

Tū Māori Mai: Māori Cultural Embeddedness Improves Adaptive Coping and Wellbeing for Māori Adolescents

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This longitudinal study investigated how being culturally embedded can improve adaptive coping strategies and wellbeing for Māori youth. We asked approximately four hundred Māori youth about: attitudes towards, and competency in, te reo Māori; connectedness to whānau and friends; and awareness of cross-cultural similarities and differences. They were also asked about their use of adaptive coping strategies and overall sense of wellbeing. Findings revealed bi-directional relationships over time between embeddedness and adaptive coping, and between adaptive coping and wellbeing. The predicted longitudinal mediation was empirically supported, namely cultural embeddedness at T1 predicted residualised adaptive coping at T2, which, in turn, predicted residualised wellbeing at T3. The only other significant longitudinal mediation was the same variables in the reverse direction. The positive implications of improving Māori cultural embeddedness are discussed.

Keywords: Māori, cultural embeddedness, adolescence, wellbeing, coping, ethnic identity

Identity of Māori People

Māori are the indigenous people of *Āotearoa* (New Zealand). However, prior to the arrival of *Pākehā* (non-Māori settlers), there were no labels for the collection of indigenous peoples in *Āotearoa* (Atkinson, 1892; Walker, 2004). Instead, Māori were, and are still, gathered within *iwi* (tribal), *hapū* (sub-tribal) and *whānau* (familial) groups. Each *iwi* has their own protocols, each *hapū* their own traditions and each *whānau* their own history. Although these separate groups can differentially shape a person's worldview, they exist together in an interconnected set of embedded systems (Doherty, 2012), such that an extensive amount of shared understanding exists among Māori people. For example, Harrington and Liu (2002) found that Māori students are oriented strongly towards the collective group. Māori would therefore be considered collectivistic (Hofstede, 1980), with a greater emphasis on group identity over individualism. However, the depth of shared knowledge and understanding will vary between group members (Durie, 2001; Houkamau & Sibley, 2015; Stevenson, 2004), particularly since Māori now live in a colonised society.

Today, *te ao Māori* (the Māori world) is enveloped by non-Māori concepts, making it difficult to maintain traditional Māori *tikanga* (Māori customs; Mead, 2016). This situation is a consequence of the assimilatory attitude of the Crown and the New Zealand government. In 1840, representatives of the British Crown drafted a treaty between the Crown and Māori, who were represented by a large gathering of Māori chiefs (Orange, 1990). In English, this treaty states that Māori would cede sovereignty to the Crown in exchange for protection. The treaty, however, was hastily translated into Māori and the translated version stipulates that Māori were only ceding governance to the Crown, allowing Māori to maintain their lands and possessions. Had they been provided with the correct translation, it is highly unlikely that the this treaty (called the Treaty of Waitangi) would have been signed

(Walker, 2004).

Within 20 years of the signing of the treaty, Māori had become outnumbered by *Pākehā* (non-Māori). Treaty promises were ignored and Māori land was unjustly confiscated through government legislation (Walker, 2004). The displacement of whānau from their home lands was a near-lethal blow to Māori identity, as connection to the land is of vital cultural importance (Durie, 2001). Furthermore, *te reo Māori* (the Māori language) was banned in schools and Māori cultural perspectives were excluded from school curricula (Durie, 1998). Rev. Māori Marsden described this process as "Cultural Genocide" (Marsden & Royal, 2003, p. 88). With the suppression of Māori language and culture, the intergenerational transmission of cultural beliefs and practices became increasingly difficult (Marsden & Royal, 2003; Mead, 2016). Over time, some Māori came to believe and internalise *Pākehā* perceptions of what it means to be Māori (Haenga-Collins & Gibbs, 2015; Webber, 2012).

This issue is particularly salient for *rangatahi* Māori (Māori youth) today. Adolescence is an important time for identity development (Erikson, 1968) and Māori youth may struggle to form a cohesive identity, with at least two competing ways of understanding the world (Māori and *Pākehā*). Furthermore, being Māori is most often portrayed negatively (i.e. by the media; Gregory et al., 2011) and so, without a secure base of understanding, these young people may internalise negative perceptions or avoid their Māori identity altogether (Houkamau, 2010). This problem can be exacerbated if the individual has only a basic understanding of *te reo Māori*. The Māori language is a window to the culture, it is complex and metaphoric, reflecting the nature of a Māori worldview (Doherty, 2012). Competency in speaking and understanding *te reo Māori* is an important measure of cultural fluency (Stevenson, 2004).

As a collectivistic culture, Māori see the world as

inherently interconnected (Harmsworth & Awatere, 2013; Marsden & Royal, 2003) and interpersonal connections are particularly crucial. *Whānau* (immediate and extended family) are the foundation of all relationships in the Māori world and healthy whānau connections are a key indicator of Māori health (Durie, 1998). Thematic analyses and other qualitative methods support this philosophy, identifying healthy whānau connections as important for rangatahi Māori in their personal development and wellbeing (Boulton & Gifford, 2014; Kara et al., 2011; Waiti & Kingi, 2014). Empirical research in this area is scarce, however, one study found that whānau connectedness buffered Māori adolescents against the developmentally normative decline in wellbeing over the period of early/mid adolescence (Stuart & Jose, 2014). Collectively, these findings suggest that whānau connectedness could help to overcome identity confusion by building an understanding of what it truly means to be Māori; although more research is required in this area.

Peer relationships are also important during adolescence, especially for Māori. Having Māori peers who share in the struggle of developing a bicultural identity can be empowering. Both peer and school connectedness have been found to increase confidence in the youth of New Zealand, including Māori adolescents (Ja & Jose, 2017). One of the challenges of adolescence is being bullied (Thomas et al., 2016), but for Māori, there is an additional problem of discrimination. Webber, McKinley, and Hattie (2013) surveyed 113 Māori students and found that 62% of participants had experienced racism, which, for some, subsequently impacted their Māori identity. However, young Māori, who experience discrimination, may be able to gain strength through an awareness of negative cultural perceptions, if these perceptions are not internalised. In their measure of Māori identity, Houkamau and Sibley (2015) identify group member evaluation as an important dimension of Māori identity. Essentially, this dimension measures the degree to which a Māori person can identify and overcome those stereotypes, with more positive evaluations reflecting a stronger Māori identity.

Cultural Embeddedness

While many cross-cultural researchers utilise ethnic self-identification to compare cultural differences (i.e. Betancourt & Lopez, 1993; Williams & Husk, 2013); we sought to measure the degree and intensity of cultural identification for the single cultural group of Māori rangatahi to see whether variability would predict different outcomes. Comprehensive measures of Māori cultural identity (Houkamau & Sibley, 2015; Stevenson, 2004) include, but are not limited to, items measuring: competency in, and appreciation of, *te reo Māori*; whānau connectedness; peer connectedness; and cultural awareness. We have collated items on these dimensions into a single variable, termed here as 'Māori cultural embeddedness', and we believe that this variable is an important foundational construct upon which Māori identity can be built. Proponents of kaupapa Māori (i.e. Durie, 2001; Marsden & Royal, 2003; Mead, 2016; Walker, 2004) would suggest that Māori are likely to benefit from being embedded within their culture. This benefit is likely to be particularly true for rangatahi Māori, who are still developing their self-concept (Erikson, 1968; Ja & Jose,

2017; Stuart & Jose, 2014). Thus, while identity may be fluid during these important years of development, we propose that Māori cultural embeddedness will remain relatively stable and confer benefits to psychological wellbeing.

We define Māori cultural embeddedness as: the foundation of Māori cultural identity, achieved through engagement with the core features of Māori culture, namely: fluency in, and appreciation of, *te reo Māori*, connection with Māori whānau and friends, and awareness of similarities and differences between Māori and other cultures. The items in the measure developed in the present work, by design, had a stronger focus on concrete behaviours and a weaker emphasis on cognitive and emotional appraisal (see Appendix A). The advantage of focusing on concrete behaviours is that these items should be relatively stable over the period of adolescence; whereas cognitive and emotional appraisal of identity can be more volatile over that same period (Crocetti, Scrignaro, Sica & Magrin, 2012). Furthermore, Fenton (2010) suggests that a measurement of ethnically aligned action; rather than membership alone, would capture the fluidity of ethnic identity. Thus, our measure of Māori cultural embeddedness seeks to measure ethnically aligned actions and attitudes, in order to capture the degree and intensity of cultural identification. As we have sought to explain thus far, the central actions and attitudes of Māori cultural identity include (but are not limited to): competency in, and an appreciation of, *te reo Māori*; whānau and peer connectedness; and an awareness of cultural similarities and differences (Durie, 2001; Houkamau & Sibley, 2015; Marsden & Royal, 2003; Stevenson, 2004; Walker, 2004). Our measure of Māori cultural embeddedness was intended to identify and quantify these central attitudes and behaviours for rangatahi Māori.

Wellbeing

Wellbeing is a construct that is defined variously within the positive psychology literature. Some researchers are inclined to use Bradburn's (1969) definition of happiness, namely a preponderance of positive over negative affect. Others define wellbeing as life satisfaction or self-esteem (e.g. Diener, Suh, Lucas, & Smith, 1999). In our study, following wellbeing theorists, we have operationalised wellbeing using the dimensions of confidence, aspiration/purpose in life and positive relations with others, which are especially relevant for adolescents (Jose, Ryan, & Pryor, 2012). Confidence is considered to be one of five key indicators of wellbeing for developing youth (Lerner, Fisher, & Weinberg, 2000; Roth & Brooks-Gunn, 2003), while purpose in life and positive relations with others are two important variables from the well-validated Ryff Wellbeing Scale (Akin, 2008; Kállay & Rus, 2014; Ryff & Keyes, 1995). In the present study we sought to determine whether Māori cultural embeddedness would promote wellbeing, defined in this way, over time.

Adaptive Coping Strategies

We propose that one possible mechanism by which cultural embeddedness might foster wellbeing is through the adoption of adaptive coping strategies. Coping strategies can be defined as efforts taken, in response to challenging situations, in order

to prevent or reduce distress, loss, harm, or threat (Carver & Connor-Smith, 2010; Folkman, Lazarus, Dunkel-Schetter, Delongis, & Gruen, 1986). Some coping strategies are more effective than others at reducing distress. Maladaptive or negative coping strategies, such as avoiding difficult situations and ruminating on negative experiences, have been shown to decrease psychological wellbeing (e.g. Frydenberg & Lewis, 2009; Jose et al., 1998; Michl, McLaughlin, Shepherd, & Nolen-Hoeksema, 2013). Adaptive coping strategies, on the other hand, are solution-focused responses to challenges, such as problem solving, resilience and the utilisation of social support. These strategies, although constrained by contextual factors, have been shown to generally improve psychological wellbeing (Chua, Milfont, & Jose, 2015; Frydenberg & Lewis, 2009; Jose et al., 2012; Jose & Schurer, 2010). In the present study, we operationalised adaptive coping using the dimensions of resilience, social support and problem solving. A primary goal of the present study was to determine how the use of adaptive coping strategies would influence the association between cultural embeddedness and wellbeing over time.

Study Description and Justification

Houkamau and Sibley (2011); (see also; Muriwai, Houkamau, & Sibley, 2015) have proposed a research agenda aimed at identifying the mechanisms through which Māori cultural efficacy, or the ability to effectively engage with Māori culture, improves wellbeing. The purpose of this study is to support their research agenda, with a specific focus on adolescents; exploring adaptive coping as a possible mechanism. To do this, we sought to develop a measure that would capture the key features of cultural efficacy during adolescence. We then examined how our new measure, which we termed Māori cultural embeddedness, was related to, and predictive of, adaptive coping strategies and wellbeing. Importantly, our study utilised longitudinal data in a subject variable design, which allowed us to draw conclusions about how these variables predict each other over time. Our hypotheses regarding the nature of these longitudinal interrelationships are as follows:

Hypotheses

1. *Positive zero-order correlations among cultural embeddedness, adaptive coping and wellbeing:*

Māori cultural embeddedness, adaptive coping and wellbeing are all conceptualised as measures of adaptive functioning (Jose et al., 1998; Neill & Dias, 2001; Rosenberg, 1965; Ryff & Keyes, 1995), so we expected them to be positively intercorrelated.

2. *Stability of Māori cultural embeddedness:*

Since we proposed Māori cultural embeddedness to be a relatively stable construct over time, we expected to find strong to moderate positive test-retest correlations for this variable between one-year time points.

3. *Relationships between cultural embeddedness, adaptive coping and wellbeing:*

Adaptive coping and wellbeing are well-known positive correlates (see Zeidner, Matthews, & Shemesh, 2016), but we also expected to identify a temporal relationship,

whereby using adaptive coping strategies would predict improved wellbeing over time.

Since the components of Māori cultural embeddedness are important in the development of a secure identity (Houkamau & Sibley, 2015; Muriwai et al., 2015; Stevenson, B. 2004), and because a secure personal and cultural identity is important for the wellbeing of an individual (Sharma & Sharma, 2010), we expected Māori cultural embeddedness to predict an improvement in wellbeing for our participants over time.

Finally, with increased whānau and peer support, greater cultural awareness and fluency in te reo Māori, we expected culturally embedded participants to have increased availability to, and therefore greater utilisation of, adaptive coping strategies over time.

4. *Indirect relationships from embeddedness to wellbeing through adaptive coping:*

To contribute to the research agenda set by Houkamau and Sibley (2011), we proposed adaptive coping would function as a mechanism through which cultural efficacy (measured through embeddedness) would predict improved wellbeing. In addition to the hypothesised direct effect, we expected Māori cultural embeddedness to indirectly predict improvements in wellbeing through improvements in adaptive coping strategies.

5. *Exploratory Analyses:*

Over the three time points and across the three variables, six indirect relationships are possible, all of which were examined. We posed a prediction for one of these indirect relationships (H4), but for the others we had no specific hypotheses regarding which of these indirect pathways would be significant. However, we were particularly interested in the reverse direction of Hypothesis 4 enunciated above, namely wellbeing to adaptive coping to cultural embeddedness.

Method

Design

This study utilised a subject variable longitudinal design measuring Māori cultural embeddedness, adaptive coping, and wellbeing at three time points, beginning in 2006, with each measurement separated by one year.

Participants

We utilised a subset of participants from the Youth Connectedness Project (YCP; see Jose et al., 2012) who were recruited from 78 schools around New Zealand using a stratified random sampling approach. This project set out to measure how youth in New Zealand are connected to families, peers, schools and communities.

Our sample consisted of 403 participants, 177 males (43.90%) and 226 females (56.10%) aged 9 to 15 years (median age = 12 years) at the first time point (T1), who reported Māori as their ethnicity at all three time points. Participants were able to self-identify with as many different ethnic groups as desired. Our sample therefore consisted of individuals who, at least, identified as Māori at all three time points, but who may have also identified with other ethnic groups. Because

our research focus was on Māori cultural identity, we did not analyse mono-, bi- or multi-cultural identification.

Ethical approval was granted by the Victoria University Ethics Committee and all schools, school principals, parents and participants (if 16 years or older) provided consent before data were collected.

Individuals who identified as Māori at T1 and subsequently dropped out of the study were analysed using a MANOVA, to see if they were significantly different from those who did not drop out on the variables of Māori cultural embeddedness, adaptive coping and wellbeing. The analysis revealed that attrited participants were, in fact, significantly different from continuing participants (Pillai's Trace: $F(3, 660) = .052, p < .001$), but the effect size was small (partial $\eta^2 = .052$). Specifically, attrited participants scored significantly higher on cultural embeddedness ($t(374.21) = 5.94, p < .001$), however the mean difference was small ($\Delta M = 0.36$), and no differences were noted for the other two variables.

Materials

Adaptive coping. This construct was measured using a 10-item scale, combining four resilience items with three items measuring social support and three problem solving items. Participants were asked to consider their actions or responses during stressful situations and were asked to respond on a five-point Likert scale from 1 (*Never/almost never*) to 5 (*Always/almost always*). Resilience items ($\alpha = .70$) were adapted from an existing resilience scale (Neill & Dias, 2001), and an example item reads: "I keep busy and interested in things". Both social support ($\alpha = .64$) and problem solving ($\alpha = .72$) were adapted from an existing coping scale (Jose et al., 1998). An item measuring social support reads: "I talk to others about how I am feeling" and an example item for problem solving reads: "I try to change the situation to fix the problem". In the present study, overall adaptive coping yielded good internal reliability at T1 ($\alpha = .84$), T2 ($\alpha = .80$) and T3 ($\alpha = .84$). Conceptually this construct included three different adaptive coping approaches that collectively operationalise an adaptive coping style (Jose et al., 1998).

Wellbeing. We measured wellbeing using 11 items capturing the dimensions of aspiration/purpose in life ($\alpha = .74$), positive relations with others ($\alpha = .70$) and confidence ($\alpha = .79$). Most of these items were adapted from the Ryff Wellbeing Scale (Ryff & Keyes, 1995), although several confidence items were adapted from the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Aspiration/purpose in life was measured using four items, and an example item reads: "I am serious about working hard now so I can have a good future". Positive relations with others had three items, for instance: "I find it easy to get on with people". Lastly, confidence was measured using four items, including: "I feel confident and positive about myself". Participants were asked how much they agree with these statements on a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Wellbeing yielded good internal reliability at each time point (T1: $\alpha = .87$; T2: $\alpha = .89$; T3: $\alpha = .89$).

Māori Cultural Embeddedness. This variable was generated for the current study. We first examined 16 potential items (shown in Appendix A) using Exploratory Factor Analyses

(EFA), one for each time point. The items were theoretically grouped on the following dimensions: three items measuring whānau connectedness, four items measuring connectedness to Māori peers, five items measuring cultural awareness, and four items measuring attitudes towards, and competency in, te reo Māori (which included two ordinal items asking how well participants could speak and understand te reo Māori). These two ordinal items had six possible responses, however all other items were presented with a five-point Likert scale. In order to equalise the metric across all items, scale responses that signified a value of six were recoded to the value of five.

The factors were rotated using the oblique (promax) method, since we expected any resulting factors to be correlated. We also utilised a parallel analysis (Horn, 1965), which helps to determine the number of factors to be extracted by the EFA, comparing eigenvalues that would be generated using random data with eigenvalues obtained from the present analysis. An online program was utilised to perform the analysis (Patil, Singh, Mishra, & Donovan, 2007) and the generated eigenvalues are presented alongside the observed eigenvalues in Table 1. The observed eigenvalues from each time point were compared to the computer-generated parallel eigenvalues and the number of factors to be extracted is indicated by the number of observed eigenvalues which are greater than their corresponding parallel eigenvalues. By this method, as shown in Table 1, a four-factor solution was indicated at T1, but a three-factor solution was indicated at T2 and T3. However, examination of factors outside of the first factor indicated the presence of double-loading items and poor internal reliability of small and difficult-to-interpret clusters of items.

Table 1. Actual and Estimated Eigenvalues from Factor Analyses at each Time Point

Factors	Eigenvalues T1	Eigenvalues T2	Eigenvalues T3	95% Estimated Parallel Values
1	6.43	6.50	6.76	1.36
2	1.52	1.75	1.65	1.28
3	1.41	1.40	1.40	1.22
4	1.11	1.19	1.24	1.17
5	0.94	0.88	0.83	1.12
6	0.79	0.72	0.68	1.09
7	0.62	0.59	0.56	1.05
8	0.57	0.50	0.51	1.01
9	0.48	0.44	0.44	0.98
10	0.42	0.39	0.37	0.94

Note: T represents time point.

Another way to determine the number of factors to be extracted involves the examination of a scree plot of obtained eigenvalues. Figure 1 presents the obtained eigenvalues at each time point along with the parallel values generated earlier. Upon inspection of the scree plot, we noted large discrepancies between the eigenvalues of the first factor with those of the second and subsequent factors, and consequently we would argue that a single factor solution should be utilised. The high internal reliability between all items in this factor ($\alpha = .90$ at all three time points) provides further evidence for a single factor solution.

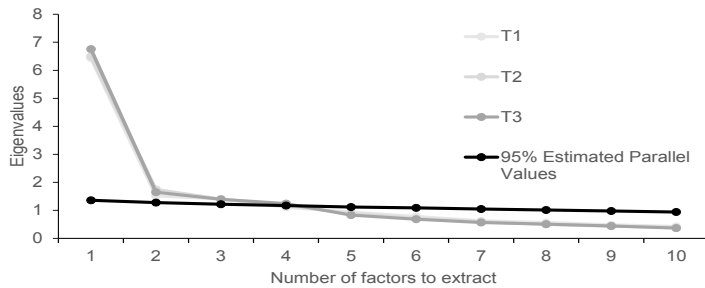


Figure 1. Scree plot of observed eigenvalues (y-axis) at each time point alongside parallel values (shown in the legend) estimated at the 95th percentile, suggesting the number of factors (x-axis) to be extracted.

Procedure

Informed parental consent and participant assent was obtained before survey administration at T1. Participants completed the survey in small groups within their school using laptop computers, which were separated physically to ensure privacy and facilitate honest responses. Online survey completion was adopted in some schools at T2 and T3. A teacher and a research assistant were present throughout the data gathering process to explain the procedure and clarify the meaning of questions if necessary. The entire survey was constituted by approximately 350 questions, with some variation in the total number of item responses due to branching and skipping. The completion time for each survey varied from 0.5 to 1.0 hour.

Data Analytic Plan

Analysing the data proceeded in the following steps. First the data were checked for patterns of missingness, with a goal in mind to impute missing values if necessary. The means and standard deviations were then calculated for each variable at each time point, as well as the zero-order correlations between them. Next, a latent variable path model was constructed and analysed through the following steps: 1) confirmatory factor analyses were carried out to examine the latent factor structure of all three variables by examining their model fit indices at each time point, 2) longitudinal invariance analyses were employed to examine whether the factorial structure of all variables maintained invariance over time, 3) the longitudinal path model was then constructed, including stability and cross-lag associations among all three variables, and the validity of this path model was measured, 4) the direct and indirect pathways among all three variables over time were analysed, to determine if there were any significant relationships, and finally 5) we tested whether the significant indirect pathways were moderated by age or gender.

Results

Data Cleaning and Coding

A missing values analysis was run for all variables across all three time points to determine whether there was any systematic missingness in the dataset. The analysis revealed 2.4% of the data was missing in the entire dataset. In addition, Little's MCAR test revealed that missingness was not distributed randomly ($\chi^2(9280) = 10057.35, p < .001$). Thus, some systematic missingness was present in the data.

However, in order to maximise statistical power, an expectancy maximisation imputation (EM; Dempster, Laird, & Rubin, 1977) with 50 iterations was performed, creating a full dataset with complete data.

The distribution of data was examined to see if there was any extreme skewness or kurtosis. Only one of twelve variables fell outside the recommended range of ± 1.96 (Field & Wilcox, 2017). Specifically, wellbeing at T2 was slightly leptokurtic (2.09). No significant skewness was found at the latent variable level. Since the majority of variables were normally distributed, no transformations were enacted.

Descriptive Statistics

As shown in Table 2, the means across all variables at all time points fell above the midpoint, with wellbeing scores being the highest. These scores indicated moderate levels of cultural embeddedness and adaptive coping as well as high levels of wellbeing among participants. Furthermore, all variables were significantly and positively intercorrelated, both concurrently and across data waves. The significant and positive intercorrelations support our first hypothesis. Also, the correlations between contiguous temporal measurements of Māori cultural embeddedness were particularly strong ($r < .60$), which suggests that this construct is reasonably stable over time, supporting hypothesis 2.

Table 2. Correlations and Descriptive Statistics for Key Variables

	1	2	3	4	5	6	7	8	9
1. Cultural Embeddedness T1	-	.69**	.63**	.22**	.15**	.13**	.27**	.25**	.21**
2. Cultural Embeddedness T2		-	.65**	.14**	.20**	.16**	.14**	.36**	.24**
3. Cultural Embeddedness T3			-	.17**	.13*	.24**	.20**	.28**	.30**
4. Wellbeing T1				-	.53**	.44**	.51**	.36**	.31**
5. Wellbeing T2					-	.53**	.37**	.57**	.40**
6. Wellbeing T3						-	.35**	.46**	.61**
7. Adaptive Coping T1							-	.44**	.38**
8. Adaptive Coping T2								-	.53**
9. Adaptive Coping T3									-
M	3.28	3.30	3.32	4.11	4.04	4.03	3.27	3.18	3.29
SD	0.69	0.67	0.68	0.54	0.57	0.57	0.69	0.74	0.72

Note: Time points are represented by T. * $p < .05$, ** $p < .01$.

Path Model Construction

A latent variable path model was constructed in the AMOS Structural Equation Modelling program (Arbuckle, 2014). As recommended by Little, Cunningham, Shahar, and Widaman (2002), each latent construct was represented by three parcels of systematically assigned items from the measure. For each variable, the first item, then subsequently every fourth item, were collated and averaged, creating the first parcel of the construct. Parcels two and three were created through a similar process, but beginning at items two and three respectively. Autocorrelated error was allowed to be estimated for all parcels over time.

Confirmatory factor analyses (CFA) were conducted in order to evaluate internal reliability by calculating the concurrent model fit indices at each time point. The model fit was excellent at all time points: T1 ($\chi^2/df = 1.44, CFI = .995, sRMR = .030, RMSEA = .033$), T2 ($\chi^2/df = 1.65, CFI = .994, sRMR = .031, RMSEA = .040$) and T3 ($\chi^2/df = 2.01, CFI = .990, sRMR = .030, RMSEA = .050$).

Invariance Testing

We performed a series of measurement invariance tests on the factorial structure of all three variables in the model, to evaluate whether the variables maintained structural equivalence on the levels of factor loading (configural), item loading (metric) and item intercepts (scalar) over time. By examining the longitudinal invariance of the path model's factorial structure between time points, the invariance of all three variables were tested at once. These analyses involved longitudinal comparisons which assessed configural, metric and scalar invariance for all variables between T1-T2, T2-T3, and T1-T3. For each time comparison, the level of interest was constrained to be equivalent at both time points and the model fit was examined to assess whether these constraints significantly altered the fit of the model. The analyses were performed in a step-wise manner: configural invariance was required in order to test for metric invariance, and metric invariance was required to test for scalar invariance. At each of these levels, longitudinal measurement invariance is accepted if two of the following three criteria are demonstrated: $\Delta\chi^2$ non-significant at $p < .05$; $\Delta CFI < .01$; and $\Delta RMSEA < .015$ (Cheung & Rensvold, 2002; Vandenberg & Lance, 2000). The invariance tests were computed and the results are reported in Table 3. Two of the three criteria were met at all three levels across all time comparisons ($\Delta\chi^2$ criteria was the exception, as it was not met at the configural and scalar levels), thus, time invariance was identified for the variables in the model, allowing for longitudinal associations to be examined.

Table 3. Stepwise Longitudinal Structural Invariance Test for all Variables in the Path Model

	T1 – T2			T2-T3			T1-T3		
	$\Delta RMSEA$	ΔCFI	$\Delta\chi^2$	$\Delta RMSEA$	ΔCFI	$\Delta\chi^2$	$\Delta RMSEA$	ΔCFI	$\Delta\chi^2$
Configural	-.002	.002	.038*	-.002	.002	.017*	.003	-.001	.913
Metric	.003	-.001	-	.003	-.001	-	.001	.001	.258
Scalar	-.002	.002	-	> .001	.001	-	-.002	.002	.010*

Note: *Invariance test did not meet criteria. Untested measurements are designated with a hyphen.

In order to try to simplify the model, we also tested whether cross-lags were invariant over time. To perform this test, we constrained the cross lags between T1-T2 to be equivalent with the corresponding cross lags from T2-T3 (Byrne, 2010). Using a chi-square significance test (Soper, 2017), we found that these constraints did not significantly alter the model fit ($\Delta\chi^2(6) = 4.66$, $p = .590$). Therefore, the final model included time equality constraints for all cross-lag estimates.

Path Model Findings

With the time equality constraints mentioned earlier, the fully saturated path model yielded mostly good model fit indices, although the CFI was low ($\chi^2/df = 1.85$, $CFI = .773$, $sRMR = .062$, $RMSEA = .046$). The stability coefficients for all variables over time were all statistically significant ($p < .001$). Of the three variables, wellbeing manifested the least stability over time (T1-T2: $\beta = .48$; T2-T3: $\beta = .40$), suggesting that participants' wellbeing levels were somewhat changeable. Adaptive coping strategies were more stable, yielding stability coefficients of moderate strength from T1-T2 ($\beta = .67$) and from T2-T3 ($\beta = .62$). Finally, the stability of Māori cultural

embeddedness was consistently strong (T1-T2: $\beta = .77$; T2-T3: $\beta = .72$), providing additional support for hypothesis 2.

The significant standardised cross-lag regression weights are presented in Figure 2; non-significant paths and stability coefficients have been omitted for the sake of readability. We found that adaptive coping predicted increases in wellbeing between T1-T2 ($\beta = .30$, $p < .001$) and again between T2-T3 ($\beta = .46$, $p < .001$). Interestingly, this relationship was bi-directional, as wellbeing predicted increases in adaptive coping between T1-T2 ($\beta = .26$, $p < .001$) and T2-T3 as well ($\beta = .28$, $p < .001$). We also found that Māori cultural embeddedness predicted improvements in adaptive coping between T1-T2 ($\beta = .09$, $p = .002$) and T2-T3 ($\beta = .08$, $p = .002$), with the reverse being significant too: adaptive coping predicted cultural embeddedness between T1-T2 ($\beta = .10$, $p = .002$) and T2-T3 ($\beta = .12$, $p = .002$). Although the associations were in the expected direction, Māori cultural embeddedness did not significantly and directly predict wellbeing ($p = .112$), nor did wellbeing directly predict embeddedness ($p = .069$), and these latter findings failed to support hypothesis 3.

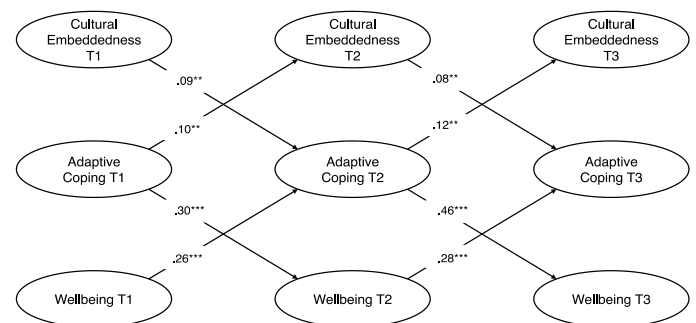


Figure 2. Standardised regression weights for the predictive relationships between Māori cultural embeddedness, adaptive coping and wellbeing over time. Note: the model was completely saturated, but nonsignificant paths, stability coefficients and covariances are omitted for the sake of readability. ** $p < .01$, *** $p < .001$.

Mediation Analysis

We also tested the six possible indirect relationships in the path model. The analysis stipulated 5,000 bootstrapped iterations of all six indirect effects in the model, and statistical significance of the effects were determined by bias corrected 95% confidence intervals. Two indirect relationships were of particular interest given our hypotheses:

a) Firstly, since Māori cultural embeddedness predicted improvements in adaptive coping one year later, which, in turn, predicted improvements in wellbeing the following year, a significant indirect relationship between embeddedness and wellbeing through adaptive coping was likely. The mediation analysis supported this predicted path, showing a significant indirect relationship between cultural embeddedness at T1 and wellbeing at T3, mediated by adaptive coping at T2 (*indirect effect* = .025, $SE = .011$, 95% $CI = [.007, .050]$). This significant indirect effect was in support of hypothesis 4. These findings also provide partial support for part of hypothesis 3: that Māori cultural embeddedness would predict improvements in wellbeing. Hypothesis 3 is only partially supported because, while Māori cultural embeddedness predicted improvements in wellbeing, it did so indirectly through adaptive coping.

b) We also sought to determine whether an indirect effect would be found in the reverse direction. Since wellbeing predicted improvements in adaptive coping one year later, which subsequently predicted improvements in embeddedness the following year, an indirect relationship between wellbeing and embeddedness was also likely to be significant. This indirect effect was found to be significant with wellbeing at T1 indirectly predicting improvements in cultural embeddedness at T3, mediated by adaptive coping at T2 (*indirect effect* = .040, *SE* = .021, 95% *CI* = [.008, .093]).

c) In exploratory analyses, the remaining four mediated relationships were found to be nonsignificant.

Moderation of the Indirect Effects by Age and Gender

We examined the two significant indirect effects (described in the above paragraph), to determine whether these effects were significantly moderated by age or gender. In order to test possible gender moderations, the AMOS path model was run separately for males and females, first constraining all paths of the model, then allowing for the indirect pathway of interest to be unconstrained. The chi-square values of the constrained path models were compared to the chi-square values of the unconstrained models, to determine whether the observed indirect effects were significantly different in strength for males and females. A similar process was followed to test whether each indirect effect was moderated by age. Participants were divided at the median age (12 years), comparing participants under 12 years at T1 ($N = 180$) to the older participants, who were 12 years and older at the same time point ($N = 223$).

Gender was not found to significantly moderate the indirect effects of the first mediation (cultural embeddedness to adaptive coping to wellbeing; $\Delta\chi^2(2) = 2.80, p = .247$) or the second mediation (wellbeing to adaptive coping to cultural embeddedness; $\Delta\chi^2(2) = 1.59, p = .452$), suggesting that males and females navigated these relationships very similarly.

Age was found to significantly moderate the indirect effect of the first mediation ($\Delta\chi^2(2) = 13.20, p = .001$). This difference was caused by the findings that cultural embeddedness was not found to predict adaptive coping ($p = .392$), nor did adaptive coping predict wellbeing ($p = .185$) in the older group, whereas both relationships were statistically significant for the younger participants. In contrast, age was not found to significantly moderate the second mediation ($\Delta\chi^2(2) = 5.59, p = .061$), which suggests that wellbeing predicted embeddedness through adaptive coping similarly for both older and younger participants. These results suggest that the indirect effect from cultural embeddedness to adaptive coping to wellbeing was significant only for younger participants; this dynamic seemed to fade away with age ($\Delta\chi^2(2) = 13.20, p = .001$). This difference was caused by the findings that cultural embeddedness was not found to predict adaptive coping ($p = .392$), nor did adaptive coping predict wellbeing ($p = .185$) in the older group, whereas both relationships were statistically significant for the younger participants. In contrast, age was not found to significantly moderate the second mediation ($\Delta\chi^2(2) = 5.59, p = .061$), which suggests that wellbeing predicted embeddedness through adaptive coping similarly for both older and younger participants. These results suggest that the indirect effect from cultural embeddedness to adaptive coping to wellbeing was

significant only for younger participants; this dynamic seemed to fade away with age.

Discussion

Overview and Interpretation of Findings

The chief purpose of this study was to support the research agenda set out by Houkamau and Sibley (2011), imploring the search for possible mechanisms through which Māori cultural efficacy, the ability to effectively navigate within Māori culture, improves the wellbeing of Māori people. Using the core features of Māori cultural identity, we developed a measure of efficacy that can be used with adolescents, which we called Māori cultural embeddedness. We then measured the degree to which variances in the embeddedness of rangatahi Māori predicted changes in adaptive coping and wellbeing over time.

Māori cultural embeddedness was found to manifest high internal reliability and, between temporal measurements, the zero-order correlations and the stability coefficients were strong. These findings are in support of hypothesis 2 and of our proposition that Māori cultural embeddedness measures the core and stable features of Māori cultural identity (Houkamau & Sibley, 2015). As such, cultural embeddedness could be an alternative measure of cultural efficacy, or the ability to participate effectively within Māori culture, which has been found to buffer psychological distress (Muriwai et al., 2015) and improve satisfaction with certain aspects of personal life (Houkamau & Sibley, 2011).

The path model findings were mostly in support of hypothesis 3. Namely, Māori cultural embeddedness was predictive of improvements in adaptive coping and adaptive coping was predictive of improvements in wellbeing over time. The exception to hypothesis 3 was that cultural embeddedness did not predict direct improvements in wellbeing over time. However, in line with hypothesis 4, analysis of the indirect pathways revealed that cultural embeddedness did, in fact, indirectly predict improvements in wellbeing through improved adaptive coping strategies. This finding is important, as it provides evidence for the theory that a strong cultural identity improves the wellbeing of Māori people (Durie, 2001; Marsden & Royal, 2003). Consistent with Houkamau and Sibley (2011), who posit that Māori cultural efficacy improves wellbeing through other mechanisms, we found that cultural embeddedness did not directly improve wellbeing, as measured in the present case. Instead, we found evidence for the role of adaptive coping strategies in mediating the association between cultural efficacy and wellbeing.

We were also interested in the possibility of bi-directional relationships between Māori cultural embeddedness, adaptive coping and wellbeing. The path model cross-lags revealed bi-directional relationships between cultural embeddedness and adaptive coping, and between adaptive coping and wellbeing. In other words, not only were levels of cultural embeddedness predictive of adaptive coping over time, but levels of adaptive coping were also predictive of cultural embeddedness, and similarly between adaptive coping and wellbeing. Furthermore, the significant indirect effect mentioned above was also observed in the opposite

direction: wellbeing at T1 predicted improvements in adaptive coping at T2, thereby strengthening cultural embeddedness at T3. Although these bi-directional relationships were not hypothesised, they are encouraging as they suggest what we have termed a 'cycle of cultural protection': whereby Māori cultural embeddedness improves adaptive coping strategies, thus leading to improved wellbeing, which subsequently returns to strengthen embeddedness through adaptive coping. These results are consistent with kaupapa Māori philosophy (i.e. Durie, 1998; 2001; Mead, 2016; Pere, 1991; Smith, 2012), which suggests that embeddedness within Māori culture is beneficial for Māori; and these benefits go on to reinforce and deepen Māori cultural embeddedness.

Applications and Future Directions

Two major applications can be drawn from our findings. Firstly, encouraging rangatahi Māori to become more engaged and embedded within their culture can help to build resilience and wellbeing through the development of adaptive coping strategies. It is imperative that whānau, hapū and iwi encourage rangatahi Māori to engage with their Māori identity, in order to establish a secure foundation from which adaptive coping strategies can be learnt, thereby improving wellbeing (Durie, 2001; Walker, 2004). This engagement includes learning *te reo Māori me ōna tikanga* (Māori language and customs), fostering connections with Māori whānau and friends, and developing greater awareness of cultural similarities and differences (Houkamau & Sibley, 2011; Muriwai, Houkamau, & Sibley, 2015).

The second application of our findings is that categorical ethnic self-identification can be a relatively crude indicator of ethnic/cultural identity (Williams & Husk, 2013), compared to measures such as Māori cultural embeddedness, which try to capture degree and intensity of cultural identification (Fenton, 2010). There is a danger of making false inferences about the influence of culture on an individual based on cultural self-identification only (Betancourt & Lopez, 1993; Smith, 2012; Winker, 2004). This point is further illustrated by our findings, since the degree of cultural embeddedness predicted outcomes differentially for our sample. Thus, future research in the area of cultural identity should be aware of the dimensional nature of culture/ethnicity in research design and interpretation.

Limitations of the Present Research

Several limitations of this study constrain its generalisability. Firstly, some variables may have been restricted by a ceiling effect. Wellbeing scores were particularly high, with scores greater than four, on a five-point scale, at each time point. These high levels of wellbeing could have influenced our results by limiting the variability (i.e., variance) of this construct. In fact, the significant indirect pathway from cultural embeddedness to wellbeing through adaptive coping, was found not to be statistically significant for older adolescents, suggesting that older adolescents, who may have spent more time in the cycle of cultural protection, may have reached a level of wellbeing where improvement was not statistically feasible. In the future, this limitation could be overcome by measuring wellbeing on a different scale, in which participants would be less inclined to provide uniformly high ratings.

A second limitation might be that only participants who identified as Māori at all three time points were included in the study. This selection choice could have led to a sampling bias, since participants who may have been unsure of their cultural identity were excluded. On a five-point scale, the mean level of cultural embeddedness was consistently above three, so including these uncertain participants could have provided a wider range of embeddedness scores. Similarly, we did not analyse differences between individuals who identified as solely Māori from those who identified as bi-cultural. Māori are very likely to have some Pākehā ancestry, but those Māori with high levels of cultural embeddedness may decide to solely identify as Māori (Houkamau & Sibley, 2014; Ward, 2006). Levels of cultural embeddedness may have therefore been meaningfully different between those who solely identify as Māori compared with those who identify as bi-cultural.

Finally, our measure of Māori cultural embeddedness could have been better informed and supported by qualitative data obtained from interviews or focus groups. The factor analysis and path model findings are promising, but the underlying assumption, that Māori cultural embeddedness is a valid measure of Māori identity, requires further empirical work. This goal can be achieved by conducting a qualitative review of embeddedness items with our research participants and with Māori leaders, and tying the cultural embeddedness measure to real world behavioural indicators of Māori identity (i.e. involvement with marae)

Conclusions

Māori cultural embeddedness was found to be positively associated with adaptive coping and wellbeing, providing evidence for the adaptive nature of this variable. Furthermore, cultural embeddedness was found to predict adaptive coping strategies, and adaptive coping strategies were found to predict wellbeing. Cultural embeddedness was thus indirectly related to improvements in wellbeing through adaptive coping, attesting to the strength and resilience of Māori rangatahi who are embedded within their culture (e.g. Durie, 2001). These positive findings are likely a consequence of Māori cultural embeddedness being a measure of the core and stable features of Māori cultural identity (e.g. Houkamau & Sibley, 2015). The significant direct pathways noted above were also observed in the reverse direction: wellbeing was found to predict adaptive coping, and adaptive coping predicted cultural embeddedness. Furthermore, wellbeing was indirectly related to cultural embeddedness through adaptive coping.

These bi-directional relationships suggest a cycle of cultural protection, whereby Māori cultural embeddedness improves wellbeing, which subsequently returns to strengthen embeddedness. Importantly, adaptive coping proved to be a central maintaining factor in the cycle of cultural protection and a key mediator between cultural efficacy and wellbeing. These findings suggest that being embedded within the Māori culture can expose rangatahi Māori to positive experiences, growing resilience and social support networks, which help to grow problem solving abilities and improve wellbeing. In conclusion, the findings suggest that being *more* Māori, or more embedded within Māori culture, helps to cultivate

adaptive coping for rangatahi Māori, thereby improving wellbeing.

Acknowledgments

We would like to thank Professor Colleen Ward for proposing the term “cultural embeddedness” to describe the construct we introduce in this article. We believe this is an excellent term which appropriately describes our construct.

Glossary of Terms

Āotearoa:	New Zealand
hapū:	sub-tribe
iwi:	tribal group
Pākehā:	non-Māori people
rangatahi:	adolescents
tangata whenua:	people of the land
te reo:	the Māori language

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Appendix A: Items for Māori cultural embeddedness

Whānau Connectedness

From 1 (Never/almost never) to 5 (always/almost always)

Please tell us how often:

- You hear stories about your elders/ancestors
- A relative tells you about how your whānau/family are related
- Your whānau/family do things for your community/iwi

From 1 (Strongly disagree) to 5 (Strongly agree)

How much do you agree with the following:

Māori Peer Connectedness

- Being Māori is normal amongst my mates
- A lot of my mates are Māori
- I speak a Maori type of English when I am with my Māori mates
- Me and my close mates use Māori words a lot when we talk to each other

Maori Cultural Awareness

- I have noticed differences in the way my culture does things compared to other cultures in New Zealand
- I have noticed similarities in the way my culture does things compared to other cultures in New Zealand
- I like hearing Māori language in the media (on TV, Radio, Music)
- I dislike seeing negative things about Māori in the media (on TV, Radio, Music)
- I like seeing Māori things in the media (On TV, Radio, Music)

Importance of Te Reo

- It is important that I know how to speak and understand Māori
- I would like to learn how to speak and understand Māori better

Categorical Reo Items

How well can you speak te reo Māori?

1. Cannot speak te reo Māori.
2. Can speak a few words and/or short sentences in te reo Māori
3. Can speak a few basic sentences in te reo Māori using different words for short periods.
4. Can speak te reo Māori using different words and sentences in many situations.
- 5a. Can confidently speak te reo Māori for long periods in many situations.
- 5b. Can confidently speak fluent te reo Māori in any situation

How well can you understand te reo Māori?

1. Cannot understand te reo Māori.
2. Can understand a few words and/or short greetings in te reo Māori
3. Can understand a few basic sentences in te reo Māori and understand different words for short periods.
4. Can understand te reo Māori used in different words and sentences in many situations.
- 5a. Can understand te reo Māori for long periods in many situations.
- 5b. Can confidently understand fluent te reo Māori being spoken in any situation.