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# Risk and Protective Factors for Suicide Attempt Among Indigenous Māori Youth in New Zealand:

## The Role of Family Connection

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### ABSTRACT

The purpose of this study was to (1) describe risk and protective factors associated with a suicide attempt for Māori youth and (2) explore whether family connection moderates the relationship between depressive symptoms and suicide attempts for Māori youth. Secondary analysis was conducted with 1702 Māori young people aged 12–18 years from an anonymous representative national school-based survey of New Zealand (NZ) youth in 2001. A logistic regression and a multivariable model were developed to identify risk and protective factors associated with suicide attempt. An interaction term was used to identify whether family connection acts as a moderator between depressive symptoms and a suicide attempt. Risk factors from the logistic regression for a suicide attempt in the past year were



depressive symptoms (OR = 4.3,  $p < 0.0001$ ), having a close friend or family member commit suicide (OR = 4.2,  $p < 0.0001$ ), being 12–15 years old (reference group: 16–18 years) (OR = 2.7,  $p < 0.0001$ ), having anxiety symptoms (OR = 2.3,  $p = 0.0073$ ), witnessing an adult hit another adult or a child in the home (OR = 1.8,  $p = 0.001$ ), and being uncomfortable in NZ European social surroundings (OR = 1.7,  $p = 0.0040$ ). Family connection was associated with fewer suicide attempts (OR = 0.9,  $p = 0.0002$ ), but this factor did not moderate the relationship between depressive symptoms and suicide attempt ( $\chi^2 = 2.84$ ,  $df = 1$ ,  $p = 0.09$ ). Family connection acts as a compensatory mechanism to reduce the risk of suicide attempts for Māori students with depressive symptoms, not as a moderating variable.

## KEY WORDS

Adolescence, indigenous, Māori, suicide attempt, protective factors, moderation, compensatory mechanism, risk factors, family connection

## INTRODUCTION

Indigenous youth around the world experience disparities for suicide and suicide attempts compared to their peers. American Indian/Alaska Native young people (10–24 years) have a suicide rate 3.3 times higher than the U.S. national average (27.7 suicides per 100,000 for males and 8.5 per 100,000 for females) (Centres for Disease Control and Prevention, 2009), and Canadian First Nations youth (15–24 years) have rates five to six times higher than non-Aboriginal youth (126 per 100,000 for males, and 35 per 100,000 for females) (Advisory Group on Suicide Prevention, 2003). Aboriginal and Torres Strait Islander youth (0–24 years) have a suicide rate at least three times higher than non-Indigenous youth (30 per 100,000 for males and 10 per 100,000 for females) (Australian Institute of Health and Welfare, 2006).

In New Zealand, the Treaty of Waitangi (1840) assures Māori, as the Indigenous Peoples, equal standards of health care and health outcomes. Yet indigenous youth in New Zealand do not have equitable access to appropriate healthcare or equitable health outcomes compared to non-indigenous youth. Māori youth (15–24 years) have a suicide rate of 43.7 and 18.8 per 100,000 in males and females, respectively, compared to 18.0 and 9.1 per 100,000 for non-Māori males and females (Beautrais, Collings, Ehrhardt, & Henare, 2005; Beautrais & Fergusson, 2006). The overall suicide death rate for Māori youth (15–24 year olds) in 2006 was 31.8 per 100,000, compared with the non-Māori rate of 16.8 per 100,000 (Ministry of Health, 2008; Coupe, 2000). Given these health concerns, access to appropriate healthcare is essential yet almost 50% of Māori youth could not access the healthcare they had required during the past year. In addition, compared to Pākehā (NZ European) youth,

Māori youth were significantly less likely to access the health care they required [odds ratio (OR) = 1.3; 95% confidence interval (CI), 0.99–1.60] (Clark et al., 2008).

Despite these significant health disparities for indigenous youth, there is limited information about the indigenous- and youth-specific factors associated with suicide attempts. There is also increasing evidence that identification and reduction of risk factors is insufficient to improve outcomes for youth (Resnick et al., 1997). Accordingly, attention is being diverted from a deficits approach that focuses on identifying risk toward a healthy youth development approach that supports the resources of indigenous youth that might reduce the effects of risk factors (Denny, Clark, Fleming, & Wall, 2004; Luthar, 2003; Masten, Best, & Garmezy, 1990; Masten & Shaffer, 2005; Rutter, 1985; Silk et al., 2007; Utsey, Hook, & Stanard, 2007; Logan, 2009; Blum, 1998; Keelan, 2001). Identifying how these mechanisms operate, particularly amongst indigenous youth, is needed to identify factors that can be helped by intervention and to address the persistent mental health inequities faced by young people in Māori and other indigenous communities. This study explores the risk and protective factors associated with suicide attempts, and family connection as a mechanism to reduce the risk of suicide attempts for Māori youth in New Zealand.

## METHODS

Ethical approval was granted by the University of Auckland Human Subjects Ethics Committee to conduct a representative national youth health and well-being survey of secondary schools throughout New Zealand (Adolescent Health Research Group, 2003). In 2001, there were 389



eligible secondary schools with more than 50 students enrolled in Years 9–13 (ages 12–18 years). One third of these schools (133) were randomly selected and invited to participate in the survey. In total, 114 schools throughout New Zealand took part in the survey. The response rate for school participation was 86%.

Students who participated were required to be New Zealand residents, have English language skills equivalent of Year 6, and be physically able to use a standard laptop computer. At each participating school, 15% of eligible Year 9–13 students were randomly selected from the school roll and invited to participate. On the day of the survey, if selected students did not arrive at the school study venue, students on a randomly generated reserve list were then invited to participate. In total, 12,934 students were invited to participate in the survey. Three-quarters (9,699) or 75% of students agreed to take part. This represents 4.0% of the total 2001 New Zealand secondary school roll. The age and gender distribution of students who participated in the survey was similar to that of the student population at the surveyed schools and of all secondary students nation-wide (Adolescent Health Research Group, 2003).

Secondary analysis of the data provided by the Māori students was undertaken. Ethical approval for secondary analysis was obtained from the Minnesota Institutional Review Board. All students who reported Māori ethnicity (24.7% of the sample) were included in the analysis, resulting in 2,340 participating students. The Statistics New Zealand ethnic prioritization method was used to classify students' ethnicity (Statistics New Zealand, 2005). Therefore, any student who selected the Māori ethnic group was classified as Māori (participants were able to choose more than one ethnic group). Of the Māori students in the sample, 52.9% were male and 76.1% were 15 years or younger.

### **Instrument**

The survey instrument consisted of a 523-item, anonymous, self-report, branched questionnaire with a comprehensive range of questions related to the health and well-being of students attending secondary school in New Zealand (Adolescent Health Research Group, 2003). The survey was administered via multimedia computer assisted self-administered interview (M-CASI) (Watson et al., 2001).

### **Consequent variable: Suicide attempt**

Suicide attempt is measured using a dichotomous variable derived from the question "During the past 12 months have

you ever tried to kill yourself?" A similar question has been used in the Youth Risk Behaviour Survey (YRBS) in the United States since 1991. Test-retest reliability of the YRBS item in 1999 showed substantial reliability ( $\alpha = 72.7\%$ ) (Brener, Billy, & Grady, 2003).

### **Focal variable: Depressive symptoms**

Depressive symptoms are measured by the Reynolds Adolescent Depression Scale (RADS) (Reynolds, 1987). It consists of a 30-item questionnaire using a four-point Likert scale. A total score above 77 is the level of symptoms associated with clinical depression. The RADS instrument has internal consistency coefficients for American youth Grades 7–12, ranging from 0.91–0.96 with a total sample alpha reliability of 0.92. This instrument appears to be acceptable and valid for measuring depressive symptoms amongst New Zealand youth with a Cronbach's alpha over 0.9 for all ethnic groups, including Māori students (Milfont et al., 2008; Walker et al., 2005).

### **Moderating variable: Family connection**

A family connection scale was developed in consultation with a Māori advisory group, using questions that might theoretically constitute family connection for Māori youth (Table 1). Scales were explored for reliability and validity to create an alpha coefficient of at least 0.60 (Cronbach & Meehl, 1955). Items were summed and scaled where necessary to have a range of 1–4. The resultant score ranged from 10 to 40. The family connection scale had a Cronbach's alpha of 0.84. The family connection scale median was 35 with a range of 13.7–40, suggesting that Māori students report high levels of connection to their families.

### **Analyses**

Frequencies of suicide attempts and hypothesized risk and protective factors were reported by gender (Table 2). The relationships between suicide attempt and hypothesized risk and protective factors were explored through logistic regression adjusting for age, gender, and socioeconomic (SES) variables: school decile (a proxy measure of school level socioeconomic status), parents or family worrying about food, and moving residence frequently. Correlations between explanatory variables were checked as part of the inclusion process. Odds ratios were used to compare the odds/risk and explore associations between the different groups (suicide attempt/no suicide attempt) and various risk and protective factors. Chi-square tests were used to





determine the strength of associations between a suicide attempt and the other variables (Table 3). A level of significance of 0.1 was used as the basis for deciding which variables were included in the final multivariable model. Distributions were described with prevalence estimates and their 95% confidence intervals. In all analyses, the appropriate procedures for complex survey designs were used to ensure that the correct standard errors were calculated.

Multiple logistic regression analyses were used to explore the relationships between suicide attempt and the family connection scale while accounting for risk and protective variables. Factors that were significant independent predictors of suicide attempt and the family connection variable were included in the final combined logistic regression (Table 4).

To determine if there was dynamic conditionality of moderating variables (e.g., does family connection change or alter its trajectory based on the amount of risk?) an interaction term (depressive symptoms x family connection with suicide attempt as the outcome variable) was used (Rutter, 1985).

TABLE 2. PREVALENCE OF HYPOTHESIZED RISK AND PROTECTIVE FACTORS FOR SUICIDE ATTEMPTS BY GENDER

Hypothesized risk items	n/N	Males % (95% CI)	Females % (95% CI)	Total % (95% CI)
Significant depressive symptoms (RADS)	381/2268	9.5 (7.8–11.4)	22.7 (20.4–25.0)	16.6 (15.1–18.1)
Anxiety symptoms	115/2185	5.8 (4.4–7.3)	4.7 (3.5–6.0)	5.2 (4.3–6.2)
Gay, lesbian, or bisexual	92/2063	4.4 (3.0–5.7)	4.3 (3.0–5.7)	4.3 (3.4–5.3)
History of sexually coercive/abusive experience	630/2175	22.6 (20.2–24.9)	34.1 (30.9–37.2)	28.7 (26.8–30.7)
Bullied weekly or more frequently	147/2219	7.3 (5.6–9.0)	5.9 (4.4–7.3)	6.5 (5.4–7.7)
Having a friend or family member who had committed suicide	951/2204	30.2 (27.1–33.3)	54.4 (51.3–57.4)	43.0 (40.3–45.7)
Witnessed adults hitting a child or adult in their home	560/2117	24.9 (22.0–27.8)	28.0 (25.0–31.0)	26.6 (25.0–31.0)
Weekly or more frequent use of marijuana	250/1981	14.6 (11.7–17.5)	11.5 (9.0–13.9)	12.9 (11.0–14.8)
Binge alcohol use	1012/2012	52.0 (48.5–55.5)	49.5 (46.8–52.2)	50.6 (48.3–53.0)
Have a disability or chronic illness	920/2329	36.0 (32.8–39.3)	43.0 (40.0–45.9)	39.7 (37.3–42.1)
Moving home more than twice this year	400/2309	14.6 (12.1–17.1)	19.3 (16.7–21.8)	17.1 (15.0–19.1)



Hypothesized risk items	n/N	Males % (95% CI)	Females % (95% CI)	Total % (95% CI)
Uncomfortable in Pākehā (NZ European) surroundings	616/2311	26.2 (23.2–29.2)	26.2 (23.4–29.0)	26.2 (24.2–28.2)
Have a friend to talk to about a serious problem	1688/2043	74.2 (71.4–77.0)	89.8 (88.1–91.6)	82.5 (80.5–84.5)
Have an evening meal with family most days	1296/2279	60.1 (56.8–63.5)	53.8 (50.7–56.9)	56.8 (54.3–59.2)
Proud to be Māori	1620/1875	84.7 (82.0–87.5)	87.4 (85.3–89.5)	86.2 (84.2–88.1)
Education about Māori culture from parents relatives, *Marae, and *Kohanga Reo	1615/2285	63.0 (59.3–66.8)	77.2 (73.9–80.5)	70.6 (67.6–73.6)
Have people in my neighbourhood who care about how my life is going	1466/1978	71.5 (68.6–74.5)	76.3 (73.8–78.9)	74.1 (72.1–76.1)
Have an adult outside my family I would feel okay talking to about a serious problem	1203/1974	58.2 (54.8–61.6)	62.9 (60.2–65.7)	60.7 (58.5–62.9)
Neighbourhood is safe	1640/1966	86.3 (84.0–88.6)	81.0 (78.2–83.9)	83.5 (81.5–85.5)
Spirituality is important	1459/1931	68.4 (64.3–72.6)	81.4 (78.8–84.0)	75.4 (72.6–78.2)
Family connection scale	2142	33.9 (33.6–34.1)	34.5 (34.2–34.7)	33.4 (33.0–33.7)

\*Marae is a traditional meeting place for whānau (family), hapū (sub-tribe), and iwi (tribal) members usually characterized by a named whareniui (meeting house) and named wharekai (dining house). Some marae are more commonly known by the name of their whareniui, which is usually named after a tupuna (ancestor).

\*Kohanga reo is a kindergarten designed to immerse children in Maori language and culture.

TABLE 3. LOGISTIC REGRESSION FOR INDIVIDUAL ITEMS FOR SUICIDE ATTEMPT  
(CONTROLLING FOR AGE, GENDER, AND PROXY SES VARIABLES)

Item	N	p	Odds ratios (95% CI)
Significant depressive symptoms (RADS)	2253	<0.0001	9.4 (6.8–13.0)
Anxiety symptoms	2185	<0.0001	4.86 (3.26–7.26)
Coercive/abusive sexual experiences	2162	<0.0001	2.42 (1.78–3.30)
Bullied weekly or more frequently	2195	<0.0001	3.27 (2.10–5.08)
Gay, lesbian, or bisexual	2047	<0.0001	3.78 (2.22–6.43)
Violence perpetration	2186	<0.0001	2.99 (2.12–4.21)
Witnessed adults hit a child or another adult in your home	2100	<0.0001	3.21 (2.50–4.12)
Violence perpetration	2146	<0.0001	2.28 (1.67–3.10)
Having a friend or family member commit suicide	2204	<0.0001	5.72 (3.98–8.22)
Weekly or more frequent marijuana use	1970	<0.0001	2.09 (1.51–2.89)
Binge alcohol use	2002	<0.0075	1.41 (1.10–1.82)
Have a long term disability or chronic illness	2301	0.0001	1.74 (1.31–2.32)
Moving home more than twice in the past year	2278	<0.0001	2.47 (1.81–3.38)
Have an evening meal with family most days	2258	<0.0001	0.58 (0.46–0.74)
Proud to be Māori	1846	0.41	0.84 (0.55–1.28)
Education about Māori culture from parents, relatives, Marae, and Kohanga Reo	2254	0.48	1.13 (0.81–1.57)
Uncomfortable in Pākehā surroundings	2278	<.0001	1.79 (1.36–2.35)
Family connection scale <sup>#</sup>	2120	<0.0001	0.90 (0.88–0.91)



Item	N	p	Odds ratios (95% CI)
Have a friend to talk to about a serious problem	2033	0.37	0.83 (0.56–1.23)
Have an adult outside my family I would feel okay talking to about a serious problem	1973	0.38	0.86 (0.60–1.22)
Neighborhood safe	1961	0.0184	0.67 (0.48–0.93)
Spiritual beliefs are important to me	1922	0.35	0.86 (0.63–1.1)

#The family connection scale is associated with a reduced odds of attempting suicide. For every one unit increase in the family connection score we expect a statistically significant decrease (0.90) in the odds of attempting suicide.

TABLE 4. REDUCED MODEL FOR SUICIDE ATTEMPT

	OR	P
Age	2.68 (1.69–4.24)	<0.0001
Gender	1.27 (0.84–1.91)	0.26
Anxiety	2.29 (1.25–4.21)	0.0073
Depression	4.35 (2.47–7.66)	<0.0001
Witnessed adults hitting a child or another adult in their home	1.81 (1.27–2.58)	0.001
Friend/ family member committed suicide	4.20 (2.84–6.91)	<0.0001
Uncomfortable in Pākehā surroundings	1.70 (0.84–1.91)	0.004
Family connection scale #	0.94 (0.91–0.97)	0.0002

#The family connection scale is associated with a reduced odds of attempting suicide. For every one unit increase in the family connection score we expect a statistically significant decrease (0.94) in the odds of attempting suicide.



## RESULTS

### Focal variable: Depression

Overall, 16.6% of Māori students had a score >77 on the Reynolds Adolescent Depression Scale, indicating they had significant depressive symptoms (female 22.7%, male 9.6%). The odds of a student reporting significant depressive symptoms were over two and a half times higher among females than among males (OR = 2.77, 95% CI (2.14–3.57),  $p < 0.0001$ ).

### Consequent variable: Suicide attempt

Overall, 11.9% of Māori youth in the sample reported a suicide attempt in the past year (females 15.3%, males 8.0%). The odds of a student reporting a suicide attempt were two times higher among females than among males (OR = 2.08, 95% CI (1.51–2.84),  $p < 0.0001$ ).

### Risk and protective factors for suicide attempt by gender

Many Māori students reported a history of sexually coercive and abusive situations (28.7%), witnessed adults hitting children or other adults in the household (21.0%), or having a friend or family member commit suicide (43.0%) (Table 2). Over half of students reported committing an act of violence (54.0%), and half (50.4%) reported binge drinking. A significant proportion of Māori students (39.7%) reported that they had a chronic health condition or disability. Most Māori students reported that they had a friend that they could talk to if they had a serious problem (82.5%), and most reported being proud to be Māori (86.2%). In general, Māori students reported high levels of protective resources. However, females more frequently reported depressive symptoms, a history of sexually coercive experiences, a chronic illness or disability, a friend or family member who had committed suicide, and having a friend to talk to about a serious problem.

### Logistic regression for suicide attempt

Logistic regressions were undertaken to see whether there was an association between the risk and protective variables for suicide attempts when controlling for age, sex, and proxy SES variables (Table 3). Most of the identified factors were correlated with a suicide attempt except “a friend to talk to,” “proud to be Māori,” “education about Māori culture from parents, relatives, Marae, and Kohanga Reo,” “have an adult outside my family I would feel okay to talking to about a

serious problem,” “know people in the neighbourhood,” and “spiritual beliefs are important to me.”

### Model building

All variables found to be statistically significant in the logistic regressions were included in a model to examine risk and protective variables for suicide attempt within the past 12 months, with age, gender, and proxy SES variables.

In the initial model, 35% of the students had missing data for at least one of the variables and were excluded, leaving 1528 out of a possible 2340 observations. In an attempt to retain more students in the model and reduce the likelihood of bias, variables with fewer than 2000 students were removed. This resulted in a model with fewer variables but a larger sample size ( $n = 1686$ , 28% of the total Māori sample). In a final step, variables that were not significant from that model were removed to create a final reduced model (Table 4) ( $n = 1835$ , 78% of the sample).

The strongest risk factor for a suicide attempt in the past year, was depressive symptoms (OR = 4.335,  $p < 0.0001$ ) (Table 4). Other significant factors were having a close friend or family member commit suicide (OR = 4.212,  $p < 0.0001$ ), being in a younger age group (OR = 2.676,  $p < 0.0001$ ), having anxiety symptoms (OR = 2.313,  $p = 0.0068$ ), witnessing an adult hit another adult or a child in the home (OR = 1.812,  $p = 0.0010$ ), and being uncomfortable in Pākehā (NZ European) social surroundings (OR = 1.698,  $p = 0.0040$ ).

There was one factor that worked in a protective manner for a suicide attempt in the past 12 months: family connection (OR = 0.938,  $p = 0.0002$ ).

### Moderation model

It was hypothesized that family connection would moderate the relationship between depression and suicide. Students who reported depressive symptoms were significantly more likely to report a suicide attempt compared to those who didn't report depressive symptoms (39.8% vs 6.2%, OR = 9.4,  $p < 0.0001$ ). To test whether family connection was moderating the risk of suicide, an interaction term was added into the model (family connection x depression) to test the relationship over and above the effects of covariates. The association between suicide attempts and family connection was not found to differ between those with and without depression (OR = 2.8,  $p = 0.0942$ ). Therefore, family connection does not appear to moderate the relationship between depression and suicide.



## DISCUSSION

The risk factors identified for suicide amongst Māori youth are consistent with previous findings for other populations. Individual characteristics, particularly psychiatric disorders, play a significant role in the origins of suicide and suicide attempts (Beautrais et al., 2005). Māori students in this study report high rates of significant depressive symptoms (16.6%) as defined by the RADS (Clark et al., 2008). Internationally, it is estimated that clinical levels of depression in the general adolescent population are between 7–10% (Beasley & Beardslee, 1998; Birmaher, Ryan, Williamson, Brent, & Kaufman, 1996; Lewinsohn, Hops, Roberts, Seeley, & Andrews, 1993; Reynolds, 1987). In New Zealand, 13% of youth (all ethnic groups) aged 14–16 in a longitudinal study reported depressive symptoms (Diagnostic and Statistical Manual of Mental Disorders (DSM) IV symptom criteria) as measured by the Composite International Diagnostic Interview (CIDI) (Boden, Fergusson & Horwood, 2007). This study found that significant depressive symptoms increased the odds of a suicide attempt by nine times for Māori students ( $OR = 9.5$ ,  $p < 0.0001$ ). In addition, anxiety symptoms increased the odds by over four times ( $OR = 4.8$ ,  $p < 0.0001$ ). The gender differences found in this study are also consistent with previous literature (Cyranowski, Frank, Young, & Shear, 2000; Kessler & Walters, 1998; Lewinsohn, Clarke, Seeley, & Rohde, 1994), with females more than twice as likely as males to report significant depressive symptoms.

Family violence (Flannery, Singer, & Wester, 2001; Johnson et al., 2002; King et al., 2001; Resnick, Ireland, & Borowsky, 2004), child abuse (Fergusson & Horwood, 2001; Silverman, Reinherz, & Giaconia, 1996), and sexual abuse (Andover, Zlotnick, & Miller, 2007; Fergusson & Horwood, 2001; Fergusson, Lynskey, & Horwood, 1996) have previously been reported as significant risk factors for a suicide attempt and are also consistent with our findings. Exposure to a friend or family member who has committed suicide is a well-recognized risk factor for suicide (Beautrais et al., 2005; Borowsky, Ireland, & Resnick, 2001; Fergusson & Lynskey, 1996; Gutierrez, Rodriguez, & Garcia, 2001; Lewinsohn et al., 1994; Russell & Joyner, 2001; Spirito & Esposito-Smythers, 2006). This study found that a large proportion of Māori students (43.0%) reported that a family member or friend had committed suicide, significantly higher than NZ European youth (31.3%). Exposure to a friend or family member who had committed suicide increased the odds of Māori youth attempting suicide by three times in the past 12 months ( $OR = 3.4$ ,  $p < 0.0001$ ).

Given that suicides are more common in the total Māori population of New Zealand, the Māori cultural practices of tangihanga (funeral rites), a community/tribal process of grieving, may expose Māori youth to suicide deaths more frequently than their NZ European peers.

This study also found that “feeling uncomfortable in Pākehā social surroundings” was a risk factor for suicide attempts ( $OR = 1.698$ ,  $p = 0.0040$ ). There are several possible explanations for this finding. It is possible that this finding highlights Māori young people’s perceptions and experiences of racism and discrimination in Pākehā (NZ European) social surroundings. We suggest that this risk factor may reflect the racist environments in which many Māori youth live, rather than any inadequacy of the youth themselves. It is also interesting to note that previous analysis of the concept of “school connection” was not protective for suicide attempts for Māori students in this sample and may reflect students’ perceptions of racism in the school environment (Clark, 2007). Perceptions of racism and discrimination have been identified as a risk factor for suicide amongst indigenous communities in previous studies (Bals, Turi, Skre, & Kvernmo, 2010; Harris et al., 2006; Johnson, 1994; Larson, Gillies, Howard, & Coffin, 2007; Paradies, Harris, & Anderson, 2008). Other explanations include correlations between constructs such as anxiety or depression. Youth who are anxious, depressed, and have cognitive distortions, negative and pessimistic attribution styles, may feel uncomfortable in social situations in general (Lewinsohn, Joiner, & Rohde, 2001; Shortt & Spence, 2006). However, we believe this result highlights a sense of discomfort for Māori youth in dominant culture environments, and is worthy of further investigation.

The concept of resilience is based on the theory that an individual bounces back when faced with adversity if certain protective factors and resources are present. The protective resource (i.e., family connection) either has no effect when there is little risk, or the effect is magnified in high risk situations, thus resulting in a moderation effect. Most Māori students are highly connected to their families according to our family connection scale (median of 35 with a range of 13.7–40.0) and family connection is associated with fewer suicide attempts. However, when exploring how this relationship operates, family connection does not work as a moderating variable (i.e., the effect of family connection does not change at varying levels of risk). In other words, family connection does not operate as a protective factor that is consistent with a resilience effect. Rather, family connection appears to work as a compensatory mechanism. A compensatory mechanism lowers risk across all levels of



exposure or risk, rather than only when a young person is exposed to high risk or adversity. This is contrary to multiple other studies that have found that family connection acts as a protective factor and moderates risk (has a resilience effect) (Resnick et al., 1997; Borowsky et al., 1999; Pettingell, 2008). Our findings are consistent with other studies that found that family connection is a compensatory mechanism (Fergusson & Horwood, 2003; Fleming, Merry, Robinson, Denny, & Watson, 2007; Luthar & Cushing, 1999; Scaramella, Conger, & Simons, 1999; Steinhausen & Metzke, 2001).

These findings have important public health implications. The identification of risk factors are a necessary part of screening, referral, and treatment of suicidality, however, Hawton et al. concluded that “suicide rates are unlikely to decline as long as we confine our prevention efforts to only those who are at immediate risk of attempting suicide” (Yip, 2005, p. 29). Population approaches that seek to reduce suicidality among the whole population are in turn likely to reduce the proportion of morbidity and mortality associated with suicide (Rose, 2008; Yip, 2005). Our study found that family connection plays a significant role in reducing risk of suicide at all levels if Māori youth perceive their families to be caring and supportive. Evidence suggests that programs that help parents to develop positive parenting skills can help reduce mental health problems in their children (Fergusson, Stanley, & Horwood, 2009; Greenberg, Domitrovich, & Bumbarger, 2001; Kumpfer & Alvarado, 2003; Martinez & Eddy, 2005; Toumbourou & Gregg, 2002; Kotchick, & Forehand, 2002). In addition, programs and policies that enhance indigenous families’ knowledge through whānau (family) transformation processes, positive whānau development, and enhance mana (prestige and integrity) are more likely to actively engage Māori/indigenous families rather than mainstream programs of parenting that are often perceived as blaming or judgemental (Herbert, 2001; Livingstone, 2002). Strategies that support positive mental health programs (Beautrais, 2003; Yip, 2005) and improve and support family connection for indigenous populations are required.

There are several limitations in this study. Socioeconomic factors are important to measure accurately, however, children and youth are notoriously inaccurate at reporting parental income (Currie, Elton, Todd, & Platt, 1997). We used proxy socioeconomic measures that students would be able to respond to such as “parents or family worrying about not having enough food,” and “moving residence or home frequently.” Alongside these items, school

decile (a school level socioeconomic measure that accounts for household incomes in the area, parental occupation skill levels, household crowding, parental qualifications, and income support/welfare) (Ministry of Education, 2010) was used. The authors acknowledge that these proxy socioeconomic measures may not be the best indicators for measuring socioeconomic factors among this population. The risk and protective variables in this study were not exhaustive, rather they were comprised of items available within a national youth health survey. Therefore, there were several risk factors for suicide that were not included in this survey, such as panic attacks (Fergusson, Woodward, & Horwood, 2000; Pilowsky, Wu, & Anthony, 1999) and a broad range of significant traumatic life events including intergenerational trauma (Dube et al., 2001; Gould, Greenberg, Velting, & Shaffer, 2003; Ypinazar, Margolis, Haswell-Elkins, & Tsey, 2007). These risk factors for suicide are not accounted for in this analysis.

Another limitation of this study is the measure of family connection. Capturing this complex cultural construct is a challenge in quantitative research. While the family connectedness scale was developed in association with the Māori advisory group, a mainstream youth health survey does not have the capacity to fully explore the cultural concepts for Māori families and how they establish and maintain connectedness. Further qualitative research is needed to explore the unique role of Māori families and how family connection can be fostered. Another limitation is that this data was collected in 2001. While this secondary analysis is now 10 years old, the authors believe that this research adds to the scarce literature regarding indigenous youth and mental health outcomes. Finally, as with any cross-sectional study, it is impossible to infer causality or identify the factors that may precede a suicidal act.

## CONCLUSIONS

This study demonstrates that family connection reduces the risk for suicide attempt for Māori youth across all levels of risk. Policies, programs, and services that prioritize indigenous youth mental health and support indigenous philosophies of family well-being and connection are required. These strategies are likely to improve mental health for all indigenous youth, not just those who are at high risk for negative mental health outcomes. Finally, this study adds to the growing body of evidence that a dual strategy to reduce a range of risk factors and foster the positive



development and capacities of indigenous youth and their families may be key to reducing their significant mental health disparities.

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## REFERENCES

- Adolescent Health Research Group. (2003). A health profile of New Zealand youth who attend secondary school. *New Zealand Medical Journal, 116*(1171), U380.
- Advisory Group on Suicide Prevention. (2003). *Acting on what we know: Preventing youth suicide in First Nations*. Ottawa: Health Canada.
- Andover, M., Zlotnick, C., & Miller, I. (2007). Childhood physical and sexual abuse in depressed patients with single and multiple suicide attempts. *Suicide and Life-Threatening Behavior, 37*(4), 467-474.
- Australian Institute of Health and Welfare. (2006). *Indigenous mental health*. Retrieved June 15, 2010, from <http://www.aihw.gov.au/indigenous/health/mental.cfm#links>.
- Bals, M., Turi, A. L., Skre, I., & Kvernmo, S. (2010). Internalization symptoms, perceived discrimination, and ethnic identity in indigenous Sami and non-Sami youth in Arctic Norway. *Ethnicity & Health, 15*(2), 165-179.
- Beasley, P. J., & Beardslee, W. R. (1998). Depression in the adolescent patient. *Adolescent Medicine State of the Art Reviews, 9*(2), 351-362.
- Beautrais, A., Collings, S. C. D., Ehrhardt, P., & Henare, K. (2005). *Suicide prevention: A review of evidence of risk and protective factors, and points of effective intervention*. Wellington, New Zealand: Ministry of Health.
- Beautrais, A., & Fergusson, D. M. (2006). Indigenous suicide in New Zealand. *Archives of Suicide Research, 10*(2), 159-168.
- Birmaher, B., Ryan, N. D., Williamson, D. E., Brent, D. A., & Kaufman, J. (1996). Childhood and adolescent depression: A review of the past 10 years. Part II. *Journal of the American Academy of Child & Adolescent Psychiatry, 35*(12), 1575-1583.
- Blum, R. W. (1998). Health youth development as a model for health promotion. *Journal of Adolescent Health, 22*, 368-375.
- Boden, J. M., Fergusson, D. M., & Horwood, L. J. (2007). Anxiety disorders and suicidal behaviours in adolescence and young adulthood: Findings from a longitudinal study. *Psychological Medicine, 37*(3), 431-440.
- Borowsky, I. W., Ireland, M., & Resnick, M. D. (2001). Adolescent suicide attempts: Risks and protectors. *Pediatrics, 107*(3), 485-493.
- Brener, N. D., Billy, J. O. G., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health, 33*(6), 436-457.
- Centers for Disease Control and Prevention. (2009). *Suicide rates among persons aged 10-24 years by race/ethnicity and sex, United States 1991-2006*. Atlanta, Georgia: Centers for Disease Control and Prevention.
- Clark, T. C. (2007). *Factors associated with reduced depression and suicide risk among Māori youth in New Zealand* [Doctoral dissertation]. Minneapolis, Minnesota: University of Minnesota.



- Clark, T. C., Robinson, E., Crengle, S., Herd, R., Grant, S., & Denny, S. (2008). *Te ara whakapiki taitamariki. Youth'07: The health and wellbeing of secondary school students in New Zealand. Results for Māori young people*. Auckland, New Zealand: The University of Auckland.
- Coupe, N. M. (2000). Maori suicide prevention in New Zealand. *Pacific Health Dialogue*, 7(1), 25-28.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52(4), 281-302.
- Currie, C.E., Elton, R.A., Todd, J., & Platt, S. (1997). Indicators of socioeconomic status for adolescents: The WHO health behaviour in school aged children survey. *Health Education Research*, 12(3), 385-397.
- Cyranowski, J. M., Frank, E., Young, E., & Shear, M. K. (2000). Adolescent onset of the gender difference in lifetime rates of major depression: A theoretical model. *Archives of General Psychiatry*, 57(1), 21-27.
- Denny, S., Clark, T. C., Fleming, T., & Wall, M. (2004). Emotional resilience: Risk and protective factors for depression among alternative education students in New Zealand. *American Journal of Orthopsychiatry*, 74(2), 137-149.
- Dube, S. R., Anda, R. F., Felitti, V. J., Chapman, D. P., Williamson, D. F., & Giles, W. H. (2001). Childhood abuse, household dysfunction, and the risk of attempted suicide throughout the life span: Findings from the Adverse Childhood Experiences Study. *Journal of the American Medical Association*, 286(24), 3089-3096.
- Fergusson, D. M., & Horwood, L. J. (2001). The Christchurch Health and Development Study: Review of findings on child and adolescent mental health. *Australian and New Zealand Journal of Psychiatry*, 35(3), 287-296.
- Fergusson, D. M., & Horwood, L. J. (2003). Resilience to childhood adversity: Results of a 21-year study. In S. S. Luthar (Ed.), *Resilience and vulnerability: Adaptation in the context of childhood adversities* (pp. 130-155). New York: Cambridge University Press.
- Fergusson, D. M., & Lynskey, M. T. (1996). Childhood circumstances, adolescent adjustment and suicide attempts in a New Zealand birth cohort. *Journal of the American Academy of Child & Adolescent Psychiatry*, 34(5), 612-622.
- Fergusson, D. M., Lynskey, M. T., & Horwood, L. J. (1996). Childhood sexual abuse and psychiatric disorder in young adulthood: I. Prevalence of sexual abuse and factors associated with sexual abuse. *Journal of the American Academy of Child & Adolescent Psychiatry*, 35(10), 1355-1364.
- Fergusson, D. M., Stanley, L., & Horwood, L. J. (2009). Preliminary data on the efficacy of the Incredible Years Basic Parent Programme in New Zealand. *The Australian and New Zealand Journal of Psychiatry*, 43(1), 76-79.
- Fergusson, D. M., Woodward, L. J., & Horwood, L. J. (2000). Risk factors and life processes associated with the onset of suicidal behaviour during adolescence and early adulthood. *Psychological Medicine*, 30(1), 23-39.
- Flannery, D., Singer, M., & Wester, K. (2001). Violence exposure, psychological trauma, and suicide risk in a community sample of dangerously violent adolescents. *Journal of the American Academy of Child & Adolescent Psychiatry*, 40(4), 435-442.
- Fleming, T., Merry, S., Robinson, E., Denny, S., & Watson, P. (2007). Self reported suicide attempts and associated risk and protective factors among secondary school students in New Zealand. *Australian and New Zealand Journal of Psychiatry*, 41(3), 213-221.
- Gould, M. S., Greenberg, T., Velting, D. M., & Shaffer, D. (2003). Youth suicide risk and preventive interventions: A review of the past 10 years. *Journal of the American Academy of Child & Adolescent Psychiatry*, 42(4), 386-405.
- Greenberg, M. T., Domitrovich, C., & Bumbarger, B. (2001). The prevention of mental disorders in school-age children: Current state of the field. *Prevention and Treatment*, 4(1).



- Gutierrez, P. M., Rodriguez, P. J., & Garcia, P. (2001). Suicide risk factors for young adults: Testing a model across ethnicities. *Death Studies, 25*(4), 319-340.
- Harris, R., Tobias, M., Jeffreys, M., Waldegrave, K., Karlsen, S., & Nazroo, J. (2006). Racism and health: The relationship between experience of racial discrimination and health in New Zealand. *Social Science & Medicine, 63*(6), 1428-1441.
- Herbert, A. M. L. (2001). *Marae-based behavioural parent-training programmes emphasising client strengths and Māori values in parenting*. In I. M. Evans (Chair), Reconciling Cognitive-Behavioural Interventions with Cultural Imperatives. Symposium conducted at the World Congress of Behavioral and Cognitive Therapies, Vancouver, Canada.
- Johnson, D. (1994). Stress, depression, substance abuse, and racism. *American Indian and Alaska Native Mental Health Research, 6*(1), 29-33.
- Johnson, J. G., Cohen, P., Gould, M. S., Kasen, S., Brown, J., & Brook, J. S. (2002). Childhood adversities, interpersonal difficulties, and risk for suicide attempts during late adolescence and early adulthood. *Archives of General Psychiatry, 59*(8), 741-749.
- Keelan, T.J.E. (2001). E tipu e rea: A framework for Taiohi Maori development. Wellington, New Zealand: Ministry of Youth Affairs.
- Kessler, R. C., & Walters, E. E. (1998). Epidemiology of DSM-III-R major depression and minor depression among adolescents and young adults in the National Comorbidity Survey. *Depression and Anxiety, 7*(1), 3-14.
- King, A., Schwab-Stone, M., Flisher, A., Greenwald, S., Kramer, R., Goodman, S., Lahey, B. B., Shaffer, D., Gould, M. S. (2001). Psychosocial and risk behavior correlates of youth suicide attempts and suicidal ideation. *Journal of the American Academy of Child and Adolescent Psychiatry, 40*(7), 837-846.
- Kotchick, B. A., & Forehand, R. (2002). Putting parenting in perspective: A discussion of the contextual factors that shape parenting practices. *Journal of Child & Family Studies, 11*(3), 255-269.
- Kumpfer, K. L., & Alvarado, R. (2003). Family-strengthening approaches for the prevention of youth problem behaviors. *The American Psychologist, 58*(6/7), 457-465.
- Larson, A., Gillies, M., Howard, P. J., & Coffin, J. (2007). It's enough to make you sick: The impact of racism on the health of Aboriginal Australians. *Australian & New Zealand Journal of Public Health, 31*(4), 322-329.
- Lewinsohn, P. M., Clarke, G. N., Seeley, J. R., & Rohde, P. (1994). Major depression in community adolescents: Age at onset, episode duration, and time to recurrence. *Journal of the American Academy of Child & Adolescent Psychiatry, 33*(6), 809-818.
- Lewinsohn, P. M., Hops, H., Roberts, R. E., Seeley, J. R., & Andrews, J. A. (1993). Adolescent psychopathology: I Prevalence and incidence of depression and other DSM-III-R disorders in high school students. *Journal of Abnormal Child Psychology, 102*(1), 133-144.
- Lewinsohn, P. M., Joiner, T. E., & Rohde, P. (2001). Evaluation of cognitive diathesis-stress models in predicting major depressive disorder. *Journal of Abnormal Psychology, 110*(2), 203-215.
- Livingstone, I. D. (2002). *Whanau toko i te ora a parenting skills programme: evaluation report to the Ministry of Education*. Wellington, New Zealand: Ministry of Education.
- Logan, J. E. (2009). Prevention factors for suicide ideation among abused pre/early adolescent youths. *Injury Prevention, 15*(4), 278-280.
- Luthar, S. (2003). *Resilience and vulnerability: Adaptation in the context of childhood adversities*. New York: Cambridge University Press.
- Luthar, S., & Cushing, G. (1999). Measurement issues in the empirical study of resilience: An overview. In M. D. Glantz & J. L. Johnson (Eds.), *Resilience and development: Positive life adaptations* (pp. 17-83). New York: Kluwer Academic/Plenum Publishers.



- Martinez, J. C. R., & Eddy, J. M. (2005). Effects of culturally adapted parent management training on Latino youth behavioral health outcomes. *Journal of Consulting & Clinical Psychology, 73*(5), 841-851.
- Masten, A. S., Best, K., & Garmezy, M. (1990). Resilience and development: Contributions from the study of children who overcome adversity. *Development and Psychopathology, 2*, 425-444.
- Masten, A. S., & Shaffer, A. (2005). How families matter in child development: Reflections from research on risk and resilience. In A. Clarke-Stewart & J. Dunn (Eds.), *Families count: Effects on child and adolescent development*. Cambridge, UK: Cambridge University Press.
- Milfont, T., Merry, S., Robinson, E., Denny, S., Crengle, S., & Ameratunga, S. (2008). Evaluating the short form of the Reynolds Adolescent Depression scale in New Zealand adolescents. *Australian & New Zealand Journal of Psychiatry, 42*(11), 950-954.
- Ministry of Education, New Zealand. (2010). *How the decile is calculated*. Retrieved January 19, 2011, from <http://www.minedu.govt.nz/NZEducation/EducationPolicies/Schools/SchoolOperations/Resourcing/OperationalFunding/Deciles/HowTheDecileIsCalculated.aspx>.
- Ministry of Health, New Zealand. (2008). *Suicide facts: Death and intentional self harm hospitalisation 2006*. Wellington, New Zealand: Ministry of Health.
- Paradies, Y., Harris, R., & Anderson, I. (2008). *The impact of racism on indigenous health in Australia and Aotearoa: Towards a research agenda*. (Discussion Paper No. 4.). Darwin, Australia: Cooperative Research Centre for Aboriginal Health.
- Pilowsky, D. J., Wu, L.-T., & Anthony, J. C. (1999). Panic attacks and suicide attempts in mid-adolescence. *Am J Psychiatry, 156*(10), 1545-1549.
- Pettingell, S., Bearinger, L., Skay, C., Resnick, M., Potthoff, S., & Eichhorn, J. (2008). Protecting urban American Indian young people from suicide. *American Journal of Health Behaviors, 32*(5) 465-476.
- Resnick, M., Bearman, P. S., Blum, R. W., Bauman, K. E., Harris, K. M., Jones, J., Tabor, J., Beuhring, T., Sieving, R. E., Shew, M., Ireland, M., Bearinger, L. H., & Udry, J. R. (1997). Protecting adolescents from harm. Findings from the National Longitudinal Study on Adolescent Health. *Journal of the American Medical Association, 278*(10), 823-832.
- Resnick, M., Ireland, M., & Borowsky, I. (2004). Youth violence perpetration: What protects? What predicts? Findings from the national longitudinal study of adolescent health. *Journal of Adolescent Health, 35*(5), 424. e1-10.
- Reynolds, W. M. (1987). *Reynolds Adolescent Depression Scale 2nd Edition: Professional Manual*. Florida: Psychological Assessment Resources, Inc.
- Rose, G., Khaw, K., & Marmot, M. (2008) *Rose's Strategy of Preventive Medicine*. Oxford: Oxford University Press. Retrieved January 19, 2011, from <http://dx.doi.org/10.1093/acprof:oso/9780192630971.001.0001>.
- Russell, S. T., & Joyner, K. (2001). Adolescent sexual orientation and suicide risk: Evidence from a national study. *American Journal of Public Health, 91*(8), 1276-1281.
- Rutter, M. (1985). Resilience in the face of adversity: Protective factors and resistance to psychiatric disorder. *British Journal of Psychiatry, 147*, 598-611.
- Scaramella, L. V., Conger, R. D., & Simons, R. L. (1999). Parental protective influences and gender-specific increases in adolescent internalizing and externalizing problems. *Journal of Research on Adolescence, 9*(2), 111-141.
- Shortt, A. L., & Spence, S. H. (2006). Risk and protective factors for depression in youth. *Behaviour Change, 23*(1), 1-30.
- Silk, J. S., Vanderbilt-Adriance, E., Shaw, D. S., Forbes, E. E., Whalen, D. J., Ryan, N. D., & Dahl, R. E. (2007). Resilience among children and adolescents at risk for depression: Meditation and moderation across social and neurobiological contexts. *Development and Psychopathology, 19*(3), 841-865.



- Silverman, A., Reinherz, H., & Giaconia, R. (1996). The long-term sequelae of child and adolescent abuse: A longitudinal community study. *Child Abuse and Neglect, 20*(8), 709-723.
- Spirito, A., & Esposito-Smythers, C. (2006). Attempted and completed suicide in adolescence. *Annual Review of Clinical Psychology, 2*, 237-266.
- Statistics New Zealand. (2005). *Statistical standard for ethnicity*. Retrieved June 15, 2010, from <http://www2.stats.govt.nz/domino/external/web/carsweb.nsf/55d63ae38ba3a25e4c2567e6007f6686/35d9b7e17a1d6151cc25701100031353?OpenDocument>.
- Steinhausen, H., & Metzke, C. W. (2001). Risk, compensatory, vulnerability, and protective factors influencing mental health in adolescence. *Journal of Youth & Adolescence, 30*(3), 259-280.
- Toumbourou, J. W., & Gregg, M. E. (2002). Impact of an empowerment-based parent education program on the reduction of youth suicide risk factors. *Journal of Adolescent Health, 31*(3), 277-285.
- Utsey, S. O., Hook, J. N., & Stanard, P. (2007). A re-examination of cultural factors that mitigate risk and promote resilience in relation to African American suicide: A review of the literature and recommendations for future research. *Death Studies, 31*(5), 399-416.
- Walker, L., Merry, S., Watson, P. D., Robinson, E., Crengle, S., & Schaaf, D. (2005). The Reynolds Adolescent Depression Scale in New Zealand adolescents. *Australian & New Zealand Journal of Psychiatry, 39*(3), 136-140.
- Watson, P. D., Denny, S. J., Adair, V., Ameratunga, S. N., Clark, T. C., Crengle, S. M., Dixon, R. S., Fa'asisila, M., Merry, S. N., Robinson, E. M., & Sporle, A. A. (2001). Adolescents' perceptions of a health survey using multimedia computer-assisted self-administered interview. *Australian & New Zealand Journal of Public Health, 25*(6), 520-524.
- Yip, P. S. F. (2005). A public health approach to suicide prevention. *Hong Kong Journal of Psychiatry, 15*, 29-31.
- Ypinazar, V. V., Margolis, S. A., Haswell-Elkins, M., & Tsey, K. (2007). Indigenous Australians' understandings regarding mental health and disorders. *Australian and New Zealand Journal of Psychiatry, 41*(6), 467-478.

