001	3.7 (2.5 – 5.6)
Against Admin. of Justice	67	(208)	7	(57)	<.001	9.0 (5.9 – 13.9)
Against Good Order	188	(653)	30	(204)	<.001	6.2 (4.6 – 8.4)
Traffic	84	(196)	28	(99)	<.001	2.9 (2.1 – 4.2)
Miscellaneous	12	(68)	2	(15)	<.001	5.6 (2.5 – 12.6)
<b>Official Convictions</b>						
Violent	90	(358)	15	(177)	<.001	5.9 (4.1 – 8.5)
Against A Person	33	(185)	3	(37)	<.001	11.1 (6.1 – 20.0)
Property	348	(1046)	56	(497)	<.001	6.2 (4.7 – 8.1)
Drug	45	(133)	12	(79)	<.001	3.8 (2.5 – 5.9)
Against Admin. of Justice	51	(154)	6	(49)	<.001	8.7 (5.4 – 13.9)
Against Good Order	156	(549)	27	(192)	<.001	5.7 (4.2 – 7.9)
Traffic	76	(174)	27	(97)	<.001	2.8 (1.9 – 3.9)
Miscellaneous	9	(48)	1	(13)	<.001	6.3 (2.5 – 15.9)

Table 3 shows the associations between ethnicity (Māori and non-Māori) and official charges and convictions as per the Ministry of Justice records over five age intervals ranging from  $\leq 16$  up to age 30-34 years, and the overall pooled rate of official contacts. The table shows, for each age interval, the mean and standard deviation of the number of official charges and convictions expressed as the rate (per 100 people) for Māori and non-Māori. The association between ethnicity and official contacts was tested for statistical significance using negative

binomial regression, and the strength of each association was tested to give the incidence rate ratio (IRR) and corresponding 95% confidence interval.

Examination of the table shows that Māori had a statistically significant ( $p < .001$ ) higher rate of official contacts than non-Māori across every age interval. For official charges, the IRR ranged from 4.2 to 8.8 and for convictions from 4.1 to 9.2 times more likely for Māori to come into official contact by the age of 35. Māori as a group have a pooled rate of 197 official charges and 162 official convictions per 100 people over the four age intervals, compared to non-Māori who have pooled rates of 36 and 30 respectively. The overall IRR for official charges and convictions indicated that the rates of Māori are 6.6 and 6.5 times higher than non-Māori to be officially charged or convicted with an offence before the age of 35 years, 95% CI (3.0 – 14.4) and (3.1 – 13.7) respectively. A negative binomial regression showed the difference between Māori and non-Māori official charges were statistically significant ( $\chi^2 (1) = 22.2, p < .001$ ), which was similar to the difference between ethnicity and official convictions ( $\chi^2 (1) = 21.5, p < .001$ ).

Collectively, these results were consistent with our expectations and previous literature. Not only were Māori more likely to come into contact (Figure 1), they also had higher overall rates of contact within the official judicial system. These trends were apparent across all age intervals from adolescence to adulthood and across the 8 major offence categories. The pooled rates of offending shown in Table 3 suggest that the rates of official contact by Māori are 6.6 to 6.5 times higher than non-Māori. The differences between the rates of Māori and non-Māori official charges and convictions are consistent across the age span from adolescence to mature adulthood.

Table 3

*Mean (SD) Rates of Official Contact per 100 people For a Series of Age Intervals and Life Time up to Age 35 Years*

Age (years)	Māori (N=83)		Non-Māori (N=789)		<i>p</i>	IRR (95% CI)
	Mean (Rate per 100)	(SD)	Mean (Rate per 100)	(SD)		
<b>Official Charges</b>						
≤16	177	(818)	20	(450)	<.001	8.8 (6.4 – 12.2)
17 – 20	340	(1116)	80	(462)	<.001	4.2 (3.2 – 5.5)
21 – 24	181	(622)	31	(193)	<.001	5.9 (4.3 – 7.9)
25 – 29	124	(416)	27	(198)	<.001	4.6 (3.3 – 6.4)
30 – 34	165	(558)	21	(139)	<.001	7.7 (5.6 – 10.6)
Pooled	197	(747)	36	(321)	<.001	6.6 (3.0 – 14.4)
<b>Official Convictions</b>						
≤16	122	(694)	16	(428)	<.001	7.4 (5.2 – 10.4)
17 – 20	300	(1002)	74	(427)	<.001	4.1 (3.1 – 5.3)
21 – 24	147	(492)	23	(143)	<.001	6.4 (4.7 – 8.9)
25 – 29	104	(359)	20	(145)	<.001	5.1 (3.6 – 7.3)
30 – 34	140	(468)	15	(107)	<.001	9.2 (6.5 – 12.9)
Pooled	162	(645)	30	(290)	<.001	6.5 (3.1 – 13.7)

### **3.3. Ethnic Differences in Self-reported Official Contacts**

Table 4 compares the rates of self-reported arrests and convictions for four age intervals, 16 – 20, 21 – 24, 25 – 29 and 30 – 34 years. The table is based on a sample of 995 participants who provided self-reported data on rates of official contact on at least one occasion from age 16 to 35 years. The table shows, for each age interval and then pooled over all the age intervals, the mean and standard deviation of the number of self-reported arrests and convictions expressed as the rate (per 100 people) for Māori and non-Māori. The associations between ethnicity and self-

reported contacts was tested for significance using negative binomial regression and the strength of each association is summarized by the incidence rate ratio (IRR) and corresponding 95% confidence interval.

Examination of the table shows a pervasive pattern in which Māori reported higher rates of arrest and conviction compared to non-Māori across all age intervals up to age 35 years. For self-reported arrests, the IRR's indicate that the rates of arrest for Māori ranged from 1.9 to 7.2 times higher than non-Māori before the age of 35 years. In total, Māori had a pooled rate of 32 self-reported arrests per 100 people (SD = 98), in comparison to non-Māori, who had a pooled rate of 11 self-reported arrests per 100 people (SD = 53). Negative binomial regression showed the difference between Māori and non-Māori self-reported arrests was highly significant ( $\chi^2(1) = 18.4, p < .001$ ). The overall incidence rate ratio indicates that Māori had a self-reported rate of arrest that was 3.0 times higher than non-Māori, 95% CI (1.9 – 4.9).

Self-reported convictions show similar trends as above. Māori had a statistically significant higher number of self-reported convictions across all age groups. The IRR indicates that Māori had self-reported a pooled rate of conviction which ranged from 1.7 to 7.2 times higher than non-Māori. In total, Māori had self-reported a pooled rate of 26 convictions per 100 people versus non-Māori (M = 10) ( $\chi^2(1) = 15.7, p < .05$ ). The overall IRR indicates that Māori had pooled rates of self-reported convictions that were 2.9 times higher than non-Māori, 95% CI (1.6 – 4.4).

In summary, there are clear patterns of difference between Māori and non-Māori in self-reported rates of official contact, which is consistent with the trends observed for officially recorded contacts. Again, Māori show higher rates of contact over each of the age intervals, which is in line with the officially recorded rates of charges and convictions. However, the overall differentials for self-reported official contacts (3.0 and 2.9) are slightly lower than for

officially recorded contacts reported in Table 3 (6.6 and 6.5 for charges and convictions respectively).

Table 4

*Mean (SD) Rates of Self-reported Contacts per 100 people for a Series of Age Intervals and Life Time up to Age 35 Years*

Age (years)	Māori		Non-Māori		<i>p</i>	IRR (95% CI)
	Mean (Rates per 100)	(SD)	Mean (Rates per 100)	(SD)		
<b>Arrests</b>						
16 – 20	37	(80)	17	(57)	<.001	2.1 (1.4 – 3.3)
21 – 24	30	(70)	13	(56)	<.001	2.3 (1.6 – 3.2)
25 – 29	15	(52)	8	(56)	<.005	1.9 (1.3 – 2.9)
30 – 34	44	(156)	6	(42)	<.001	7.2 (4.5 – 11.6)
Pooled	32	(98)	11	(53)	<.001	3.0 (1.9 – 4.9)
<b>Convictions</b>						
16 – 20	37	(83)	17	(58)	<.001	2.1 (1.4 – 3.3)
21 – 24	21	(61)	9	(48)	<.001	2.3 (1.6 – 3.4)
25 – 29	13	(46)	8	(51)	.023	1.7 (1.1 – 2.6)
30 – 34	31	(104)	4	(24)	<.001	7.2 (5.3 – 9.8)
Pooled	26	(77)	10	(47)	<.001	2.9 (1.8 – 4.7)

*\*Note. No arrest/conviction data for under age 16 years. Observed sample sizes: age 16-20, Māori (N = 86) non-Māori (N = 836); age 21 – 24, Māori (N = 89), non-Māori (N = 845); age 25 – 29, Māori (N = 85), non-Māori (N = 834); age 30 – 34, Māori (N = 87), non-Māori (N = 809).*

### 3.4. Ethnic Differences in Self-reported Offending

Table 5 shows the associations between Māori and non-Māori self-reported rates of engagement in offending over the life course available for three offence categories: self-reported violent, property and other offences. The table is based on a sample of 995 participants observed on at least one occurrence from adolescence to age 35 years. The table shows, for each of the three categories, the mean and standard deviation of the self-reported rates of offending (per 100 people) by age and pooled over all age intervals for Māori and non-Māori. The association between ethnicity and self-reported offending was tested for statistical significance using negative binomial regression, and the strength of each association is summarized by the IRR and corresponding 95% CI.

Examination of the table shows that overall, Māori reported significantly higher rates ( $p < .001$ ) of offending for each of the three categories. Specifically for violent offending, Māori reported a pooled rate of offending that was 2.8 times (95% CI, 1.5 – 4.9) higher than non-Māori; for property offending, Māori reported a pooled rate of offending that was 3.1 times (95% CI, 1.7 – 5.6) higher than for non-Māori; and for other offending, Māori reported a pooled rate of offending that was 1.3 times (95% CI, .99 – 1.7) higher than for non-Māori. Negative binomial regression shows the difference between Māori and non-Māori self-reported violent ( $\chi^2 (1) = 14.1$ ), property ( $\chi^2 (1) = 12.7$ ) and other ( $\chi^2 (1) = 2.6$ ) offences to be significant. A close examination of the IRR showed that across all domains and age intervals, Māori had higher rates of offending, though for two age intervals within violent offences, these did not reach significance.

The pooled rates of self-reported violent, property and other offences in Table 5, further suggest that Māori tend to engage in more criminal behaviours, across all age intervals up to age 35 years. The ethnic differentials in rates of self-reported offending are somewhat weaker than the rates observed for officially recorded rates of offending.

Table 5

*Mean (SD) Rates of Self-reported Offending by Offence Type per 100 People for a Series of Age Intervals and Life Time up to Age 35 Years*

Age (years)	Māori		Non-Māori		<i>p</i>	IRR (95% CI)
	Mean (Rate per 100)	(SD)	Mean (Rate per 100)	(SD)		
<b>Violent</b>						
<16	332	(1352)	162	(1064)	<.001	2.1 (1.6 – 2.6)
16 – 20	1186	(2833)	296	(1355)	<.001	4.0 (3.2 – 5.1)
21 – 24	236	(1139)	29	(372)	<.001	8.2 (6.2 – 10.9)
25 – 29	131	(1063)	69	(737)	<.001	1.9 (1.4 – 2.5)
30 – 34	16	(61)	19	(349)	.534	.83 (.46 – 1.5)
Pooled	378	(1608)	116	(878)	<.001	2.8 (1.5 – 4.9)
<b>Property</b>						
<16	223	(1074)	463	(1267)	<.001	2.1 (1.6 – 2.6) 2.4 (1.9 – 3.1)
16 – 20	705	(1944)	291	(1186)	<.001	2.4 (1.7 – 3.3)
21 – 24	88	(529)	37	(280)	<.001	2.8 (1.9 – 4.1)
25 – 29	75	(662)	27	(386)	<.001	6.1 (4.8 – 7.9)
30 – 34	484	(2069)	79	(621)	<.001	
Pooled	364	(1451)	132	(806)	<.001	3.1 (1.7 – 5.6)
<b>Other</b>						
<16	1985	(2927)	1029	(2367)	<.001	1.9 (1.5 – 2.4)
16 – 20	1234	(2343)	1287	(2635)	.721	.96 (.76 – 1.2)
21 – 24	508	(1642)	620	(1912)	.100	.82 (.65 – 1.0)
25 – 29	453	(1712)	653	(1996)	.004	.69 (.54 – .89)
30 – 34	914	(2080)	443	(1587)	<.001	2.1 (1.6 – 2.6)
Pooled	1031	(2265)	810	(2156)	<.001	1.3 (.99 – 1.7)

\*Observed sample sizes: age <16, Māori (*N* = 93) non-Māori (*N* = 871); age 16-20, Māori (*N* = 86) non-Māori (*N* = 836); age 21 – 24, Māori (*N* = 89), non-Māori (*N* = 845); age 25 – 29, Māori (*N* = 85), non-Māori (*N* = 834); age 30 – 34, Māori (*N* = 87), non-Māori (*N* = 809).

In conclusion, Māori as a group, in comparison to non-Māori tend to consistently have higher rates of official charges and convictions (IRR = 6.6 and 6.5 respectively), higher rates of self-reported official charges and convictions (IRR = 3.0 and 2.9 respectively) and higher rates of self-reported offending across each of the five age intervals to age 35 years. One possible explanation of these differences in rates of offending is a bias in official contacts, such that Māori are more likely than non-Māori to be charged or convicted. The following chapter will develop a statistical bias model, controlling for external factors in order to test for bias.

## CHAPTER FOUR

### 4. RESULTS

#### *4.1. Introduction*

Results from Chapter 3 confirm the hypothesis that Māori offend at a higher rate than non-Māori. For each offence type, and each age period, Māori were found to have significantly higher rates of official and self-reported charges and convictions compared to non-Māori. However, the differences between Māori and non-Māori rates of offending were smaller for self-reported offending and the IRR was still lower than for measures of official contact. The discrepancies between comparative rates of offending by Māori and non-Māori among self-reported offending, official charges and convictions suggest there may be ethnic bias from officials in the criminal justice system. In this chapter we investigate the extent to which the associations between ethnicity and official contacts can be explained by a set of disadvantageous social, family and individual characteristics that are known to be linked to offending outcomes. After controlling for these risk factors, we examine the extent to which any difference in offending is consistent with the notion of a bias by developing a statistical model.

We know that Māori offend at a higher rate comparatively to non-Māori. After adjusting for social, family and individual risk factors that have been previously linked to offending, and self-reported rates of violent, property and other offences. If there is no bias evident, then we would expect to see the IRR to be 1.0 official charges, convictions, self-reported arrests and self-reported convictions.

#### *4.2. Associations between Ethnicity and Potential Risk Factors of Offending*

As discussed in the introduction, there is extensive research literature on risk factors that have been linked to criminal behaviour. These risk factors include: socio-demographic

disadvantage (parents who were of young maternal age, less educated, of low socioeconomic status, low standard of living and low household income), family dysfunction (e.g. single parent family, changes of parents, high level of interparental violence and poorer parental attachment), parental adjustment problems (e.g. parental history of offending, parental alcohol problems and illicit drug use), child maltreatment (physical and/or sexual), being male, low IQ, conduct problems, leaving school without qualifications and deviant peer affiliations. There is also substantial evidence that the Māori on average have higher rates of disadvantage across socio-demographic, individual and family factors, which may contribute to criminal behaviour. In this section, we will examine the associations between Māori ethnicity, rates of offending and potential risk factors in attempt to identify whether these risk factors account for the discrepancies between the rates of official contacts for Māori and non-Māori.

Table 6 shows the associations between ethnicity and a series of measures extracted from the CHDS database. These measures included socio-demographic risk, family dysfunction, parental adjustment problems, child abuse, gender, childhood IQ score, conduct problems, leaving school without qualifications and deviant peer affiliations (note: refer to Method section for detailed description of these measures). The table shows the profile of disadvantage for Māori and non-Māori on each of the risk measures (means, SD) for continuous measures, and rates (%) for dichotomous measures. Each association was tested for significance by a t-test for independent samples or chi square test of independence, and the strength of each association between ethnicity and the risk score is summarized by the Pearson correlation ( $r$ ).

There were highly significant ( $p < .001$ ) differences between Māori and non-Māori on almost all comparisons reflecting greater socio-demographic, family and individual disadvantage for Māori. Specifically, Māori were more likely to come from families characterized by socio-demographic disadvantage, higher reports of family dysfunction, parental adjustment problems and exposure to child abuse. In addition, Māori were more likely to exhibit conduct problems

during childhood, to affiliate with delinquent or substance using peers in adolescence, and to leave school before obtaining qualifications. Māori also were more likely to have a lower IQ score, with the differences between Māori and non-Māori reaching significance ( $p < .05$ ). The correlations between these risk measures and ethnicity ranged from  $-.074$  to  $.230$ .

Table 6

*Associations between Ethnicity and Measures of Potential Risk Factors*

Factor	Māori (N = 97)	Non-Māori (N = 898)	<i>r</i>	<i>p</i> <sup>1</sup>
Mean (SD) Socio-demographic risk score	2.93 (1.79)	1.68 (1.55)	.230	<.001
Mean (SD) Family dysfunction score	1.12 (.96)	.56 (.77)	.205	<.001
Mean (SD) number of parental adjustment problems	.93 (.97)	.45 (.72)	.186	<.001
Mean (SD) Child maltreatment score	.43 (.63)	.28 (.51)	.084	.008
% Male	49.5	49.4	.000	.973
Mean (SD) IQ	99.89 (14.6)	103.56 (14.7)	-.074	.020
Mean (SD) Conduct problems score	54.33 (9.15)	51.45 (7.79)	.107	.001
% Left school with no qualifications	29.7	17.7	.090	<.001
Mean (SD) Deviant peer affiliations	6.61 (2.73)	5.47 (2.49)	.107	.001

1. *t*-test for independent samples for comparison of means, chi square test for comparison of percentages

#### **4.3. Associations between Risk Factors and Rates of Official Contacts**

Table 7 shows the associations between each specific measure of child, family and individual risk factors and the population averaged rates of official contact for each of the four outcome measures pooled over the periods from early adolescence to age 35 years. For the purpose of data display, all measures have been categorised for levels of disadvantage, and are ordered in the table from least to most disadvantage. The table shows, for each risk factor, the pooled rate and standard deviation (per 100 people) for the total number of official charges, official convictions,

self-reported arrests, and self-reported convictions from early adolescence to age 35 years. The associations between risk factors and offending measures were tested for statistical significance using negative binomial regression, and the strength of the associations is summarized by the correlation ( $r$ ) between each risk factor and the pooled rate of official reports of contact.

Examination of Table 7 shows that there were pervasive and statistically significant associations ( $p < .001$ ) between all measures of childhood, family and individual characteristics and all measures of official contact. These associations were dose-response like, such that those with the most disadvantageous profile of childhood, family and individual risk factors had the highest rate of official contacts (high score on risk factors and high rates of official contact) and those with the least disadvantageous profile of risk factors had the lowest rate of official contacts. The correlations between risk factors and rates of official contact ranged from .06 to .18.

Together, the findings summarized in Tables 6 and 7 show that Māori have high levels of disadvantage across social, family and individual characteristics, which in turn, are associated with higher rates of official contact. These findings suggest that the higher rates of official contact for Māori may be explained by the fact Māori have considerably higher rates of disadvantage across all of the potential risk factors of offending. In the following section, we will examine the associations between ethnicity and each of the four outcome measures while controlling for social, family and individual risk factors.

Table 7

*Associations between Risk Factors and Rates of Official and Self-reported Contact Pooled over Age Periods from Adolescence to 35 Years*

Measure	Official Charges Mean (SD) per 100	Official Convictions Mean (SD) per 100	Self-reported Arrests Mean (SD) per 100	Self-reported Convictions Mean (SD) per 100
<b>Socio-demographic risk score</b>				
0 ( low)	16 (104)	13 (85)	10 (42)	8 (39)
1	30 (279)	25 (254)	11 (65)	10 (55)
2	49 (363)	41 (314)	12 (66)	11 (55)
3	55 (368)	45 (328)	13 (61)	13 (52)
4+ (high)	128 (663)	105 (595)	20 (57)	17 (52)
<i>p</i>	<.001	<.001	.001	<.001
<i>r</i>	.11	.09	.06	.07
<b>Family dysfunction score</b>				
0 (low)	21 (145)	17 (117)	9 (42)	8 (41)
1	29 (178)	24 (148)	13 (54)	10 (44)
2	214 (952)	178 (855)	28 (92)	25 (79)
3 (high)	142 (543)	124 (469)	36 (111)	32. (93)
<i>p</i>	<.001	<.001	<.001	<.001
<i>r</i>	.14	.13	.12	.11
<b>Parental adjustment problems score</b>				
0 (low)	21 (285)	18 (269)	9 (43)	7 (36)
1	24 (110)	24 (110)	3 (16)	5 (22)
2	65 ( 370)	54 (320)	14 (57)	13 (58)
3 (high)	189 (718)	153 (613)	36 (114)	29 (87)
<i>p</i>	<.001	<.001	<.001	<.001
<i>r</i>	.15	.13	.13	.13
<b>Child maltreatment score</b>				
0 (low)	34 (223)	28 (196)	10 (45)	9 (37)
1	90 (624)	74 (554)	20 (71)	16 (65)
2 (high)	157 (733)	139 (676)	42 (141)	37 (120)
<i>p</i>	<.001	<.001	<.001	<.001
<i>r</i>	.08	.08	.11	.11

Child IQ (percentile)				
1 (high)	19 (160)	14 (116)	10 (48)	8 (44)
2	25 (203)	20 (191)	10 (49)	8 (34)
3	26 (125)	23 (115)	10 (39)	11 (41)
4 (low)	132 (688)	111 (615)	22 (85)	18 (71)
<i>p</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>.001</i>
<i>r</i>	<i>.10</i>	<i>.10</i>	<i>.07</i>	<i>.08</i>
Conduct problems score (quartile)				
1 (low)	6 (81)	5 (80)	3 (25)	3 (25)
2	17 (115)	14 (95)	6 (28)	5 (27)
3	26 (124)	22 (110)	13 (42)	11 (44)
4 (high)	150 (708)	125 (630)	31 (98)	26 (80)
<i>p</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>
<i>r</i>	<i>.14</i>	<i>.13</i>	<i>.18</i>	<i>.17</i>
Gender				
Female	13 (152)	11 (145)	3 (21)	3 (20)
Male	90 (512)	74 (453)	23 (80)	20 (68)
<i>p</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>
<i>r</i>	<i>.10</i>	<i>.09</i>	<i>.17</i>	<i>.17</i>
Has school qualification				
Yes	19 (157)	15 (130)	9 (46)	7 (39)
No	185 (792)	155 (708)	32 (88)	30 (82)
<i>p</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>
<i>r</i>	<i>.17</i>	<i>.16</i>	<i>.16</i>	<i>.18</i>
Deviant peer affiliations (quartile)				
1 (low)	18 (147)	15 (115)	6 (29)	6 (32)
2	10 (86)	9 (79)	5 (27)	5 (28)
3	58 (361)	47 (312)	16 (68)	14 (56)
4 (high)	123 (659)	103 (597)	27 (89)	22 (74)
<i>p</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>	<i>&lt;.001</i>
<i>r</i>	<i>.11</i>	<i>.09</i>	<i>.14</i>	<i>.12</i>

#### ***4.4. Associations between Rates of Official Contact and Social, Family and Individual Risk Factors of Offending***

We developed a statistical model to examine the extent to which social, family and individual risk factors (identified in the previous section) may provide an explanation for the associations between ethnicity and each of the four outcome measures. If Māori ethnicity is significantly related to rates of official contact after adjustment for social, family and individual risk factors, then this is consistent with the existence of a possible ethnic bias in official contacts and suggests the need to explore other possible explanations for this bias.

To explore this issue in detail, an extension of the statistical model in Equation 1 (see methods) was developed to examine the association between ethnicity and rates of official contact taking into account the following risk factors: socio-demographic risk, family dysfunction, parental adjustment problems, child maltreatment, childhood IQ, conduct problems, gender, education and affiliations with deviant peers. In fitting the model, the measures for social, family and individual risk factors were scored in their natural metric, rather than the categories used in Table 8.

The model was fitted to the repeated measures data for each of the four outcomes of offending (official charges, official convictions, self-reported arrests and self-reported convictions). The results of the fitted models are summarized in Tables 8 and 9, which report the results of the fitted models for official charges and convictions, including the fitted regression coefficients and tests of significance for each of the measures in the fitted model. For comparison purposes, Tables 8 and 9 show the fitted model parameters for a model in which each outcome is predicted for ethnicity alone, as well as the adjusted and unadjusted estimates of effect size (IRR) for Māori for each outcome.

Examination of Table 8 shows:

1. Adjustment for social, family and individual risk factors explained a substantial component of the estimated effects for ethnicity. Prior to adjustment, Māori had rates of official reported charges and convictions that were 6.6 to 6.5 times higher than for non-Māori. After adjustment these rates were reduced to 1.8 times higher for both official charges and convictions. In both cases the adjusted associations were not statistically significant.
2. Family dysfunction, parental adjustment problems, conduct problems, being male, leaving school without qualifications and having deviant peer affiliations were all statistically significant predictors of official charges, while all of these with the exception of parental adjustment problems were also statistically significant predictors of official convictions. Each of these factors appears to contribute to the explanation of higher rates of offending by Māori.

Examination of Table 9 shows:

1. For both self-reported arrests and convictions, adjustment for social, family and individual risk factors explained a large component of the estimated effects for ethnicity. Prior to adjustment, Māori had rates of self-reported arrests and convictions that were 3.0 and 2.9 times higher than for non-Māori. After adjustment these rates were reduced to 1.8 and 1.7 times higher for self-reported arrests and convictions respectively. In both cases the adjusted associations were statistically significant ( $p < .05$ ).
2. Socio-demographic risk, parental adjustment problems, child maltreatment, conduct problems, being male, leaving school without qualifications and having deviant peer affiliations were statistically significant predictors of self-reported arrests. All of these risk factors were also statistically significant predictors for self-reported convictions.

These findings suggest that the higher rates of official contact for Māori cannot be explained solely by social, family and individual disadvantage, which may be consistent with the issue of bias. After adjusting for ethnic differences in exposures of childhood, family and individual disadvantage, the associations between ethnicity and rates of official contacts were substantially reduced. In three of the four cases these associations were modest and not statistically non-significant. At the same time, the adjusted IRR's were all in the region of 1.7 – 1.8, suggesting that even after controlling for social, family and individual risk factors, Māori had rates of official charges and convictions that were 70% to 80% higher than for non-Māori. Not all of the association was able to be explained, which suggests the potential for a small bias in official contacts for Māori over and above the estimated effects of social, family and individual disadvantage.

Table 8

*Fitted Regression Model of the Associations between Māori Ethnicity and Measures of Official Contact Before and After Adjustment for Social, Family and Individual Risk Factors.*

Measure	Unadjusted			Adjusted for Risk Factors		
	$\beta$ (SE)	<i>p</i>	IRR (95% CI)	$\beta$ (SE)	<i>p</i>	IRR (95% CI)
<b>Official Charges</b>						
<b>Māori Ethnicity</b>	<b>1.9 (.40)</b>	<b>&lt; .001</b>	<b>6.6 (3.0 – 14.4)</b>	<b>.563 (.33)</b>	<b>.086</b>	<b>1.8 (.92 – 3.3)</b>
Socio-demographic risk score				-.03 (.09)	.705	
Family dysfunction score				.30 (.12)	.013	
Parental adjustment problems				.41 (.18)	.022	
Child maltreatment score				-.06 (.17)	.730	
Child IQ score				-.01 (.01)	.295	
Conduct problems score				.06 (.01)	<.001	
Male				1.5 (.25)	<.001	
No school qualification				.74 (.27)	.006	
Deviant peer affiliations				.14 (.05)	.008	
<b>Official Convictions</b>						
<b>Māori Ethnicity</b>	<b>1.9 (.38)</b>	<b>&lt; .001</b>	<b>6.5 (3.1 – 13.7)</b>	<b>.574 (.35)</b>	<b>.102</b>	<b>1.8 (.89 – 3.5)</b>
Socio-demographic risk score				-.05 (.09)	.576	
Family dysfunction score				.36 (.11)	.002	
Parental adjustment problems				.34 (.22)	.122	
Child maltreatment score				-.04 (.18)	.826	
Child IQ score				-.01 (.01)	.245	
Conduct problems score				.07 (.02)	<.001	
Male				1.5 (.27)	<.001	
No school qualification				.77 (.29)	.007	
Deviant peer affiliations				.14 (.05)	.009	

Table 9

*Fitted Regression Model of the Associations between Māori Ethnicity and Measures of Self-reported Contact Before and After Adjustment for Social, Family and Individual Risk Factors.*

Measure	Unadjusted			Adjusted for Risk Factors		
	$\beta$ (SE)	<i>p</i>	IRR (95% CI)	$\beta$ (SE)	<i>p</i>	IRR (95% CI)
<b>Self-reported Arrest</b>						
<b>Māori Ethnicity</b>	<b>1.1 (.25)</b>	<b>&lt; .001</b>	<b>3.0 (1.9 – 4.9)</b>	<b>.567 (.21)</b>	<b>.008</b>	<b>1.8 (1.2 – 2.7)</b>
Socio-demographic risk score				-.14 (.05)	.012	
Family dysfunction score				.12 (.11)	.278	
Parental adjustment problems				.24 (.11)	.025	
Child maltreatment score				.46 (.17)	.009	
Child IQ score				.00 (.01)	.461	
Conduct problems score				.04 (.01)	<.001	
Male				1.8 (.20)	<.001	
No school qualification				.51 (.22)	.018	
Deviant peer affiliations				.14 (.03)	<.001	
<b>Self-reported Convictions</b>						
<b>Māori Ethnicity</b>	<b>1.1 (.25)</b>	<b>&lt; .001</b>	<b>2.9 (1.8 – 4.7)</b>	<b>.551 (.26)</b>	<b>.031</b>	<b>1.7 (1.1 – 2.9)</b>
Socio-demographic risk score				-.13 (.07)	.059	
Family dysfunction score				.12 (.12)	.306	
Parental adjustment problems				.23 (.11)	.032	
Child maltreatment score				.36 (.15)	.017	
Child IQ score				.00 (.01)	.949	
Conduct problems score				.04 (.01)	<.001	
Male				1.6 (.19)	<.001	
No school qualification				.68 (.22)	.002	
Deviant peer affiliations				.13 (.03)	<.001	

#### ***4.5. Testing for Ethnic Bias in Officially Reported Contacts***

The previous results suggest the possibility of a small residual bias against Māori. One other possible explanation for the higher rates of official contact against Māori is that Māori may be offending at a higher rate or in different ways compared to non-Māori. To the extent that self-reported rates of offending reflect actual rates of offending, we further extended the statistical model (see Methods) to take into account the pattern of self-reported offending over time as a test of this explanation.

Table 10 reports the results of the fitted models for official charges and convictions, including the fitted regression coefficients and tests of significance for each of the measures in the fitted model. The results of the fitted models for self-reported arrests and convictions are reported in Table 11. Tables 10 and 11 also show the estimated IRR of official contact for Māori after adjustment for each of the social, family and individual risk factors and self-reported violent, property and other offences.

For both official and self-reported rates of contact, adjustment for self-reported rates of offending resulted in a small reduction (compared to when adjusted for risk factors only) in the estimated effects for ethnicity. Prior to any adjustment, Māori had rates of official reported charges and convictions that were 6.6 and 6.5 times higher than for non-Māori, and rates of self-reported arrests and convictions that were 3.0 and 2.9 times higher than for non-Māori. When adjusted for social, family and individual risk factors, Māori had rates of officially reported charges and convictions that were 1.8 times higher (for both measures) than non-Māori; and rates of self-reported arrests and convictions that were 1.8 and 1.7 times higher than non-Māori (see Tables 8 and 9).

Table 10 shows that after adjustment for risk factors and self-reported offending, Māori had rates of official charges and convictions that were 1.5 times higher than non-Māori. Self-

reported violent, property and other offences were all statistically significant predictors in the model. The association between Māori ethnicity and officially reported charges were both not significant, though they appeared to be trending towards significance.

Table 11 shows that after adjustment for risk factors and self-reported offending, Māori had rates of self-reported arrests and convictions that were 1.4 times higher than for non-Māori. Similar to Table 10, self-reported violent, property and other offences were all statistically significant predictors. Overall, the associations between ethnicity and self-reported arrests/convictions were not statistically significant.

In summary, Māori as a group in comparison to non-Māori are more likely to be characterised by disadvantageous social, family and individual risk factors which are known predictors of offending behaviour. These results show that even after accounting for the disadvantageous social, family and individual risk factors, Māori still had rates of official charges and convictions that were 1.8 times higher than non-Māori, and rates of self-reported arrests and convictions that were 1.7 to 1.8 times higher than non-Māori. Furthermore, when the model was adjusted to account for disadvantageous risk factors and self-reported violent, property and other offences, Māori still had higher rates of official charges and convictions (IRR = 1.5) and higher rates of self-reported rates of arrests and convictions (IRR = 1.4). Although none of the associations between ethnicity and rates of contact were statistically significant, these residual IRR's are still unable to reach 1.0, which is suggestive of a small ethnic bias against Māori in the criminal justice system.

Table 10

*Regression Model for Official Charges and Convictions Controlling for Social, Family and Individual Risk Factors and Self-reported Offending*

Measure	Charges			Convictions		
	$\beta$ (SE)	<i>p</i>	IRR (95% CI)	$\beta$ (SE)	<i>p</i>	IRR (95% CI)
<b>Ethnicity</b>	<b>.381 (.28)</b>	<b>.170</b>	<b>1.5 (.85 – 2.5)</b>	<b>.431 (.30)</b>	<b>.145</b>	<b>1.5 (.86 – 2.7)</b>
Socio-demographic risk score	.033 (.08)	.677		-.00 (.79)	.955	
Family dysfunction score	.173 (.12)	.145		.199 (.11)	.072	
Parental adjustment problems	.529 (.12)	<.001		.476 (.14)	.001	
Child maltreatment score	-.19 (.19)	.285		-.18 (.19)	.335	
Child IQ score	-.01 (.01)	.155		-.01 (.01)	.083	
Conduct problems score	.046 (.01)	<.001		.052 (.01)	<.001	
Male	1.24 (.26)	<.001		1.14 (.26)	<.001	
No school qualification	.560 (.26)	.029		.609 (.27)	.025	
Deviant peer affiliations	.067 (.05)	.213		.061 (.48)	.208	
Self-report violent offences	.213 (.09)	.033		.243 (.11)	.021	
Self-report property offences	.340 (.09)	<.001		.340 (.08)	<.001	
Self-report other offences	.149 (.05)	.006		.147 (.06)	.008	

Table 11

*Regression Model for Self-reported Arrests and Convictions Controlling for Social, Family and Individual Risk Factors and Self-reported Offending*

Measure	Self-report Arrests			Self-report Convictions		
	$\beta$ (SE)	<i>p</i>	IRR (95% CI)	$\beta$ (SE)	<i>P</i>	IRR (95% CI)
<b>Ethnicity</b>	<b>.365 (.19)</b>	<b>.060</b>	<b>1.4 (.99 – 2.1)</b>	<b>.301 (.24)</b>	<b>.218</b>	<b>1.4 (.84 – 2.2)</b>
Socio-demographic risk score	-.07 (.05)	.187		-.05 (.06)	.458	
Family dysfunction score	.051 (.09)	.581		.023 (.10)	.820	
Parental adjustment problems	.287 (.09)	.001		.269 (.09)	.006	
Child maltreatment score	.243 (.14)	.078		.173 (.14)	.200	
Child IQ score	.001 (.01)	.850		-.00 (.01)	.538	
Conduct problems score	.032 (.01)	<.001		.027 (.01)	.004	
Male	1.41 (.20)	<.001		1.27 (.19)	<.001	
No school qualification	.403 (.19)	.030		.567 (.20)	.005	
Deviant peer affiliations	.073 (.03)	.022		.072 (.37)	.050	
Self-report violent offences	.162 (.05)	.002		.172 (.56)	.002	
Self-report property offences	.182 (.06)	.003		.196 (.06)	.002	
Self-report other offences	.259 (.05)	<.001		.232 (.05)	<.001	

#### **4.6. Supplementary Analysis**

To examine the robustness of the above findings, a series of supplementary analyses were conducted. These included varying the definition of ethnicity, exploring the role of cultural identification, examining the extent to which the associations between ethnicity and official contacts vary with other individual characteristics, and testing the consistency of the associations by the type of offending.

#### ***4.6.1. Varying the Definition of Ethnicity***

The above results used a measure of ethnicity provided by parental report at age 14. In the following analysis, we have varied the definition of ethnicity based on an alternative measure of ethnicity that was self-reported at ages 21 and 25. As described in the Methods section, participants were classified as Māori if they identified as Māori on the basis of self-report at either 21 or 25 years of age. Table 12 reports the associations of ethnicity (measured during adulthood) and each of the four outcome measures before and after adjustment for risk factors and self-reported offending. The table reports the effect sizes as Incidence Rate Ratios (IRR) and a 95% CI for the unadjusted model, the model adjusting for social, family and individual risk factors, and the full model adjusting for social, family and self-reported rates of violent, property and other offending.

Table 12 shows a similar pattern of findings to the main analysis in which before and after adjustment, there were highly significant associations between self-reported ethnicity at age 21/25 and all measures of official contact (IRR ranging from 2.8 to 10.8). Adjustment for social, family and individual characteristics substantially reduced the associations between ethnicity and measures of official contact to an IRR which ranged between 1.6 and 2.1, which remained significant. However, when adjusted further to include self-reported violent, property and other offences, each of the associations was further reduced and became statistically non-significant (IRR ranging from 1.3 to 1.5)

Table 12

*Regression Model of the Associations between Māori Ethnicity (Measured at age 21 and 25 Years) and Measures of Official and Self-reported Contacts Before and After Adjustment for Social, Family and Individual Risk Factors, and Self-reported Offending*

Measure	Unadjusted	Adjusted for Risk Factors	Adjusted for Risk Factors and Self-reported Offending
	IRR (95% CI)	IRR (95% CI)	IRR (95% CI)
Official Charges	10.0 (4.8 – 20.8)	1.9 (1.1 – 3.3)	1.3 (.82 – 2.1)
Official Convictions	10.8 (5.0 – 23.2)	2.1 (1.2 – 3.8)	1.5 (.95 – 2.4)
Self-reported Arrests	3.1 (2.0 – 4.8)	1.8 (1.3 – 2.6)	1.4 (1.0 – 2.0)
Self-reported Convictions	2.8 (1.8 – 4.3)	1.6 (1.1 – 2.5)	1.3 (.84 – 1.9)

#### ***4.6.2. Exploring the Role of Cultural Identification***

As part of the report of adult ethnicity, participants were able to nominate whether they identified as sole Māori or Māori plus other ethnicity. In order to explore the role of cultural identification, we examined whether the pattern of findings was influenced by the level of cultural identification as reflected in this measure of ethnicity at ages 21 and 25. The models were therefore repeated using the expanded measure of ethnicity and the results are reported in Table 13.

Table 13 shows the estimated IRR at a 95% CI for each of the four outcome measures for participants who identified as sole Māori or Māori + other, after adjustment for social, family and individual risk factors and self-reported offending. Examination of the table shows that for official charges, there is some suggestion that sole Māori had somewhat higher rates of contact relative to non-Māori, suggesting that there may be a modest association between the level of

cultural affiliation and rates of officially recorded contacts. However, this finding was not observed for self-reported measures of official contact.

Table 13

*Associations between Ethnicity (Measured as Sole Māori or Māori + Other) and Rates of Official Contacts after Adjustment for Social, Family and Individual Risk Factors and Self-reported Offending*

Measure	Sole Māori	Māori + Other
	IRR (95% CI)	IRR (95% CI)
Official Charges	1.6 (.88 – 2.8)	.95 (.48 – 1.9)
Official Convictions	1.8* (1.0 – 3.3)	1.0 (.49 – 2.2)
Self-reported Arrests	1.3 (.88 – 1.9)	1.6 (.99 – 2.5)
Self-reported Convictions	1.1 (.72 – 1.7)	1.5 (.82 – 2.6)

#### ***4.6.3. Associations between Ethnicity (measured at both ages 14 and 21/25) and Official Contacts with Age and Gender Interactions***

To explore the extent to which findings may vary with age or by gender, the analysis was extended to incorporate tests of interactions. In both cases these tests were statistically non-significant suggesting that the associations between ethnicity and offending outcomes were consistent across age intervals, and similar for males and females.

#### ***4.6.4. Testing For Consistency in the Associations between Ethnicity and Outcome Measures by Types of Offending***

For the measures of officially recorded contacts, it was possible to further sub-classify the outcome measures by the type of offence in three broad classifications of offending, including Violent (a combination of violent and offences against a person), Property offences

and Offences against Good Order (a combination of offences against good order and offences against the administration of justice). Table 14 reports the IRR's (95% CI) of the associations for both reports of ethnicity and each of the three broad classifications of offending, for officially recorded charges and convictions.

Examination of the table shows that for most official charges and convictions across each offence type, the IRR's suggest that the rates of contact for Māori measured at age 21/25 are slightly higher, suggesting that those who self-reported Māori identity at age 21/25 are more likely than non-Māori to come into official contact. For Violent offences, the IRR's are slightly stronger than for the overall rate of offending, suggesting that there may be more residual bias against Māori in relation to Violent offending.

Table 14

*Associations between Ethnicity (Measured at Age 14 or Age 21/25) and Rates of Official Contacts by Offence Type*

Measure	Māori at age 14 (IRR 95% CI)	Māori at age 21/25 (IRR 95% CI)
<b>Violent Offence</b>		
Official Charges	1.6 (.71 – 3.5)	1.8 (.94 – 3.4)
Official Convictions	2.1 (.85 – 5.2)	2.2 (1.1 – 4.4)
<b>Property Offence</b>		
Official Charges	1.6 (.89 – 2.7)	.75 (2.0 – 4.9)
Official Convictions	1.5 (.72 – 3.2)	1.9 (.97 – 7.0)
<b>Against Good Order Offence</b>		
Official Charges	1.7 (.89 – 3.1)	1.6 (.90 – 2.7)
Official Convictions	1.5 (.79 – 2.9)	1.6 (.91 – 2.8)

In summary, the results of these supplementary analyses are similar to the main analysis in which Māori ethnicity measured at ages 21 or 25 are more likely than non-Māori to come into official contact for any type of offending. By exploring the effects of cultural affiliations, there are inconsistencies between each type of different reports. In addition, these supplementary analysis have showed that there were no age or gender interactions within the associations of ethnicity and offending outcomes. Similar to the main analysis, although these results were not significant, they appeared to be approaching significance, and show that after adjustment for social, family and individual risk factors and self-reported rates of violent, property and other offences, there are associations between ethnicity and rates of official charges and convictions which are unable to be fully explained by the risk factors included in the model. Notably, there is a small suggestion that the residual effects are slightly higher for violence, which suggests that bias, if it exists, may apply more strongly in the context of violent offending.

## CHAPTER FIVE

### 5. DISCUSSION

The major goal of the present study was to investigate whether there was evidence of a bias from the New Zealand criminal justice system towards Māori. Additionally, the study aimed to highlight the differences in rates of official contacts between Māori and non-Māori. To investigate this, we developed a Generalized Estimating Equations (GEE) model to examine the differences in rates of official contact by Māori and non-Māori. This model was then extended to include social, family and individual risk factors of offending, and then adjusted again to also include self-reported rates of offending. The Incidence Rate Ratio (IRR) was used to measure the residual associations between ethnicity and rates of official contacts after controlling for risk factors and self-reported offending. Though the final adjusted associations were not statistically significant, they were still suggestive that there may be presence of an ethnic bias in the criminal justice system.

#### *5.1. Findings*

This section summarises the results of the study, examines their relationship to the aims, and compares them to previous research.

#### **Aim 1: To examine ethnic differences in rates of official contacts for Māori and non-Māori**

Results showed that overall, the lifetime probability for Māori to receive one or more official charges was 34.9%, while for non-Māori the lifetime probability was 24.0%. For official convictions, the probability for Māori was 31.3% versus 20.9% for non-Māori (see Figure 1). For both charges and convictions, ethnic differences were statistically significant and suggest that research is necessary in order to understand why the rates were significantly higher for Māori.

Results from the current study provide support for the hypothesis that Māori would have higher rates of official charges and convictions compared to non-Māori (Hypothesis 1). The unadjusted GEE model indicated that there was a significantly higher rate of officially recorded charges and convictions for Māori compared to non-Māori for all offence types (IRR ranging from 2.9 to 12.1 for official charges; 2.8 to 11.1 for official convictions). Furthermore, there was a significant difference in rates of officially and self-reported contacts across each of the five age intervals. The pooled IRRs for officially recorded charges and convictions were 6.6 and 6.5, 95% CI (3.0 – 14.4) and (3.1 – 13.7) respectively. For self-reported rates of arrests and convictions, similar trends were observed. The pooled IRRs for self-reported rates of arrests and convictions were 3.0 and 2.9 times higher than for non-Māori, 95% CI (1.9 – 4.9) and (1.8 – 4.7) respectively. These results support part of Hypothesis 1 which predicted that rates of official and self-reported contacts will be significantly higher for Māori than for non-Māori.

The results showed that Māori had rates of self-reported offending that were 2.8 times higher for Violent offences, 3.1 times higher for Property offences and 1.3 times higher for Other offences. These findings support the second part of Hypothesis 1, which states that Māori will have higher rates of self-reported violent, property and other offences.

Collectively, these results are consistent with previous findings by Fergusson, Horwood and Lynskey (1993) who demonstrated significant differences between Māori and non-Māori rates of official contacts. Additionally, these results reflect the current prison population statistics in which Māori are largely overrepresented (Statistics New Zealand, 2012) and justifies the need for further investigation as to why Māori rates of offending are significantly higher than non-Māori.

**Aim 2: To explore possible processes that will explain ethnic differences in rates of official contacts, including social, family and individual risk factors to examine the extent to which any residual association will be consistent with bias.**

Results showed Māori were more likely to come from families characterised by socio-demographic disadvantage, higher reports of family dysfunction, parental adjustment problems and exposure to conduct problems. In addition, Māori were more likely to exhibit conduct problems during childhood, to affiliate with delinquent or substance using peers in adolescence, leave school without obtaining qualifications and have lower cognitive ability. Further exploration found that there were statistically significant associations between all measures of childhood, family and individual characteristics, and all measures of official contact. Each of the associations were dose-response like, such that those who were the most disadvantaged had the highest rates of official contacts.

When the GEE model was extended to adjust for socio-demographic, family and individual risk factors, Māori had IRRs for rates of official charges and convictions that were 1.8 times higher than for non-Māori. The adjusted associations were not statistically significant. For self-reported rates of arrests and convictions after adjustment, Māori had rates that were 1.7 and 1.8 times higher than for non-Māori, which were both statistically significant. Hypothesis 2 predicted that after controlling for social, family and individual risk factors which have previously been linked to offending, Māori will still have a significantly higher rate of official contacts compared to non-Māori. Thus, Hypothesis 2 was partially supported, with two of the four outcome variables showing statistically significant results. However, for each of the four outcomes, the residual IRR remained between 1.7 and 1.8, which suggests the potential for a small bias in official contacts for Māori, over and above the estimated effects of social, family and individual disadvantage.

Together, these results suggest that Māori are disadvantaged by social, family and individual risk factors, which may contribute to a large portion of the differential rates of official contacts between Māori and non-Māori. More specifically, results from the GEE model also indicated that family dysfunction, parental adjustment problems, conduct problems, being male, leaving school without qualifications and having deviant peer affiliations were all significant predictors of official charges, while each of these with the exception of parental adjustment issues were also significant predictors of official convictions. Each of these factors may contribute to explaining why offending rates for Māori are higher than for non-Māori. This finding is consistent with previous literature which describes that those who engage in criminal activity are more likely to be disadvantaged by a range of factors (Department of Corrections, 2007, Wundersitz, 2010; Belknap & Holsinger, 2006; Sampson & Lauritsen, 1994; Loeber, 1990; Herrenkohl et al., 2000). More specifically, this finding is also consistent with prior studies which have suggested that there are multiple pathways that lead Māori to high rates of offending (Durie, 2005; Department of Corrections, 2007).

**Aim 3: To explore possible processes that will explain ethnic differences in rates of official contacts, including social, family and individual risk factors, as well as self-reported rates of offending to examine the extent to which any residual association will be consistent with bias.**

When the GEE model was extended to include social, family and individual risk factors of offending, as well as self-reported rates of violent, property and other offences, the rates of official and self-reported contacts were still higher for Māori. This finding supports Hypothesis 3 which predicts that Māori will have a higher rate of official contacts compared to non-Māori, after controlling for social, family and individual characteristics, as well as self-reported property, violent and other offences. After the final adjustment, Māori had rates of officially recorded charges and convictions that were 1.5 times higher than for non-Māori; and rates of

self-reported arrests and convictions that were 1.4 times higher than for non-Māori. These results were not significant, but were trending in that direction, which suggests that the risk for being charged or convicted of an offence among Māori is higher than for non-Māori, even after taking into account all external risk factors of offending and self-reported rates of offending. While the associations were not statistically significant, the residual IRR's are suggestive of a small ethnic bias against Māori in the criminal justice system. This finding adds to the overseas literatures which have shown that there is bias against minority groups (Quinton, Bland & Miller, 2000; Young, 1994; Lundman & Kaufman, 2003; Horrace & Rohlin, 2015; Harding et al., 1995; Snowball & Weatherburn, 2006; Weatherburn, Fitzgerald & Hua, 2003; Sommers & Ellsworth, 2001; Spohn, 2000; Steffensmeier, Ulmer & Kramer, 1998; Steffensmeier et al., 1998; Demuth & Steffensmeier 2004; Spohn & Holleran, 2000; Steen et al., 2005; Ulmer & Johnson, 2004; Zatz, 2000; Austin & Allen, 2000; Mustard, 2001). This is important for New Zealand because a bias in the system could potentially be a factor which is contributing to the overrepresentation of Māori in the prison population.

Similar conclusions applied for the supplementary analyses when we varied the definition of ethnicity and investigated cultural identification. Additionally, there were no interactions involving age, so the same model appeared to apply equally well regardless of age. To the extent that we were able to examine specific types of offending, there was a small indication that violent offences were relatively more likely for Māori compared to property and other offences. This suggests there may be greater potential for bias to occur in more serious and violent crimes.

Taken together, these findings suggest that Māori, compared to non-Māori, are significantly disadvantaged among various social, family and individual risk factors, all of which were correlated with higher rates of charges and convictions. This finding is in line with previously suggested explanations of the differences in rates of offending for Māori and non-Māori. For example, The Māori Perspective (He Whaipanga Hou) suggests that the well-being

of Māori has been diminished over time and consequently has led to the overrepresentation of Māori in prison (Jackson, 1987, 1988; Smith, 1999). Other research suggestions include Fergusson, Donnell and Slater (1974) and Fifield and Donnell (1980) who both placed a large emphasis on the explanation of higher rates of offending by Māori to be socio-economic disadvantage. Notably, these publications appeared over 30 years prior to this research. In the present study, socio-economic disadvantage was included among other factors to compute a socio-demographic risk score. Socio-demographic disadvantage was indeed a contributing factor to higher rates of charges and convictions, however, within the GEE model, the associations between socio-demographic disadvantage and rates of official contact were not statistically significant (see Tables 10 and 11). Factors which were significant and consequently appeared to have the most impact on rates of charges and convictions included family dysfunction, parental adjustment problems, conduct problems, being male, and having a low level of education. This finding shows that many factors contribute to offending behaviours, not just socio-demographic or socio-economic disadvantage as suggested by previous literature, which is in line with research by the Department of Corrections (2007) who suggested that there were multiple pathways to offending.

The current study's findings of a potential bias in the criminal justice system is similar to findings by Fergusson, Swain-Campbell and Horwood (2003) who used the same birth cohort as the present study. Fergusson and his colleagues found that Māori who had a previous arrest record, and those who reported involvement in violent or property offending were more likely to be arrested or convicted for cannabis use when compared to Pākehā, which they concluded to be suggestive of a bias from New Zealand Police.

The present study aimed to extend the work by Fergusson, Horwood and Lynskey (1993) by examining the same birth cohort from ages 15 to 35 years. In the 1993 study, Fergusson and his colleagues identified that there was a large discrepancy between self-reported rates of police

contacts and official records of police contact, even when the self-reported rates of police contacts were identical for both Māori/Pacific Island and Pākehā. Self-reported rates reflected that Māori/Pacific Islanders were 1.7 times more likely to come into contact, whereas officially reported rates reflected that Māori/Pacific Islanders were 2.9 times more likely than non-Māori. The 1993 study developed a statistical model in which they could observe the associations between ethnicity and risks of police contact, while adjusting for maternal education and family socio-economic status.

Likewise, the present study had a large discrepancy between self-reported and officially recorded contacts. Māori had self-reported rates of coming into official contacts that were 2.9 and 3.0 times higher than for non-Māori, but official rates of contact were 6.5 to 6.6 times higher than for non-Māori (see Tables 3 and 4). The current study had a residual IRR which was suggestive of the presence of bias after controlling for potential risk factors of offending, though a strength of the present study was that we were able to include 9 risk factors of offending, as opposed to only two in the previous study. One limitation mentioned in the previous study was that data were only available for participants up to age 15 years. This study improved on the previous study as we were able to investigate participants from age 15 through to age 35 years. Results of both studies are similar in the fact that they were able to put forward evidence of the presence of a bias in the criminal justice system. Notably, as the sample grew from adolescence into adulthood, the differentials in the rates of official contacts were significantly higher than for when the sample was under age 15 years (6.5 versus 2.9 for official contacts in each study respectively).

## ***5.2. Practical and Theoretical Implications***

The current study found that after controlling for social, family and individual risk factors of offending, as well as self-reported rates of offending, a residual IRR of 1.5 and 1.4 was

present for officially and self-reported contacts respectively. The implications of this finding are hugely important, as an IRR of 1.5 is essentially a 50% increase in rates of official contacts from Māori comparative to non-Māori, which was unable to be explained by other covariates in the model. A 50% increase is clearly a substantial risk, which also reflects the current rates of Māori population in the criminal justice system, who make up over 40% of police apprehensions and more than 50% of the prison population (Department of Corrections, 2013; New Zealand Police, 2012).

The present results, in addition to previous overseas research, underscore the importance of recognizing a bias against ethnic minorities in the criminal justice system. If such a bias is identified, future officials need to take measures in order to address and reduce bias. If officials adjust their decision making process to reduce bias, we may be able to reduce the overpopulation of Māori in the New Zealand prison population. For example, both Canada and Australia have introduced legislation which has attempted to limit the use of imprisonment for Aboriginal offenders since recognising the problem of ethnic disproportions within the system (Haslip 2000; Doob & Webster 2006; Edney 2004, 2005).

A bias in the criminal justice system against Māori is extremely detrimental for both Māori and non-Māori. Having knowledge of a bias would contribute to injustice and make relations between Māori and non-Māori more difficult. If police officers and court officials demonstrate bias against Māori, this suggests that Māori individuals may have been too harshly punished. An individual who has been charged or convicted of an offence will experience further disadvantages in various aspects of life, for example, maintaining or applying for jobs, wanting to leave the country, and family disruptions/issues. If Māori are more likely to be charged or convicted due, they are subject to further unnecessary setbacks. A disparity in punishment between Māori and non-Māori is a huge issue for the operations of the New Zealand justice

system. Not to mention, should there be bias against Māori in the system, this goes against Treaty of Waitangi principles and further alienates the indigenous people of New Zealand.

This study has found that Māori are significantly disadvantaged by various social, family and individual risk factors of offending, which adds to previous research (Department of Corrections, 2007; Statistics New Zealand, 2009; Marie, 2010; Workman, 2011). Māori, compared to non-Māori have higher levels of disadvantage of social, family and individual risk factors, which have been linked to higher rates of official charges and convictions. Our findings show that these risk factors accounted for a large proportion of the higher rates of official contact, which suggest that action needs to be taken in order to reduce the risk of Māori being so highly disadvantaged.

It is highly important that the disadvantage factors suffered by Māori are reduced. Some initiatives to reduce the high rates of Māori disadvantage have already been employed. For example, in 2013 the Ministry of Education released Ka Hikitia – Accelerating Success 2013 – 2017, which is the current strategy to improve how the education system performs to ensure Māori students are enjoying and achieving educational success. Initiatives which secondary schools in New Zealand have undertaken to improve presence and achievement from Māori include, but are not limited to: appointing a home or iwi liaison person, establishing mentor programmes, setting strategic and annual targets for Māori achievement, developing Māori leadership programmes, increasing opportunities for cultural participation and leadership and building teachers knowledge and understanding of the Māori native language. Having a focus on improving education for Māori students should have a positive impact on improving disadvantageous factors which Māori are so over-represented in. In theory, if Māori students participate and perform well at school, there is less chance of disruptive and careless behaviours outside of school, which may aid in reducing rates of offending and other disadvantages among Māori (Ministry of Education, 2013).

Much of the prison population is made up of individuals who re-offend over time. The Department of Corrections have put a large focus on reducing the number of Māori returning to prison. Whilst serving time in prison, offenders have opportunities to participate in intervention programmes which aim to improve lifestyle habits of offenders in preparation for when they are released from prison. After a low success rate by Māori, The Department of Corrections set up Māori specific programmes which cater to the cultural needs of Māori in attempt to reduce recidivism rates. The Department of Corrections set up the Framework for Reducing Māori Offending (FReMO), which is a structured approach in order to achieve quality in services and policy to reduce Māori offending. FReMO aims to use Māori perspectives and concepts in order to have a sound knowledge in Māori culture to guide initiatives into reducing recidivism. Rehabilitative programmes that have been developed include the Te Piriti sex offenders programme and Tikanga Māori programme, and are delivered by Māori service providers that use Māori philosophy, values, knowledge and practices to develop the reinforcement of Māori identity and values to encourage offender motivation. Programmes such as FReMO are evidence that New Zealand has acknowledged the problem and has invested in improving outcomes and reducing the ethnic disparities between Māori and non-Māori (Department of Corrections; 2012, 2013).

### ***5.3. Limitations of the Study***

One limitation of this study is the fact that we are unable to account for all types of risk factors of offending. While we had an acceptable number of covariates in the GEE model, it is not possible to include every single risk factor which may link individuals to offending. If the study had access to more covariate factors, or time dynamic measures, this potentially may have further reduced the residual IRR and consequently we may have generated different results.

The small sample size of Māori is a limitation of this study. While the overall size of the sample was satisfactory, the number of Māori participants in this sample is relatively small. This may have limited the precision of estimation of differences in rates of official and self-reported offending outcomes between Māori and non-Māori. If another study was able to include a larger sample of Māori, it may yield different estimates of the rates of offending outcomes amongst Māori. Furthermore, while it may have been valuable to conduct parallel analyses that examined the outcomes of other ethnic groups, the small numbers of participants in the present sample that were of other ethnic minority groups (such as Pacific Islander) meant we were unable to conduct comparative analyses.

Self-report data was used to collect data on rates of offending, as well as some measures of personal disadvantage. The questions used were chosen for having robust psychometric properties. Although convenient, self-report interviews are limited by being subject to personal bias. In this sample, participants may have not reported all the offences they had previously committed, or reported inaccurately the number of times they had been arrested or convicted. Participants may have inaccurately reported offending behaviours to avoid judgement by the interviewer or to avoid getting into trouble.

#### ***5.4. Future Research Directions***

An ethnic bias in the criminal justice system represents not only a major issue, but a challenging problem to study and respond to. Previous researchers have been unable to reach a definitive answer regarding the nature and extent of bias against ethnic minority groups and how this should be addressed successfully, hence the problem of ethnic disproportion in the criminal justice system has remained unsolved. Future research efforts should aim to expose the various contexts or decision making points in the justice system in which bias occurs, in attempt to understand where solutions to reduce bias can be most effectively directed. In addition, it may be

worthwhile to comprehensively explore the procedures which lead to the ethnic differentials between Māori and non-Māori, as opposed to only looking at the offending outcomes. By using this approach, it may be possible to find out which stages within the justice system Māori (or other minority groups) experience discriminatory actions, and in turn officials may be able to improve the stages within the justice system which are thought to be most problematic for Māori.

This field of research could benefit from adding an alternative mechanism to test for bias. For example, the shooter bias paradigm has been examined in many countries and found significant effects of bias against various ethnic minority groups (Correll, Urland & Ito, 2006; Correll et al., 2007; Plant, Goplen & Kunstman, 2011; Miller, Zielaskowski & Plant, 2012; Unkelbach, Goldenberg, Muller, Sobbe & Spannaus, 2010), however this has not been applied using a New Zealand sample. Adopting the shooter bias paradigm to test for bias using New Zealand participants might be one way to test for bias, using any ethnic minority groups or potentially using Māori and non-Māori as the ‘suspects’ in which participants have to make a quick decision whether to shoot. Although police in New Zealand are not required to carry guns, testing the shooter bias paradigm on New Zealand police officers might show evidence of an underlying bias towards Māori.

### ***5.5. Conclusions***

The present study was an exploration of the differences in rates of offending by Māori and non-Māori, in order to investigate whether there was evidence of a bias against Māori from the New Zealand criminal justice system. The results indicated that after controlling for social, family and individual risk factors which are known predictors of offending, the presence of a small residual bias was evident. The findings of this study add to the growing field of research which examines the issue of bias from officials towards ethnic minority groups. Secondly, and equally important, it draws attention to this issue in the New Zealand criminal justice system.

Future research in this area may continue to add to this work by further exploring this bias within the judicial system, in attempt to understand exactly where the presence of bias is most evident.

The study was somewhat limited by a small sample size of Māori in the ability to generate statistically significant results from the fully adjusted GEE model. Nonetheless, the results from this study provide necessary insight into potential bias in the New Zealand criminal justice system. Furthermore, the evidence of a potential bias against an ethnic minority group in New Zealand adds to existing research, of which almost all has only been conducted overseas.

Knowledge of potential bias in New Zealand may aid in attempting to reduce this issue through training in the police force and other judicial roles.

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## APPENDICES

### Appendix A

#### **Items from the Self Report Early Delinquency Scale (SRED) used to classify self-reports of violent, property and other offending at ages 14-16**

##### **Violent Offending**

- Carrying a weapon in case you needed it in a fight
- Hitting one of your parents
- Fighting in the street or other place (not fighting at school)
- Struggling to get away from a policeman
- Using force or threats to get money from someone your age or younger
- Using force or threats to get money from someone older than you
- Using a weapon in a fight (e.g. knife, chain, rock, stick)
- Been cruel to animals
- Attached or beaten someone up when they couldn't fight back

##### **Property Offending**

- Starting a fire where you should not burn anything
- Damaging a parked car (e.g. breaking an aerial, scratching paint)
- Going around in a gang and damaging property or getting into fights
- Damaging something in a public place (e.g. streets, toilets, buses, etc.)
- Purposely damaging or destroying something belonging to your parents
- Raising a false alarm (e.g. dialling 111 or setting off a fire alarm)
- Stealing a thing or money worth between \$2 and \$50
- Stealing a thing or money worth over \$50
- Breaking into a house, flat or car (to try to steal something or just to look around)
- Stealing something from a shop or a store (shoplifting)
- Stealing something from a parked car
- Stealing goods or money from a video machine, public telephone or vending machine
- Stealing a bicycle
- Taking a car or motorcycle for a drive without permission

##### **Other Offending**

Running away from home and staying overnight

Sniffing glue or other things in order to get 'high'

Smoking marijuana (cannabis, pot)

Used any illegal drugs other than marijuana (heroin, cocaine, etc.)

Buying or drinking alcohol in a public place

Drinking alcohol during school hours or at lunchtime on a school day

Getting suspended or expelled from school

Playing truant from school (skipping school)

## APPENDIX B

### Items from the Self Report Delinquency Inventory (SRDI) used to classify self-reports of violent, property and other offending at ages 18-35

#### Violent Offending

Carried a hidden weapon

Been so angry with someone you lived with that you attacked them with a weapon or with the idea of seriously hurting them. This includes adults or children, anyone at home

Been so angry with someone you lived with that you hit them (other than in [question] above). This includes adults or children, anyone at home.

Attacked someone with a weapon or with the idea of seriously hurting or killing them. Someone you were not living with

Hit someone with the idea of hurting them (other than the events we already talked about)

Used a weapon, force or strong-arm methods to rob a person, shop, bank or other business

Been involved in a gang fight

Hurt or threatened someone to get them to have sex with you

Been cruel to animals

#### Property Offending

Purposely damaged or destroyed property that did not belong to you

Set fire to a house, building, car or other property, or tried to do so

Broke into, or tried to go into, a building to steal something

Stolen or tried to steal money or things worth \$5 or less

Stolen or tried to steal money or things worth between \$5 and \$100

Stolen or tried to steal money or things worth between \$100 and \$500

Stolen or tried to steal money or things worth over \$500

Taken something from a shop without paying for it (including events you have already told me about)

Snatched someone's purse or wallet, or picked their pocket

Taken something from a car that did not belong to you

Knowingly bought or sold or held stolen goods or tried to do any of these things

Converted a car or other vehicle (taken a vehicle for a drive without permission) when you didn't mean to keep or sell it

Stolen or tried to steal a motor vehicle to keep or sell it

Used worthless cheques or fake money to pay for something

Used or tried to use credit or bank cards or a cheque without the owner's permission

Tried to cheat someone by selling them something that was worthless or not what you said it was.

Stolen money from the place where you worked

Embezzled money, that means used money left in your care for some purpose not intended

### **Other Offending**

Been so loud, rowdy or unruly in a public place that people complained about it or you got into trouble

Begged for money or things from strangers

Made obscene phone calls

Been drunk in a public place

Avoided paying for things such as movies, bus rides, food, petrol etc.

Given false information on an application for a job, a tax form or application for a loan or a bank account

Used a false name or alias

Moved away from a flat or house without paying the final bill or rent

Received welfare benefits, unemployment benefits or ACC compensation when you were not entitled to

Bought something on credit and then never made the payments

Interfered with the work of the law by trying to get away from the police, hiding someone the police were looking for or telling a lie to the police or judge

Driven a motor vehicle when you did not have a licence or your licence had been suspended or disqualified

Sold marijuana or hashish

Sold hard drugs such as heroin, cocaine or LSD

Been paid for having sex with someone

Paid someone to have sex with you

Failed to obey the courts e.g. failed to answer a summons from a bailiff, failed to show up for periodic detention, broke conditions of parole, failed to pay a fine, escaped or tried to escape from prison