University of Canterbury – Te Whare Wānanga o Waitaha

Risk and Protective Factors of Depression and their association to Academic Performance in Pacific Children

Master of Health Sciences

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Abstract

Depression has become a growing mental health crisis around the world. In New Zealand, the Pacific population are overrepresented in mental health statistics in comparison to other ethnic groups. Pacific children and Pacific youth are recognised as a group that are of higher risk for depression. The effects of depression have also shown to have an impact on academic performance. Despite this, little is known about potential factors associated with Pacific children's academic performance and furthermore, the relationship of depression and academic performance in this ethnic minority group.

The main aim of this research was to examine the risk and protective factors of depression associated with teacher assessed academic performance in Pacific children aged 6, 9 and 11 years. Age-specific associations between the various factors and teacher assessed academic performance at 11 years was investigated to gain insight into potential mechanisms that lead to adverse academic performance. The examination of the population average trajectory of behavioural development and teacher assessment scores of Pacific children in New Zealand was also conducted.

Data was extracted from the Pacific Islands Families (PIF) Study, a longitudinal birth cohort study that examines Pacific children and their families. This quantitative study focuses on Pacific children at ages 6, 9 and 11 years and the impact of various risk and protective factors on teacher assessed academic performance. This study includes 703 child participants with maternal reports for data collection measured at 6-weeks, 2 years, 6 years, 9 years and 11 years.

In the PIF cohort, externalising behaviour, gang involvement and being a perpetrator of bullying were risk factors associated with lower teacher assessed academic performance at 11 years for Pacific children. Depression was found as a risk factor for lower teacher assessed academic performance at both 9 and 11 years. The protective factor of positive self-description at 9 and 11 years was associated with higher teacher assessed academic performance. Externalising behaviour over subsequent years of 6, 9 and 11 years indicated a decline in academic performance teacher assessment scores, whereas positive self-description in Pacific children indicated an increase in academic performance over the years. Post-secondary school qualifications of mothers, also increases teacher assessed academic performance in Pacific children.

The findings of this study show that academic performance in Pacific children can be negatively influenced by externalising behaviour, gang involvement and bullying perpetration at ages 6, 9 and 11 years. Positive self-description is an important factor protecting against low academic performance in Pacific children. Externalising behaviour continued over the years leads to lower academic performance over time. Such findings highlight the need for targeting these particular risk and protective factors for future interventions and more importantly, how the onset of these factors can lead to detrimental mental health outcomes impacting on academic performance in later years.

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List of Abbreviations

APQ	Alabama Parenting Questionnaire
APQ - SF	Alabama Parenting Questionnaire – Short Form
CBCL	Child Behaviour Checklist
CBCL/6-18	120-item Child Behaviour Checklist
CDI	Children's Depression Inventory
CDI:S	Children's Depression Inventory: Short version
CFA	Confirmatory Factor Analysis
CFI	Comparative Fit Index
CI	Confidence Interval
EPDS	Edinburgh Postnatal Depression scale
GEE	Generalised Estimating Equations
GMI	Gang Membership Inventory
IPW	Inverse Probability Weighting
LME	Linear Mixed Effects
MAR	Missing At Random
ML	Maximum Likelihood
NZ	New Zealand
PI	Pacific Island
PIF	Pacific Islands Families
PIFS	Pacific Islands Families Study
RMSEA	Root Mean Squared Error of Approximation
SD	Standard Deviation
WHO	World Health Organisation

Chapter 1. Introduction

Depression is a mental health issue described as recurrent feelings of sadness, hopelessness and emptiness with a loss of pleasure or interest in activities (Maughan et al., 2013). Globally, the rates of child depression have risen in adolescent years with depression being one of the leading causes of illness for youth aged 10-19 years old (WHO, 2021). In New Zealand, depression affects one in five young people by the age of 18 (Youth Mental Health Project, 2015). Symptoms of depression among young people in New Zealand have increased from a prevalence of 13% in 2012 to 23% in 2019 (Fleming et al., 2020). Significant depressive symptoms are higher among those living in lower socio-economic communities. These communities are known to have higher deprivation, lower family income and children who are more likely to go to lower-decile schools (Fleming, et al., 2020).

For Māori and Pacific people living in New Zealand, they both display the highest prevalence of depression compared to other ethnicities (Ministry of Health, 2021). New Zealand is made up of multiple ethnic groups with the Pacific population being one of them. Pacific people in New Zealand are part of a diverse and fast-growing population that descend from Pacific Islands such as Samoa, Tonga, the Cook Islands, Fiji and 13 other islands (Stats NZ, 2018). The Pacific population are an ethnic minority group in New Zealand consisting of their own cultures, languages and traditions that constitute their worldview. Upon migration to New Zealand however, health and economic disparities have been noted as more apparent within this socially and culturally diverse group (Ministry for Pacific peoples, 2021).

A higher proportion of Pacific youth over time were found to have significant depressive symptoms along with an increased proportion attempting suicide compared to other ethnicities (Fleming, et al., 2020). Among Pacific people, female students were reported to have higher significant depressive symptoms compared to male students (Fleming et al., 2020). Ethnic discrimination has been associated with depression in students and is more commonly reported in indigenous and minority groups (Crengle et al., 2012). This association between higher depressive symptoms found in Pacific people is suggested to be affected by ethnic discrimination (Crengle et al., 2012).

In Pacific children living in New Zealand, high depression scores were significantly associated with bullying victimisation and perpetration, internalising behavioural problems and low maternal education (Paterson et al., 2014). In contrast, low depression scores were associated with positive child self-perception and high performance at school in the same study. These factors were noted as protective factors of depression. Positive parenting was also revealed to reduce depressive symptoms whereas gang membership was seen to increase depressive symptoms in Pacific children (Paterson et al., 2018). Additional maternal and family risk factors in another study reiterate the findings above while indicating that maternal depression, intimate partner violence, maternal smoking and having a single mother are associated with higher depressive symptoms specifically in their Pacific children (Paterson et al., 2012). In this same research study, children with mothers who align strongly with Pacific traditions were at lower risk of depression indicating the relevance of cultural influence and acculturation process on emotional development in children from immigrant families (Paterson et al., 2012).

The effects of depression within individuals are also reported to impact on students' academic performance (Khalid et al., 2016). Multiple studies have shown an association between depression and lower educational attainment in children (Wickersham et al., 2021). Depression is understood to impair cognitive functions within the brain leading to increased test-specific worry and affect

working memory central processes (Owens et al., 2012). These processes are important in academic performance as cognitive functions influence concentration, behavioural problems and attention difficulties (Lundy et al., 2010). A meta-analysis examining adolescent (individuals between 10 to 19 years of age) depression and long-term psychosocial outcomes concluded that adolescent depression is associated with psychosocial outcomes in adulthood including educational attainment (Clayborne et al., 2019). Depression in adolescence was correlated with higher odds of not completing secondary school, unemployment in adulthood and lower odds of entering postsecondary education (Clayborne et al., 2019).

Possible mediators such as school connectedness, social support and social competence may mediate between the relationship of depression and low academic performance (Wickersham et al., 2021). Depression as a mediating factor has also been investigated and associated with lower academic performance from bullying, threats and fighting (Kim et al., 2019). Ethnic minority status and gender have been associated with lower academic performance levels and higher mental health problems as well (Pate et al., 2016). A study suggests a bi-directional relationship between depression and academic performance with both adolescent depression and academic achievement being closely linked (Weidman et al., 2015). The association between depression and low academic performance has been repeatedly concluded in multiple studies with future research being aimed at evidence-based interventions and more research on the mechanisms that associate depression with low academic performance (Wickersham et al., 2021).

In New Zealand, academic performance in Pacific people is another well-noted disparity (Ministry of Education, 2020). Compared to the general New Zealand population, the Pacific population have a higher percentage of people who have no qualification from school (Stats NZ, 2018). Disparities in post-secondary qualifications are particularly concerning with 7.7% of Pacific people achieving this while 14.6% of the New Zealand population qualify at this level (Stats NZ, 2018).

In measuring academic performance in Pacific children, higher teacher assessment scores at 6 years of age were indicated among those with mothers having post-secondary qualifications, English proficiency and a stronger alignment with New Zealand culture (Kim et al., 2019). In a survey completed by Māori and Pacific youth aged 16 to 24 years old, 63% of participants indicated a key stressor affecting them was educational pressures (Youthline – The State of the Generation, 2019). Pressures from social media and expectations put on them to succeed were felt by these youth and not knowing how to deal with these pressures was another factor impacting on their educational success. For Pacific people in the Western-dominant New Zealand education system, a Pasifika Education Plan was designed allowing for more equitable outcomes to be made for Pacific learners (Pasefika Proud, 2016). The implementation of this plan over the years for Pacific people in education showed an improvement in most areas, however the target of the Education plan was set high at 85% for overall Pacific achievement in reading, writing and mathematics. This was outlined as unlikely to be fulfilled and although improvements have been made over the last decade, significant disparities in achievement are still shown. Low achieving outcomes have been attributed to lack of English proficiency and acculturation in the Pacific population (Ministry of Education, 2020).

Despite this long-standing inequity in outcomes, there is a paucity of research on the association of depression and academic performance in Pacific children and adolescents in New Zealand. A small number of studies have noted the associations between depression in Pacific children and lower academic performance (Paterson et al., 2014). However, there is a lack of knowledge on the mechanisms behind this relationship and further research is needed (Wickersham et al., 2021). A literature review by Johns (2017) indicates a lack of current New Zealand research that focuses on mental health in adolescents and its association to education. This review revealed that most

strategies in studies were focused on responding to issues rather than using preventative approaches. Most mental health interventions in New Zealand are adult focused with few interventions regarded as appropriate for Māori, Pacific or lower socioeconomic communities (Johns, 2017). The ignorance of cultural complexities and multi-ethnic nature in Pacific communities within Pacific research in New Zealand has also been discussed (Anae, 2010). This study by Anae (2010) portrays the need for research to focus on Pacific methodologies for better Pacific schooling in New Zealand. Risk and protective factors of depression have also been researched and studied, yet the underlying mechanisms of its impact on academic performance is needed.

There is limited research for mental health in adolescents in New Zealand as well as the disparities seen for Pacific people regarding depression and academic performance. This illustrates the need for current studies to address these problems in hopes of changing the negative outlook and discourse. Not only is Pacific research in New Zealand scarce, but with interventions for mental health being focused more on adults, the need for research on Pacific children or adolescents is required. An aspect of prevention strategies is informed by risk and protective factors which are useful in establishing causes or correlations to an issue (Maguire et al., 2007). By understanding the risk and protective factors of depression impacting specifically on Pacific children, this can aid in contributing to decreasing the prevalence of depression. Risk and protective factors attributed to academic performance in Pacific children is also limited. Although the associations between depression and later academic performance are studied in international literature (Wickersham et al., 2021), a study that specifically uses data on the Pacific population in New Zealand is crucial. This will provide a better understanding regarding educational outcomes and their associations with emotional and behavioural development including depression.

The importance of filling these evidence gaps is to see if particular factors contribute to reducing the disparities seen in Pacific adolescents for depression and academic performance. By identifying the risk factors of depression that impact on academic performance, this evidence can support the design of targeted preventative interventions aimed at mitigating the risks of further inequity in outcomes.

To address the evidence-gaps of limited Pacific research in New Zealand, an understanding of the longitudinal factors of relationships between key emotional and behavioural development and academic performance is required. This study has chosen to analyse the correlates of child depression and their association to teacher assessed academic performance in Pacific children. Key educational milestones often take place during adolescence (Wickersham et al., 2021). Therefore, Pacific children at ages 6, 9 and 11 will be studied with academic performance progression being followed at these three timepoints.

A deeper understanding of emotional and behavioural development and academic performance in Pacific children and the significant association shared between them could help identify factors that can be targeted within new educational plans and interventions aimed at reducing disparities in educational outcomes. Analysing all the different risk and protective factors found in these previous studies would lead to a drawn-out research study. In this case focusing on particular risk and protective factors of behavioural problems that are specific to Pacific children is considered more ideal for this longitudinal study. Due to an association between emotional and behavioural problems and academic performance being informed in multiple studies, this thesis will focus on the correlates of both of these measures as a way of researching underlying relationships and the impact this has on Pacific children.

Overall, this thesis will study risk and protective factors of emotional and behavioural problems and their association to academic performance in Pacific children aged 6, 9 and 11 years. Age-specific associations between risk and protective factors associated with behavioural development and high teacher assessed academic performance scores at 11 years are studied. Baseline measurements describing sociodemographic characteristics are also compared to overall teacher assessed academic performance. Lastly, the examination of the population average trajectory of behavioural development and teacher assessed academic performance of Pacific children in New Zealand is analysed. The importance of studying this association is not only to enhance Pacific research in New Zealand, but to contribute to identifying factors useful for future interventions targeting academic performance in Pacific children.

Chapter 2. Literature Review

2.1 Risk and Protective Factors of Depression in Children and Youth

Globally, mental health among children and adolescents has declined over the years, and this is seen in the increased prevalence of clinical depression within this age group (Shorey et al., 2021). Much is known about factors that influence the onset and rise of depression with future research aimed at building interventions to prevent this (Lay-Yee et al., 2018). One recurring theme found in the research is the determination of modifiable risk and protective factors for depression that are specific to a target population. Research has been prompted to build upon previous studies in hopes of advancing future analyses. This aids in developing culturally relevant intervention programmes to combat depression in children and furthermore young adults (Shorey et al., 2021). Due to an overwhelming amount of research on factors that impact on depression in children and youth, this section will focus on reviews that have researched multiple studies on this topic and discuss their main findings in more detail. Relevant and significant studies that relate to these findings will also be discussed. This review is to help summarise the collective knowledge gained on the impact of specific factors of depression on children and youth and which factors are deemed as significant.

A comprehensive list of modifiable risk and protective factors of depression for adolescents were studied in a systematic review by Cairns et al. (2014). Of the 113 publications that met the criteria for this review, the results listed presumed modifiable risk and protective factors all with a sound evidence base. The risk factors included substance use (alcohol, tobacco, cannabis and other illicit drugs), dieting, negative coping strategies and weight. The protective factors found were healthy diet and sleep (Cairns et al., 2014). All studies were captured during the adolescent period of 12-18 years and were clarified as modifiable factors by the young person.

Alcohol frequency and quantity appeared as a significant predictor of higher levels of depression noted in research by Cairns et al. (2014). Other studies assist in supporting this evidence with some results showing that alcohol use and frequency increase the risk for major depressive disorder during adolescence and youth (Pedrelli et al., 2016; Lamis & Lester, 2011). Research by Monahan et al. (2014) also found that risk and protective factors known to be associated with externalising behaviour problems are associated with depressive symptoms for adolescents. The crucial part of their findings was that prevention programmes that target externalising behaviour problems, such as alcohol use, in fact have the potential to affect the level of depressive symptoms among youth (Monahan et al., 2014). This presents the idea that targeting risk and protective factors of alcohol use can have crossover effects and therefore could be used to target depressive symptoms in youth as well. A study by McCarty et al. (2012) also shares evidence of a bidirectional relationship between depressive symptoms and alcohol use in early adolescence. Measured by self-reports of youth, depressive symptoms were positively associated with alcohol use one year later in early adolescence. Conclusions made indicated that depressive symptoms are important signals of risk for use of alcohol among early adolescents. These findings illustrate that alcohol use and frequency of alcohol consumption can be a predictor of higher levels of depression with depressive symptoms also being a predictor of alcohol consumption for adolescents.

Of the studies reviewed by Cairns et al. (2014), a small number focused on other illicit drug use which is described as illegal and highly addictive substances. These studies had a significant combined mean effect size showing practical significance in the association between illicit drug use and depressive symptoms (Cairns et al., 2014). A study by Ranney et al. (2013) examines correlates

of depressive symptoms among at-risk youth seeking emergency department (ED) care. Identified correlates of depressive symptoms included illicit drugs indicating that youth were more likely to report depressive symptoms if they reported use of illicit drugs. The relationship found by Ranney et al. (2013) described depressive symptoms, substance use and violence as a multidimensional relationship where youth with depressive symptoms may use illicit drugs or violence as an outlet to manage their distress.

Negative coping strategies revealed an association to higher levels of depression within the studies analysed by Cairns et al. (2014). A modest but significant relationship between depression and negative coping strategies emerged based on seven studies reported in this review. A later study by Bettis et al. (2015), adds more insight to the associations of coping and stress with depressive symptoms. The author confirms the associations that negative coping strategies have in relation to higher depressive symptom levels. Results from this study presents that stress from youth (aged 9-15) related to parental depression and primary control coping were specific correlates of youth depressive symptoms. Secondary control coping was also negatively associated with youth depressive symptoms, but more strongly associated with primary control coping. Primary control coping was defined as strategies used by a person to alter objective conditions to cope, and secondary control coping was defined as the person altering oneself to objective conditions to cope. This study gave evidence of the pattern that parental depression has in increasing stress and unpredictability within their child's environment. Their study then focused on primary, secondary and disengagement coping and its association to both anxiety and depression in youth (Bettis et al., 2015). Parental depression, youth anxiety and stress were discovered as risk factors for youth depression and based on the findings of this study, specific strategies to cope with this stress are important to understand. Weissman et al. (2016) validates parental depression as a risk factor. This is due to their findings indicating a higher risk of major depression in biological offspring with two previous generations affected by depression. Bird et al. (2012) supports the other notion dictating that automatic negative cognitions have been shown to predict symptoms of depression and anxiety.

Discussions around this include implementing strategies to reframe and manage those negative thoughts in youth due to parental depression through secondary control coping. This may prove useful in decreasing symptoms for youth at high risk (Bettis et al., 2015). Monti & Rudolph. (2017) investigate in their study the individual differences in trajectories of depression among offspring of depressed mothers. This study explored youth stress responses and found that using adaptive responses to peer stress (low involuntary disengagement and high effortful engagements) mitigated the effect of maternal depression on initial trajectories and levels to stress. This study supports the previous research above on the factor of negative coping strategies. It adds that maladaptive stress responses increase the risk of depression in youth with depressed mothers, and therefore is an important target when attempting to promote resilience in at-risk youth (Monti & Rudolph, 2017).

Family level factors have also been outlined as influencing depression in children and youth. These include factors such as parenting practices and harmful family relationships (Scott et al., 2015). For parenting styles and practices, these are known to have either a protective or risk factor effect on youth. Research from King et al. (2016) analysed depression and authoritarian parenting in 17,399 youth aged 12–17-years-old. The findings from this secondary data analysis show that those who reported to have authoritarian parenting were more likely to report having depressive symptoms. This was compared to their peers with authoritative parenting who are likely to report no depressive symptoms (King et al., 2016). Authoritative parenting was described as parents setting firm boundaries for their children while being nurturing and supportive. On the other hand, authoritarian

parenting style was described as an extremely strict parenting style where obedience and discipline were used. Discussions on this research suggests that parenting practices that are criticizing, dominating and disapproving increase the likelihood of developing depression in youth. In comparison to this, parental warmth and family connectedness have protective influences on the development of depression specifically in Pacific youth living in New Zealand (Paterson et al., 2018). These situations emphasise the role that parents play in protecting against or increasing the risk of depression in youth, and hereby show the need of teaching positive parenting practices and styles for prevention programmes (King et al., 2016).

In a more recent review, Chen (2019) evaluates and goes into more detail about family factors and treatment of child and adolescent depression. Chen (2019) discusses how family risk factors are multi-dimensional breaking this down into three domains of factors that were focused on. These were parent-child interaction patterns, inter-parent relationship and parents' personal characteristics. Parenting cognitive styles and parental depression were under the scope of the parents' own characteristics. For maladaptive parenting styles, Chen (2019) explains how this can influence cognitive styles of children and consequently increase the risk of depressive symptoms in youth. Marital conflicts were another issue associated with higher risk of children and adolescents developing depressive episodes (Chen, 2019). Numerous studies indicated family conflicts impacting on adolescent depression and results from these studies showed that higher level of family conflicts added to greater dependent interpersonal stressors. Other interesting results also display that people with a negative self-perception and a higher level of depressive symptoms may also regard themselves to be blamed for the family conflicts (Auerbach & Ho, 2012).

The third domain outlined was the parent-youth relationship and under this domain the factors such as parenting control and rejection was analysed. Chen (2019) defines parenting rejection as excessive criticism, disapproval, and lack of contact with the child. This definition is also backed up by older research studies such as Clark & Ladd (2000). Studies reviewed by Chen (2019) encompass that parental rejection (withdrawal, aggressiveness, lack of warmth) for children increase the risk of depressive symptoms. Parental control is also another risk factor relating to the parent-youth relationship. Excessive regulation of the child and strict discipline defines parental control and by the studies reviewed by Chen (2019), results display a higher level of parental control being associated with more depressive symptoms. This in turn had a weaker effect than parental rejection.

Family risk factors involve many sub-factors associated with adolescent and youth depression that are rooted from family environments. In general, family models for depression in youth are still developing and only a few studies were shown to focus on mediators of association between fundamental factors and depression (Chen, 2019). With family factors having a significant impact on adolescent depression, understanding this relationship more will aid in the development of psychosocial treatment in the future. These findings outlined coincide with findings from King et al. (2016) and Scott et al. (2015) showcasing the importance of family level factors in the influence of depression in children and youth.

Scott et al. (2015) which reviewed empirical studies discusses community level risk factors of depression which include violent or poor neighbourhoods and discrimination. Multiple community level risk factors were shown to be associated with increasing the prevalence of depression in youth. These risk factors are also likely to have a reciprocal relationship with each other. An example of this would be that socioeconomic disadvantages in families can lead to deprivation due to families living in low socioeconomic neighbourhoods. Therefore, children of these families are more prone to attending schools inclined to violence leading to poorer academic standards (Scott et al., 2015).

Garcia-Reid et al. (2013) gives an example of community level risk factors impacting on depression. The risk and protective factors associated with internalising problems in Dominican adolescents living in North-eastern and high poverty community areas were investigated (Garcia-Reid et al., 2013). A path analysis revealed that depression and anxiety are complex mental health issues and that many factors can contribute to the trajectory of their development. Regarding community level risk factors, results illustrated that a greater extent of disorganisation in one's neighbourhood, overall drug use, violent behaviours and perception of availability of drugs and handguns in one's community were all associated with depression and anxiety (Garcia-Reid et al., 2013). Individuals that had a higher sense of community were associated with lower levels of depression whereas social and neighbourhood disorganisation were inclined to report considerable levels of anxiety and therefore those with higher levels of anxiety reported higher depression scores. Higher levels of sense of community and higher levels of self-esteem were labelled as protective factors and in comparison; drug use, violent behaviour and disorganisation within one's neighbourhood were regarded as risk factors linked to higher levels of depression. Although limitations of this study indicate that these findings cannot be generalised for other population groups, it shows how community level risk factors can influence depression in others, which has consequential effects on community health.

A statistical analysis by Fleming et al. (2020) specifies emotional and mental health statistics for New Zealand youth. In the recent Youth19 survey, a population representative survey of youth in New Zealand, 23% of students surveyed disclosed significant symptoms of depression. In particular, a large proportion of secondary school students that reported high depressive symptoms came from neighbourhoods of high deprivation, lower income communities and low decile schools (Fleming et al., 2020). This report continued to show comparisons over the years with 13% of students reporting depressive symptoms in 2012 which has now increased to 23% in 2019. A higher proportion of female students reported significant depressive symptoms (29%) compared to males (17%). The researchers of this report described the importance of socioeconomic deprivation and its correlation to depressive symptoms and the rates of suicide attempts. Socioeconomic deprivation is higher among those living in lower income communities and this report implies the importance of advocacy, policy and service provision in reducing these disparities seen (Fleming et al., 2020). As socioeconomic deprivation has shown to be a likely factor of increasing a person's chance of developing depressive symptoms, this variable is deemed as a risk factor for depression in New Zealand youth. Researchers also reported that attention to this data is needed to address the long-term causes of depression and current needs of youth in New Zealand.

For protective factors of depression, Scott et al. (2015) also used a path analysis to measure this in youth. Protective factors included family protective mechanisms and social community protective mechanisms (Scott et al., 2015). When distinguishing between risk and protective factors, protective mechanisms are more complex to study as there may be overlap between the concepts. This can be seen with neighbourhood interactions as Scott et al. (2015) elaborates on neighbourhood interaction being a protective factor while neighbourhood disorder can be deemed as a risk factor of depression in youth.

Research by Rueger & George (2016) focus their study on protective factors analysing the indirect effect of attributional style for positive events on depressive symptoms. Participants included 491 middle school students from 12-15 years of age. The role of attributional style for positive events and self-esteem as protective factors were studied in order to understand more of the effect it has on adolescent depression. Rueger & George (2016) define attributional style as a habitual pattern of attributing causal explanations to life events. Prior research has focused on negative life events

compared to positive life events as negative events were assumed to trigger attributional processes. Self-esteem was the other factor measured which was defined as an aspect of one's self concept comprising motivational, emotional and cognitive components (Rueger & George, 2019). Results highlighted evidence that effects of an enhancing attributional style for positive events reduces depressive symptoms through self-esteem. Significant longitudinal and cross-sectional associations were made concluding that attributional style of positive events is important due to its indirect effect on depressive symptoms through self-esteem (Rueger & George, 2019).

A study by Harvey et al. (2021) analysed a resilience training programme for New Zealand youth students which builds on prevention strategies that develop protective factors. This is to reduce the probability of depression later in life. This programme focused on developing skills within these students to build strategies to help them deal with difficult situations and challenges. This study evaluated resilience by using a questionnaire consisting of resilience measure questions taken from State Trait Assessment of Resilience Scale (STARS) and Child and Youth Resilience Measure (CYRM)-12 questionnaires (Harvey et al., 2021). For the several schools that completed this survey, a significant increase in both the STARS trait and CYRM-12 resilience scores and the resilience knowledge recall scores were seen. This indicated that the implementation of the training programme improved resilience skills and knowledge of the students. Resilience skills were concluded as a protective factor in promoting mental health for New Zealand youth and children and implied that this may be a leading factor to focus on in future prevention programmes for depression in youth.

Dray et al. (2015) reiterates this idea by suggesting that developing protective factors is important in programmes supporting resilience in children. This is to ensure that the programme enriches the development of positive coping. Research from Reivich et al. (2013) also presents the role of resilience in treating and preventing depression in youth with their Penn Resiliency programme aimed at building skills within these youth decreasing depressive symptoms. Researchers add that resilience is difficult to measure as it is developed over time and is not inherent, however despite this, the positive changes perceived are promising (Harvey et al., 2021). Limitations of this study include confounding factors having an influence on results where session one cannot be compared to session four as the stress levels may increase as the year progresses. Gaps in the data for this study were questions that were skipped or not answered adding to the limitations of this study. Despite the limitation, this analysis supports the idea that protective factors of depression are important in combating depressive symptoms in youth.

This same purpose of investigating risk factors of depression in adolescence was investigated by Kim & Kim (2018) where risk factors were split into different categories like the research of Scott et al. (2015). The research by Kim & Kim (2018) outlined risk factors and critiqued whether prevention strategies that are currently in place are targeting these risk factors of depression. Familial, genetic, psychosocial and neural risk factors were discussed in more detail to unpack the causal mechanism of depression and preventative strategies to protect against these risk factors. Familial risks included parental depression and how adolescents with depressed parents are vulnerable and at a greater risk of depression coinciding with research from Scott et al. (2015) and Weissman et al. (2016). Genetic risks were also investigated with many studies analysing genetic associations with depression in adolescents and children, but there is yet to be consistent and powerful risk factors shown (Kim & Kim, 2018). Psychosocial risks include childhood adversity and the experience of social environmental stress. Kim & Kim (2018) explained how childhood adversity encompassed abuse, neglect and children being deprived of parental care which increased the risk of depression in these individuals. Loss of parents, divorced or single parenting, bullying or conflict within the home are all

put under psychosocial risks as well. Due to the late maturation of a human brain, neural risk factors build upon genetic and environmental factors to influence the adolescent brain more than the adult. For most of the studies reviewed, suggestions revealed that two neural circuit and related systems can be associated with the increased risk of depression (Kim & Kim, 2018). The first neural circuit connects the amygdala to the hippocampus and the second neural circuit connects the striatum, prefrontal cortex and ventral dopamine within the brain. Emotional regulation was also considered a risk factor for depression in children and adolescents under neural risk factors.

Limitations of these studies begin with some having a cross-sectional study design. This limits the ability of the study to infer causal directions and offer alternative explanations (Garcia-Reid et al., 2013). A longitudinal study analysis will allow for a stronger causal relationship to be established between variables measured. Other limitations include studies that looked at specific target population groups. These included studies that looked at different ethnic groups such as Garcia-Reid et al. (2013). Although all the above studies focused on adolescents and youth, the risk and protective factors vary slightly within different ethnic groups especially in minority groups. Due to minority adolescents and youth being more at risk of deprivation and of lower socioeconomic class, these social factors influence a higher risk of association of depression for these individuals (Scott et al., 2015). Thus, minority youth have risk and protective factors that are more essential to focus on due to higher at-risk associations compared to other youth who may have different lived experiences.

Evidence has also shown multiple studies focusing on how to mitigate risk factors of depression in youth, but studies have seldom focused on protective factors (Rueger & George, 2016). Participants within these studies were mostly youth as well with children of younger ages not being included as often in the selected study cohorts. This indicates that more research may need to be done on protective factors and their association with depression as important information may be overlooked or unnoticed. Having more research focusing on children may also provide evidence for prevention strategies on when factors of depression may begin taking effect. Self-reporting in case studies that include surveys and interviews was another noted limitation within the research. Data may not be as accurate as self-reporting may induce under or over reporting of symptoms. Social desirability or stigma association with depression and mental health issues may also induce a limitation of self-reporting.

Most of these studies highlighted the importance of understanding these relationships to improve future prevention and treatment research. Although these studies focused on different groups of people ranging from minority youth to youth from socioeconomically different backgrounds, similar factors were analysed in these research studies. These suggested that there is a recurring theme of specific risk and protective factors that are associated with depressive symptoms in children and youth. A leading message from these studies is that specific protective mechanisms should be focused within the contexts of your target group, and that those factors that focus on your target population are more effective than using any non-specific risk or protective factors (Scott et al., 2015; Cairns et al., 2014). This approach has been deemed more effective compared to a 'one size fits all' approach. There are a lot of risk and protective factors of depression that have been or are currently being measured and it is up to the researchers to specify which ones would be more effective at combating depression in children and youth in different cultures and places over the world.

2.2 Risk and Protective Factors of Depression in Pacific Children and Youth

Literature is limited when researching studies that specifically target Pacific youth in New Zealand. One of the few studies that does target this group is by Paterson et al. (2014) who investigated depressive symptoms in 9-year-old Pacific children living in New Zealand. This article examined the associations between individual, maternal (family), cultural and sociodemographic variables with symptoms of child depression within 9-year-old Pacific children in New Zealand. A longitudinal cohort study following a birth cohort of Pacific children born in Auckland in the year 2000 was used. At 9-years of age, depressive symptoms were collected from this cohort using child self-reports. This cohort study is known as the Pacific Islands Families (PIF) study and this article draws data from the PIF study to research the relationship between these variables and child depressive symptoms.

Findings from Paterson et al. (2014) resulted in a 7.3% prevalence of self-reported depressive symptoms from participants measured by the Children's Depression Inventory: Short version (CDI:S). The authors presented this percentage to be relatively high and discussed further on how recognising depression during early stages can be critical in reducing the high prevalence found within the study. Reasons constructed from the associations indicated that child depression scores were high due to either being a perpetrator or victim of bullying, low maternal education scores and previous internalising behavioural problems. Low child depression scores were associated with multiple different factors such as physical abilities, parental and peer relationship, high verbal intelligence, a positive perception of self and high performance at school. Results also highlight that those high levels of perceived depressive symptoms within the 9-year-old individuals were associated more with the individual abilities of the child instead of their family context. Positive self-perception of Pacific 9-year-old children proved to be associated more with lower depressive symptoms compared to family context.

In comparison with international data, family risk factors including family home environments and parent-child relationships were shown to significantly influence depressive symptoms in children (Chen, 2019). Family interpersonal stressors such as family conflicts are regarded as family risk factors and impact on children where they gain a negative self-perception of themselves and blame themselves in relation to their family issues (Chen, 2019). In this case, self-perception for the child and what they think of themselves may be influenced by family factors showcasing them being interlinked. In relation to the study by Paterson et al. (2014), these give interesting findings as self-perception in Pacific children have a greater influence on depressive symptoms whereas other non-Pacific children may be more influenced by family context as Chen (2019) outlines. Low maternal education was also considered a risk factor for depression in participants of this study, but interestingly results show that higher depressive symptoms were in fact associated with negative child self-perception. Further research would be interesting to see whether self-perception has the same effect correlating to higher depressive symptoms in other non-Pacific children. Also, whether family context impacts more on older ages in youth compared to Pacific 9-year-old children would be interesting research as well.

The authors also found that supportive relationships and building the self-esteem of a child can bring forth changes that are more likely to reduce the risk of depression and can further become protective factors against bullying involvement. No gender differences were found in relation to more depressive symptoms found in either gender. Overall, the significant risk factors that were found comprised of bullying (victim or perpetrator), low maternal education scores and previous internalising behavioural problems. Protective factors of supportive relationships and building the self-esteem of the child were considered useful in reducing depressive symptoms. These risk and

protective factors are specific to Pacific children living in New Zealand but are considered significant within international and national data. This is due to these findings illustrating how risk factors impact other ethnic and population groups as well (Garcia-Reid et al, 2013). Authors also noted that no gender differences were found indicating different results from another article researching 11- and 14-year-old Pacific adolescents (Paterson et al., 2018). Limitations of the study outlined by the authors state how under-reporting due to the use of self-reporting measures can occur, however in a large research study such as this, this measurement option is most realistic.

A second study using the PIF study dataset is by Paterson et al. (2018) which explores cultural, individual and familial risk and protective factors associated with depressive symptoms in Pacific youth living in New Zealand. The target age group for this study was for 11-year-old and 14-year-old Pacific youth living in New Zealand. Participants were measured for child depression, gang involvement, pubertal development and bullying. Multidisciplinary interviews were held such as the Children's Depression Inventory (CDI) as well as maternal measures being studied. Findings from this study examined that bullying and gang activities were associated with higher depressive symptoms and therefore noted as risk factors whereas positive parenting was correlated with lower depressive symptoms acting as a protective factor. These risk and protective factors associated with depressive symptoms were found to either be consistent across time points or vary. Time-varying factors, which indicate factors that are significantly different when comparing both age groups of 11-year-olds and 14-year-olds, were gender, maternal education and problem behaviour. In terms of gender differences, 14-year-old girls were more likely to report depressive symptoms compared to boys aged 14-years-old.

Maternal education acted as a significant protective factor against depressive symptoms with 11-year-old children of highly educated mothers reporting fewer depressive symptoms. Lastly, for problem behaviour, externalising behaviours corresponded to depressive symptoms in 11-year-olds while internalising behaviours was linked to depressive symptoms in 14-year-olds. These findings could imply that externalising behaviours at 11 years acts as a cry for help and then at 14-years of age these children begin to internalise their depressive moods. For protective factors, positive parenting and healthy peer relationships were emphasised as important for Pacific youth in protecting against depressive symptoms at these time points. The authors agree that more research is needed about modifiable risk and protective factors in order to cater to our Pacific youth and support the new approaches that are to come. Although the strength of this study is the large cohort of children followed up and the multiple risk and protective factors analysed, the authors do illustrate that this measure of depression using multidisciplinary interviews does not elucidate the distinction between enduring and temporary aspects of depression. This reason along with participants under-reporting their feelings (due to using brief self-report measures) are some of the limitations that the authors discuss. These findings are significant in order to create interventions more applicable in reducing Pacific youth depression.

The results of low maternal education, internalising behavioural problems and positive parental and peer relationships and their association with depressive symptoms in this article have similar findings found in the Paterson et al. (2014) article. Both articles used the dataset from the PIF study, and although different age groups were targeted, the authors of both articles came to the same conclusion for the listed factors above. Ethnic group differences were also detected with Tongan youth significantly less likely to report depressive symptoms compared to Samoan youth. The authors found the ethnic group results difficult to interpret but gives way for more research especially qualitative studies to be carried out to analyse this data.

Research by Paterson et al. (2012) also uses the PIF study data set and focuses on the prevalence of child behaviour problems at 2, 4 and 6 years-of-age and the relationships between child behaviour and maternal, cultural and socio-demographic variables. This longitudinal birth cohort study intends to acquire an evidence base and holistic understanding of Pacific intervention studies. This includes research that is essential to the health and development of the population of Pacific Islanders. The Child Behaviour Checklist (CBCL) was the measurement used to measure child behaviour in study participants and is used extensively to portray problematic behaviour in early childhood.

Behavioural change is significant when regarding depression as internalising behaviour, and externalising behaviour is researched as time-varying factors relating to depressive symptoms (Paterson et al., 2018). Results from the Paterson et al. (2012) study show that the prevalence of clinical internalising problems was high with a 16.8% prevalence for 2-year-olds, 22.0% prevalence for 4-year-olds and an 8.5% prevalence for those aged 6. Clinical externalising behaviour prevalence for 2 to 6 years old increased gradually from 6.7% to 14.6%. The author's analysis regarding the prevalence of child behavioural problems (at a young age) has been presupposed to pressures of migration. Across early childhood, retention of traditional Pacific culture and marginal ties within wider New Zealand society presents the role of being a protective factor for clinical internalising and externalising behaviour. This protective factor was specifically highlighted by the authors due to the multiple risk factors that were found in comparison. The relevance of shedding light on this protective factor may be to indicate the lack of other protective factors found within this research study.

Harsh parenting styles and disrupted home environments, symptomatic depression reported in mothers, witnessing partner violence, economic deprivation, single parenting and other factors listed in the article were seen as having damaging effects on the child's behavioural problems increasing the odds of clinical internalising and externalising behaviour. The multiple factors analysed within this article illustrates a strong importance of the home environment for children and their behaviour outcomes. By affecting the child's behavioural problems negatively in the home, this then affects the onset of depressive symptoms within the child.

The authors close by stating both the limitations and strengths of the study. Multidisciplinary questionnaires result in less opportunities to uncover the multi-layered issues which is a limitation highlighted by the authors. On the other hand, the authors also commend the study for its strength in having a strong representation of Pacific researchers enhancing the cultural sensitivity of the methodology and procedures that took place. The authors conclude that policy makers need to respect the diversity of cultures in New Zealand and that results regarding Pacific ethnicity cannot fit under one category.

Tucker-Masters & Tiatia-Seath (2017) review literature on anxiety and depression in Pacific youth giving a fresh perspective on all the research available. These Pacific researchers put together a literature review that investigated the occurrence of anxiety and depression in Pacific youth who were from the Pacific region and Western countries. The authors identified key themes that underpinned anxiety and depression in Pacific youth. The literature search focused on studies from New Zealand, the United States, and the Pacific Islands within the last 15 years. The databases of Scopus, Google Scholar, Medline and PubMed helped in gathering 91 pieces of evidence in total and 51 were analysed in the review. The authors also chose articles that were published within the year period between 2005 to 2016.

Results from the New Zealand literature summarised in this journal article show that Pacific youth were twice as likely to have depression, be anxious, or attempt suicide compared to non-Pacific

youth. Pacific youth were also reported to have lower contact with mental health services compared to non-Pacific youth in New Zealand. In the United States, there is evidence to suggest the same trends however, it was difficult for the authors to determine the exact rates of anxiety and depression, because Pacific people were grouped with Asian Americans in a large amount of data. For both countries, migration and acculturation are also important risk factors identified for Pacific youth. In the Pacific region, Pacific youth are also more likely to experience a mental illness such as anxiety and depression compared to other ethnic groups. A survey conducted by the United Nations included 12 Pacific Island nations, where a questionnaire was sent out to students aged 13-17 year and included questions around their mental health. The results illustrated that youth from the Pacific Islands have higher levels of suicidal thoughts than Pacific youth in New Zealand. Urbanisation and modernisation are also major risk factors for Pacific youth mental illness.

Key findings from this article highlight that common risk and protective factors that contribute to Pacific youth mental illness and depression in New Zealand, the United States and Pacific Islands are spirituality, religion, culture, and family. Pacific youth are experiencing higher levels of depression and anxiety compared to other ethnic groups worldwide. Acculturation and deprivation are identified as key risk factors for migrant Pacific youth. Furthermore, urbanisation and modernisation are risk factors for Pacific youth, particularly in the Pacific region. A limitation of this study was that it looked at literature written in the English language only as well as literature that were part of online databases. Pacific youth mental health and wellbeing is an under-researched area of study and authors suggest further research is needed in evidence-based studies around the globe.

For international studies that analysed Pacific youth not living in New Zealand, parallels between the risk and protective factors associated with depressive symptoms can be seen in other studies analysing Pacific youth living elsewhere. Examples of this are found in research by Yeh, Borrero & Tito (2014) who examine predictors of depression specifically investigating family intergenerational conflict and collective self-esteem. The study looked at 128 Samoan middle and high school students living in San Francisco. Three main variables which were measured were family conflict, collective self-esteem and depression.

Findings from this article indicate a significant association between depression and family conflict and collective self-esteem. The association between depression and family conflict resulted in a positive correlation where higher levels of depression showing a significant association with higher levels of family conflict. About collective self-esteem, a negative correlation between depression and collective self-esteem was found. The results showed that higher levels of collective self-esteem corresponded with lower levels of depression in participants. The authors state that this study provides useful information on family and cultural predictors of depression with collective self-esteem and family conflict concluded to be unique and significant predictors of depression. Family conflict can now be defined as a risk factor of depression with collective self-esteem as a protective factor. From the results of the study, the authors discuss that family conflict can occur due to pressures of an academic identity competing with family and cultural obligations. A lack of support for Samoan students can also cause them to feel depressed and alienated. Negative feelings about their cultural worth for these Samoan students also showed that they felt more depressed. Experiences with discrimination and negative stereotypes added to their negative feelings of their cultural worth and the authors discuss that these Samoan students as a minority group in school feel they have no control over their experiences. These students reported that their culture was not represented within the school curriculum and therefore they felt stuck between their cultural world and their educational world (Yeh, Borrero & Tito, 2014).

This study was carried out researching only Samoan students and the authors were aware that these findings could be used to explain other ethnic minority groups whereas Samoan's have their own culture and therefore family conflict and collective self-esteem could vary significantly across different ethnicities. This shines light on the issue of not generalising all Pacific Island groups as having the same cultural practices and that within Pacific youth, there may be more diversity in what risk and protective factors affect different Pacific ethnicities. Other limitations reported in this article were related to the nature of self-reporting where students could under-report their feelings.

A next step sought out by the authors would be to have a measure of acculturation which may have provided more specific information on family conflict. In the context of the topic, this study examined Samoan students living in San Francisco so this research cannot be truly representative of Pacific youth living in New Zealand, but it can give us insight into the Samoan sub-group within Pacific youth leading to further research to be carried out on other Pacific ethnicities. This highlights the need for more research that investigates predictors of depression to be carried out in New Zealand and in Samoa as comparative studies, especially in places where depression and in particular, suicides rates are the highest for Samoan youth in the world.

2.3 Risk and Protective Factors of Academic Performance in Children and Youth

Academic performance is known to play an important role in every person's life especially in the early stages of a child's schooling (Steinmayr et al., 2014). Early development years for a child are a critical period for acquiring and developing valuable cognitive, social and literacy skills essential for later academic functioning (NICHD Early Child Care Research Net, 2004). A vast range of literature on factors influencing academic performance can be found with multiple studies focusing on particular factors known to be significant within their target populations. This review as outlined in the introduction assumes an association between depression and academic performance which can be identified in multiple studies (Kelvin, 2016; Owens et al., 2012; Moilanen et al., 2010) and therefore this section will focus more on other factors impacting on academic performance in children and youth.

Huffman et al. (2000) reports multiple risk and protective factors for academic and behavioural problems at the beginning of school. The causal risk factors presented to affect academic performance were cognitive deficits, child behavioural problems, difficulty with peer relationships, postnatally depressed mothers, teacher-student relationships and poor parenting practices. Protective factors shown to affect academic performance includes maternal education, lack of family learning problems and positive self-perception (Huffman et al., 2000).

Cognitive deficits are known as impairments in cognitive functions which aid in processing information and knowledge (Dhakal & Bobrin, 2020). A study by Nesayan et al. (2018) exhibits cognitive abilities as important factors for successful learning. This cross-sectional study collected data using the Ray Osterrieth complex figure test. Coding subtest from the Wechsler intelligence scale and the behavioural rating inventory of executive functions (BRIEF) were also techniques used to measure cognitive functions in children. The population consisted of 289 student participants from ages 6-13 years in Jajarm City, Iran. Conclusions made from this study show a significant relationship between cognitive profile and academic performance. Cognitive functions of processing speed, perceptual organisational ability, working memory, emotional regulation, planning, monitoring, set shifting and inhibition controlling were all significantly correlated with academic performance. Explanations from this study show that different cognitive levels within children are necessary to understand as this can lead to diverse performances. Executive function skills are

helpful in the development of academic standards in children allowing for suitable opportunities for a child's learning to occur. King et al. (2005) elaborates on this showing cognitive functioning to be a major predictor of academic performance. One of the limitations noted in this study is the exclusion of emotional factors such as anxiety known to influence child academic performance and thus worthy of consideration for future research studies. Having a limited sample size was also noted as another limitation as generalisations and comparisons of this data to other communities should be made with caution. Nevertheless, this research highlighted cognitive abilities that are associated with academic performance which can be used to help identify children who are at risk of poor academic performance.

Behavioural problems presented in Huffman et al. (2000) study was also indicated as a risk factor of academic performance in children. A study by Park et al. (2019) researched the influence of behavioural and emotional characteristics on academic achievement of mid-childhood aged (12- to 16-year-olds) students. This longitudinal study extracted data from the National Youth Policy Institute (NYPI)'s Korean Students and Youth Panel survey (KCYPS) with a cohort of 7,071 Korean elementary and middle school students. This study selected data from 12–13-year-old students and 15–16-year-old students to investigate the longitudinal effects of behavioural and emotional characteristics. A final sample of 1,874 students was used for analysis. Findings from this study show that a deficit in the behavioural attention variable correlates with a decline in academic performance in middle school students. Self-esteem was another factor that presented a strong effect on academic performance. This study concluded that students with higher self-esteem or behavioural attention control grow in academic achievement. A key limitation of this study is that students' cognitive ability and socioeconomic status were not considered in the study although other research demonstrate these two variables as strong predictors of academic performance (Ferguson et al., 2007; Owens et al., 2012). Their study used data from South Korea and therefore generalisations to other populations and cultures should be made with caution.

Research by Soomro & Clarbour (2012) also investigated emotional behaviour and academic achievement in middle school aged children. Participants within this study included 146 eighth grade students in Hyderabad, Pakistan from two separate secondary schools that were gender specific. The measurements used for this analysis were the Emotional Behavioural Scale for Pakistani adolescents (EBS – PA). These results indicated malevolent aggression to be negatively associated with academic achievement, but social self-esteem showed a positive association to academic achievement in students. Social self-esteem was also presented as a mediating factor in the relationship between academic achievement and malevolent aggressive behaviour. Findings from this study coincide with Huffman et al. (2000) and Park et al. (2019) illustrating the significance of self-esteem, attention behaviour and cognitive ability in influencing academic performance.

Peer relationships were also indicated to be a risk or protective factor of academic performance in children. A review by Christenson et al. (2013) studied the role of peer relationships in student academic and extracurricular engagement. The main findings from this research indicated that relationships with friends who are engaged more in school and have a lack of behavioural problems are associated with higher academic achievement and motivation. The quality of the friendship as well as friends who provide emotional and social support add to peer relationships therefore leading to higher academic performance. In contrast to this, youth who had difficulty with peer relationships and felt socially alienated and feeling like they do not belong were more likely to drop out due to less engagement within school. Good peer relationships were seen as a protective factor of high academic performance whereas difficulty with peer relationships acted as a risk factor for lower academic performance in youth. Various other studies also highlight the importance of good peer

relationships and its association to higher academic performance in children (Wentzel, 2017; Llorca et al., 2017). Peer relationships have been outlined to play a significant role in academic performance in children and youth. Therefore, this establishment sets the foundation for future research on knowing how important having good and healthy friendships during school is.

Postnatally depressed mothers were expressed as another risk factor of academic performance (Huffman et al., 2000). A study by Claessens et al. (2015) examines the relationship between maternal depression and child outcomes within their first formal year of schooling. Data was used from the Early Childhood Longitudinal Study Kindergarten Cohort (ECLS-K) who were in kindergarten during 1998-1999. The final analytic sample contained 19,990 children living in the United States. Highlighted findings from this research concluded a negative association between maternal depression and academic achievement and school attendance in children. Persistent postnatal depression in mothers is associated with more negative school outcomes for the child suggesting long term effects of maternal depression and the impact it has on child academic performance. Mothers are known as the primary influence on their child's development, which may explain why maternal depression has a significant effect on the child's academic performance (Kalil et al., 2012). Recommendations are made to extend this research in order for a replication of this study to occur with maternal depression and child outcomes measured at multiple time points. This would aid in clarifying the persistence of maternal depression and timing in association to school outcomes within a child.

Lastly from Huffman et al. (2000), negative teacher-student relationships were communicated as risk factors of lower academic performance in children and youth. Sointu et al. (2016) analysed the longitudinal associations of student-teacher relationships and behavioural and emotional strengths on academic achievement in children. This cohort consisted of 11–14-year-old students living in Eastern Finland. The School Wellbeing Profile Questionnaire (SWBPQ) and the Behavioural and Emotional Rating Scale – 2 was used for assessment. Results from this study show that positive teacher-student relationships are related to academic achievement in students. This also indicates that behavioural and emotional strengths are related to teacher-student relationships, hence affecting academic performance. The mediating effect of behavioural and emotional strengths is shown to be significant adding to the effect that behavioural outcomes have on influencing academic performance both indirectly and directly.

Protective factors of maternal education, lack of family learning problems and positive self-perception were shown to be related to higher academic performance in children and adolescents (Huffman et al., 2000). Awada & Shelleby (2021) studied the relationship between a higher level of maternal education and its effect on child behavioural and academic outcomes. This study collected data from the Fragile Families and Child Well-being Study which is a longitudinal cohort study. The cohort was comprised of 4898 families who had a child born between the years 1998 – 2000 in 20 different United States cities. Results from this study revealed that mothers who increased their education during the first five years of the child's life, higher academic skill appeared in their children in the middle of childhood. Not only does maternal education act as a protective factor of lower academic performance but the enhancement of maternal education even within early years of a child's life provides a greater improvement in child academic performance. A limitation of this research outlines that the measure of maternal increases in education did not take into consideration the type of degree earned or when the degree was earned. Implications for future research suggest an examination of the effect of different educational degrees earned by mothers and when it was completed. This will allow a more thorough look into variations of maternal

education and if differences occur between them in relation to their effect on child academic performance.

Positive parenting interactions can be linked to having a protective effect against low academic performance in children (Huffman et al., 2000). Research by Masud et al. (2019) reviews literature on parenting styles and aggression among young adolescents. Conclusions made indicate that authoritative parenting style results in positive behaviour in children whereas authoritarian parenting style leads to negative and aggressive behaviour in children. Authoritative parenting is supportive while also setting firm boundaries for their children. Authoritarian parenting style is a strict parenting style including aspects of obedience and discipline. A study by Nyarko (2011) unpacks these results from Masud et al. (2019) presenting that authoritative parenting in mothers and fathers had a positive significant relationship with the academic success of students. Authoritative parents were shown to provide a warm comforting environment while also setting standards encouraging independence and communication within the child. Although this particular study did not analyse authoritarian parenting in relation to students' academic achievement which is a limitation outlined by the study, the importance of creating a warm and supportive environment through parenting can guide children to perform better academically in later years.

Lastly, positive self-perception was expressed as a protective factor of low academic performance in children (Huffman et al. 2000). Research by Lohbeck et al. (2017) investigates academic self-concept and causal attributions for success and failure in primary school children. A greater number of research can be found attributing academic self-concept to the development of academic school performance in children (Arens et al., 2016; Grygiel et al., 2016; Jansen 2014). This study by Lohbeck et al. (2017) builds upon this known finding analysing specific gender differences and causal attributions to self-perceived school success and failure in children. Participants included 68 children from German primary schools aged seven to eight years and how they expressed their successes and failures in school subjects. At this age, results found no significant gender differences, however child academic self-concept was related to unstable attributions of success to ability and effort. Academic self-concept was also related to unstable attributions of failure to task difficulty and luck. Literature on self-concept and how children perceive themselves has developed more with studies building on findings of other research allowing gaps and missing evidence to be analysed. Overall, many risk and protective factors were found to be associated with academic performance giving future research analyses many factors to focus on and pursue with the view of increasing academic performance in children. Current and past literature is the best source of information that helps to shape and guide future research in effective treatment or prevention interventions.

2.4 Risk and Protective Factors of Academic Performance in Pacific Children and Youth

In terms of the impact of risk and protective factors of educational outcomes for Pacific youth living in New Zealand, miniscule research is found. Paterson, Iusitini & Taylor (2014) who analysed depressive symptoms in 9-year-old Pacific children showed that children with positive perceptions about their general self, including their school performance communicated significantly lower levels of depressive symptoms. Significant associations between high teacher-related scholastic performance and high verbal intelligence scores were associated with low depression scores for Pacific children (Paterson, Iusitini & Taylor, 2014). This importance of school connectedness as an individual youth factor may be protective against adolescent depression which is also highlighted by Paterson et al. (2018). Both Paterson, Iusitini & Taylor (2014) and Paterson et al. (2018) use data from the PIF study giving insight into factors influencing depressive symptoms in Pacific youth and children. Both articles mention the importance of school connectedness within Pacific youth and its

risk association with depressive symptoms. The effects of school connectedness and its association to depressive symptoms is also reiterated by other international research articles (Lin et al., 2008; Joyce & Early, 2014).

The report *Youthline – The State of the Generation* gives insight into key issues affecting Māori and Pasifika youth (16–24-year-old) in a survey. Key stressors for these youth were around education pressures with 63% of participants indicating this. Pressure from social media and expectations put on them to succeed were felt by youth and not knowing how to deal or recognise this as stress was another notable factor. To better equip youth and support them in school environments, changing the education system was a notion brought about within this survey (Youthline – The State of Generation, 2019). Wanting to create a learning environment that supports youth to equip them with the skills to look after themselves and becoming more educated about the issue of mental health were just a few of the findings addressed. Empowering them in school and through education to manage their stress and support them may prove to be a protective factor for depressive symptoms in youth as promoting and building self-esteem has shown to have positive effects.

Although there is limited literature discussing the effects of risk and protective factors of depression and its association to academic performance in Pacific children and youth, the scarce amount of research does show the gaps that exist in this area. The literature that does mention the influence of academic performance on depression and vice versa gives us an indication that more research is needed in this field. Correlations between risk and protective factors of both depression and academic performance can be seen such as self-perception, maternal depression and parenting styles. Relations such as these are useful in adapting new ideas. Findings from these can lead to better interventions on how to prevent depressive symptoms and poor academic performance leading to new approaches being developed for depression in Pacific children and youth.

2.5 Summary and Motivation for this Study

The literature reviewed indicates that for Pacific children and youth, more risk and protective factors of depression have been researched in comparison to factors influencing academic performance. With this being portrayed, Pacific research in New Zealand is still scare. This illustrates the need for more studies related to risk and protective factors of depression to support current research, and for more literature on factors of academic performance affecting Pacific youth living in New Zealand. A vast amount of literature is found on risk and protective factors of depression and academic performance globally. Taking on board the findings analysed and applying these to future studies can allow a starting point for future studies in bridging the evidence gap seen.

For literature focusing on factors affecting New Zealand youth, most of these studies looked at mental health as a whole. A gap seen in the literature is that depression is studied as an extension of mental health and not specifically focused on itself. Within the New Zealand literature reviewed, risk and protective factors of depression are also stated as future research recommendations. For the literature pertaining to the factors associated with depression impacting Pacific children and youth, seldom studies were found focusing on this population group. Most of the recent articles researching depression in Pacific youth came from the Pacific Islands Families (PIF) Study and other qualitative studies. Statistics already show a rise in depressive symptoms for Pacific youth, but more research is needed to build prevention programmes which are also outlined for future implications in the literature. The impact of depression on educational outcomes in Pacific youth was also rarely found in literature. The effect of school connectedness and its relation to lower depressive

symptoms were briefly outlined, but gaps shown were specific studies analysing how depression affected educational outcomes in more detail. There are many gaps that need to be filled but understanding where the gaps are gives us knowledge on what is missing and therefore what our next steps are in future research.

This master's research is uniquely positioned to study the relationships between emotional and behavioural problems and the teacher assessed academic performance among Pacific children growing up in New Zealand. Extending previous research involving the PIF Study data, this project will look at the risk and protective factors for depression among children aged 6-11 years then examine the association between these and teacher assessed academic performance over the same years. The mid-childhood years studied here cover the first year of formal school to the end of primary schooling in New Zealand. These years are crucial for setting the child on the right path to academic success as there is a strong positive trajectory effect in educational outcomes, a phenomenon well-known as the "Matthew Effect" (Stanovich, 1986). The study will utilise the extensive suite of measures available from the PIF study, hence weaving factors from wide-ranging domains such as social, economic, cultural and health backgrounds, and analyse their relationships with teacher assessment of academic performance at ages 6-11 years. Such approach will be taken to ensure that a holistic view of the environment within which the child grows in and interacts with is captured in the analysis of their academic performance.

Chapter 3. Population and Methods

3.1 Overview of Methodological Approach

As described in Chapter One, the aim of this master's research was to analyse the risk and protective factors associated with teacher assessed academic performance in Pacific children. Within the Pacific population living in New Zealand, Pacific people are shown to be at a disadvantage in the educational system due to cultural differences, language barriers and less qualifications (Statistics New Zealand & Ministry of Pacific Island Affairs, 2010). Drawing from the theoretical concepts explored in the literature review in Chapter Two, success in education and academic performance is important to the wellbeing of individuals, families and communities (McCallum & Price, 2015). Many factors impact on educational success in our young people including depressive symptoms and various other mental health outcomes (Fleming et al., 2020). It is with this in mind, that this study focused on the role of depressive and externalising behavioural problems as key risk factors for teacher-assessed educational outcomes in the study population.

Pacific children in New Zealand grow up in a complex and multicultural environment that may differ from the communities in the Pacific Islands where their families have originated from. Based on this social context, this study analysed a broad range of individual and family level factors associated with teacher assessed academic performance at ages 6, 9 and 11 years. Risk and protective factors associated with emotional and behavioural development including depressive and externalising symptoms were analysed. Potential protective factors such as strong self-concept and the level of love and support from parents in early childhood were also examined in relation to the teacher assessed academic performance. These child level factors were studied in conjunction with family level factors such as maternal health and sociodemographic backgrounds. The impact of immigration and acculturation on child outcomes was also investigated through measures that look at the child's cultural background in early childhood years. These included the length of stay in New Zealand and maternal fluency in the English language. The factors associated with teacher assessments were deliberately drawn from a wide range of domains to capture the holistic environment that interact with children's academic progress at school.

This chapter describes the methods and procedures used including the research objectives, data collection and population, and statistical methods. The data analysis of this study will also be discussed with an evaluation of the methodological choices used.

3.2 Research Objectives

The aim of this secondary data analysis was to examine the risk and protective factors associated with emotional and behavioural development and teacher assessed academic performance in Pacific children at ages 6, 9 and 11 years. Key educational milestones occur within mid-childhood such as the beginning and the end of primary school which are crucial stages in setting up children on an educational pathway to success (Wickersham et al., 2021). This gives us the rationale for studying Pacific children at ages 6, 9 and 11 years as understanding academic performance at these ages will give us greater insight into how to build and set up educational success to allow these children to succeed in later schooling years. The null hypothesis for this analysis states that Pacific children influenced by risk factors of depression will not be associated with lower teacher assessed academic performance, and Pacific children influenced by protective factors will not be associated with higher

teacher assessed academic performance. The alternative hypothesis however states that Pacific children influenced by risk factors of depression will be associated with lower teacher assessed academic performance, and Pacific children influenced by protective factors of depression will be associated with higher teacher assessed academic performance.

This analysis was achieved through conducting three specific analyses:

i. Age-specific associations between risk and protective factors associated with depressive symptoms at 6, 9 and 11 years and high teacher assessed academic performance scores at 11 years (Table 4.6)

ii. Age-specific associations between overall teacher assessed academic performance at 6, 9, 11 years and baseline measurements (Table 4.7)

iii. Examination of the population average trajectory of behavioural development and teacher assessment of academic performance of Pacific children in New Zealand (Table 4.8)

In the above analyses, the associations between teacher assessments and key emotional and behavioural risk and protective factors were compared across repeated measures at 6, 9 and 11 years. The sociodemographic characteristics were also compared in association to teacher assessed academic performance at 6, 9 and 11 years to discover patterns within these variables. The objective of the research was to examine risk and protective factors of depression and determine the extent of their association with teacher assessed academic performance in Pacific children at each timepoint (6, 9, 11 years). This would allow insight into patterns across time to examine if specific risk factors at 6 weeks, 2, 6 or 9 years determine a significant negative association with teacher assessed academic performance later in life (e.g., at 11 years). The analyses and results of these research objectives are presented in Chapter 4 of this thesis.

3.3 Pacific Island Families Study (PIFS)

The Pacific Islands Families study is a longitudinal study tracking the health and development of a cohort of 1,398 children born in the year 2000 in South Auckland, New Zealand. Participants were selected from births at Middlemore hospital in Manukau. Pacific infants born between 15 March 2000 and 17 December 2000, having at least one parent of the infant identified as having Pacific ethnicity and was a New Zealand permanent resident were eligible to participate in this study (Sundborn et al., 2011).

The first data collection phase occurred at 6-weeks postpartum. At this interview, 1,477 mothers were considered eligible of which 1376 mothers (93% of eligible mothers) agreed to participate in this study. This cohort of 1,376 mothers gave birth to 1,398 Pacific infants (including 44 twins). Participants and their families were followed up when children were at ages 6 weeks and 1, 2, 4, 6, 9, 11, and 14 years old (Paterson et al., 2007). For the majority of children, the primary caregiver is their birth mother with their secondary (collateral) caregiver being their birth father (Sundborn et al., 2011).

This master's research study was conducted using the main Pacific Islands Families Study (PIFS) dataset. In particular, the data from the 6-years, 9-years and 11-years measurement waves of the PIF study were used for analysis. Teacher assessment was also measured at these specific waves (6, 9, 11) as well. Data at 6-weeks postpartum from the maternal interviews were used and set as the baseline measurements. Data at 2-years from paternal and maternal interviews were also used specifically for the parenting variable. Details of the measurements conducted and used within this analysis are outlined below (3.3.4 Baseline measures, 3.3.5 Child measures).

In total, 703 participants were selected for this analysis based on one or more teacher assessment scores having been completed at waves 6, 9 or 11 years. To account for the missing outcome values, age specific inverse probability weights were computed and incorporated in the repeated measure statistical model (Table 4.6). One child from each twin was randomly selected for this analysis.

3.3.1 PIFS Data Collection Phases

In order to follow the study data aims, each collection phase was planned around the developmental stages in the individual child's life. Female interviewers of a Pacific ethnicity visited mothers in their homes for maternal interviews. All interviewers were fluent in both English and a Pacific Islands language and interviewers were ethnically matched to the potential participants. The interview was conducted for 1 hour in the preferred language of the mother, and at the end of each interview the participants were compensated for their time with koha (gift). Paternal interviews were first consented by mothers of the child and were carried out at the 12-month, 2-year, 6-year and 11-year collection data phases. Interviews were conducted by bilingual male interviewers.

Both maternal and paternal interviews consisted of an array of questions and standardised instruments widely assessing socio-demographic, environmental, cultural and lifestyle factors, family and household dynamics, child development, childcare and parental and child health issues. Fathers were not interviewed until the 12-month phase of interviews in 2001. At the 2001 interview phase (12-month measurement wave), 825 (83%) of fathers completed an interview (Sundborn et al., 2011).

Child assessments were executed by trained child assessors from 2-years of age and consecutively at each measurement phase thereafter. These assessments that were composed of physical, social, cognitive and language developmental information were also reaffirmed by maternal consent. Teacher questionnaires were initiated at the 6-year and 9-year phases continuing to the 11-year phase. These questionnaires provided insightful data about the child's school life, their social attributes and scholastic performance. Additional information about the child was obtained from the hospital and Plunket postnatal records including obstetric and perinatal information.

In addition to the main Pacific Islands Families Study (PIFS), various supplementary studies were carried out. For this specific analysis, only variables from the main PIFS data set were used. The other supplementary studies are outlined in Figure 1 for recognition. Data collection phases dating from 2000 - 2011 and its components are displayed in Figure 3.1.
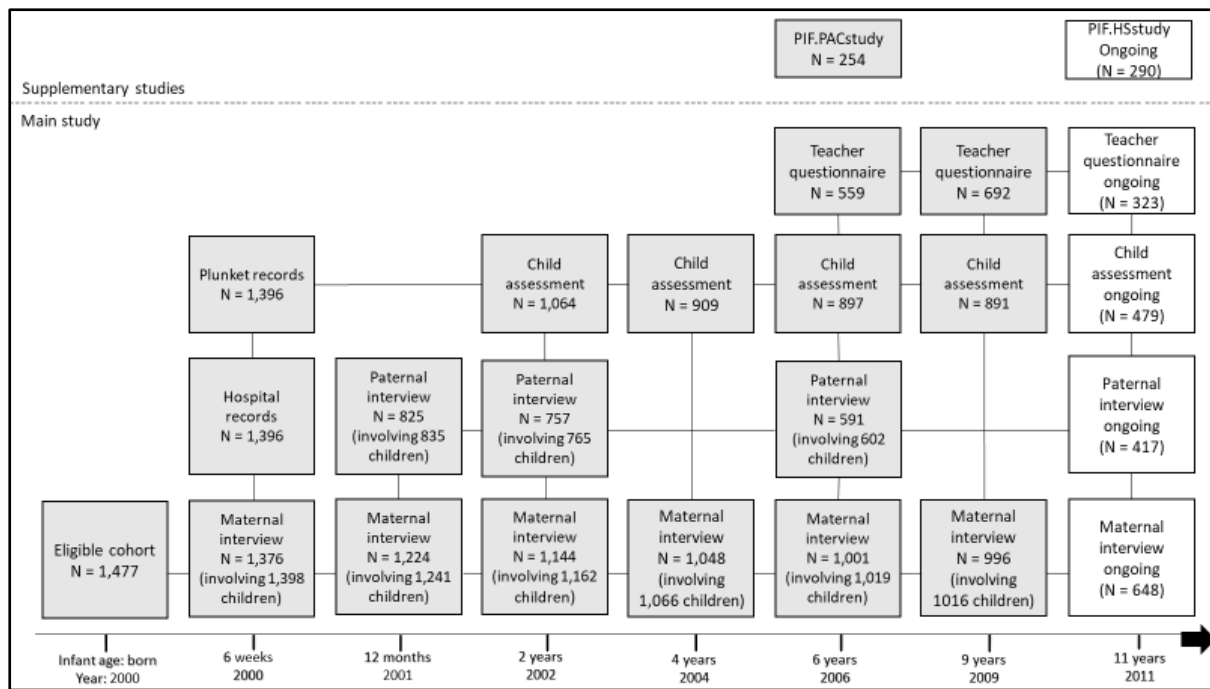
Figure 3.1 Participant groups and numbers over time covering information of 1398 children in the cohort

PIF.PACstudy = The Child and Parental Physical Activity and Body Size study. This sample was recruited from the first eligible 660 participants at the 6-year measurement phase. PIF.HSstudy = Hearing status of 11-year-olds study (revised figure from Sundborn et al., 2011).

3.3.2 PIFS Attrition

Due to the nature of this study, eligible participants were allowed to participate at any phase irrespective of their participation at previous phases (Sundborn et al., 2011). The design of this study limits the effect of attrition through the whole cohort of participants being eligible to participate at each phase (this excludes instances where a child has died, or the family has elected to drop out of the study). As eligibility and formal recruitment was established at the 6-week phase by mothers, maternal participants who completed the 6-week interview formed the baseline cohort in which non-participants or attrition has been measured at successive phases (Sundborn et al., 2011).

The main cause of attrition outlined has been difficulty tracking participants and families involved in the study. The geographical movement by participants from the original recruitment site in Manukau has put a fair amount of pressure on the study team to maintain the cohort over the years and considered the main reason for attrition in latter phases (Sundborn et al., 2011). At the 11-year measurement phase, 80.2% of participants still reside in Auckland with 3.9% living elsewhere in New Zealand, 13.7% living in Australia and the remainder living worldwide. To minimise the effects of geographical mobility attrition, phone interviews and postal questionnaires were used to keep retention rates high across each study phase.

In this study, the attrition across the measurement waves and the resulting missing outcome data are analysed using inverse probability weighting methods (Robins et al., 1994, 1995). The Inverse Probability Weighting (IPW) technique was proposed as a method to address missing outcome

observations in follow-up studies or repeated measures analyses. At each measurement wave, a participants' chance of having the outcome observed is predicted in a model using the baseline or other individual characteristics. The weights are then incorporated into the regression analysis. Using this technique, the participants with characteristics that are similar to those who are more likely to be missing the outcome data are given higher weights. The technique has a parallel to the regression estimator technique in survey literature. This technique, like most other methods for dealing with missing values, assume missing at random (MAR) assumption which cannot be empirically verified. Validation studies comment on its reasonable performance (under MAR) even when a high proportion (~ 50%) of outcome observations are missing.

In this study, the weights for each measurement period were computed using a logistic regression model with a binary outcome for having at least one teacher assessment in four academic subjects and with baseline characteristics as the predictors. The characteristics used were child's biological sex, maternal post-natal depression symptom score, household income, maternal age at childbirth, maternal ethnicity, maternal fluency in English, maternal highest educational qualification, maternal social relationship status, and length of stay in New Zealand.

3.3.3 Baseline Measures

At the six-week postpartum maternal interview, nine baseline variables measured social demographic characteristics. These include sex of child, household income, maternal age, maternal education status, maternal social marital status, maternal ethnicity, maternal English fluency, if mother was New Zealand born and maternal symptoms of postnatal depression (Sundborn et al., 2011). At the 2-year measurement phase, maternal and paternal love and support scores were also measured.

Sex of child - The maternal interview was used to identify the biological sex of the child. Components of this measurement include either male or female. The hospital birthing record was used to cross check the response.

Household income - The maternal interview was used to identify the household income of the participant's family. Categories of this measurement include less than $20,000, between $20,000 and $40,000 and equal to or more than $40,000 per year. Declined or unknown household income was analysed as a separate category.

Maternal age - Age of the mother in years at childbirth was measured within the maternal interview at baseline. The response was corroborated with the birthing record.

Maternal education status - The maternal interview was used to identify the education status of the mother. The levels of this measurement were categorised as the mother having no formal qualification, a secondary qualification or a post-secondary qualification.

Maternal marital status – Maternal social marital status was measured within the maternal interview with questions indicating if the mother was married/de facto or single at 6-weeks postpartum.

Maternal ethnicity - Maternal ethnicity was measured within the maternal interview indicating the Pacific ethnicity of the mother. A non-Pacific category was added to include mothers who were not of Pacific ethnicity but were eligible for the study due to the Pacific ethnicity of their partner.

Maternal English fluency - The maternal interview was used to ask if the mother was fluent in English or not. English fluency was based on the mother's perception of her fluency in English.

Maternal country of birth - Mothers were asked within the maternal interview if they were born in New Zealand or born in a Pacific Island. For those who were not born in New Zealand, additional questions were added to indicate if the mother had been living in New Zealand for over 10 years or under 10 years.

Maternal postnatal depression - The Edinburgh Postnatal Depression Scale (EPDS) was used as an indication of cognitive and affective aspects of depression in mothers at the 6-week measurement phase. This instrument is self-reported. The scale does not provide a clinical diagnosis of depression, but scores measured over the total score of 12 are broadly used to specify a probable depressive disorder. The 10 item EPDS and its sensitivity and specificity are outlined as accurate similarly across reference standards (Levis et al., 2020).

3.3.4 Child and Parental Measures

Child depression – The Children's Depression Inventory was used at 9 and 11 years postpartum with the child to identify symptoms of child depression. The 10-item short version (CDI:S) is a self-rated symptom orientated scale suited for youths aged 7 to 17 years of age (Kovacs, 2003). CDI:S was developed to provide a psychometrically sound way to screen children for depressive symptoms. The CDI-S has good internal consistency reliability (α = 0.80) and an omega coefficient of 0.90 indicating good reliability of total scale scores (Ahlen & Ghaderi, 2017). Test-retest correlation coefficient of CDI-S was 0.74 presenting adequate test-retest reliability (Ahlen & Ghaderi, 2017).

Child behaviour – The 120-item Child Behaviour Checklist (CBCL/6-18) was used with mothers to identify behaviour patterns in their child. The CBCL is the best validated behavioural rating scale across many countries and cultures (Rescorla et al., 2011). Numeric scores for the composite scales of Internalizing and Externalizing were derived.

For the CBCL/6-18, the score for internalising behaviour is the sum of the scores derived from 32 questions within three syndromes: *somatic complaints*, *withdrawn* and *anxious/depressed*. The score for externalising behaviour is the sum score of 35 questions within two syndromes: *aggressive behaviour* and *rule-breaking behaviour* (Rescorla et al., 2011). Three individual syndromes which are *social problems*, *thought problems* and *attention problems* are summed up independently. For internalising CBCL, the minimum is 0 with a maximum of 32. Externalising CBCL has a minimum of 0 and a maximum of 35 (Cronbach's alpha = 0.76 – 0.93) (Paterson et al., 2014).

Both clinically referred and non-referred samples of children were normed according to gender and age differences for the CBCL/6-18 behaviour scale. Normalised T-scores are used as clinical cut-offs for referred and non-referred children. The clinical cut-off for each syndrome equated to a T-score of 70 (98th percentile) with the borderline clinical range set between T-scores of 67-70 (95th-98th percentile). For the composite scales (internalising and externalising), the cut-off was marked at a T-score of 63 (90th percentile) with the borderline clinical range set at 60-63 T-score (83rd percentile) (Achenbach & Rescorla, 2000). Psychometric information based on multicultural comparisons is available (Achenbach & Rescorla, 2000; Rescorla et al., 2007, 2011).

In the PIFS, the CBCL/6-18 was condensed to 90 items to reduce burden on participants. The items were selected for relevance within the New Zealand cultural context following the review of the

Pacific Scientific Advisory Group which consisted of Pacific community leaders and researchers. The CBCL was administered at 6, 9, and 11-years measurement waves.

Gang involvement – A modified version of the Gang Membership Inventory (GMI) has three items: hanging out with a gang, wearing gang colours or using gang signs, and representing a gang in fights or delinquent activities. This measure was used with children at 9 and 11 years and had a good internal consistency of 0.83 (Paterson et al., 2014). The GMI consists of true/false items and participants were asked to answer yes/no if questions did or did not apply to them.

For PIFS, at ages 9 and 11, the following questions were asked:
1. Have you had any involvement with gangs in terms of wearing gang colours or using gang signs?
2. Have you done things to represent a gang such as spray-painting gang signs or getting into fights, etc?
3. Do you have family who are gang members?
4. Do you have friends who are gang members?

"Any street club that carries a name, wears or represents particular colours etc." were described as a gang (Pillen & Hoewing-Robertson, 1992). From these four questions, a total score out of four was created as the "gang involvement" variable (0 = No to all four questions, 1 = Yes to one question, 2 = Yes to two questions, 3 = Yes to three questions and 4 = Yes to all four questions). Gang involvement was scored as follows: minimum = 0 and maximum = 4.

Bullying - Bullying questions were based on the Revised Olweus Bully/Victim Questionnaire (Olweus, 1996) which examines physical, verbal, and indirect forms of bullying involvement. The questionnaire consists of true/false items where participants are to answer yes if the question applies to them or no if it does not.

At 9 and 11 years, the children were asked following (victim statements shown) eight questions about bullying, separately as a perpetrator (e.g., I called another student mean names) and as a victim (I was called mean names).

1. Called mean names, was made fun of, or teased in a hurtful way
2. Excluded or completely ignored by other students
3. Hit, kicked, pushed, shoved around, or locked indoors
4. Other students told lies or spread false rumours and tried to make others dislike me
5. Money or other things taken or damaged
6. Threatened or forced to do things
7. Bullied about race or skin colour
8. Bullied with a sexual meaning

A total score of eight for both perpetrator and victim of bullying was created (min = 0, max = 8). Each point represents a question answered 'yes' by the participant. Internal consistency and test-retest reliability are satisfactory (Cronbach alpha = 0.86) (Kyriakides et al., 2006).

Cultural competence – The child's level of perceived confidence in the New Zealand cultural settings and connection to their Pacific culture was analysed using a set of custom-written items. The following five items were responded with "Yes" or "No" and the total score was computed as the

sum out of the five items ranging 1 to 5. Cronbach alpha = 0.10 which was calculated with 95% confidence intervals in R, the statistical programme.

1. Feel comfortable in social gatherings with Palagi
2. Feel comfortable in Pacific social gatherings or events
3. Have you ever visited Pacific Island roots?
4. Have you learnt about Pacific culture?
5. Is it important to be recognised as a Pacific person?

Self-description – At 6, 9 and 11 years, the children's self-perceptions of their physical abilities, parental relationships, peer relationships and their general self-perceptions were assessed based on the Self-Description Questionnaire (Marsh, 1994). These four non-academic areas were examined and responses to the 10 questions for each of the four categories were summed up into a total score out of 40 (min = 0 and max = 40). Construct validity of this instrument is cited as strong with Cronbach alpha being at 0.75 – 0.88 for each of the self-concept scales (Marsh, 1994).

Special person – At 11 years, the children were asked about the presence of people in their lives who provide regular emotional support. The following 12 items were used to gauge the children's perceived level of support from their families, friends and other special persons. The items were scored from 0 (strongly disagree) to 4 (strongly agree) and the scores from each item were summed to create a total score ranging 0 to 48. Cronbach alpha = 0.84 which was calculated with 95% confidence intervals in R, the statistical programme.

1. There is a special person who is around when I am in need
2. There is a special person with whom I can share my joys and sorrows
3. My family tries to help me
4. I get the emotional help and support I need from my family
5. I have a special person who is a real source of comfort to me
6. My friends really try to help me
7. I can count on my friends when things go wrong
8. I can talk about my problems with my family
9. I have friends with whom I can share my joys and sorrows
10. There is a special person in my life who cares about my feelings
11. My family is willing to help me make decisions
12. I can talk about my problems with my friends

Teacher assessment – At 6, 9 and 11 years, teachers completed a short questionnaire about the child which included assessment on a five-point scale (1= Very poor to 5 = Excellent) of the child's performance in four areas: reading, oral language, written language and mathematics. The four cores were summed to form a single overall score (Cronbach's α=0.92). A detailed analysis of one-factor model was conducted in R, and the results are presented in Chapter 4.3.1.

Parental measures
Parenting love and support scale: The Alabama Parenting Questionnaire short form (APQ-SF) is a nine-item scale with three dimensions (Elgar et al., 2007). Mothers and fathers in their interviews were asked about positive parenting, poor supervision and inconsistent discipline. The reliability across APQ scales is an average 0.68 exhibiting robust psychometric properties. This includes criterion validity in differentiating non-clinical and clinical groups (Dadds et al., 2003).

Table 3.1 Overview of instruments used and their internal consistency (Cronbach's alpha)

Name of Instrument	Item type	Minimum	Maximum	Mean (SD)	Cronbach's alpha
Children's Depression Inventory - Short Version	10-item	0	54	9y = 3.1 (2.6) 11y = 2 (2.3)	0.80
Child Behaviour Checklist	120-item	0	32 (Int) 35 (Ext)	6 (Int) = 2.8 (3.6) 9 (Int) = 5.7 (4.5) 11 (Int) = 6.5 (4.8) 6 (Ext) = 5 (3.6) 9 (Ext) = 8 (5.9) 11 (Ext) = 8.5 (5.6)	0.76 - 0.93
Modified Gang Involvement Inventory	3-item	0	2	9y = 0.43 (0.78) 11y = 0.47 (0.8)	0.83
Bullying Questionnaire (Perpetrator/victim)	8-item each	0	8	9p = 0.78 (1.3) 11p = 0.6 (1.2) 9v = 2.7 (2.5) 11v = 1.8 (2.2)	0.86
Self-description Questionnaire	10-item	0	40	6y = 34 (4.4) 9y = 31 (4.9) 11y = 33 (4.3)	0.75 – 0.88
Teacher Assessment questionnaire	5-item	1	5	6y = 2.7 (1) 9y = 2.9 (1) 11y = 3 (1)	0.92
Special person questionnaire	12-item	0	48	11y = 39.1 (7.4)	0.84
Cultural competence questionnaire	5-item	1	5	11y = 3.9 (0.9)	0.10
Alabama parenting questionnaire	9-item	0	20	Mat = 14 (4.3) Pat = 13.5 (4.8)	0.68

SD = Standard Deviation, Int = Internalising, Ext = Externalising, Mat = Maternal, Pat = Paternal

3.4 Steps of Data Analysis

Descriptive analyses were performed to summarise and describe the distribution of teacher assessed academic performance scores at ages 6, 9 and 11 years. To explore the variation of the teacher assessment data, the minimum, median, maximum and the mean of the scores were determined.

Participant sociodemographic characteristics were described using summary level statistics (means, standard deviations, percentages). The internal consistency of the instruments used, and composite scores were assessed using Cronbach's alpha which evaluates internal reliability. Internal reliability for risk and protective factors outlined in Table 3.1 were either cited from sources outlined in section 3.3.4 or calculated using bootstrap 95% confidence intervals in R. The internal reliability for teacher assessment scores was estimated using resampling (bootstrap) 95% confidence intervals based on 1000 replicate samples. The correlation between different subject areas (reading, written language, oral language and mathematics) were analysed using Pearson's Product-Moment Correlation Coefficients in Table 4.3. Confirmatory Factor Analysis (CFA) technique was used to assess the fit of the one-factor model for 6-years measurement wave. Comparative Fit Index (CFI) and Root Mean Squared Error of Approximation (RMSEA) statistics were analysed to assess the fit.

Pearson's Product-Moment Correlation coefficient estimates were analysed for various risk and protective factors at 11 years. Then, bivariable associations between depression, internalising and externalising behavioural problems, self-description, gang involvement, bullying as a victim and/or perpetrator, special person for social support, cultural competence and strong academic performance (average above 4 out of 5) at 11 years were examined using Welch's t-test for differences in means.

Welch's t-test is used to compare means from unpaired data and is suitable for groups with unequal variance and sample sizes (Sakai, 2016). It is a generalised version of two-sample t-test for independent groups. This analysis used Welch's t-test to investigate whether mean scores between students with high and low average teacher-assessed academic performance at 11 years were different for various risk and protective factors. The output of Welch's t-test gives us t-test statistic, p-value, 95% confidence intervals and sample estimates. A significance level of 0.05 was used for the test.

Bivariable regression technique was used to examine the age-specific associations between overall teacher assessed academic performance at 6, 9, 11 years and baseline measurements in Table 4.7. Using the bivariate regression equation $Y = a + bX + \varepsilon$, the teacher-assessed academic performance as our Y (outcome) variable was regressed against individual risk and protective factors which are our X (exposure) variables. This was to examine associations between depression, behavioural outcomes and other outlined significant risk and protective factors of depression to aid in predicting teacher assessed academic performance in Pacific children.

Generalised Estimating Equations (GEE) were used to model the longitudinal data. This is a type of semi-parametric estimation used to produce reasonable estimates of population average effects (Ballinger, 2004). A cluster is made for repeated observations found for an individual participant and cluster-robust standard error were estimated. The averaged academic performance outcome by teacher assessment scores were fitted in the model for 6, 9 and 11 years. Inverse probability weights (IPW) were computed to consider missing outcomes and selective attrition over the measurement periods. Details of the included variables and the references are presented as results in Table 4.8. A further sensitivity analysis was performed to examine the sensitivity of the model fit to using arithmetic mean of overall teacher assessment versus the latent construct. The model fit was also checked using a linear mixed effects model with specific terms for cross-sectional and longitudinal effects. R (The R Foundation, Vienna, AT) was the statistical programme used for the data analysis (R Core Team, 2022).

3.4.1 Steps of Data Pre-processing

Before examination of the dataset, data pre-processing was used to transform the raw data set into an efficient format for analysis. This includes the following steps and actions:

a) Identifying outliers, incompatible, and extreme values and re-examining the original data set to make sure that values are indeed present in the original data set.

b) Graphically examining each variable for their distribution. The programme 'inzight lite' was used to visualise the distribution for each variable and comparisons between two different variables. Data was imported to the programme and the distribution was examined graphically allowing the influence of a more appropriate choice for statistical testing to be carried out.

c) Identifying missing values. Children with a measure of teacher assessed academic performance at 6, 9 or 11 years were included in the final model (N = 703). To address missing covariates and selective attrition, an inverse probability weighting adjustment was included in all analyses. Density plots were made comparing the observed data to the imputed data checking credibility of the imputed values. For each group, a logistic regression model was fitted to predict probability of inclusion at each age in the analysis cohort.

d) Converting the data into tidy data for analysis. Tidying the data consists of a data set where each variable and each individual contribute to only one cell at a time. Each cell in the spreadsheet view of the data will contain only one type of information. The tidied data set is imported to RStudio where the analysis will begin. Firstly, descriptive statistics (mean, standard deviation, no. for variable and the percentage) will be calculated for the baseline characteristics.

e) Converting data into long or wide format dependent on the context of data analysis. The wide format for data analysis was used for the bivariable association analyses in R. The long format was used within the longitudinal analysis for the repeated measure of teacher assessed academic performance at 6, 9 and 11 years. The "survey" package was used for the longitudinal analysis incorporating inverse probability weights in R (v4.0; Lumley, 2020).

3.4.2 Statistical Data Analysis

Statistical analyses for the following included:

Categorical variables such as the teacher assessed academic performance scores were described within a table of values and presented as numbers (n) and percentages of cohort (%). All key exposure and predictor variables were all numeric variables allowing the minimum, median and maximum to be calculated as well.

The bivariate analysis for assessing two numeric variables used the Pearson's Product-Moment Correlation Coefficient. To assess the associations between the risk and protective factors and teacher assessed academic performance, the teacher assessment variable was converted to a numeric variable for this to proceed. Pearson's Product-Moment Correlation Coefficient was chosen as the bivariate analysis as it is typically used for jointly normally distributed data and indicates the presence or absence of correlation between two variables and produces the exact degree to which the two variables are associated (Schober et al., 2018). These associations presented the unweighted association between the risk and protective factors and teacher assessed academic performance in Pacific children aged 11. Hypotheses of the overall analysis would be that the overall teacher assessed academic performance would be negatively associated with mental health predictors such as depressive symptoms and behavioural outcomes. Other risk factors such as gang involvement and bulling as a perpetrator and victim would also be hypothesised to be negatively associated with teacher assessed academic performance.

The longitudinal analysis investigated the repeated measure of teacher assessed academic performance at 6, 9 and 11 years and Generalised Estimating Equations (GEE) was used as the fitted model. GEEs are an extension of generalized linear models (GLMs) to longitudinal data and this method uses all the available information without excluding any individual who are missing outcomes at one or more measurement periods (Salazar et al., 2016). Using GEE requires the data to

be in the 'long form' but allows subjects to be included although they may be missing some time points. Inverse Probability Weights (IPW) were incorporated and computed to account for missing outcomes and selective attrition over measurement periods. The calibration of weights and augmented IPW have been noted to be closely related and useful for constructing practical estimators (Lumley, 2010). The "survey" package was used within the analysis also and provides 'model-robust' standard errors. The survey design was then specified with each child as its own cluster and then the model was fitted with the average teacher assessed academic performance. Change over time was also seen when the formula changed for the model fit. Interaction terms between measurement waves and key exposure variables such as internalising and externalising problem behaviours were fitted and analysed. The baseline or 2-years measurement variables that were measured prior to these exposures were included as confounding factors.

3.5 Evaluation of Methodological Choices

The methods chosen were deemed as suitable to analyse variables regarding the specific data that was available. GEE is a marginal model which seeks to model a population average. Marginal models require only a regression model for the mean response and does not require distributional assumptions for observations (Fitzmaurice et al., 2011). This allows assumptions to rely on how the mean response is related to the covariates. The mean responses and within-subject associations are modelled separately in marginal models for longitudinal data (Fitzmaurice et al., 2011). This separation modelling in marginal models allows the regression parameters to have population-averaged interpretations. These interpretations of the regression parameters are not modified by the assumptions made from within-subject correlation ultimately leading to inferences about population means being made (Zeger, 1988).

To avoid distributional assumptions, GEE is applied which is also a convenient alternative to maximum likelihood (ML) estimation. For analysis of correlated responses that are discrete or continuous, this can be provided by the GEE method. The application of marginal models to longitudinal data involves a three-part specification. These are 1) the mean response related to covariates by an identity link function; 2) assumptions of the variance of the response; and 3) within-subject correlation (Carlin et al., 1999).

A strength of GEE is that even if the assumed model for covariances across repeated measures is not correct, it still produces consistent estimators (that is, in large samples, the estimators will be unbiased and on average equal the population mean). This is due to the GEE estimator only requiring a correct model for the mean response in order to provide a valid estimate (Salazar et al., 2016). The robustness of the GEE model is clearly shown as valid standard errors are still presented when covariance structure is incorrect. This model is also most practical when the sample size is relatively large such as this analysis. In saying that, for time-varying and stochastic covariates, greater care is needed when modelling its relation to response variables. For time-varying covariates, regression parameters do not necessarily imply casual interpretations and additional assumptions may be needed. Regression parameters within this model can only be given a causal interpretation when it is assumed that covariates which are time-varying are external with compliance to the response variable (Carlin et al., 1999). Inverse probability weighted methods were also used to handle missing data due to dropout. The GEE approach was adapted to handle data missing at random by generating a model for the remaining participants in the study. This allows for inferences that are made on the initial population of Pacific children rather than the population of Pacific children who did not drop out. The weights account for under-representation of certain

responses in the observed data and are valid given that the model producing the estimated weight is correctly identified (Fitzmaurice et al., 2011).

For bivariable associations, Pearson's product-moment correlation coefficient was used to analyse numeric variables. Pearson's correlation coefficient is similar to Spearman's correlation coefficient where the correlation between two variables and the strength of the relationship is measured. The difference between these correlation coefficients is that Pearson's works with a linear relationship and raw data values whereas Spearman's works with monotonic relationships and rank-ordered variables (Schober et al., 2018). Due to the data being linear, normally distributed and variables being numeric, Pearson's correlation coefficient was deemed suitable and used for analysis.

The use of mixed effects model which is a subject-specific model was considered as this would allow estimates for different parameters for each subject to be made. The parameter estimates in mixed effects model are conditional on the subject and would provide insight into the variability between subjects. A population-level model could also be induced from an average of the subject-specific models from the mixed effects model. A mixed effects model and GEE will yield similar parameter estimates of the interpretation for this analysis when the specifications are identical and the IPW is not applied, therefore although other models were considered, due to the nature and distribution of the data and the study aim wanting to uncover population average effect of a covariate, GEE was the specified model used.

Chapter 4. Results

4.1 Introduction

The results of this study are presented and described with reference to the objectives of the study. The objective was to assess the relationship between risk factors and protective factors of depression and teacher assessed academic performance in Pacific children. Risk factors studied were depression, internalising and externalising behaviours, gang involvement, bullying as a victim or perpetrator and protective factors studied were self-description, cultural competence and special person. Teacher-assessed academic performance was measured with teacher assessment scores at 11 years and their correlation to various risk and protective factors across repeated measures at 6, 9 and 11 years form the main comparisons in this examination. Three measurement waves at 6, 9 and 11 years were used to understand the longitudinal effects of risk and protective factors and their effect on teacher assessed academic performance at 6, 9 and 11-years. Patterns across time would allow significant associations to be identified. Demographic data, descriptive data and inferential data outline the main analyses that will be presented in this chapter.

4.2 Characteristics of the Participants

The participants used for this analysis were identified from the PIF study with the requirement of having at least one completed teacher assessment at any time point at 6, 9 or 11-years. Randomly removing a child from each twin birth as well as participants having at least one completed teacher assessment at a measurement wave outlined, left a total of 703 participants. All participants had completed baseline measurements at 6-weeks postpartum with missing teacher assessment scores analysed using inverse probability weights as discussed in the methods (3.4.1).

4.3 Demographic Data

At 6-weeks postpartum, maternal interviews were carried out making up the baseline measurements for the PIF study. Of these baseline variables, nine variables were analysed in this study. These included the sex of child, household income, maternal education, social marital status, maternal postnatal depression, maternal age, maternal ethnicity, maternal English fluency and maternal country of birth and length of stay in New Zealand. Maternal and paternal love and support parenting scales were measured at the 2-year measurement wave with this variable measuring the parents love and support towards their child. The mean maternal age of mothers within this study was 28.4 years with 367 females (52.2%) and 336 males (47.8%) making up our study population. Singleton births of 692 (98.4%) describe children born singularly and not part of a multiple birth (i.e., twin births). The ethnic distribution of participants illustrates 325 (46.2%) of mothers identified with Samoan ethnicity, 154 (21.9%) with Tongan ethnicity, 117 (16.6%) with Cook Islands Māori. Of the remaining, 55 (7.8%) mothers identified with multiple ethnic groups or other Pacific ethnic groups than the above and 52 (7.4%) were of non-Pacific ethnic groups. All participants lived in Manukau, Auckland and Table 4.1 outlines in more detail the socio-demographic characteristics measured and their frequencies.

Table 4.1 Frequencies (%) of the socio-demographic characteristics of 703 participants measured at baseline

Description	n (%)	Missing n (%)
Demographic:		
Child's sex		
Female	367 (52.2%)	
Male	336 (47.8%)	
Singleton birth	692 (98.4%)	
	Mean (SD)	
Maternal age at birth	28.4 (6.3)	
Socio-economic background:		
Household income		9 (1.3%)
< $20,000	234 (34.6%)	
$20,000 - $40,000	347 (49.4%)	
> $40,000	94 (13.4%)	
Don't know; Declined	19 (2.7%)	
Maternal education		
No formal qualification	244 (34.7%)	
Secondary	268 (38.1%)	
Post-secondary	191 (27.2%)	
Social marital status		10 (1.4%)
Partnered	556 (80.5%)	
Not partnered	137 (19.5%)	
Early home environment:	*Mean (SD)*	
Maternal Postnatal Depression	6.71 (5.1)	3 (0.4%)
Mother Love and Support Scale	14.41 (4.3)	10 (1.4%)
Father Love and Support Scale	13.51 (4.6)	67 (9.5%)
Cultural environment:		
Maternal ethnicity		
Samoan	325 (46.2%)	
Cook Islands Māori	117 (16.6%)	
Tongan	154 (21.9%)	
Other Pacific	55 (7.8%)	
Non-Pacific	52 (7.4%)	
Maternal English fluency		
Not fluent	262 (37.3%)	
Fluent	441 (62.7%)	
Length of mothers' stay in NZ		2 (0.28%)
NZ born	232 (33.1%)	
PI born, >10 years in NZ	282 (40.2%)	

PI born, <=10 years in NZ	187 (26.7%)

4.4 Descriptive Outcome Data

To investigate the associations between teacher assessed academic performance scores and risk and protective factors associated with depressive symptoms, descriptive data was captured to distinguish the distribution of teacher assessment scores at 11 years. Table 4.2 presents all the teacher assessment scores for academic performance across each of the four domains (reading, oral language, written language, and mathematics). The overall assessment was scored out of five for participants at each measurement wave.

Table 4.2 Teacher assessed academic performance scores across five domains at 6-, 9-, 11-years

Teacher Assessment	Minimum	Median	Maximum	Mean (SD)	n
6-Years					
Reading	1.0	3.0	5.0	2.7 (1.20)	542
Oral Language	1.0	3.0	5.0	2.8 (1.04)	540
Written Language	1.0	3.0	5.0	2.5 (1.03)	542
Mathematics	1.0	3.0	5.0	2.7 (0.97)	542
Overall Average Score	1.0	2.8	5.0	2.7 (0.95)	540
9-Years					
Reading	1.0	3.0	5.0	3.0 (1.13)	669
Oral Language	1.0	3.0	5.0	3.0 (1.02)	668
Written Language	1.0	3.0	5.0	2.8 (1.06)	668
Mathematics	1.0	3.0	5.0	2.9 (1.03)	669
Overall Average Score	1.0	3.0	5.0	2.9 (0.95)	665
11-Years					
Reading	1.0	3.0	5.0	3.1 (1.11)	685
Oral Language	1.0	3.0	5.0	3.2 (1.01)	686
Written Language	1.0	3.0	5.0	2.9 (1.03)	685
Mathematics	1.0	3.0	5.0	3.0 (1.06)	682
Overall Average Score	1.0	3.0	5.0	3.0 (0.95)	679

For the overall assessment score, majority of participants (69.2%) scored between "3 – satisfactory" (n = 35.4%) and "2 – needs improvement" (n = 33.9%). The mean score for the overall assessment is at 3 indicating satisfactory overall teacher assessed performance scores at 11 years. Oral language presented the highest mean of 3.17 compared to all other academic subjects (reading, written language and mathematics). Written language scored the lowest mean of 2.89 out of the academic subjects.

4.4.1 Construct Validity and Reliability of Teacher Assessment Measure

The overall academic performance measure was computed based on four separate teacher-assessed performances in reading, oral language, written language, and mathematics (see Figure 1). The reliability of this measure was analysed in several steps.
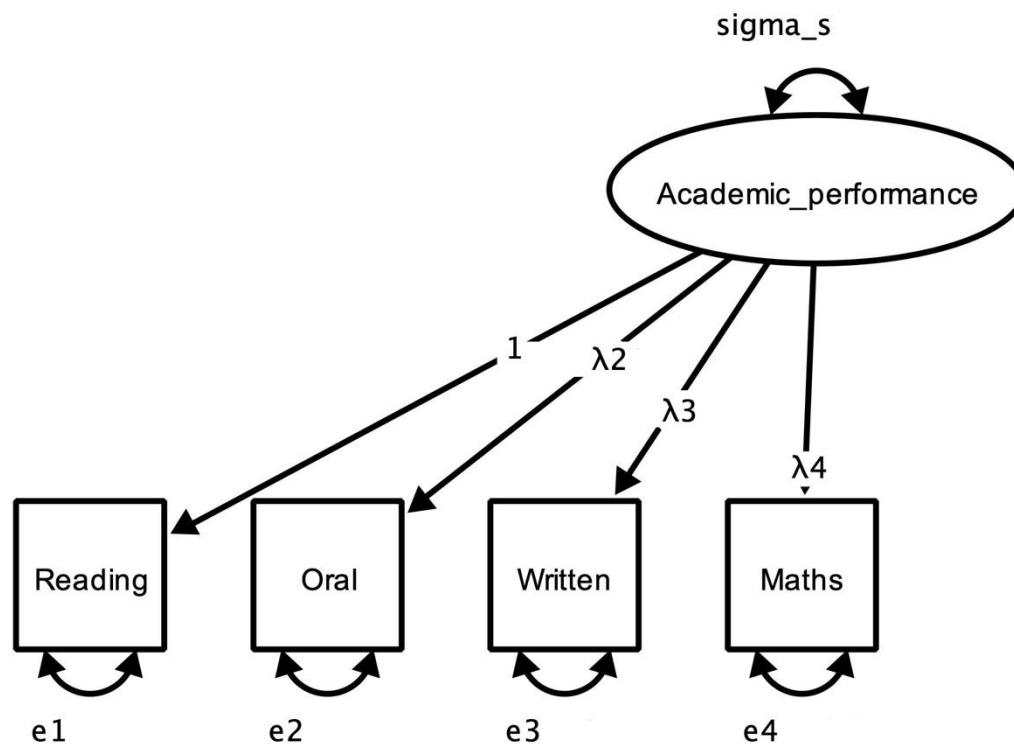
Figure 4.1 Academic Performance

First, to assess the reliability of internal test structure, Cronbach's alpha coefficient was estimated along with resampling (bootstrap) 95% confidence intervals based on 1,000 replicate samples. The Cronbach's alpha estimate was 0.92 (95% CI: 0.91, 0.93) at 6-years measurement wave.

Second, the correlation matrices were estimated using Pearson's Product Moment Correlation Coefficient method (see Table 4.3). At each measurement wave, the correlation coefficient estimates indicated a high level of linear correlation between academic subjects with estimates ranging 0.68-0.83. Each subject area showed a symmetrical distribution and hence the product moment correlation coefficients were strongly consistent with those of Spearman's rank-based correlation coefficient estimates.

Table 4.3 Pearson's product moment correlation coefficient estimates

6-Years	Reading	Oral Language	Written Language	Mathematics
Reading	1			
Oral Language	0.705	1		
Written Language	0.826	0.723	1	
Mathematics	0.737	0.678	0.789	1
9-Years				
Reading	1			
Oral Language	0.775	1		
Written Language	0.83	0.765	1	
Mathematics	0.718	0.685	0.728	1
11-Years				
Reading	1			
Oral Language	0.742	1		
Written Language	0.822	0.716	1	
Mathematics	0.758	0.641	0.776	1

Third, the fit of 1-factor model for academic performance at 6-years was tested against our dataset using the Confirmatory Factor Analysis (CFA) technique. The goodness of fit statistics (Comparative Fit Index (CFI) and Root Mean Squared Error of Approximation (RMSEA) statistics) were analysed (see Table 4.4).

Table 4.4 Goodness of fit measures from CFA

Latent Variable	Estimate	Standard Error	P-value
Reading	1.00		
Oral Language	0.77	0.033	<.0001
Written Language	0.90	0.028	<.0001
Mathematics	0.77	0.029	<.0001
Variances			
Reading	0.30	0.026	<.0001
Oral Language	0.41	0.028	<.0001
Written Language	0.14	0.017	<.0001
Mathematics	0.27	0.020	<.0001
Latent Academic Score	1.13	0.087	<.0001
RMSEA	0.031		
CFI	0.999		

In CFA, and more generally, the Structural Equation Model structure, the data matrix is fit with the model matrix, which is derived from a stated theory. The goodness of fit statistics is used to test the closeness of fit of the data matrix with the model matrix.

The commonly used statistics for goodness of fit are often assessed in conjunction, with agreement in two or more considered a reasonable weight of evidence. However, if the specified model structure has strong biological plausibility or compelling evidence and theoretical underpinning, then a poor fit statistics may indicate inadequacy of data rather than the model being invalid or implausible.

The Comparative Fit Index (CFI) is a test statistic for goodness of fit. An estimate greater than 0.9 usually indicates a good fit. The Root Mean Square Error of Approximation (RMSEA) is a measure of the closeness of fit. The lower the value, the better the fit. By convention, RMSEA of 0.05 or lower is considered evidence of better fit than higher values.

For our dataset, both goodness of fit statistics analysed above (Table 4.4) indicate a strong fit for a 1-factor model that combines all four academic subjects into a single, global academic performance score.

The CFA results also indicate that an arithmetic mean, which gives equal importance (or weighting) to each academic subject, is valid for our data with the factor coefficient estimates from the latent models ranging 0.77-0.90 at 6-years measurement wave when using reading scores as the fixed parameter. In addition, there is no prior assumption or rationale for giving more weight to a particular subject when combining these into a single global measure of academic performance. Although the CFA results provide a reasonable rationale for using the arithmetic mean as the measure of overall teacher-assessed academic performance, a further sensitivity analysis was performed for the repeated measure multivariable model using the latent variable created from four subjects. The results are discussed in the section following the main analysis.

4.5 Inferential Data

Techniques that assess the relationships between the risk and protective factors and teacher assessed academic performance scores are used within this category to make generalisations about these associations within the wider population. The research literature described various risk and protective factors that are associated with depressive symptoms. In this context, Table 4.5 assesses the correlation of particular risk and protective factors and their association to child depression measured by Child's Depression Inventory (CDI:S) as well as their relation to each other.

Age-specific associations between risk and protective factors and high teacher assessed academic performance scores at 11 years at each measurement wave of 6, 9 and 11 years are analysed secondly. These comparisons test the correlations between high teacher assessment scores in relation to the timepoints selected. Lastly the final model formula was fitted and investigated the repeated measures of teacher assessed academic performance at 6, 9 and 11 years and their association to the baseline measurements.

4.5.1 Correlation of Risk and Protective Factors at 11 Years

The cross-sectional correlation between various risk and protective factors described in Methods Chapter 3 are analysed to examine the relationship among them. The correlation estimates were computed using the Pearson's Product-Moment Correlation Coefficient.

Table 4.5 presents a correlation coefficient matrix for risk and protective factors at 11 years within the study. Strong correlations (close to 1 or -1) can be seen between externalising behaviour and the variables attention (0.602), social (0.557) and thought (0.451). Attention, social and thought variables are correlated more closely with externalising behaviour compared to internalising behaviour. Other strong correlations between variables within the CBCL measures are displayed also.

Correlations between child depression and special person (-0.345) and child depression and self-description (-0.364) result in the strongest negative associations displayed. Cultural competence and child depression (-0.191) also result in a negative association. The variables special person, cultural competence and self-description also show weak associations to all other variables within Table 4.5. Child depression correlations are also fairly associated with social (0.271), bullying as a victim (0.246) and bullying as a perpetrator (0.175) exhibiting multiple associations relating to child depression.

Table 4. 5 Correlation coefficient matrix of risk and protective factors at 11 years

Description	1	2	3	4	5	6	7	8	9	10	11	12
1. Child Depression	1											
2. Internalising behaviour	0.115	1										
3. Externalising behaviour	0.183	0.48	1									
4. Attention*	0.188	0.449	0.602	1								
5. Social*	0.271	0.58	0.557	0.522	1							
6. Thought*	0.091	0.518	0.451	0.424	0.39	1						
7. Bullying - victim	0.246	0.092	0.093	0.101	0.193	0.035	1					
8. Bullying - perpetrator	0.175	0.048	0.107	0.112	0.105	0.191	0.414	1				
9. Gang involvement	0.165	0.141	0.209	0.214	0.2	0.113	0.244	0.374	1			
10. Special person	-0.345	0.018	-0.011	-0.055	0.000	0.008	-0.06	-0.024	-0.078	1		
11. Cultural competence	-0.191	-0.077	-0.082	-0.119	-0.09	-0.075	-0.027	-0.035	-0.001	0.138	1	
12.Self-description	-0.364	-0.049	-0.045	0.111	-0.085	-0.048	-0.070	-0.162	-0.112	0.447	0.184	1

A syndrome analysed within the CBCL (Child Behaviour Checklist). Internalising behaviour is made up of the anxious/depressed, withdrawn and somatic complaints syndromes within CBCL. Externalising behaviour is made up of the rule-breaking and aggressive behaviour syndromes within CBCL.

4.5.2 Cross-Sectional Analysis of Risk and Protective Factors and High Teacher Assessed Academic Performance at 11 Years

In order to identify the relevant risk and protective factors for high teacher assessed academic performance, the various instruments measured at 6, 9, and 11 years were analysed in relation to the binary indicator for the average assessment score over 4. The mean difference between the high performers (average over 4 out of 5) and the rest of the cohort was computed for each risk and protective factor in Table 4.6.

Lower overall teacher assessment scores at 11 years were significantly associated (p<0.001) with higher externalising behavioural problems at 9 and 11 years, gang involvement at 11 years, and bullying (as both a victim and a perpetrator) at 11 years. Self-description scores at 9 and 11 years were significantly associated (p<0.005) with higher overall teacher assessment scores at 11 years. Children who reported positive perceptions about their physical abilities and relationships with their peers and parents were shown to have higher teacher assessment scores.

At 6-years, no significant associations for any risk or protective factors were associated with high teacher assessed academic performance at 11 years. Only at 9 years is where development occurs, and some longitudinal effects of risk and protective factors of depressive symptoms can be seen to have an impact on teacher assessment scores at 11 years. Special person (social support) and cultural competence although having a strong correlation to child depression measures at 11 years display no significant association to high teacher assessed academic performance scores.

Table 4.6 Age-specific associations between risk and protective factors associated with depressive symptoms at 6, 9 and 11 years and high teacher assessed academic performance scores at 11 years

Description	Excellent/Very Good score	Other score	Mean difference	P-value
	mean (SD)	*mean (SD)*	*(95% CI)*	*(2 sf)*
Age 6 years:				
Internalising behaviour	3.18 (3.96)	2.67 (3.42)	0.51 (-0.27, 1.27)	0.20
Externalising behaviour	5.0 (3.63)	5.08 (3.63)	-0.08 (-0.81, 0.64)	0.82
Self-Description	34.6 (3.89)	34.3 (4.66)	0.3 (-0.54, 1.13)	0.49
Age 9 years:				
Child depression	**2.12 (2.38)**	**3.15 (2.66)**	**-1.03 (-1.54, -0.54)**	**<0.001**
Internalising behaviour	5.29 (4.28)	5.79 (4.57)	-0.5 (-1.32, 0.34)	0.24
Externalising behaviour	**6.9 (5.22)**	**8.39 (6.13)**	**-1.49 (-2.52, -0.45)**	**0.005**
Self-Description	**32.2 (4.43)**	**30.2 (4.88)**	**2 (1.08, 2.85)**	**< 0.001**
Gang Involvement	0.38 (0.75)	0.45 (0.77)	-0.39 (-0.22, 0.08)	0.37
Bullying – Victim	2.47 (2.36)	2.78 (2.51)	-0.31 (-0.78, 0.16)	0.20
Bullying – Perpetrator	0.63 (1.17)	0.82 (1.29)	-0.19 (-0.42, 0.05)	0.13
Age 11 years:				
Child depression	**1.44 (1.87)**	**2.20 (2.39)**	**-0.76 (-1.14, -0.38)**	**<0.001**

Internalising behaviour	6.12 (4.95)	6.68 (4.71)	-0.56 (-1.47, 0.34)	0.22
Externalising behaviour	**7.19 (4.7)**	**8.76 (5.75)**	**-1.57 (-2.48, -0.66)**	**< 0.001**
Self-Description	**33.49 (3.82)**	**32.44 (4.34)**	**1.05 (0.33, 1.78)**	**0.0047**
Gang Involvement	**0.26 (0.59)**	**0.52 (0.84)**	**-0.26 (-0.38, -0.13)**	**< 0.001**
Bullying - Victim	**1.49 (2.01)**	**1.92 (2.18)**	**-0.43 (-0.81, -0.05)**	**0.026**
Bullying - Perpetrator	**0.36 (0.83)**	**0.7 (1.22)**	**-0.34 (-0.51, -0.17)**	**< 0.001**
Special Person (Social support)	40.0 (7.19)	39.31 (7.36)	0.69 (-0.64, 2.03)	0.31
Cultural Competence	3.97 (0.84)	3.94 (0.86)	0.03 (-0.13, 0.19)	0.70

4.5.3 Baseline and 2-Year Measures and High Teacher Assessed Academic Performance at 11 Years

Bivariable associations between baseline and 2-years variables and the teacher assessed academic performance at 6, 9, and 11 years were analysed using bivariable regression technique. The mean level was estimated for the reference category for each categorical variable and the mean difference was estimated for other categories for the variable. The estimates along with the 95% confidence interval (CI) estimates are presented in Table 4.7.

Table 4.7 Age-specific associations between overall teacher assessed academic performance at 6, 9, 11 years and baseline measurements

	6 years		9 years		11 years	
Description	b[a]	(95% CI)	b[a]	(95% CI)	b[a]	(95% CI)
Child sex						
Female (Ref)	2.72	(2.61, 2.84)	3.01	(2.91, 3.12)	3.12	(3.02, 3.22)
Male	-0.11	(-0.27, 0.05)	-0.23	(-0.37, -0.08) **	-0.20	(-0.35, -0.05) **
Maternal postnatal depression	-0.01	(-0.02, 0.01)	-0.004	(-0.02, 0.01)	-0.01	(-0.03, 0.003)
Household income						
<$20,000 (Ref)	2.63	(2.51, 2.76)	2.82	(2.69, 2.95)	2.95	(2.83, 3.08)
$20,001-$40,000	0.04	(-0.13, 0.20)	0.10	(-0.067, 0.26)	0.10	(-0.07, 0.26)
>$40,000	0.11	(-0.17, 0.40)	0.21	(-0.032, 0.45)	0.15	(-0.08, 0.37)
Unknown	0.06	(-0.53, 0.65)	0.08	(-0.43, 0.59)	-0.03	(-0.54, 0.49)
Maternal ethnicity						
Samoan (Ref)	2.70	(2.59, 2.82)	2.97	(2.86, 3.08)	3.08	(2.97, 3.18)
Cook Island	0.0026	(-0.23, 0.23)	-0.13	(-0.34, 0.07)	-0.17	(-0.37, 0.03)
Tongan	-0.093	(-0.29, 0.11)	-0.21	(-0.40, -0.02) *	-0.10	(-0.28, 0.09)
Other Pacific	-0.051	(-0.40, 0.29)	0.092	(-0.19, 0.37)	0.18	(-0.10, 0.46)
Non-Pacific	0.38	(0.047, 0.72) *	0.14	(-0.15, 0.43)	-0.07	(-0.36, 0.21)
Maternal age	-0.0006	(-0.013, 0.012)	0.005	(-0.007, 0.018)	0.001	(-0.01, 0.013)
Maternal education						

No formal education (Ref)	2.45	(2.32, 2.58)	2.66	(2.53, 2.78)	2.88	(2.76, 3.01)
Secondary school qualification	0.22	(0.04, 0.40) *	0.33	(0.16, 0.50) ***	0.17	(-0.003, 0.34)
Post school qualification	0.54	(0.34, 0.74) ***	0.47	(0.29, 0.65) ***	0.28	(0.097, 0.47) **
Length of stay in NZ						
Born in NZ (Ref)	2.83	(2.69, 2.97)	3.01	(2.88, 3.14)	3.05	(2.91, 3.18)
Pacific born, NZ stay >10 yrs.	-0.17	(-0.36, 0.021)	-0.11	(-0.28, 0.068)	-0.004	(-0.18, 0.17)
Pacific born, NZ stay <=10 yrs.	-0.34	(-0.54, -0.14)*	-0.23	(-0.41, -0.039) *	-0.09	(-0.29, 0.10)
Maternal English fluency						
No (Ref)	2.47	(2.34, 2.60)	2.79	(2.67, 2.91)	2.91	(2.79, 3.03)
Yes	0.37	(0.20, 0.53) ***	0.20	(0.05, 0.35) *	0.20	(0.05, 0.35) **
Maternal marital status						
Partnered (Ref)	2.7	(2.61, 2.79)	2.91	(2.83, 2.99)	3.04	(2.96, 3.12)
Non-partnered	0.01	(-0.20, 0.22)	0.03	(-0.15, 0.21)	-0.03	(-0.21, 0.15)
Maternal love and support	0.009	(-0.011, 0.030)	0.006	(-0.011, 0.023)	0.012	(-0.006, 0.029)
Paternal love and support	-0.008	(-0.028, 0.011)	-0.009	(-0.025, 0.008)	-0.008	(-0.025, 0.009)

*$p < 0.05$ **$p < 0.01$ ***$p < 0.001$, (Ref) = reference, b = Coefficient estimate, 95% CI = 95% confidence interval, b[a] reference indicates the mean level for the reference level and the mean difference for other levels.*

Sex of the child at ages 9 and 11 indicated a moderate association to teacher assessed academic performance with lower teacher assessment scores for male students at 9 years (-0.23) and at 11-years (-0.20) compared to female Pacific children. Post school qualifications for maternal education were significantly associated (p<0.001) with higher teacher assessed academic performance at ages 6 and 9. At 11 years, post school qualifications were moderately associated (p<0.01) with higher teacher assessment scores. At 9 years, secondary school qualifications for maternal education also displayed significant association to higher teacher assessment scores.

Mothers who were born in the Pacific Islands and had stayed in New Zealand for over 10 years have a significant association to teacher assessed academic performance in 6-year-old Pacific children. At 6-years, a decrease (-0.17) in teacher assessment scores were shown for children whose mothers were Pacific Island born and had stayed in New Zealand for over 10 years. Maternal English fluency was also significantly associated (p<0.001) with teacher assessed academic performance in children at 6-years-old. An increase (0.37) in teacher assessment scores at 6-years was demonstrated in comparison to mothers who were not fluent in English. At ages 9 and 11, an increase (0.20) in teacher assessment scores is presented for mothers who were fluent in English compared to mothers who were not fluent in English.

4.5.4 Repeated Measure Analysis of Teacher Assessed Academic Performance

The associations between risk and protective factors examined in earlier sections and the teacher assessed academic performance at 6, 9, and 11 years are analysed using a GEE model to estimate the population average change in academic performance over the measurement waves. The results of the multivariable model that incorporates various predictors are presented in Table 4.8.

Table 4.8 Repeated measures of teacher assessed academic performance at 6, 9 and 11 years

Predictor	Estimate	Std. Error	2.5% CI	97.5% CI	t value	Pr(>|t|)
Internalizing behaviour (6, 9, 11yr)	0.01	0.01	0.00	0.02	1.60	0.1107
Externalizing behaviour (6, 9, 11yr) *	-0.03	0.01	-0.04	-0.02	-4.39	**< 0.001**
Self-Description (6, 9, 11yr) *	0.03	0.01	0.02	0.05	6.28	**< 0.001**
Child Sex: Male*	-0.14	0.06	-0.25	-0.03	-2.47	**0.0137**
Maternal postnatal depression score (Baseline)*	-0.01	0.01	-0.02	0.00	-2.11	**0.0355**
Household Income (Baseline) Ref: <$20,000						
$20,001-$40,000	0.03	0.07	-0.12	0.17	0.37	0.7141
>$40,000	0.07	0.10	-0.13	0.28	0.71	0.4772
Unknown	-0.01	0.21	-0.42	0.41	-0.03	0.9788
Maternal Ethnicity (Baseline) Ref: Samoan						
Cook Island	-0.08	0.09	-0.25	0.10	-0.87	0.3871
Tongan	0.03	0.08	-0.13	0.19	0.38	0.7020
Other Pacific	0.00	0.13	-0.25	0.25	-0.01	0.9893
Non-Pacific Island	-0.05	0.13	-0.30	0.20	-0.42	0.6769
Maternal Age (Baseline)	0.01	0.01	0.00	0.02	1.33	0.1855
Maternal Education (Baseline) Ref: No Formal Education						
Secondary School Qualification*	0.16	0.07	0.02	0.30	2.32	**0.0207**
Post-Secondary School Qualification***	0.32	0.08	0.16	0.47	3.92	**< 0.001**
Maternal Fluency in English (Baseline)^	0.14	0.07	-0.01	0.29	1.89	0.0590
Length of Stay in New Zealand (Baseline) Ref: Mother New Zealand Born						
Mother Born in Pacific, in New Zealand >10 yrs.	-0.05	0.08	-0.22	0.12	-0.59	0.5584
Mother Born in Pacific, in New Zealand <=10 yrs.	-0.09	0.09	-0.27	0.09	-1.00	0.3158
Maternal Marital Status: Not Partnered	0.05	0.09	-0.12	0.22	0.61	0.5409
Maternal Love & Support (2yr) **	0.03	0.01	0.01	0.05	2.63	**0.0088**
Paternal Love & Support (2yr) *	-0.03	0.01	-0.05	-0.01	-3.57	**< 0.001**
Measurement Wave: Ref: 11yr						
6yr Measurement Wave***	-0.65	0.09	-0.84	-0.47	-7.06	**< 0.001**
9yr Measurement Wave^	-0.14	0.08	-0.30	0.01	-1.82	0.0693
Interaction (6yr Wave and Externalizing behaviour) **	0.04	0.01	0.01	0.06	2.90	**0.0039**
Interaction (9yr Wave and Externalizing behaviour)	0.01	0.01	0.00	0.03	1.35	0.1782

*p < 0.05 **p < 0.01 ***p < 0.001*

CBCL internalizing variable compiled of somatic, anxious and withdrawn scores. CBCL externalizing variable compiled of aggressive and rule breaking scores. Positive self-description variable consists of self-description questions with "I am" positive self-concept. Measurement wave reference = 11 years.

Predictor variables of externalising behaviour, self-description, male sex, postnatal depression, maternal higher educational qualification and paternal love and support were shown to have statistical significance in relation to teacher assessed academic performance at 6, 9 and 11 years. Positive self-description and post-secondary school qualification of mothers and maternal love and support at 2 years are associated with higher academic performance at 6, 9 and 11 years.

Pacific children who are males indicated a 0.14 drop in teacher assessment scores compared to female Pacific children. Household income and maternal ethnicity have signified no bearing or major impact on a child's teacher assessed academic performance. Within maternal education, a 16% increase in teacher assessment scores for children with mothers having a secondary school qualification are measured. An even higher increase (0.32) in teacher assessment scores is presented for mothers with a post-secondary qualification across ages 6, 9 and 11.

A dose response relationship is evident for the interaction between externalising behaviour and 6-year wave. The interaction terms show this difference (0.04) indicating that higher externalising problem behaviours is associated with lower teacher assessed academic performance. With the baseline teacher assessment scores set at 11 years, this interaction between externalising behaviour and year progression shows a new trend presenting teacher assessed academic scores to be better at 6-years and at 11-years this drops. As externalising behaviour increases, this leads to a -0.03 estimate drop in teacher assessment scores in subsequent years. Between 11 years and 9-years, a -0.14-estimate drop is shown and between 11 years and 6-years, a -0.65-estimate drop is described. As the years progress from 6 to 9 to 11 years, if externalising behaviour remains, this outlines a greater decrease in teacher assessed academic performance for Pacific children living in New Zealand. This indicates a near causal association between externalising behaviour and poor teacher assessed academic performance.

Paternal love and support scores were significantly associated with teacher assessed academic performance with higher paternal love and support scores being associated with lower teacher assessment scores. A -0.03 drop is shown whereas a 0.03 increase is found in teacher assessment scores for maternal love and support scores. Measurement waves exhibit a positive trend with teacher assessed academic performance improving overtime.

4.5.5 Sensitivity Analysis: Latent Variable of Teacher Assessed Academic Performance

The repeated measure multivariable regression models were fitted using the latent variable (computed as the fitted values from the CFA analysis) as the outcome variable in this analysis to assess the sensitivity of the regression results to this latent construct compared to those of the model using the arithmetic average (or mean) score as the outcome variable.

The full model results were consistent with those of the arithmetic mean outcome scores. The multivariable regression model showed a sign of improvement in global academic performance for the PIF students from age 6 to 11 years. We also detected negative associations between student's externalising problem behaviours and the academic performance. Higher self-description scores which measure positive self-concept showed positive relationships with the academic performance.

4.5.6 Sensitivity Analysis: Linear Mixed Effects Model

The GEE model results are expected to be similar to the results of linear mixed effects (LME) model. A sensitivity analysis was performed using the LME model technique with separate estimation of between-subject and within-subject changes in the exposure variables. Overall, the results were similar to the model in Table 4.8 suggesting that the main driver behind the changes and differences in teacher assessed academic performance was the between-subject differences and population mean changes. The results of LME also reinforce the interpretations made above and highlight the time-stable effects of externalising behaviours and self-concept factors on the academic outcome.

4.5 Summary of Significant Findings

Externalising behaviour, gang involvement and bullying (as a perpetrator) act as risk factors for lower teacher assessed academic performance at 11 years. Depression acts as a risk factor for low teacher assessment scores at 9 and 11 years. Higher self-description at 9 and 11 years are protective factors against low teacher assessment scores at 11 years. Externalising behaviour for all time points and paternal love and support decreases teacher assessed academic performance for each year. Externalising behaviour over subsequent years leads to a decrease in teacher assessment scores. Positive self-description and post-secondary school qualification for mothers' increases academic performance in children aged 6, 9 and 11 years.

4.6 Limitations of Analysis and Potential Future Research

Limitations can include self-reported data and missing data. Self-reported measurements are acknowledged to lead to underreporting. Missing data for various years can also limit the strength of the data shown as key results may be missed. However, in large scale studies such as this, the measurements used would be the most practical option and weights can be computed to render the data more representative. Although shown to be associated with teacher assessed academic performance scores, the Child Depression Inventory (CDI) measure was only available for 9 and 11 years and was not included in the longitudinal analysis of 6, 9, and 11 years. Future research looking at latent variable of internalising and CDI depression scores will be considered.

For teacher assessment scores of Pacific participants, these evaluations were only carried out for ages 6, 9 and 11 years. After the 11-year phase, teacher assessments did not continue therefore limiting possible research and potential future analyses of various ways to measure academic performance. The subjectivity around using teacher assessment as a means of assessing academic performance is also a limitation of this analysis. A more objective measure such as standardised test results could lead to more conclusive findings regarding associations between academic performance and the variables measured. The academic performance variable also summed together scores from reading, writing, oral language and mathematics. Potential future research adding to this analysis could analyse the specific individual subjects of academic performance.

The significance of this study is that mental health education has been voiced by Pacific youth and children as an important topic that needs to be taught in school (Le Va, 2017). Associating specific risk and protective factors with academic performance can potentially indicate what changes need to be made and contribute to decreasing mental health issues hindering academic performance in Pacific children and youth.

Chapter 5. Discussion

5.1 Overview of the Findings

The focus of this research was to study risk and protective factors associated with depressive symptoms illustrated by reviewed literature and their effect on teacher assessed academic performance in Pacific children using data on a large cohort of Pacific participants. Within this cohort, teacher assessed academic performance of New Zealand-born Pacific children and their association to risk and protective factors at ages 6, 9 and 11 years were used to assess the longitudinal effects these factors had on teacher assessment scores.

A cross-sectional analysis was performed first to examine the relationship between various risk and protective factors and teacher assessment at 11 years. The majority of teacher assessment scores at 11 years were measured within the *satisfactory* and *needs improvement* domains. Risk and protective factors were then required for further examination against teacher assessment scores, but for this to occur the chosen factors were compared to child depression evaluating if these factors were in fact risk and protective factors of depression. Correlations between the chosen factors were then analysed to determine the strength of their association to one another especially to child depression. Negative correlations between *cultural competence* and *special person* variables to child depression were presented with these two variables acting as protective factors against child depression. Gang involvement, bullying (as a victim and perpetrator), attention, social and thought problems and internalising and externalising behaviour variables measured a positive correlation for child depression acting as risk factors for child depression.

Upon additional analysis, the bivariable associations between high teacher assessed academic performance at 11 years and risk and protective factors at 6, 9 and 11 years were then investigated. Findings within this analysis indicated risk factors of child depression and externalising behaviour being associated with lower teacher assessed academic performance and the protective factor of self-description being associated with higher teacher assessment scores both at 9 and 11 years. Other risk factors were also significantly associated with lower overall teacher assessment scores at 11 years. These findings indicate the strong influences that particular risk and protective factors have on teacher assessed academic performance in 11-year-old Pacific children.

Mothers of the Pacific children participating in this study all undertook maternal interviews at 6-weeks postpartum comprising the baseline measurements for this study. Background information of the participants familial, environmental, social and cultural factors were measured and deemed important, therefore associations between baseline measurements and teacher assessed academic performance at 6, 9 and 11 years were measured. When analysing the Pacific families' sociodemographic background, some features had considerable influences on teacher assessed academic performance at 11 years.

Mothers who had achieved post school qualifications were significantly associated with higher teacher assessment scores in Pacific children aged 6, 9 and 11. Mothers who had achieved even secondary school qualifications also indicated an association to higher teacher assessment scores compared to mothers who had no formal qualifications. Similarly, maternal English fluency at ages 6, 9 and 11 also gave significant associations to an increase in teacher assessment scores. Interestingly, at age 6, mothers who were born in a Pacific Island and had stayed in New Zealand for longer than 10 years showed an association to lower teacher assessment scores. Important insight into the

influence of baseline measurements on teacher assessment scores in Pacific children were studied within this specific analysis.

Lastly, repeated measures across 6, 9 and 11 years investigating the longitudinal effects of baseline measurements and variables measured at each of these specific time points were studied. Important findings included Pacific male children achieving lower teacher assessment scores across these subsequent years compared to the Pacific female children. Surprisingly, paternal love and support measured at 2-years were associated with lower teacher assessment scores in 11-year-old Pacific children whereas maternal love and support scores exhibited an association to higher teacher assessment scores.

Secondary school qualifications and post-secondary school qualifications in mothers indicated an increase in teacher assessed academic performance in their children compared to mothers with no formal qualification. These findings align with previous analyses above which indicate the same results. The interaction between externalising behaviour and year progression from the repeated measures shows an interesting trend of teacher assessed academic performance scores being higher at 6-years compared to 11-years. The impact of this describes that over the years from 6 to 9 to 11 years, if externalising behaviour remains an issue within Pacific children, a drop in high teacher assessment scores will be seen indicating a near causal association between externalising behaviour and poor teacher assessed academic performance. This result gives substantial evidence on the longitudinal effect of externalising behaviour on Pacific children and its influence on teacher assessed academic performance over time. Overall, this study found that various risk and protective factors associated with depressive symptoms and socio demographic factors can significantly influence whether higher or lower teacher assessment scores are achieved in Pacific children at 11-years of age.

5.2 Interpretation and Implications

This section consists of the main interpretations of the analyses providing implications of the study relating to the role of risk and protective factors in academic performance, the role of socio demographic factors in Pacific children's academic performance and teacher education within a Pacific context. Limitations and strengths of the analyses are addressed with future directions of the research being suggested and identified. Recommendations for Pacific health providers, policy makers, parents and educators are also discussed.

5.3 Measurement of Academic Performance by Teacher Assessment Scores

Academic performance of Pacific children in this study was measured by teacher assessment scores. Teacher assessment scores are based on the teacher's judgement of the student's academic performance in school scored within four domains (reading, writing, oral language, and maths).

As a measure of academic performance, teacher-based assessments have been shown to have a high validity level for being an accurate measure of students' achievement level (Hoge & Coladarci, 1989; Südkamp et al., 2012). An important part of a teachers' profession is to have the ability to accurately assess students' academic achievement (Ready & Wright, 2011). Teaching philosophy, job experience and professional goals were all seen in the same study as characteristics influencing teacher's judgement on academic performance in students. For ethnic minority students, greater accuracy of teachers' judgement was also found (Kaiser et al., 2017). Although scholastic scores

were not used to assess academic performance in this study, sufficient evidence shows teacher assessment scores as practical in the use of determining academic performance in Pacific children.

5.4 Effects of Risk and Protective Factors on Academic Performance

Risk and protective factors of depression were used to study their effect on the academic performance in Pacific children. Further insight on the impact these factors had on the academic performance of Pacific children in this study are discussed below.

5.4.1 Depression

Depression is a commonly known mental health issue that has been linked to interfering with educational experiences and close relationships in young people (Kelvin, 2016). Within this study, conclusions were made indicating that child depression was significantly associated with lower teacher assessed academic performance in Pacific children at ages 9 and 11 years. Most of the findings pertaining to depression and low academic performance in children are congruent with cross sectional studies.

In a cross-sectional study by Owens et al., (2012), 80 participants from ages 12 to 13 years indicated that higher levels of both depression and anxiety were significantly associated with lower academic performance. These findings from Owen's research correspond to the results in this study with depression at ages 9 and 11 being linked to lower academic performance. Other main findings in their study included the discovery of mediating factors and their relationship in influencing academic performance in children (Owens et al., 2012). The reviewed literature also supports further evidence of a significant association between academic performance and depression in children (Son & Kirchner, 2000; Paterson et al., 2014; Jaureguizar et al., 2017). For Pacific children, a study by Paterson et al. (2014) reiterates the significant association between high teacher assessed academic performance and low depression scores. A bidirectional relationship between depression and academic performance has been developed in other studies where high levels of academic performance were protective against depressive symptoms as well (Moilanen et al., 2010).

The importance of understanding various mechanisms involved in this relationship implies that there are many factors that can influence the onset of depression in children and affect their academic performance. This result indicates that researching more about mechanisms and other factors involved with depression in children can help in reducing the causes of it by understanding specific targets (Fröjd et al., 2008). Academic performance could also serve as an indication of depression in a child and knowing what risk and protective factors are involved can aid in combating the prevalence of this mental health issue in Pacific children.

5.4.2 Externalising and Internalising Behaviour

In this research study, through both bivariable and multivariable associations, externalising behaviour in Pacific children was significantly linked to lower academic performance assessed by teachers. Repeated measures of externalising behaviour at 6, 9 and 11 years displayed a prolonged effect where an increasing decline in academic performance is seen if externalising behaviour continued over the years in Pacific children. For internalising behaviour, no significant associations were found between academic performance and internalising behaviour within this study.

Mental health problems are a universal phenomenon reporting an inverse relationship with educational attainment (Agnafors et al., 2012). In Agnafors et al. (2020) longitudinal study with a

cohort of 1,700 children, mental health problems in early childhood and adolescence increases the risk for poorer academic performance. Findings from their study included externalising behavioural problems and emotional problems at age 3 being associated with lower performance grades at the age of 12. Their study indicated the long-term effects of mental health problems at a young age and its impact on academic performance at adolescence.

Agnafors et al. (2020) study along with other previous research describes the negative effects of externalising behaviour on academic performance in children and adolescents (Vaillancourt et al., 2013; Chen et al., 2019; Arslan, 2021). Young people with lower academic attainment were also shown to exhibit greater externalised behavioural problems introducing evidence of a bidirectional relationship that may exist between these two variables (Kulkarni et al., 2020). Externalising behaviour is measured from rule-breaking and aggressive behaviour within the CBCL measurement. Rule-breaking behaviour is negatively associated with teacher-student affiliation which disturbs the relationship between both groups (de Laet et al., 2015). Teacher assessed academic performance was the measurement used to score academic performance in Pacific children. Although using teacher assessment scores have been deemed appropriate for this analysis, an underlying factor implied from de Laet et al. (2015) study is that the teacher-student relationships are more likely to have a negative association to each other compared to internalising behaviour. Aggressive outbursts in class and rule-breaking in children can indicate to teachers a lack of discipline in following rules and teacher assessed academic scores can be altered by this (Mercer & DeRosier, 2008). In contrast, internalising behaviour is made up of scores from withdrawn, depressed and anxious behaviour in which teachers find less bothersome in comparison to externalising behaviour (Liljequist & Renk, 2007). Internalising behaviour although being an issue within the child is harder to explicitly see and teachers may deem this behaviour as good listening skills rather than withdrawal allowing teacher assessed academic scores to be less significantly associated than externalising behaviour.

Multiple research studies have found the same negative association of externalising behaviour and academic performance, but for internalising behaviour, inconsistencies in findings can be found. Studies such as Margetts (2005) associates internalising and externalising behaviour as both significant negative correlations to academic performance contrasting the findings concluded for internalising behaviour within this study. A study by van der Ende et al. (2016) presents externalising but not internalising behaviour being a predictor of poor academic performance in children. Arslan (2021) also displays internalising behaviour not having a significant effect on academic performance in children coinciding with results outlined in this study.

A study by Paterson et al. (2014) communicates internalising behaviour reporting higher levels of depressive symptoms at 9 years in Pacific children. Internalising behaviour is known to measure behaviours of depression under this syndrome and other research has shown depression to be significantly related to lower academic achievement and school dropouts (Owens et al., 2012; Quiroga et al., 2013). Although internalising behaviour within the present study was not directly shown to be significantly associated with lower academic performance, other findings suggest internalising behaviour to increase the risk of lower academic performance due to its role in increasing higher levels of depressive symptoms or peer victimisation (Espelage et al., 2013).

In Pacific children, multiple factors are shown to be significantly associated with externalising and internalising behaviour (Paterson et al., 2012). Various factors are associated with externalising and internalising behaviour suggesting the need for exploring mediating factors between behavioural outcomes and academic performance. The present study specifies the need for targeting externalising behaviour for future intervention programmes in increasing academic performance in Pacific children. It serves as a reminder for the need to provide fair opportunities to education and

that in the years of childhood to adolescence, these years are crucial in nurturing and setting the child up for success.

5.4.3 Gang Involvement

Within this study, gang involvement was shown to be significantly associated with lower teacher assessed academic performance at 11 years in Pacific children with no significant associations found at 9 years. Research by Martinez et al. (2014) indicated poor school performance to be linked as a primary predictor for eventual gang involvement. Not only is gang involvement shown to be associated with lower academic performance, but this study amplifies the reverse relationship of early academic failure being associated with gang involvement (Thornberry et al., 2003; Herrenkohl et al., 2001). Children and youth involved in gangs explicitly showed more aggressive behaviour relating to externalising behaviour (Macfarlane, 2018). Actions directed from gang involvement such as aggressive behaviour can elicit externalising behaviour relating to lower academic performance from factors such as difficulty in following rules (Bergin & Bergin, 2014). Academic failure, dropping out of school and a lack of commitment to school are all consequences associated with gang membership (Alleyne & Wood, 2010).

The role of teachers and teacher knowledge of student culture has been perceived to influence student engagement and learning outcomes (van Vuuren, 2016). Nakhid et al. (2009) highlights the significance of family and their role in gang involvement in Pacific Island youth. Expectations from family greatly influenced Pacific Island youth in gangs. These results came from students leaving school early and gives an indication that family can influence gang involvement within young people further influencing academic performance in Pacific children.

The most common age for youth to join a gang is around the age of 15 (National Gang Center, 2015). Early adolescent years from 12-14 years were stated as a crucial time where exposure to gangs may be considered. Reasoning behind no significant association being found in gang involvement at 9 years and academic performance at 11 years may be due to children at age 9 not being at the perceived age were considering joining a gang is more prominent. At 11 years, gang involvement is significantly associated with poor academic performance which is near the adolescent years outlined as most important. This finding illustrates the influence gang involvement has on young people and the consequences it has on academic performance.

Research by Poulter (2017) who studied this same cohort of Pacific children analysed a high correlation between Pacific children having family members part of a gang and internalising and externalising behaviours. Aspects of gang involvement may be associated more with other factors that influence academic performance hence showing the relation outlined in this study. Further research is again needed to provide more insight into this relationship and how other variables for gang involvement and academic performance are interlinked and relate specifically to Pacific children.

5.4.4 Bullying Victimisation and Perpetration

Bullying in Pacific children at 11 years-of-age in this study was significantly associated with lower academic performance. Both being a victim of bullying and a perpetrator of bullying had significant associations to lower academic performance at 11 years, but no significant associations were found at 9 years in Pacific children.

Findings within this study coincide with the reviewed literature outlining lower academic performance being associated with bullying victimisation and perpetration of bullying (Juvonen et al., 2010; Lacey & Cornell, 2013; Riffle et al., 2021). Research by Riffle et al. (2021) discussed other behaviours such as expulsion and suspension being associated with bullying perpetration and school avoidance being associated with bullying victimisation. These other behaviours were used as further explanations to explain the association seen between high engagement in bullying and low academic performance. School bullying was also shown to affect students' connectedness to the school community evidently leading to lower students' academic performance (Huang, 2022). This same study observed increased bullying victimisation or bullying climate relating to lower academic performance specifically in science, maths and reading subjects.

Individual factors such as age and gender were explored in Atik and Güneri (2013) study as stronger predictors of discriminating bullies from uninvolved students. Increased age was described as increasing the likelihood of students being a bully compared to not involved. Results from this study relate to these findings as significant associations for both bullying victimisation and bullying perpetration were found at 11 years but not at 9 years in Pacific children. The role of increased age in students suggests 11-year-old participants to be more significantly associated with bullying compared to 9-year-olds. This is because increased age gives a stronger prediction of the increased prevalence of bullying.

In Pacific children, bullying has been significantly associated with higher depressive symptoms (Paterson et al., 2018). Pacific children who were victims of bullying showed higher internalising behaviour whereas those who were perpetrators of bullying displayed a higher frequency of externalising behaviour (Poulter, 2017). Bullying has been shown to be associated with different factors associated with lower academic performance. Further research of the interrelatedness between these factors and how strongly they influence each other could give more information on which factors coupled together and individually affect lower academic performance in Pacific children.

5.4.5 Protective Factors of Self-Description, Cultural Competence & Special Person

Self-description, cultural competence and special person variables analysed in this study were protective factors of depression. Significant associations were found between self-description and academic performance with higher academic performance being related to self-description at 9 and 11 years. The repeated measures over 6, 9 and 11 years reinforce the same finding of higher academic performance for self-description. Cultural competence and special person variables showed no significant associations to academic performance at 11 years.

As discussed in the reviewed literature, most research refers to self-description as self-concept which both have an equivalent meaning of "a person's perception of himself" (Shavelson et al., 1976). A positive relationship between academic achievement and academic self-concept is a central finding in studies (Jansen, 2014; Prince & Nurius, 2016; Wang & Neihart, 2015). In an overview study by Rüschenpöhler and Markic (2019) on self-concept research, evidence veers towards a causal relationship between both self-concept and academic achievement. Positive self-description has positive effects on academic performance leading to a more positive self-concept. Although a positive trend is shown for positive self-description, a study by Arens et al. (2016) warns us of the negative effects on self-concept for children transitioning from primary to secondary school. Young people at this age are still developing their self-concept with their beliefs about their abilities being less stable compared to adults. This regards self-description as not only an important factor

influencing higher academic performance in children, but for ages 6, 9 and 11, this transitional age is crucial in building their confidence and positive self-description to later lead to an influence in higher academic performance and a greater positive self-concept afterwards (Rüschenpöhler & Markic, 2019).

From a Pacific perspective, research by Manuela & Sibley (2013) looked at ethnic identity and the notion of self-concept for Pacific people. The factors of the relationship between one's identity and particular cultural aspects of wellbeing present the idea of a Pacific self-concept. Adopting a Pacific lens is important when referring to the self-concept of a Pacific individual. Manuela & Sibley (2013) portray the significance of understanding that a Pacific individual may view themselves holistically that can influence their identity and wellbeing and hence their self-concept. Although cultural competence did not show significant association to higher academic performance in Pacific children in this study, other research affirms the idea of cultural competence and self-concept being intertwined for Pacific people (Manuela & Sibley, 2013). Research by Coggins & Campbell (2008) outline how cultural competence embedded in schooling for minority students can be used to close the academic achievement gap. This suggests that if cultural competence was integrated into the curriculum, a more significant association to higher academic performance in Pacific children may have been shown.

Having a special person that provides emotional support in children has been associated with reducing academic stress (Luo et al., 2020). Peer emotional support from teachers and parents have shown to have a positive association to academic self-concept and school engagement (Wang & Eccles, 2013). Within the present study, no significant associations were found between having a special person and academic performance. Interestingly, Wang and Eccles (2013) show that emotional support leads to positive academic self-concept within students. This implies that having a special person may not be directly associated with academic performance, but the emotional support provided by a special person may provide a greater influence on the academic performance in children.

The main outcome of these findings highlights the importance of self-description in Pacific children. Positive self-description is shown as more significant in influencing higher academic performance compared to their cultural competence knowledge and a special person of comfort in their lives. Self-description in children at ages 6, 9 and 11 years is important as these transitional years can greatly influence a negative or positive effect on academic performance in later years. A child's connection to their Pacific culture and language may support their own cultural competence and sense of cultural identity, but in this study, it has shown that other protective factors are more significant in higher academic performance.

5.5 Socio Demographic Factors and Their Effect on Pacific Children's Academic Performance

Socio demographic factors were measured in maternal interviews at baseline including factors of child sex, maternal postnatal depression, household income, maternal ethnicity and age, maternal education, length of stay in New Zealand, maternal English fluency and maternal marital status. Parental love and support scores measured at 2-years are also included as an early childhood environmental and family influence factor. These factors were analysed regarding their association to academic performance in Pacific children and are discussed in more detail about the insight their findings portray and how this relates to Pacific children living in New Zealand.

5.5.1 Sex of Child

The child's sex was measured as the biological sex of the child at birth including only two categories of male and female. No children were born with ambiguous genitalia in this study and the child's sex was not induced to any changes over the years regarding gender changes. Findings from this study indicate females having an overall higher academic performance compared to boys at ages 6 and 11 years. Surprising results include boys at 9 years displaying higher academic performance compared to girls. Repeated measures across 6, 9 and 11 years show a significant association between lower academic performance and Pacific male children.

A study by Ghazvini & Khajehpour (2011) examined gender differences with girls having a more adaptive approach to learning tasks. This same study discussed girls having a greater use of significant learning strategies while also taking more responsibility for their academic failures in comparison to the boys. The findings in their study were associated with the reasoning of girls obtaining higher results in literature subjects and could affirm why girls were shown to have higher academic performance in our study. Gender differences - as many studies have described, mostly reflect girls being better performers than boys with reasoning behind this being due to various cultural, social and developmental factors (Alghadir et al., 2020).

5.5.2 Maternal Postnatal Depression

Academic performance analysed individually at 6, 9 and 11 years and their bivariable association to maternal postnatal depression indicated no significant associations. However, across repeated measures over 6, 9 and 11 years, a significant multivariable association was found with maternal depression imposing a significant relation to lower academic performance in Pacific children.

Prior research has explored and posited a negative association between maternal depression and academic achievement in children (Claessens et al., 2015; Ng-Knight et al., 2017). The persistence of maternal depression and its effect in later academic performance is highlighted as an important aspect of this relationship. Claessens et al. (2015) study highlights this same outcome with mothers with depression in both kindergarten and third grade being associated with more negative school-related outcomes in later years of the child. Their study also indicates that single episodes of depression in mothers had few negative associations with achievement outcomes. This reasoning relates to no significant associations found at specific timepoints of 6, 9 and 11 years in this study. Maternal depression that is persistent over the years impacts negatively on a child's academic performance whereas episodes of depression that are not continuous account as less significantly related to lower academic performance in children.

A strong association to a higher risk of depression in children from postnatal depression is shown in longitudinal findings (Murray et al., 2011). Depression has been significantly related to an increase in lower academic performance and may act as a mediating factor connecting maternal postnatal depression to lower academic performance in children also. Alternatively, maternal postnatal depression may be a relevant confounding factor in the association between child behavioural and emotional health and educational outcomes. Although specific studies investigating Pacific children academic performance and maternal depression were not clearly observed, prior research gives substantial implications of the significance of maternal depression in children which can be applied as some of the reasoning for these findings.

5.5.3 Household Income

Household income within Pacific families was shown to have no significant relation to academic performance in Pacific children at the age of 6, 9 or 11 years. Measuring the longitudinal outcomes of academic performance, household income was still displayed as having no significant association to academic performance.

A vast literature on the effects of low household income and poorer academic performance in children gives contrary evidence to the findings found in this study (Morrissey et al., 2014; Hair et al., 2015). Abundant research has shown the effects of lower household income impacting on a child's academic performance through various aspects of mental health, parental education, parental beliefs of school and socioeconomic status (Ferguson et al., 2007; Aslam & Kingdon 2012; Zheng, 2018). Through different factors produced due to lower household income, this association to lower academic performance in a child is therefore concluded.

Within Pacific families living in New Zealand, family income during early childhood (0-5 years) affects educational achievement within children at primary school (Craig et al., 2010). Socioeconomic position and access to educational resources were also highlighted as important aspects in influencing academic performance in Pacific children. The impact of positive factors such as parental expectation, social networks, community engagement and peer influences were regarded as enhancements of children's education as well. Although this research suggests no significant association between household income and academic performance in children, it implies the significant impact that other factors may have on academic performance in Pacific children. More research within this cohort on mediating factors for household income and academic performance is needed.

5.5.4 Maternal Ethnicity and Age

Non-Pacific mothers showed a significant association to an increase in the academic performance of their child at 6 years old. Tongan mothers indicated a negative association to academic performance in their child at 9 years old. The longitudinal effects over 6, 9 and 11 years of Pacific children indicated no significant associations or differences across the ethnicities of Samoan, Cook Island, Tongan, Other Pacific and Non-Pacific Island. Maternal age reveals no significant associations to academic performance in Pacific children as well.

A study by Tiatia-Seath et al. (2017) exhibited findings of Tongan youth (less than 15 years-of-age) having the highest suicide rate being the most at-risk group analysed. Tongan youth were also described to be less likely to report depressive symptoms compared to Samoan youth (Paterson et al., 2018). These findings demonstrate a need for ethnic differences and culturally specific beliefs about mental health within the Tongan culture to be understood more. Culture is an important part of life and future research is needed to investigate the underlying factors involved. This will allow a wider understanding of Tongan culture and therefore the implications it has on the results found in this study.

Children that are both Pacific and non-Pacific in ethnicity were less likely to receive a literacy intervention used to identify difficult literacy needs (Schluter et al., 2018). This same study explains that these children are more likely to be multilingual with evidence suggesting an improved academic performance compared to monolingual peers. For non-Pacific mothers who have a Pacific partner, two languages within the home can build up the child to be multilingual. With improved academic performance seen in multilingual children, implications suggest an explanation to why

non-Pacific mothers are associated with higher academic performance in 6-year-old Pacific children. Further study is again implied to solidify these implications with evidence.

5.5.5 Maternal Education

Higher forms of maternal education were significantly associated with higher academic performance in Pacific children. Post-secondary school qualifications were more significantly associated with higher academic performance compared to secondary school qualifications in mothers. Multiple research literature aligns with the findings in this study discussing how higher maternal education increases the academic performance in their child (Wang, 2009; Awada & Shelleby, 2021). Reasoning behind maternal education having such an impact includes mothers of higher education being embedded in social networks that contain access to resources relevant to bettering the academic performance of their children (Harding et al., 2015). Maternal education was also positively correlated with providing learning opportunities for children implying a higher academic achievement (Farley & Piasta, 2019). In Pacific mothers, low maternal education is indicated as a risk factor for youth depression with children of more highly educated mothers presenting fewer depressive symptoms (Paterson et al., 2018). This along with other reasons above may indicate the many factors involved in maternal education being associated with higher academic performance in Pacific children.

5.5.6 Length of Stay in New Zealand

In this study, mothers who were born in a Pacific Island and had stayed in New Zealand for over 10 years were indicated to have a negative association to academic performance in 6-year-old Pacific children compared to the reference of New Zealand born mothers. An interesting negative association between mothers who were Pacific born and had stayed in New Zealand for less than 10 years also indicated a significant association to lower academic performance in Pacific children aged 9 years old. Across repeated measures of 6, 9 and 11 years, no significant associations were developed when controlling for other measures.

Length of time in New Zealand is positively associated with higher standardised acculturation scores (Schluter et al., 2011). For Pacific mothers, their length of exposure to New Zealand culture and people proportionally affected their inclination towards NZ culture and the people. Findings in their study show that Pacific mothers immigrating to New Zealand held onto their strong Pacific cultural ties for approximately 12 years after immigrating (Schluter et al., 2011). After these 12 years, the strength of this inclination decreases, veering towards the level at which mothers who have lived here their entire lives are at. In relation to the present study, significant associations could be attributed to acculturation. With Pacific mothers holding onto their strong cultural values, this could influence the rate of school readiness and hence academic performance in Pacific children. The cultural environment Pacific children are exposed to at 6 years is important in establishing strong English-receptive skills (Kim et al., 2019). As part of academic performance, the effects of acculturation and its influence on the length of time stayed in New Zealand would give a better understanding on significant findings at 6 and 9 years as proposed.

5.5.7 Maternal English Fluency

Pacific children with mothers who were fluent in English presented significant associations to higher academic performance at ages 6, 9 and 11 years. The longitudinal study also produced significant

relations to higher academic performance suggesting the persistence of maternal English fluency overtime is outstanding.

Different studies have shown a positive relationship between mothers who are fluent or more proficient in the English language and an increase in school readiness for children (Liu et al., 2008; Baker, 2014). Mothers who had higher English fluency indicated a greater quantity of English input in children showing higher English comprehension and level of academic performance in children (Paradis & Jia 2016). A study by Schluter et al. (2020) gives evidence showing English-and-Pacific speaking mothers having lower rates of mental health disorders compared to mothers only fluent in a Pacific language. Maternal depression as well as other mental health issues have presented an association to lower academic performance in Pacific children suggesting English fluency in mothers to have a protective effect on maternal mental health impacting on academic performance.

5.5.8 Maternal Marital Status

The marital status of mothers did not indicate any significant associations to academic performance in Pacific children. Various findings support this same result of marital status having no significant influence on the academic performance of students (Amuda et al., 2016). The home environment of a child is an important factor affecting academic performance in which marital status can influence (Ngure & Amollo, 2017). An unhealthy atmosphere and psychological home conditions due to parental deprivation and a broken home add to the influence that marital status can play in families and hence influence academic performance in children (Frazer, 2001). These were also the key factors behind the relationship between marital status and academic performance of children in other studies (Son & Peterson, 2016). Although no significant associations were made between marital status and academic performance in Pacific children, further research into factors such as home environment may provide more insight into the dynamics within Pacific families that allow for no associations to occur.

5.5.9 Parental Love and Support

Parental love and support scores were differentiated into maternal and paternal scores with questions relating to parenting, supervision and discipline for their child. Maternal love and support were shown to be significantly associated with higher academic performance. In contrast to this, paternal love and support was negatively associated with academic performance in Pacific children leading to lower academic performance.

The effects of parental behaviour have been outlined as predictors of academic performance and school adjustment in children (Ki, 2018). Fathers' warm behaviours were shown in their study as a mediator for child-father interactions. The interactions parents have with their children influences the quality of their parental behaviour and for fathers, the more often they interact with their child, this positively influences the child's academic performance (Howard et al., 2006). The role fathers play within their home also alludes to the influence fathers have on academic performance in their child. Fathers taking on a more traditional role by working and spending more time outside the home meant having less interaction with the children (Ki, 2018). School aged children who had fathers that were more involved within the family home, often showed better academic performance (McBride et al., 2005).

Relating these findings to this study, fathers could be self-reporting high levels of love and support, but if not much involvement or personal interaction is happening between the father and the child, academic performance levels may decrease. Although fathers may indicate high levels of consistent

discipline, positive parenting and good supervision of the child, maternal involvement in the child's life may prove to be more important.

For maternal love and support, many studies affirm the findings of mothers' love and support having greater influence on a child's academic performance (Ki et al., 2018; Ceka & Murati, 2016). Authoritative parenting styles as highlighted in the literature review are shown to be the best predictor of academic achievement in adolescents with students having better academic performance (Abdorreza & Rozumah, 2010; Nyarko, 2011). Mothers tend to be more authoritative than fathers positively impacting on academic performance as authoritative parenting promotes loving, supportive and caring environments (Masud et al., 2014). The role of mothers and fathers within a Pacific family may also bring context and understanding to these results as cultural and familial factors play a major part in a child's upbringing and lifestyle choices (Paterson et al., 2012). Although research on the dynamic within Pacific families relating to love and support is inadequate, this again gives context to what research is needed for better insight into factors influencing academic performance.

5.6 The impact of the education system on the academic performance of Pacific learners

The New Zealand Education system has a key objective to help every child and student to access and attain educational achievement to the best of their ability (Education Act, 1989). Therefore, the academic performance of Pacific learners is fundamental to meeting the objectives of the Education Act. The New Zealand Government has consistently identified Pacific learners as 'priority learners' for the past four decades, due to the continuing failure of the education system to meet the learning needs of Pacific learners (Education Review Office, 2012). Due to these issues, there have been numerous initiatives and strategies led by the Ministry of Education to improve learning experiences and achievement for Pasifika learners in Aotearoa.

The Pacific Evidence Brief (Ministry of Education, 2020) shows that achievement data for all learners has been improving over the last decade, with Pacific learners achieving well in both Primary and Secondary schooling. While this is promising, the rate of progress has levelled out in recent years, showing that Pacific learners are still experiencing significant disparities in achievement and experiences. Educational inequality in New Zealand based on socio-economic class and language background is still prevalent. The four key areas that the brief summarised as essential for Pacific student achievement and future research priorities are: respecting and valuing identities, languages and cultures, the importance of home-school partnerships, teacher having high expectations drive good pedagogy and achievement and lastly that culturally responsive pedagogy is a key strategy for lifting achievement (Ministry of Education, 2020).

The research of Allen et al. (2009) suggests that poor Pasifika achievement is attributed to three interrelated challenges, deficit theorising by teachers, issues relating to teachers not understanding Pasifika culture, and a lack of effective pedagogy. There is much research that has delved deeper into understanding these three teaching areas in the last two decades that is beyond the scope of this thesis. However, it is important to mention that there are documents for teachers that have been published to support the implementation of Pasifika competencies for Pacific learners like *Tapasā* (Ministry of Education, 2018). Thus, document highlights how essential it is for teachers to support the culture, language and worldviews of Pacific learners and families within schools.

Unfortunately, New Zealand has one of the largest achievement gaps between students whose first language is the language of the school and those for whom it is not (May, 2019). This explains why bilingual students, including Pacific students, are consistently over-represented in low literacy

achievement. The current lack of a policy that supports school bilingual educational programs means that most Pacific students are educated in the dominant English language. These English-language classroom contexts have been consistently found in the international literature to be the least effective in successfully educating bilingual students. The three key reasons to support language revitalisation and maintenance for Pasifika communities, includes the bilingual continuum, building on students' emergent bilingualism and moving from subtractive to additive bilingual educational approaches (May, 2019).

Another explanation for the failure of the education system to support Pacific students relates to cultural differences. If the culture of the home is not the same as the culture of school, children can find it difficult to understand what is expected and how to respond appropriately at school (Meade et al., 2012). The cultural expectations of Pacific parents may differ significantly from the practices and thinking in New Zealand schools. For example, the traditional Pacific expectation of unquestioning obedience and respect for authority figures can mean that parents encourage their children to listen and not question their teachers (Coxon, 2002). However, the expectation in New Zealand education is that students learn best through questioning and building independence. If teachers do not understand these differences in beliefs, school expectations can be barriers for many Pacific students. Even though these challenges for Pacific learners have been well discussed particularly before the implementation of the first Pacific Education Plan in 2001, the cultural differences continue to exist as highlighted in *The Action Plan for Pacific Education 2020–2030*. The current plan has a vision that diverse Pacific learners and their families feel safe, valued and equipped to achieve their education aspirations. It outlines the actions the Government has committed to achieving this and signals how early learning services, schools and tertiary providers can achieve change for Pacific learners and their families. While it is heartening to see that there is a plan to support the educational achievement and aspirations of Pacific learners and families for the decade ahead, specific research needs to be conducted alongside this plan so that key goals and strategies for improvements can be monitored and strengthened effectively.

While the emphasis of this research was to study risk and protective factors associated with depressive symptoms in Pacific children and the longitudinal effects these factors had on teacher assessment scores, we cannot deny the importance of the education system and the impact it has on children's mental health and academic performance. The findings from this study can also provide implications for teachers and Pacific learners regarding academic performance.

5.7 Strengths and Limitations of the Research

This research study utilises data from the PIF study. Key strengths within this study are the multidisciplinary longitudinal design that follows a cohort of 1,376 Pacific infants and their families from birth. The Pacific Island Families study is not limited by sample attrition and is considered a vigorous study with no differential loss of ethnic subgroups. At the 11-year measurement wave, 1,047 participants remain with 703 participants specifically chosen for this study indicating high retention rates. This high cohort is broadly representative of the Pacific population in New Zealand.

The cultural sensitivity of the PIF study data collection procedures and methods are another strength. Within the maternal interviews taken at 6-weeks postpartum, all field researchers who visited and undertook these interviews were fluent in both a Pacific Island language and English. Participants had the option of being interviewed in their own language if they wanted, allowing a safe space for them ensuring respectful and appropriate interactions. Modifications were made to some of the measurements used including modified test instruments designs. These changes were made to increase its relevance to the New Zealand context and for a more culturally appropriate

measure to be used, however this also makes it difficult for direct comparisons to be made to other populations.

A limitation of this study includes the multiple informants' reports used to assess child behaviour. Parental, child and teacher interviews have all been obtained for data collection but having different informant groups can lead to variations in the level of behaviour for the child. Child self-score and parent ratings have been shown to be rated higher compared to teacher ratings on child behaviour (Sargisson et al., 2016). For teacher assessed academic performance, this was also reliant on the teachers' perception of the child's academic performance, yet it had been proven that teacher assessment scores are accurate informants of students' academic achievement (Südkamp et al., 2012). Self-report measures are also another limitation within this study, however in large scale studies such as the PIF study, this is the most feasible option.

An important limitation of this research approach is that variables that were only measured at the 9-year and 11-year measurement wave and not at the 6-year measurement waves, causal links were not able to be isolated and identified. In the literature review, this search revealed that a scarce amount of longitudinal and cross-sectional research was found on Pacific Island children excluding previous PIF study research. This limits the capacity to compare these findings to identical population groups. Even so, previous PIF study findings, statistics from Pacific youth and ethnic minorities in overseas communities have been used to draw conclusions allowing comparisons to this study.

5.8 Summary

Findings from this study indicate that various risk and protective factors of depression as well as sociodemographic factors suggest significant associations to academic performance in Pacific children at 11 years. Child depression, externalising behaviour, gang involvement and bullying victimisation and perpetration are associated with lower teacher assessed academic performance in Pacific children at age 11. The protective factor of self-description in Pacific children is associated with higher teacher assessed academic performance at 11 years. Boys achieved lower teacher assessment scores in comparison to girls. Paternal love and support was associated with low teacher assessed academic performance in Pacific children with maternal love and support scores being associated with higher teacher assessed academic performance.

The sociodemographic factors of maternal education and maternal English fluency were significantly related to higher teacher assessed academic performance in 11-year-old Pacific children. Mothers who received post school qualifications influenced higher academic performance in Pacific children compared to mothers who did not receive any formal education. Mothers who were fluent in English also indicated higher academic performance in their children compared to mothers who were not.

5.9 Recommendations

Suggestions include reducing risk factors that are identified in this study and enhancing protective factors that increase academic performance as a first step in improving the well-being of Pacific Island children. Academic performance is important in understanding health and wellbeing to better our quality of life in the future. Growing positive self-description in Pacific children can be offered as a programme to build up their confidence and enhance these protective factors which are associated with higher academic performance.

For interventions aimed at tackling depression within Pacific children, this research can aid in knowing which particular risk and protective factors are significant for Pacific children and incorporating those within the intervention. School programmes that target bullying victimisation, perpetration and gang involvement can assist in diminishing those risk factors in the prevention of lower academic performance.

Maternal education and English fluency provide an initiative for Pacific mothers to improve their qualification with our Pacific communities encouraging this for the betterment of our Pacific children. Improving the skills of our parents and caregivers is seen as crucial in paving the way for our Pacific children. These findings also indicate a positive affirmation for government policy initiatives in knowing how to better support our Pacific children and families living in New Zealand.

Other results within this study suggest additional investigation on particular risk and protective factors to understand the causes and longitudinal effects of child depression, bullying and gang involvement. Other recommendations include for future research to examine the behavioural patterns of Pacific children and their growth moving towards late adolescence. The effect of sociodemographic factors and risk and protective factors researched will explain the long-term effects contributing to the importance of child education and the impact this has on later life.

References

Abdorreza, K., & Rozumah, B. (2010). Parenting attitude and style and its effect on children's school achievements. *International Journal of Psychological Studies*, *2*(2). https://doi.org/10.5539/ijps.v2n2p217

Achenbach, T. M., & Rescorla, L. A. (2000). *Manual for the ASEBA Preschool Forms & Profiles*. Burlington, VT: University of Vermont, Department of Psychiatry.

Agnafors, S., Sydsjo G., Dekeyser L., Svedin C. G. (2012). Symptoms of depression postpartum and 12 years later-associations to child mental health at 12 years of age. *Maternal and Child Health Journal.* 17, 405–414 10.1007/s10995-012-0985-z

Agnafors, S., Barmark, M., & Sydsjö, G. (2020). Mental health and academic performance: A study on selection and causation effects from childhood to early adulthood. *Social Psychiatry and Psychiatric Epidemiology*, *56*(5), 857–866. https://doi.org/10.1007/s00127-020-01934-5

Ahlen, J., & Ghaderi, A. (2017). Evaluation of the Children's Depression Inventory—Short Version (CDI–S). *Psychological Assessment*, *29*(9), 1157–1166.

Alghadir, A., Gabr, S., & Iqbal, Z. (2020). Effect of gender, physical activity and stress-related hormones on adolescent's academic achievements. *International Journal of Environmental Research and Public Health*, *17*(11), 4143. https://doi.org/10.3390/ijerph17114143

Allen, P., Tufulasitaleni, L., & Robertson, J. (2009). "In order to teach you, I must know you." the Pasifika initiative: A professional development project for teachers. *New Zealand Journal of Educational Studies,* 44(2): 47-62.

Alleyne, E., & Wood, J. L. (2010). Gang involvement: Psychological and behavioral characteristics of gang members, peripheral youth, and nongang youth. *Aggressive Behavior*, *36*(6), 423–436.

Amuda, B. G., Bulus, A. K., & Joseph, H. P. (2016). Marital status and age as predictors of academic performance of students of colleges of education in the Nort- Eastern Nigeria. *American Journal of Educational Research*, *4*(12), 896–902.

Anae, M. (2010). Research for better Pacific schooling in New Zealand: Teu le va – a Samoan per-

spective. *MAI Review*, *3*, 1–24. http://www.review.mai.ac.nz/mrindex/MR/article/down-

load/298/298-2299-1-PB.pdf

Arens, A. K., Möller, J., & Watermann, R. (2016). Extending the internal/external frame of reference

model to social studies: Self-concept and achievement in history and politics. *Learning and*

Individual Differences, 51, 91–99. https://doi.org/10.1016/j. Lindif.2016.08.044

Arslan, G. (2021). School belongingness, well-being, and mental health among adolescents: Exploring

the role of loneliness. *Australian Journal of Psychology*, *73*(1), 70–80.

Aslam, M., & Kingdon, G. G. (2012). Parental education and child health—understanding the

pathways of impact in Pakistan. *World Development*, *40*(10), 2014–2032.

https://doi.org/10.1016/j.worlddev.2012.05.007

Atik, G., & Güneri, O. Y. (2013). Bullying and victimization: Predictive role of individual, parental, and

academic factors. *School Psychology International*, *34*(6), 658–673.

https://doi.org/10.1177/0143034313479699

Auerbach, R. P., & Ho, M. H. R. (2012). A cognitive-interpersonal model of adolescent depression:

The impact of family conflict and depressogenic cognitive styles. *Journal of Clinical Child &*

Adolescent Psychology, *41*(6), 792–802. https://doi.org/10.1080/15374416.2012.727760

Awada, S. R., & Shelleby, E. C. (2021). Increases in maternal education and child behavioral and

academic outcomes. *Journal of Child and Family Studies*, *30*(7), 1813–1830.

https://doi.org/10.1007/s10826-021-01983-7

Baker, C. E. (2014). Mexican mothers' English proficiency and children's school readiness: Mediation

through home literacy involvement. *Early Education and Development*, *25*(3), 338–355.

https://doi.org/10.1080/10409289.2013.807721

Bergin, C. C., & Bergin, D. A. (2014). *Child and adolescent development in your classroom* (2nd

edition). Cengage Learning.

Bettis, A. H., Forehand, R., McKee, L., Dunbar, J. P., Watson, K. H., & Compas, B. E. (2015). Testing

specificity: Associations of stress and coping with symptoms of anxiety and depression in

youth. *Journal of Child and Family Studies*, *25*(3), 949–958.

Bird, T., Mansell, W., Dickens, C., & Tai, S. (2012). Is there a core process across depression and anxi-

ety? *Cognitive Therapy and Research*, *37*(2), 307–323. https://doi.org/10.1007/s10608-012-

9475-2

Cairns, K. E., Yap, M. B. H., Pilkington, P. D., & Jorm, A. F. (2014). Risk and protective factors for

depression that adolescents can modify: A systematic review and meta-analysis of

longitudinal studies. *Journal of Affective Disorders*, *169*, 61–75.

https://doi.org/10.1016/j.jad.2014.08.006

Carlin, J. B., Wolfe, R., Coffey, C., & Patton, G. C. (1999). Analysis of binary outcomes in longitudinal

studies using weighted estimating equations and discrete-time survival methods: prevalence

and incidence of smoking in an adolescent cohort. *Statistics in Medicine*, 18(19), 2655–2679.

Ceka, A., & Murati, R. (2016). The role of parents in the education of children. *Journal of Education

and Practice*, *7*(5), 61–64. https://files.eric.ed.gov/fulltext/EJ1092391.pdf

Chen, Y. (2019). *A review of child and adolescent depression: Family factors and treatment*. Francis

Academic Press, UK. https://doi.org/10.25236/cmph.2019.022

Christenson, S. L., Reschly, A. L., & Wylie, C. (2013). *Handbook of research on student engagement*

(2012th ed.). Springer.

Claessens, A., Engel, M., & Chris Curran, F. (2015). The effects of maternal depression on child

outcomes during the first years of formal schooling. *Early Childhood Research Quarterly*, *32*,

80–93. https://doi.org/10.1016/j.ecresq.2015.02.003

Clark, K. E., & Ladd, G. W. (2000). Connectedness and autonomy support in parent–child

relationships: Links to children's socioemotional orientation and peer relationships.

Developmental Psychology, *36*(4), 485–498. https://doi.org/10.1037/0012-1649.36.4.485

Clayborne, Z. M., Varin, M., & Colman, I. (2019). Systematic review and meta-analysis: Adolescent depression and long-term psychosocial outcomes. *Journal of the American Academy of Child & Adolescent Psychiatry*, *58*(1), 72–79. https://doi.org/10.1016/j.jaac.2018.07.896

Coggins, P., & Campbell, S. D. (2008). Using cultural competence to close the achievement gap. *The Journal of Pan African Studies*, *2*(4), 44–59. http://jpanafrican.org/docs/vol2no4/2.4_Using_Cultural_Competence_to_Close_the_Achievement_Ga1.pdf

Coxon, E., Anae, M., Mara, D., Wendt-Samu, T., & Finau, C. (2002). *Literature review on Pacific education issues.* Wellington, NZ: Ministry of Education.

Craig, E., McDonald, G., Wicken, A., Reddington, A., & Taufa, S. (2010, February). *The Determinants of Health for Pacific Children and Young People in New Zealand*. Auckland UniServices Limited. https://www.otago.ac.nz/nzcyes/otago085988.pdf

Crengle, S., Robinson, E., Ameratunga, S., Clark, T., & Raphael, D. (2012). Ethnic discrimination prevalence and associations with health outcomes: Data from a nationally representative cross-sectional survey of secondary school students in New Zealand. *BMC Public Health*, *12*(1). https://doi.org/10.1186/1471-2458-12-45

Dadds, M. R., Maujean, A., & Fraser, J. A. (2003). Parenting and conduct problems in children: Australian data and psychometric properties of the alabama parenting questionnaire. *Australian Psychologist*, *38*(3), 238–241. https://doi.org/10.1080/00050060310001707267

de Laet, S., Colpin, H., Vervoort, E., Doumen, S., van Leeuwen, K., Goossens, L., & Verschueren, K. (2015). Developmental trajectories of children's behavioral engagement in late elementary school: Both teachers and peers matter. *Developmental Psychology*, *51*(9), 1292–1306. https://doi.org/10.1037/a0039478

Dhakal, A., & Bobrin, B. D. (2020). Cognitive Deficits. In *StatPearls [Internet]*. StatPearls Publishing.

Education Act. (1989). http://www.legislation.govt.nz/act/public/1989/0080/latest/DLM175959.htmlhe

Education Review Office. (May 2012). *Improving Education Outcomes for Pacific Learners*

Elgar, F. J., Waschbusch, D. A., Dadds, M. R., & Sigvaldason, N. (2007). Development and validation of a short form of the Alabama parenting questionnaire. *Journal of Child and Family Studies*, *16*(2), 243–259. https://doi.org/10.1007/s10826-006-9082-5

Elliot, A. J., Dweck, C. S., & Yeager, D. S. (2018). *Handbook of competence and motivation, second edition: Theory and Application* (2nd edition). The Guilford Press.

Espelage, D. L., Hong, J. S., Rao, M. A., & Low, S. (2013). Associations between peer victimization and academic performance. *Theory into Practice*, *52*(4), 233–240. https://doi.org/10.1080/00405841.2013.829724

Farley, K. S., & Piasta, S. B. (2019). Examining early childhood language and literacy learning opportunities in relation to maternal education and children's initial skills. *Journal of Education for Students Placed at Risk (JESPAR)*, *25*(3), 183–200. https://doi.org/10.1080/10824669.2019.1689506

Ferguson, H., Bovaird, S., & Mueller, M. (2007). The impact of poverty on educational outcomes for children. *Paediatrics & Child Health*, *12*(8), 701–706. https://doi.org/10.1093/pch/12.8.701

Fitzmaurice, G. M., Laird N. M., Ware J. H. (2011) *Applied longitudinal analysis* (2nd Edition) John Wiley & Sons. Hoboken, New Jersey.

Fleming, T., Tiatia-Seath, J., Peiris-John, R., Sutcliffe, K., Archer, D., Bavin, L., Crengle, S., & Clark, T. (2020). *Youth19 rangatahi smart survey, initial findings: Hauora hinengaro / emotional and mental health*. The Youth19 Research Group, The University of Auckland and Victoria University of Wellington, New Zealand.

Frazer, W. J. (2001) Family structure, parental practices and high school completion. *American Sociology Review, 56, 309-320*

Fröjd, S. A., Nissinen, E. S., Pelkonen, M. U., Marttunen, M. J., Koivisto, A. M., & Kaltiala-Heino, R. (2008). Depression and school performance in middle adolescent boys and girls. *Journal of Adolescence*, *31*(4), 485–498. https://doi.org/10.1016/j.adolescence.2007.08.006

Garcia-Reid, P., Peterson, C. H., Reid, R. J., & Peterson, N. A. (2013). The protective effects of sense of community, multigroup ethnic identity, and self-esteem against internalizing problems among Dominican youth: Implications for social workers. *Social Work in Mental Health*, *11*(3), 199–222. https://doi.org/10.1080/15332985.2013.774923

Ghazvini, S. and Khajehpour, M. (2011). Gender differences in factors affecting academic performance of high school students. *Procedia—Social and Behavioral Sciences*, 15, 1040-1045. https://doi.org/10.1016/j.sbspro.2011.03.236

Goldschmidt, A. B., Wall, M., Choo, T. H. J., Becker, C., & Neumark-Sztainer, D. (2016). Shared risk factors for mood-, eating-, and weight-related health outcomes. *Health Psychology*, *35*(3), 245–252. https://doi.org/10.1037/hea0000283

Grygiel, P., Modzelewski, M., & Pisarek, J. (2016). Academic self-concept and achievement in Polish primary schools: Cross-lagged modelling and gender-specific effects. *European Journal of Psychology of Education*, *32*(3), 407–429. https://doi.org/10.1007/s10212-016-0300-2

Hair, N. L., Hanson, J. L., Wolfe, B. L., & Pollak, S. D. (2015). Association of child poverty, brain development, and academic achievement. *JAMA Pediatrics*, *169*(9), 822. https://doi.org/10.1001/jamapediatrics.2015.1475

Harding, J. F., Morris, P. A., & Hughes, D. (2015). The relationship between maternal education and children's academic outcomes: A theoretical framework. *Journal of Marriage and Family*, *77*(1), 60–76. https://doi.org/10.1111/jomf.12156

Harvey, C., Otis, E., Osseiran-Moisson, R., Forrest, R. H. J., Heritage, B. J., & Knight, B. A. (2021). Promoting mental health in New Zealand: building resilience in teenage children. *New Zealand Journal of Educational Studies*. https://doi.org/10.1007/s40841-021-00232-1

Herrenkohl, T. I., Guo, J., Kosterman, R., Hawkins, J. D., Catalano, R. F., & Smith, B. H. (2001). Early adolescent predictors of youth violence as mediators of childhood risks. *The Journal of Early Adolescence*, *21*(4), 447–469. https://doi.org/10.1177/0272431601021004004

Hipkins, R. (2017). *Weaving a coherent curriculum: How the idea of capabilities can help.* Wellington:

New Zealand Council for Educational Research. Retrieved from

http://www.nzcer.org.nz/research/publications/weaving-coherent-curriculum-how-idea-

capabilities [1] can-help

Hoge, R. D., & Coladarci, T. (1989). Teacher-based judgments of academic achievement: A review of

literature. *Review of Educational Research*, *59*(3), 297–313.

https://doi.org/10.3102/00346543059003297

Howard, K. S., Lefever, J. E. B., Borkowski, J. G., & Whitman, T. L. (2006). Fathers' influence in the

lives of children with adolescent mothers. *Journal of Family Psychology*, *20*(3), 468–476.

https://doi.org/10.1037/0893-3200.20.3.468

Huang, L. (2020). Exploring the relationship between school bullying and academic performance: The

mediating role of students' sense of belonging at school. *Educational Studies*, *48*(2), 216–

232. https://doi.org/10.1080/03055698.2020.1749032

Huffman, L. C., Mehlinger, S. L., & Kerivan, A. S. (2000). Risk factors for academic and behavioral

problems at the beginning of school. *Off to a good start: Research on the risk factors for

early school problems and selected federal policies affecting children's social and emotional

development and their readiness for school*.

Jansen, W. S., Otten, S., van der Zee, K. I., & Jans, L. (2014). Inclusion: Conceptualization and

measurement. *European Journal of Social Psychology*, *44*(4), 370–385.

https://doi.org/10.1002/ejsp.2011

Jaureguizar, J., Bernaras, E., & Garaigordobil, M. (2017). Child depression: Prevalence and

comparison between self-reports and teacher reports. *The Spanish Journal of Psychology*,

20. https://doi.org/10.1017/sjp.2017.14

Johns, C. (2017). Mental health and wellbeing in New Zealand education. *Journal of Initial Teacher

Inquiry*, *3*, 61–64. https://ir.canterbury.ac.nz/handle/10092/14629

Joyce, H. D., & Early, T. J. (2014). The impact of school connectedness and teacher support on depressive symptoms in adolescents: A multilevel analysis. *Children and Youth Services Review*, *39*, 101–107. https://doi.org/10.1016/j.childyouth.2014.02.005

Juvonen, J., Yueyan Wang, & Espinoza, G. (2010). Bullying experiences and compromised academic performance across middle school grades. *The Journal of Early Adolescence*, *31*(1), 152–173. https://doi.org/10.1177/0272431610379415

Kaiser, J., Südkamp, A., & Möller, J. (2017). The effects of student characteristics on teachers' judgment accuracy: Disentangling ethnicity, minority status, and achievement. *Journal of Educational Psychology*, *109*(6), 871–888. https://doi.org/10.1037/edu0000156

Kalil, A., Ryan, R., & Corey, M. (2012). Diverging destinies: Maternal education and the developmental gradient in time with children. *Demography*, *49*(4), 1361–1383. https://doi.org/10.1007/s13524-012-0129-5

Kelvin, R. (2016). Depression in children and young people. *Paediatrics and Child Health*, *26* (12), 540–547.

Khalid, F. M., Suman, N. A. A., Rasid, N. A., Mohamad, N. A., & Ghazali, N. N. N. (2016). *Depression & academic performance: A Case Study*. 1–7.

Ki, P. (2018). Parenting attitude and style and its effect on children's school achievements. *Early Child Development and Care*, 1–13. https://doi.org/10.1080/03004430.2018.1518904

Kim, H. M., Schluter, P. J., McNeill, B., Everatt, J., Sisk, R., Iusitini, L., Taleni, L. T., Tautolo, E., & Gillon, G. (2019). Integrating health, education and culture in predicting Pacific children's English receptive vocabulary at 6 years: A classification tree approach. *Journal of Paediatrics and Child Health*, *55*(10), 1251–1260. https://doi.org/10.1111/jpc.14397

Kim, J. W., & Kim, J. W. (2018). Risk factors and prevention strategies for depression in childhood and adolescence. In *Understanding Depression* (pp. 263–278). Springer, Singapore. https://doi.org/10.1007/978-981-10-6580-4_22

Kim, S. W., & Hill, N. E. (2015). Including fathers in the picture: A meta-analysis of parental involvement and students' academic achievement. *Journal of Educational Psychology*, *107*(4), 919–934. https://doi.org/10.1037/edu0000023

Kim, Y. K., Sanders, J. E., Makubuya, T., & Yu, M. (2020). Risk factors of academic performance: Experiences of school violence, school safety concerns, and depression by gender. *Child & Youth Care Forum*, *49*(5), 725–742. https://doi.org/10.1007/s10566-020-09552-7

King, G., McDougall, J., DeWit, D., Hong, S., Miller, L., Offord, D., Meyer, K., & LaPorta, J. (2005). Pathways to children's academic performance and prosocial behaviour: Roles of physical health status, environmental, family, and child factors. *International Journal of Disability, Development and Education*, *52*(4), 313–344. https://doi.org/10.1080/10349120500348680

King, K. A., Vidourek, R. A., & Merianos, A. L. (2016). Authoritarian parenting and youth depression: Results from a national study. *Journal of Prevention & Intervention in the Community*, *44*(2), 130–139. https://doi.org/10.1080/10852352.2016.1132870

Kulkarni, T., Sullivan, A. L., & Kim, J. (2020). Externalizing behavior problems and low academic achievement: Does a causal relation exist? *Educational Psychology Review*, *33*(3), 915–936. https://doi.org/10.1007/s10648-020-09582-6

Kyriakides, L., Kaloyirou, C., & Lindsay, G. (2006). An analysis of the revised Olweus bully/victim questionnaire using the Rasch measurement model. *British Journal of Educational Psychology*, *76*(4), 781–801. https://doi.org/10.1348/000709905x53499

Lacey, A., & Cornell, D. (2013). The impact of teasing and bullying on schoolwide academic performance. *Journal of Applied School Psychology*, *29*(3), 262–283. https://doi.org/10.1080/15377903.2013.806883

Lamis, D. A., & Lester, D. (2011). *Understanding and preventing college student suicide* (1st ed.). Charles C Thomas Pub Ltd.

Lay-Yee, R., Milne, B. J., Shackleton, N., Chang, K., & Davis, P. (2018). Preventing youth depression: Simulating the impact of parenting interventions. *Advances in Life Course Research*, *37*, 15–22. https://doi.org/10.1016/j.alcr.2018.05.001

Le Va. (2017). *Pacific youth call for mental health education in schools*. https://www.leva.co.nz/news/pacific-youth-call-for-mental-health-education-in-schools/

Levis, B., Negeri, Z., Sun, Y., Benedetti, A., & Thombs, B. D. (2020). Accuracy of the Edinburgh postnatal depression scale (EPDS) for screening to detect major depression among pregnant and postpartum women: Systematic review and meta-analysis of individual participant data. *BMJ*, m4022. https://doi.org/10.1136/bmj.m4022

Liljequist, L., & Renk, K. (2007). The relationships among teachers' perceptions of student behaviour, teachers' characteristics, and ratings of students' emotional and behavioural problems. *Educational Psychology*, *27*(4), 557–571. https://doi.org/10.1080/01443410601159944

Lin, H. C., Tang, T. C., Yen, J. Y., Ko, C. H., Huang, C. F., Liu, S. C., & Yen, C. F. (2008). Depression and its association with self-esteem, family, peer and school factors in a population of 9586 adolescents in southern Taiwan. *Psychiatry and Clinical Neurosciences*, *62*(4), 412–420. https://doi.org/10.1111/j.1440-1819.2008.01820.x

Liu, L. L., Benner, A. D., Lau, A. S., & Kim, S. Y. (2008). Mother-adolescent language proficiency and adolescent academic and emotional adjustment among Chinese American families. *Journal of Youth and Adolescence*, *38*(4), 572–586. https://doi.org/10.1007/s10964-008-9358-8

Llorca, A., Cristina Richaud, M., & Malonda, E. (2017). Parenting, peer relationships, academic self-efficacy, and academic achievement: Direct and mediating effects. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.02120

Lohbeck, A., Grube, D., & Moschner, B. (2017). Academic self-concept and causal attributions for success and failure amongst elementary school children. *International Journal of Early Years Education*, *25*(2), 190–203. https://doi.org/10.1080/09669760.2017.1301806

Lundy, S. M., Silva, G. E., Kaemingk, K. L., Goodwin, J. L., & Quan, S. F. (2010). Cognitive functioning and academic performance in elementary school children with anxious/depressed and withdrawn symptoms. *The Open Pediatric Medicine Journal*, *4*(1), 1–9. https://doi.org/10.2174/1874309901004010001

Lumley, T. (2010). *Complex Surveys: A guide to analysis using R*. John Wiley & Sons. Hoboken, New Jersey. https://doi.org/10.1002/9780470580066

Lumley, T. (2020). *survey: analysis of complex survey samples*.

Luo, Y., Deng, Y., & Zhang, H. (2020). The influences of parental emotional warmth on the association between perceived teacher–student relationships and academic stress among middle school students in China. *Children and Youth Services Review*, *114*, 105014. https://doi.org/10.1016/j.childyouth.2020.105014

Macfarlane, A. (2018). Gangs and adolescent mental health: A narrative review. *Journal of Child & Adolescent Trauma*, *12*(3), 411–420. https://doi.org/10.1007/s40653-018-0231-y

Maguire, M., Morgan, R., & Reiner, R. (2007). *The Oxford handbook of criminology (4th ed.).* Oxford University Press.

Manuela, S., & Sibley, C. G. (2013). Exploring the hierarchical structure of Pacific identity and wellbeing. *Social Indicators Research*, *118*(3), 969–985. https://doi.org/10.1007/s11205-013-0472-y

Margetts, K. (2005). Children's adjustment to the first year of schooling: Indicators of hyperactivity, internalising and externalising behaviours. *International Journal of Transitions in Childhood*, *1*, 36–44. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.530.3218&rep=rep1&type=pdf

Marsh, H. W. (1994). Using the national longitudinal study of 1988 to evaluate theoretical models of self-concept: The self-description questionnaire. *Journal of Educational Psychology*, *86*(3), 439–456. https://doi.org/10.1037/0022-0663.86.3.439

Martinez, J., Tost, J., Wilfred, S., & Hilgert, L. (2014). Gang risk factors and academic readiness in a southern middle school. *Georgia Educational Researcher*, *11*(2). https://doi.org/10.20429/ger.2014.110201

Masud, H., Thurasamy, R., & Ahmad, M. S. (2014). Parenting styles and academic achievement of young adolescents: A systematic literature review. *Quality & Quantity*, *49*(6), 2411–2433. https://doi.org/10.1007/s11135-014-0120-x

Masud, H., Ahmad, M. S., Cho, K. W., & Fakhr, Z. (2019). Parenting styles and aggression among young adolescents: A systematic review of literature. *Community Mental Health Journal*, *55*(6), 1015–1030. https://doi.org/10.1007/s10597-019-00400-0

Maughan, B., Collishaw, S., & Stringaris, A. (2013). Depression in childhood and adolescence. *Journal of the Canadian Academy of Child and Adolescent Psychiatry*, *22*, 35–40.

May, S. (2019). Research to understand the features of quality Pacific bilingual education: Review of best practices. University of Auckland. Ministry of Education

McBride, B. A., Brown, G. L., Bost, K. K., Shin, N., Vaughn, B., & Korth, B. (2005). Paternal identity, maternal gatekeeping, and father involvement. *Family Relations*, *54*(3), 360–372. https://doi.org/10.1111/j.1741-3729.2005.00323.x

McCallum, F., & Price, D. (2015). *Nurturing wellbeing development in education*. Taylor & Francis.

McCarty, C. A., Wymbs, B. T., King, K. M., Mason, W. A., Stoep, A. V., McCauley, E., & Baer, J. (2012). Developmental consistency in associations between depressive symptoms and alcohol use in early adolescence. *Journal of Studies on Alcohol and Drugs*, *73*(3), 444–453. https://doi.org/10.15288/jsad.2012.73.444

Meade, A., New Zealand Childcare Association, & Te Tari Puna Ora o Aotearoa/New Zealand Childcare Association. (2012). *Early childhood teachers' work in education and care centres: Profiles, patterns and purposes = te mahi a ngā kaiako kōhungahunga i ngā pokapū mātauranga, manaaki hoki: Ngā kōtaha, ngā tauira me ngā pūtake*. Te Tari Puna Ora o Aotearoa / NZ Childcare Association

Meissel, K., & Rubie-Davies, C. M. (2016). Cultural invariance of goal orientation and self-efficacy in

New Zealand: Relations with achievement. British Journal of Educational Psychology 86(1):

92.

Mercer, S. H., & DeRosier, M. E. (2008). Teacher preference, peer rejection, and student aggression:

A prospective study of transactional influence and independent contributions to emotional

adjustment and grades. *Journal of School Psychology*, *46*(6), 661–685.

https://doi.org/10.1016/j.jsp.2008.06.006

Ministry for Pacific Peoples. (2021, October). *Pacific Aotearoa status report: A snapshot (2020)*.

https://www.mpp.govt.nz/assets/Reports/Pacific-Peoples-in-Aotearoa-Report.pdf

Ministry of Health. (2021). Annual data explorer 2020/21: New Zealand health survey [Data File].

https://minhealthnz.shinyapps.io/nz-health-survey-2020-21-annual-data-explorer/

Ministry of Education. (2020). *Best practice for teaching Pacific learners. Pacific evidence brief 2019.*

Wellington, New Zealand: Author.

Moilanen, K. L., Shaw, D. S., & Maxwell, K. L. (2010). Developmental cascades: Externalizing,

internalizing, and academic competence from middle childhood to early adolescence.

Development and Psychopathology, *22*(3), 635–653.

https://doi.org/10.1017/s0954579410000337

Monahan, K. C., Oesterle, S., Rhew, I., & Hawkins, J. D. (2014). Relation between risk and protective

factors for problem behaviors and depressive symptoms, antisocial behavior, and alcohol

use in adolescence. *Journal of Community Psychology*, *42*(5), 621–638.

https://doi.org/10.1002/jcop.21642

Monti, J. D., & Rudolph, K. D. (2017). Maternal depression and trajectories of adolescent depression:

The role of stress responses in youth risk and resilience. *Development and Psychopathology*,

29(4), 1413–1429. https://doi.org/10.1017/s0954579417000359

Morrison, K. M., Shin, S., Tarnopolsky, M., & Taylor, V. H. (2015). Association of depression & health related quality of life with body composition in children and youth with obesity. *Journal of Affective Disorders*, *172*, 18–23. https://doi.org/10.1016/j.jad.2014.09.014

Morrissey, T. W., Hutchison, L., & Winsler, A. (2014). Family income, school attendance, and academic achievement in elementary school. *Developmental Psychology*, *50*(3), 741–753. https://doi.org/10.1037/a0033848

Murray, L., Arteche, A., Fearon, P., Halligan, S., Goodyer, I., & Cooper, P. (2011). Maternal postnatal depression and the development of depression in offspring up to 16 years of age. *Journal of the American Academy of Child & Adolescent Psychiatry*, *50*(5), 460–470. https://doi.org/10.1016/j.jaac.2011.02.001

Nakhid, C., Collins, E., & Tanielu, R. (2009). *Pasifika youth in South Auckland: Family, community, gangs, culture, leadership and the future*. Families Commission. http://156.62.60.45/bitstream/handle/10292/4416/Families%20Commission%20pasifika-youth.pdf?sequence=2&isAllowed=y

National Gang Center. (2015, July). *Parents' guide to gangs*. Office of Juvenile Justice and Delinquency Prevention. https://www.nationalgangcenter.gov/Content/Documents/Parents-Guide-to-gangs.pdf

Nesayan, A., Amani, M., & Asadi Gandomani, R. (2018). A study of the cognitive profile of children and its relationship with academic performance. *Basic and Clinical Neuroscience Journal*. https://doi.org/10.32598/bcn.9.10.230

Ng-Knight, T., Shelton, K. H., Frederickson, N., McManus, I., & Rice, F. (2017). Maternal depressive symptoms and adolescent academic attainment: Testing pathways via parenting and self-control. *Journal of Adolescence*, *62*(1), 61–69. https://doi.org/10.1016/j.adolescence.2017.11.003

Ngure, W. W., & Amollo, P. O. (2017). Influence of parental marital status on academic achievement of preschool children in Embakasi, Nairobi, Kenya. *International Journal of Social Science and*

Humanities Research, *5*(2), 37–42.

https://www.academia.edu/32227944/Influence_of_Parental_Marital_Status_

NICHD Early Child Care Research Net, (2004). Multiple pathways to early academic achievement.

Harvard Educational Review, 74(1), 1–29. doi:10.17763/haer.74.1.k845735459043543

Nyarko, K. (2011). The influence of authoritative parenting style on adolescents' academic

achievement. *American Journal of Social and Management Sciences*, *2*(3), 278–282.

https://doi.org/10.5251/ajsms.2011.2.3.278.282

Olweus, D. (1996). *Revised Olweus bully/victim questionnaire*. https://doi.org/10.1037/t09634-000

Owens, M., Stevenson, J., Hadwin, J. A., & Norgate, R. (2012). Anxiety and depression in academic

performance: An exploration of the mediating factors of worry and working memory. *School

Psychology International*, *33*(4), 433–449. https://doi.org/10.1177/0143034311427433

Paradis, J., & Jia, R. (2016). Bilingual children's long-term outcomes in English as a second language:

Language environment factors shape individual differences in catching up with

monolinguals. *Developmental Science*, *20*(1), e12433. https://doi.org/10.1111/desc.12433

Park, Y., Seo, D. G., Park, J., Kim, B., & Choi, J. (2019). The influence of behavioral and emotional

characteristics on academic achievement of middle school students: A growth modeling

approach. *School Psychology International*, *40*(5), 433–455.

https://doi.org/10.1177/0143034319853010

Pasefika Proud. (2016). *The profile of Pacific peoples in New Zealand*. Ministry of Social Develop-

ment. https://pasefikaproud.co.nz/assets/Resources-for-download/PasefikaProudResource-

Pacific-peoples-paper.pdf

Pate, C. M., Maras, M. A., Whitney, S. D., & Bradshaw, C. P. (2016). Exploring psychosocial mecha-

nisms and interactions: Links between adolescent emotional distress, school connectedness,

and educational achievement. *School Mental Health*, *9*(1), 28–43.

https://doi.org/10.1007/s12310-016-9202-3

Paterson, J., Iusitini, L., & Taylor, S. (2014). Pacific Islands families study: Depressive symptoms in 9-year-old Pacific children living in New Zealand. *The New Zealand Medical Journal*, *127*(1390), 13–22. https://pubmed.ncbi.nlm.nih.gov/24670585/

Paterson, J., Percival, T., Schluter, P., Sundborn, G., Abbott, M., Carter, S., Cowley-Malcolm, E., Borrows, J., & Gao, W. (2007). Cohort profile: The Pacific Islands families (PIF) study. *International Journal of Epidemiology*, *37*(2), 273–279. https://doi.org/10.1093/ije/dym171

Paterson, J., Tautolo, E. S., Iusitini, L., & Sisk, R. (2018). Cultural, individual, and familial risk and protective factors associated with depressive symptoms in Pacific youth living in New Zealand. *Social Work in Mental Health*, *16*(6), 728–745. https://doi.org/10.1080/15332985.2018.1497566

Paterson, J., Taylor, S., Schluter, P., & Iusitini, L. (2012). Pacific Islands families (PIF) Study: Behavioural problems during childhood. *Journal of Child and Family Studies*, *22*(2), 231–243. https://doi.org/10.1007/s10826-012-9572-6

Pedrelli, P., Shapero, B., Archibald, A., & Dale, C. (2016). Alcohol use and depression during adolescence and young adulthood: A summary and interpretation of mixed findings. *Current Addiction Reports*, *3*(1), 91–97. https://doi.org/10.1007/s40429-016-0084-0

Poulter, A. C. (2017). *Social factors associated with internalising and externalising behaviours in Pacific Island children, at age 11 years* (Master of Health Science). Auckland University of Technology. http://156.62.60.45/bitstream/handle/10292/10860/PoulterAC.pdf?sequence=1&isAllowed=y

Prince, D., & Nurius, P. S. (2014). The role of positive academic self-concept in promoting school success. *Children and Youth Services Review*, *43*, 145–152. https://doi.org/10.1016/j.childyouth.2014.05.003

Quiroga, C. V., Janosz, M., Bisset, S., & Morin, A. J. S. (2013). Early adolescent depression symptoms and school dropout: Mediating processes involving self-reported academic competence and

achievement. *Journal of Educational Psychology*, *105*(2), 552–560.

https://doi.org/10.1037/a0031524

R Core Team. (2022). *R: The R project for statistical computing*. R: A language and environment for

statistical computing. https://www.R-project.org/

Ranney, M. L., Walton, M., Whiteside, L., Epstein-Ngo, Q., Patton, R., Chermack, S., Blow, F., &

Cunningham, R. M. (2013). Correlates of depressive symptoms among at-risk youth

presenting to the emergency department. *General Hospital Psychiatry*, *35*(5), 537–544.

https://doi.org/10.1016/j.genhosppsych.2013.05.007

Ready, D. D., & Wright, D. L. (2011). Accuracy and inaccuracy in teachers' perceptions of young

children's cognitive abilities. *American Educational Research Journal*, *48*(2), 335–360.

https://doi.org/10.3102/0002831210374874

Rescorla, L., Achenbach, T., Ivanova, M. Y., Dumenci, L., Almqvist, F., Bilenberg, N., Bird, H., Chen,

W., Dobrean, A., Döpfner, M., Erol, N., Fombonne, E., Fonseca, A., Frigerio, A., Grietens, H.,

Hannesdottir, H., Kanbayashi, Y., Lambert, M., Larsson, B., . . . Verhulst, F. (2007). Behavioral

and emotional problems reported by parents of children ages 6 to 16 in 31 societies. *Journal*

of Emotional and Behavioral Disorders, *15*(3), 130–142.

https://doi.org/10.1177/10634266070150030101

Rescorla, L., Achenbach, T., Ivanova, M., Harder, V., Otten, L., Bilenberg, N., & Verhulst, F. (2011).

International comparisons of behavioral and emotional problems in preschool children:

Parents' reports from 24 societies. *Journal of Clinical Child and & Adolescent Psychology*,

40(3), 456–467. https://doi.org/10.1080/15374416.2011.563472

Riffle, L. N., Kelly, K. M., Demaray, M. L., Malecki, C. E., Santuzzi, A. M., Rodriguez-Harris, D. J., &

Emmons, J. D. (2021). Associations among bullying role behaviors and academic

performance over the course of an academic year for boys and girls. *Journal of School*

Psychology, *86*, 49–63. https://doi.org/10.1016/j.jsp.2021.03.002

Robins J. M., Rotnizky A., & Zhao L. P. (1994) Estimation of regression coefficients when some

regressors are not always observed. *Journal of the American Statistical Association*, 89:846-

866

Robins J. M., Rotnizky A., & Zhao L. P. (1995) Analysis of semiparametric regression models for

repeated outcomes in the presence of missing data. *Journal of the American Statistical

Association*, 90:106-121

Rueger, S. Y., & George, R. (2016). Indirect effects of attributional style for positive events on

depressive symptoms through self-esteem during early adolescence. *Journal of Youth and

Adolescence*, *46*(4), 701–708. https://doi.org/10.1007/s10964-016-0530-2

Rüschenpöhler, L., & Markic, S. (2019). Self-concept research in science and technology education –

theoretical foundation, measurement instruments, and main findings. *Studies in Science

Education*, *55*(1), 37–68. https://doi.org/10.1080/03057267.2019.1645533

Sakai, T. (2016). Two sample T-tests for IR evaluation. *Proceedings of the 39th International ACM

SIGIR Conference on Research and Development in Information Retrieval*, 1045–1048.

https://doi.org/10.1145/2911451.2914684

Salazar, A., Ojeda, B., Dueñas, M., Fernández, F., & Failde, I. (2016). Simple generalized estimating

equations (GEEs) and weighted generalized estimating equations (WGEEs) in longitudinal

studies with dropouts: Guidelines and implementation in R. *Statistics in Medicine*, *35*(19),

3424–3448. https://doi.org/10.1002/sim.6947

Sargisson, R. J., Stanley, P. G., & Hayward, A. (2016). Multi-informant scores and gender differences

on the strengths and difficulties questionnaire for New Zealand children. *New Zealand

Journal of Psychology*, *45*(2), 4–12. https://www.researchgate.net/profile/Rebecca-

Sargisson/publication/307475513_Multi-

informant_scores_and_gender_differences_on_the_Strengths_and_Difficulties_Questionnai

re_for_New_Zealand_children/links/5e1c4b8da6fdcc28376e8a98/Multi-informant-scores-

and-gender-differences-on-the-Strengths-and-Difficulties-Questionnaire-for-New-Zealand-children.pdf

Schluter, P. J., Collet, O. A. M., Tautolo, E. S., Iusitini, L., Kokaua, J., & Paterson, J. (2020). Pacific and English language fluency and mental disorder symptom indications among Pacific mothers in New Zealand: Findings from the Pacific Islands families study. *Asia Pacific Journal of Public Health*, *33*(6–7), 753–760. https://doi.org/10.1177/1010539520956433

Schluter, P. J., Kokaua, J., Tautolo, E. S., Richards, R., Taleni, T., Kim, H. M., Audas, R., McNeill, B., Taylor, B., & Gillon, G. (2018). Patterns of early primary school-based literacy interventions among Pacific children from a nationwide health screening programme of 4 year olds. *Scientific Reports*, *8*(1). https://doi.org/10.1038/s41598-018-29939-w

Schluter, P. J., Tautolo, E. S., & Paterson, J. (2011). Acculturation of Pacific mothers in New Zealand over time: Findings from the Pacific Islands Families study. *BMC Public Health*, *11*(1). https://doi.org/10.1186/1471-2458-11-307

Schober, P., Boer, C., & Schwarte, L. A. (2018). Correlation coefficients. *Anesthesia & Analgesia*, *126*(5), 1763–1768. https://doi.org/10.1213/ane.0000000000002864

Scott, S. M., Wallander, J. L., & Cameron, L. (2015). Protective mechanisms for depression among racial/ethnic minority youth: Empirical findings, issues, and recommendations. *Clinical Child and Family Psychology Review*, *18*(4), 346–369. https://doi.org/10.1007/s10567-015-0188-4

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-Concept: Validation of Construct Interpretations. *Review of Educational Research*, *46*(3), 407–441. https://doi.org/10.3102/00346543046003407

Shorey, S., Ng, E. D., & Wong, C. H. J. (2021). Global prevalence of depression and elevated depressive symptoms among adolescents: A systematic review and meta-analysis. *British Journal of Clinical Psychology*. https://doi.org/10.1111/bjc.12333

Sivertsen, H., Bjørkløf, G. H., Engedal, K., Selbæk, G., & Helvik, A. S. (2015). Depression and quality of life in older persons: A review. *Dementia and Geriatric Cognitive Disorders*, *40*(5–6), 311–339. https://doi.org/10.1159/000437299

Sointu, E. T., Savolainen, H., Lappalainen, K., & Lambert, M. C. (2016). Longitudinal associations of student–teacher relationships and behavioural and emotional strengths on academic achievement. *Educational Psychology*, *37*(4), 457–467. https://doi.org/10.1080/01443410.2016.1165796

Son, S. C., & Peterson, M. F. (2016). Marital status, home environments, and family strain: Complex effects on preschool children's school readiness skills. *Infant and Child Development*, *26*(2), e1967. https://doi.org/10.1002/icd.1967

Son, S., & Kirchner, J. (2000). Depression in children and adolescents. *Am Fam Physician*, *62*(10), 2297–2308. https://www.aafp.org/pubs/afp/issues/2000/1115/p2297.html

Soomro, N. H., & Clarbour, J. (2012). Emotional behaviour and academic achievement in middle school children. *Pakistan Journal of Social and Clinical Psychology*, *10*(1), 10–16. https://gcu.edu.pk/pages/gcupress/pjscp/volumes/pjscp2012april-2.pdf

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of literacy. *Reading Research Quarterly*, *21*(4), 360–407. https://doi.org/10.1598/rrq.21.4.1

Statistics New Zealand and Ministry of Pacific Island Affairs (2010). Demographics of New Zealand's Pacific population. Wellington: Author

Stats NZ. (2018). *Pacific Peoples ethnic group*. 2018 Census ethnic group summaries | Stats NZ. https://www.stats.govt.nz/tools/2018-census-ethnic-group-summaries//pacific-peoples

Steinmayr, R., Meiǹer, A., Weideinger, A. F., & Wirthwein, L. (2014). *Academic achievement* (pp. 9780199756810-0108). Oxford University Press.

Südkamp, A., Kaiser, J., & Möller, J. (2012). Accuracy of teachers' judgments of students' academic achievement: A meta-analysis. *Journal of Educational Psychology*, *104*(3), 743–762. https://doi.org/10.1037/a0027627

Sundborn, G., Paterson, J., Jhagroo, U., Taylor, S., Iusitini, L., Tautolo, E.-S., Savila, F., Hirao, A., & Oliver, M. (2011). Cohort profile: A decade on and strong - The Pacific Islands families study. *Pacific Health Dialog*, *17*(2), 9–21. https://niphmhr.aut.ac.nz/__data/assets/pdf_file/0003/7590/069-Cohort-profile-A-decade-on-and-strong-PIFS.pdf

Thornberry, T. P., Krohn, M. D., Lizotte, A. J., Smith, C. A., & Tobin, K. (2003). *Gangs and delinquency in developmental perspective*. Cambridge University Press.

Tiatia-Seath, J., Lay-Yee, R., & Von Randow, M. (2017). Suicide mortality among Pacific peoples in New Zealand, 1996–2013. *New Zealand Medical Journal, 130(1454)*, 21-29. Retrieved from https: / / www.nzma.org.nz/ journal/ read-thejournal/ all-issues/ 2010-2019/ 2017/ vol-130-no-1454-28-april-2017/ 7224

Tucker-Masters, L., & Tiatia-Seath, J. (2017). Reviewing the literature on anxiety and depression in Pacific youth: A fresh perspective. *The New Zealand Medical Student Journal*, *25*, 24–28. https://www.researchgate.net/publication/321978186_Reviewing_the_literature_on_anxiety_and_depression_in_Pacific_youth_a_fresh_perspective

Vaillancourt, T., Brittain, H. L., McDougall, P., & Duku, E. (2013). Longitudinal links between childhood peer victimization, internalizing and externalizing problems, and academic functioning: Developmental cascades. *Journal of Abnormal Child Psychology*, *41*(8), 1203–1215. https://doi.org/10.1007/s10802-013-9781-5

van der Ende, J., Verhulst, F. C., & Tiemeier, H. (2016). The bidirectional pathways between internalizing and externalizing problems and academic performance from 6 to 18 years. *Development and Psychopathology*, *28*(3), 855–867. https://doi.org/10.1017/s0954579416000353

van Vuuren, A. (2016). *Factors facilitating the engagement in learning of Pāsifika students at intermediate school level* (Doctor of Philosophy in Education). Massey University. https://mro.massey.ac.nz/bitstream/handle/10179/10954/02_whole.pdf?sequence=2&isAllowed=y

Viner, R. M., Ozer, E. M., Denny, S., Marmot, M., Resnick, M., Fatusi, A., & Currie, C. (2012). Adolescence and the social determinants of health. *The Lancet*, *379*(9826), 1641–1652. https://doi.org/10.1016/s0140-6736(12)60149-4

Walker-Barnes, C. J., & Mason, C. A. (2001). Ethnic differences in the effect of parenting on gang involvement and gang delinquency: A longitudinal, hierarchical linear modeling perspective. *Child Development*, *72*(6), 1814–1831. https://doi.org/10.1111/1467-8624.00380

Wang, C. W., & Neihart, M. (2015). Academic self-concept and academic self-efficacy: Self-beliefs enable academic achievement of twice-exceptional students. *Roeper Review*, *37*(2), 63–73. https://doi.org/10.1080/02783193.2015.1008660

Wang, M. T., & Eccles, J. S. (2013). School context, achievement motivation, and academic engagement: A longitudinal study of school engagement using a multidimensional perspective. *Learning and Instruction*, *28*, 12–23. https://doi.org/10.1016/j.learninstruc.2013.04.002

Wang, X. (2009). *Maternal education, maternal language acculturation, parental involvement, and maternal social support as predictors of the academic achievement and socioemotional development of Asian American children*. College Park ProQuest Dissertations Publishing. https://www.proquest.com/docview/304923607?pq-origsite=gscholar&fromopenview=true

Weidman, A. C., Augustine, A. A., Murayama, K., & Elliot, A. J. (2015). Internalizing symptomatology and academic achievement: Bi-directional prospective relations in adolescence. *Journal of Research in Personality*, *58*, 106–114. https://doi.org/10.1016/j.jrp.2015.07.005

Weissman, M. M., Berry, O. O., Warner, V., Gameroff, M. J., Skipper, J., Talati, A., Pilowsky, D. J., & Wickramaratne, P. (2016). A 30-year study of 3 generations at high risk and low risk for depression. *JAMA Psychiatry*, *73*(9), 970. https://doi.org/10.1001/jamapsychiatry.2016.1586

Wentzel, K. R. (2017). Peer relationships, motivation, and academic performance at school. In A. J. Elliot, C. S. Dweck, & D. S. Yeager (Eds.), *Handbook of competence and motivation: Theory and application* (pp. 586–603). The Guilford Press.

WHO. (2021, September 13). *Depression*. World Health Organization. https://www.who.int/newsroom/fact-sheets/detail/depression?adlt=strict&toWww=1&redig=EB1C94FCDBE641118729500BE8D863D8

Wickersham, A., Sugg, H. V., Epstein, S., Stewart, R., Ford, T., & Downs, J. (2021). Systematic review and meta-analysis: The association between child and adolescent depression and later educational attainment. *Journal of the American Academy of Child & Adolescent Psychiatry*, *60*(1), 105–118. https://doi.org/10.1016/j.jaac.2020.10.008

Womack, S. R., Shaw, D. S., Weaver, C. M., & Forbes, E. E. (2016). Bidirectional associations between cannabis use and depressive symptoms from adolescence through early adulthood among at-risk young men. *Journal of Studies on Alcohol and Drugs*, *77*(2), 287–297. https://doi.org/10.15288/jsad.2016.77.287

Yeh, C., Borrero, N., & Tito, P. (2013). Family and cultural predictors of depression among Samoan American middle and high school students. *Journal of Multicultural Counseling and Development, 41*(2), 96-107

Youth Mental Health Project. (2015). Social Policy Evaluation and Research Unit.

Youthline – The state of the generation. (2019). Colmar Brunton. https://orangatamariki.govt.nz/assets/Uploads/About-us/Research/Research-seminars/December-2019/Shae-Ronald-Supporting-Young-People-in-Aotearoa.pdf

Zeger, S. L., Liang, K. Y., & Albert, P. S. (1988). Models for longitudinal data: A generalized estimating equation approach. *Biometrics*, *44*(4), 1049. https://doi.org/10.2307/2531734

Zheng, P. (2018). *The role of parental education, household income, and race on parents' academic*

beliefs and the provision of home learning opportunities for 4- to 8-year-old children

(Undergraduate Thesis). University of Pittsburgh. http://d-scholarship.pitt.edu/33770/

Appendix A

Ethics Approval Letter – PIF Study

March 17, 2021

Vevesi Togiaso
Masters Candidate
School of Health Sciences
University of Canterbury

Dr. El-Shadan Tautolo
Director
Pacific Islands Families Study
Faculty of Health and Environmental Sciences
AUT University
Private Ba 92006
Auckland 1142

Dear Dr. Tautolo,

Application to use PIF study for Masters thesis

I am currently studying towards a Master of Health Sciences and will be completing a thesis this year related to the wellbeing and education of Pacific youth in New Zealand. I would like to ask for permission to use the *Pacific Islands Families* (PIF) study in the research performed as part of the Master of Health Sciences (MHealSC) degree at the School of Health Sciences, University of Canterbury.

This Masters research will be conducted as part of a thesis exploring the research topic of the longitudinal relationship that exists between depression and education outcomes among Pacific youth in New Zealand. By accessing this research, I intend to use the data set to investigate this research topic. Although a separate ethics approval is not required from the University of Canterbury Ethics Committee, I am advised to acquire the acknowledgement of the PIF study team to use their data to fulfill the requirements of this Masters thesis.

In accessing and using the PIF study data for the Masters research, I agree to:

- Only use the data for the purpose stated for this project.
- Conduct the research in accordance with the ethical clearances already obtained for this thesis – and comply with the ethical standards for human experimentation, as established by the Helsinki Declaration.
- Analyse and propagate the data in a culturally appropriate manner.
- Protect the privacy of the study participants.
- Gather additional permission prior to publishing the results of the study.
- Dispose of the data upon the completion of the project.

On behalf of myself and my supervisors, we express our gratitude in examining our request for data and would kindly appreciate the approval of the use of PIF data by signing your acknowledgement on the following page.

Yours sincerely,

Togiaso

Vevesi Togiaso

March 17, 2021

In my capacity as Director of the Pacific Islands Families Study, I agree to the terms outlined above in this letter.

Signed: _____ (Dr. El-Shadan Tautolo)   Date: 18/06/2021