

The Revised Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE3)

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Māori are the diverse indigenous people of Aotearoa New Zealand. The Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE) is a quantitative self-report survey measuring the extent that Māori view various domains of Māori culture as relevant to their self-concept. We describe the psychometric features of the seven refined subscales and add an eighth subscale reflecting Whānau Efficacy. We assess the MMM-ICE3 measurement properties using data from the Māori Identity and Financial Attitudes Study, the largest probability self-report study of Māori identity and psychology (N = 7019). Confirmatory Factor Analysis showed the MMM-ICE3 subscales were internally reliable and the eight theorised domains of identity fit better than alternative factor structures. Whānau Efficacy showed good construct validity and predicted unique variation in time spent with whānau and perceived social support. We provide the MMM-ICE3 scale in Māori and English.

Keywords: *Māori, Psychometrics, Identity, Self-report questionnaire, Scale development*

Introduction

Māori are the ethnically and culturally diverse indigenous people of Aotearoa New Zealand and comprise approximately 15.4% of the national population (MacPherson, 2017). The Multidimensional Model of Māori Identity and Cultural Engagement (MMM-ICE) is a quantitative self-report questionnaire. Here, Māori identity is defined as the parts of the person's self-concept that are related to their membership in the ethnic group Māori. The MMM-ICE assesses the extent to which Māori view different domains that are relevant to Māori identity and cultural engagement as central to their self-concept (Houkamau & Sibley, 2010). The survey is concerned with both the extent that an individual self-identifies as Māori as well as the individual's interpretations of what it means to be Māori. This survey was designed specifically to be inclusive of Māori realities (Houkamau & Sibley, 2010).

The most recent version of the MMM-ICE3, assesses concepts and characteristics commonly associated with Māori identity from eight domains. A table of operational definitions, means, standard deviations, Cronbach alpha scores, skewness and kurtosis for each MMM-ICE3 subscale is included in Table 1. Briefly, each of the MMM-ICE dimensions assess specific domains which are relevant to Māori identity and cultural engagement. These include; positive and central self-identification as Māori (Group Membership Evaluation, GME), confidence to engage in Māori cultural practices (Cultural Efficacy and Active Identity Engagement, CEAIE), belief that relationships with other Māori are fundamental to their Māori identity (Interdependent Self-Concept, ISC), Māori-specific spiritual beliefs (Spirituality, S), support for Māori rights (Socio-Political Consciousness, SPC),

stereotypical beliefs about Māori (Authenticity Beliefs, AB), certainty that they are “Māori looking” to others (Perceived Appearance, PA), and confidence in their whānau compatibility and capability (Whānau Efficacy, WE). Whānau is a Māori language term that can refer to a family group or familiar group of people and even include friends who are not kin with other members of the group (Moorfield, n.d). A key strength of this quantitative survey method is the ability to analyse trends, predict outcomes and explain processes that generate change for Māori. This scale can also be used to make comparisons between Māori about Māori-specific factors of identity.

The MMM-ICE: A brief history

The inception, development and validation of the MMM-ICE scale has previously been described in several papers (see Houkamau & Sibley, 2010; 2015; 2018). The first iteration of the MMM-ICE, created by Houkamau and Sibley (2010), utilised Exploratory Factor Analysis from an online (primarily undergraduate) sample (N = 270). Six defined but interrelated aspects of Māori identity (GME, CEAIE, ISC, S, SPC and AB) were detected and indicated a robust model. All six subscales were internally reliable and had acceptable item response parameters (Houkamau & Sibley 2010; Sibley & Houkamau, 2013). These aspects became the basis of an extensive multidimensional model of experiences and cultural engagement for Māori.

Houkamau and Sibley (2015) then updated the survey, MMM-ICE2, to include a seventh subscale named Perceived Appearance. This addition was in direct response to participant emails and comments on the initial MMM-ICE such as ‘I strongly identify as Māori, but people don’t often realise that I am Māori at all because I don’t look it’ (see Houkamau & Sibley, 2018, p. 479).

Table 1. Construct definitions and descriptive statistics for the eight factors indexed by the MMM-ICE3.*Group membership evaluation (GME)*

M = 5.28 (SD = 1.35), $\alpha = .81$, skewness = $-.59$ (SE = .03), kurtosis = $-.33$ (SE = .06).

The extent to which a person positively evaluates their membership in the social category Māori and views their membership as Māori as a personally important or central aspect of their self-concept *versus* the extent to which the person negatively evaluates their membership in the social category Māori and views their membership as Māori as peripheral or irrelevant to their self-concept.

Cultural efficacy and active identity engagement (CEAIE)

M = 4.84, (SD = 1.40), $\alpha = .78$, skewness = $-.41$ (SE = .03), kurtosis = $-.44$ (SE = .06).

The extent to which a person perceives that they have the personal resources required (that is, the personal efficacy) to engage appropriately with other Māori in Māori social and cultural contexts *versus* the extent to which the person perceives that they lack the personal resources and ability to engage appropriately with other Māori in Māori social and cultural contexts.

Interdependent self-concept (ISC)

M = 4.01, (SD = 1.39), $\alpha = .76$, skewness = $-.02$ (SE = .03), kurtosis = $-.52$ (SE = .06).

The extent to which the concept of the self-as-Māori is defined by virtue of relationships with other Māori *versus* the extent to which the concept of the self-as-Māori is viewed as being solely unique and independent to the individual rather than as part of the social group.

Spirituality (S)

M = 5.08, (SD = 1.62), $\alpha = .86$, skewness = $-.66$ (SE = .03), kurtosis = $-.49$ (SE = .06).

The extent to which a person is engaged with their taha wairua and has a belief in Māori concepts of spirituality, including a feeling a connection with tūpuna or believing in tapu *versus* the extent to which the person is disengaged from or does not believe in Māori concepts of spirituality.

Socio-political consciousness (SPC)

M = 5.21, (SD = 1.62), $\alpha = .82$, skewness = $-.67$ (SE = .03), kurtosis = $-.21$ (SE = .06).

The extent to which a person perceives historical factors as being of continued importance for understanding contemporary intergroup relations between Māori and other ethnic groups in Aotearoa New Zealand; and how actively engaged the individual is in promoting and defending Māori rights given the context of the Treaty of Waitangi *versus* the extent to which the person perceives historical factors and injustices experienced by Māori as being irrelevant in contemporary society.

Authenticity beliefs (AB)

M = 4.03, (SD = 1.37), $\alpha = .67$, skewness = $-.02$ (SE = .03), kurtosis = $-.32$ (SE = .06).

The extent to which a person believes that to be a 'real' or 'authentic' member of the social category Māori, one must display specific (stereotypical) features, knowledge and behaviour *versus* the extent to which the person believes that Māori identity is fluid rather than fixed and produced through lived experience.

Perceived appearance (PA)

M = 4.12, (SD = 1.98), $\alpha = .93$, skewness = $-.10$ (SE = .03), kurtosis = -1.21 (SE = .06).

The extent to which a person subjectively evaluates their appearance as having clear and visible features that signal their ethnicity and ancestry as Māori (or high Māori prototypicality) *versus* the extent to which a person evaluates their appearance as less indicative of having Māori ancestry (low Māori prototypicality).

Whānau efficacy (WE)

M = 4.72, (SD = 1.15), $\alpha = .71$, skewness = $-.32$ (SE = .03), kurtosis = $.09$ (SE = .06).

The extent to which a person subjectively considers their whānau as solutions-focussed and able to work together (high whānau efficacy) *versus* the extent to which the person has little confidence that their whānau can deal with conflict or accomplish work together (low whānau efficacy).

Māori participants from Wave III of the New Zealand Attitudes and Values Study were invited to complete the MMM-ICE2 online (N = 276; Houkamau & Sibley, 2015). Results indicated that all seven subscales were internally reliable and Confirmatory Factor Analysis revealed a reasonable model fit. Houkamau and Sibley noted that future amendments of the MMM-ICE should aim to develop scale items to improve model fit.

The MMM-ICE survey has been further refined with the intention to more accurately capture the distinct, yet interconnected factors hypothesised as being part of Māori identity. We expect that as the first survey of its kind, the MMM-ICE should continuously improve, directed by feedback from Māori participants and research. Changes from the MMM-ICE2 to the MMM-ICE3 include the addition of an eighth factor - Whānau

Efficacy, omission of certain items across all factors for brevity and clarity as well as more appropriate wording for some survey questions.

The Whānau Efficacy Scale

Importance of whānau

As noted above, the MMM-ICE dimensions assess domains which are relevant to Māori identity and cultural engagement. The Whānau Efficacy subscale, therefore, should be viewed as an experiential domain that contributes to the subjective experience of identifying and engaging culturally as Māori. The Whānau Efficacy subscale was added because whānau are widely accepted as the primary social unit of Māori society, and commonly recognised as a crucial source of identity and well-being (Ministry of Health, 2014; Durie, 2006; Statistics New Zealand, 2013). In traditional Māori society, people would typically identify themselves through descent-based structures including their immediate biological whānau and their wider cultural institutions of hapū, iwi and waka (Moeke-Pickering, 1996). In their analysis of Te Kupenga (the first Māori Social Survey; Statistics New Zealand, 2013), Kukutai, Sporle, and Roskrige (2016) suggested that strengthening whānau connectedness will be most effective when also strengthening cultural connections. Connection to whānau can therefore be considered an important aspect of identifying, expressing and experiencing the self culturally as Māori.

In contemporary Aotearoa New Zealand society, definitions of whānau vary. For some, whānau can encompass family (especially across generations), extended family, friends or other kinship ties (Kukutai et al., 2016). McNatty and Roa (2002) explained that whānau can be purpose-oriented (for example, members of a kapa haka group) or descent-oriented (through whakapapa or genealogical connections). These whānau relationships are associated with responsibilities, expectations and duties including reciprocity (Kukutai, Sporle, & Roskrige, 2016). As the Ministry of Social Development stated, “for Māori, whānau provides care and nurturing as well as identity and a sense of purpose and belonging” (2004, p. 105; see also Durie, 1998).

Māori and non-Māori perspectives of whānau/family

Literature suggests that Māori perspectives of whānau may differ from Aotearoa New Zealand’s ethnic majority Pākehā and that the western view of family structure is not reflective of a Māori worldview of whānau (Taiapa, 1995; Cunningham, Stevenson, & Tassell, 2005; Hirini, 1997; Kukutai, Sporle, & Roskrige, 2016). Māori are more likely to have children at younger ages and involve older generations (such as grandparents) and other whānau in raising their children than non-Māori (Cribb, 2009; Ministry of Social Development, 2004). Te Kupenga (Statistics New Zealand, 2013), a nationally representative survey of Māori well-being (N = 5549), reported that almost all Māori (98%) included people who did not live with them as part of their whānau. This is important since generic census surveys are traditionally based on Pākehā views of the household or neolocal “nuclear families” (for an in-depth history of Aotearoa New Zealand family morphologies see Pool, 2013). For statistical purposes, the Ministry of Social Development (2004) defined family as “two or more people living in the

same household who comprise either a couple, with or without children, or one parent and their children.” They acknowledged that by using such a narrow scope of “family” and “household” they could not consider cultural distinctions in how family or whānau are conceptualised and managed. This definition of family may not be a fitting term since most Māori include people who do not live with them as part of their whānau. Research (such as the present study) that utilises a broader approach to the Māori concept of whānau will be more relevant for Māori.

Whānau and well-being

Given the importance of whānau to Māori identity, policy related to te ao Māori typically emphasises the key role of whānau connectedness for well-being (Kukutai, Sporle, & Roskrige, 2016). To empower (Māori and non-Māori) whānau there have been many models of whānau ora or whānau well-being proposed over the years. Whānau Ora is an initiative shaped by te ao Māori that recognises that a whānau-engaging, transformative and strength-based approach from health and social services will achieve long-term outcomes better than the traditional issue-focused and individual-centred approach to improving health (Te Puni Kōkiri, 2018).

There is a wealth of research documenting the positive contribution of social support to people’s health and well-being (Tay, Tan, Diener, & Gonzalez, 2012; Waite, Iveniuk, & Laumann, 2014). Moeke-Pickering (1996) suggested that an environment that nurtured well-being among whānau members would create meaningful whānau and Māori identities and that a secure whānau identity would likely play a part in an overall stable Māori identity. In a similar vein (as part of a whānau-centred model) Durie and colleagues (2010) acknowledged that the state of each whānau member naturally affects others in the whānau and vice versa. Clearly, since the conditions and identities of whānau members influence each other, it would be ideal if whānau were “cohesive, resilient and nurturing” (Te Puni Kōkiri, 2018, p. 18). This is a specific outcome of the Whānau Ora initiative and is also comparable to collective efficacy.

In social psychology, collective efficacy can refer to an individual’s belief in the overall ability of their group to work together and act effectively to achieve desired outcomes (Zaccaro, Blair, Peterson, & Zazanis, 1995). Research has shown that higher perceived collective efficacy is related to stronger resilience in the face of challenges and better accomplishments by the group (Bandura, 2000). Developing a sense of collective efficacy may be more relevant to Māori as opposed to self-efficacy.

Knowing that whānau are important sources of support, identity and well-being for Māori (Ministry of Health, 2014; Durie, 2006), we suggest that whānau cohesion may be a crucial aspect of identity for Māori. The Whānau Efficacy subscale was created to evaluate just that. The subscale explores an individual’s faith in whānau to achieve collective goals and address challenges that affect whānau members. Being confident in the congruency and effectiveness of one’s whānau would probably influence people’s risk-taking behaviours and emotional well-being. Stated formally, the Whānau Efficacy domain is defined in the MMM-ICE3 as representing the extent to which a person considers their

Table 2. Factor loadings for MMM-ICE3 survey items in English.

	Standardised CFA loading
<i>Group Membership Evaluation (GME)</i>	
1. I reckon being Māori is awesome.	.876
2. I love that I am Māori.	.848
3. Being Māori is NOT important to my sense of what kind of person I am.	.458
4. Being Māori is cool.	.815
5. Being Māori is NOT important to who I am as a person.	.553
<i>Cultural Efficacy and Active Identity Engagement (CEAIE)</i>	
6. I don't know how to behave on a marae.	.583
7. I try to kōrero (speak) Māori whenever I can.	.704
8. I can't do Māori culture or speak Māori.	.548
9. I know how to behave the right way when I am on a marae.	.724
10. I have a clear sense of my Māori heritage and what it means for me.	.663
<i>Interdependent Self-Concept (ISC)</i>	
11. My relationships with other Māori (friends and family) are what make me Māori.	.731
12. How I see myself is totally tied up with my relationships with my Māori friends and family.	.696
13. For me, a big part of being Māori is based on my connections with other whānau.	.761
14. My Māori identity is fundamentally about my relationships with other Māori.	.567
15. My Māori identity has nothing to do with my relationships with other Māori.	.393
<i>Spirituality (S)</i>	
16. I believe that tūpuna (ancient ancestors) can communicate with you if they want to.	.814
17. I believe that my taha wairua (my spiritual side) is an important part of my Māori identity.	.834
18. I can sometimes feel my Māori ancestors watching over me.	.870
19. I have never felt a spiritual connection with my ancestors.	.663
20. I think tapu is just a made up thing. It can't actually affect you.	.499
<i>Socio-Political Consciousness (SPC)</i>	
21. I stand up for Māori rights.	.733
22. Māori would be heaps better off if we just forgot about the past and moved on.	.625
23. I'm sick of hearing about the Treaty of Waitangi and how Māori had their land stolen.	.644
24. What the European settlers did to Māori in the past has nothing to do with me personally. I wasn't there and I don't think it affects me at all.	.632
25. I think that Māori have been wronged in the past, and that we should stand up for what is ours.	.796
<i>Authenticity Beliefs (AB)</i>	
26. I reckon that true Māori hang out at their marae all the time.	.523
27. To be truly Māori you need to understand your whakapapa and the history of your people.	.594
28. True Māori always do karakia (prayer) before important events.	.658
29. Real Māori put their whānau first.	.563
<i>Perceived Appearance (PA)</i>	
30. I think it is easy to tell that I am Māori just by looking at me.	.857
31. I think it is clear to other people when they look at me that I am of Māori descent.	.830
32. People would never know that I am of Māori descent just by looking at me.	.833
33. I think it is hard to tell that I am Māori just by looking at me.	.882
34. When people meet me, they often do not realize that I am Māori.	.793
<i>Whānau Efficacy (WE)</i>	
35. If a problem arises that people cannot solve by themselves, the whānau as a whole will be able to solve it.	.658
36. People in my whānau usually have trouble dealing with conflict.	.320
37. People in my whānau have always been able to discuss problems that affect everyone.	.631
38. When a problem arises in my whānau, I often have very little confidence that we will be able to solve it.	.459
39. Whenever my whānau undertake a project together, we know that we will all work hard until it is accomplished.	.734

whānau as solutions-focussed and able to complete work together (higher Whānau Efficacy) versus the extent to which the person has little confidence that their whānau can deal with conflict or accomplish work together (lower Whānau Efficacy).

Whānau Efficacy is an important aspect of Māori cultural engagement not captured in the original MMM-ICE (nor any other survey). This subscale differs from Group Membership Evaluation by focussing specifically on the extent that participants evaluate their whānau as

effective and cohesive, rather than their ratings on how positive or important identifying with the wider social group, Māori, is for them. Whānau Efficacy is also different to the Interdependent Self Concept which measures an individual's belief that their relationships with other Māori is important to their identity as Māori rather than how capable or compatible they think their whānau are. A significant advantage of using the term "whānau" compared to family or household means that participants can respond with either their descent- or purpose-oriented whānau in mind. However, one could assume that because previous research found that "expressions of whānau that were solely based on a kaupapa concept were extremely rare" (Kukutai, Sporle, & Roskrige, p. 59, 2016), that participants may be likely to respond to the Whānau Efficacy items with their descent-oriented whānau in mind.

Additional refinements to the MMM-ICE3

In order to maintain a similar overall length, we also tweaked the MMM-ICE by removing items which had performed poorly in previous psychometric analyses or items noted by previous participants to be ambiguous. The refined MMM-ICE3 now contains 39 items and eight subscales in the MMM-ICE3 (see Table 2 for MMM-ICE3 items and factor loadings) in comparison to the 54 items and seven subscales in the MMM-ICE2. This more streamlined approach saves questionnaire space, is quicker for participants to complete and is expected to encourage better response rates due to having fewer items (Edwards et al., 2002).

We also refined the scale by subtly altering the wording of some items. These revisions were made based on feedback we had collected over the years from participants and stakeholders. As discussed by Houkamau and Sibley (2018), statements used in the MMM-ICE survey are intended to reflect how Māori identity might be referred to or discussed in day-to-day life, as opposed to how researchers believe that people should talk about being Māori. It is critical that survey questions strike the balance between everyday spoken phrases and item content. The original MMM-ICE items were based on analyses of qualitative data relating to Māori culture and identity (Houkamau & Sibley, 2010), however, feedback from participants suggested that some item wording could be interpreted as inappropriate and / or confusing. Reflecting this feedback, the MMM-ICE3 contains reworded versions of some of the less popular items. For example, some participants found phrases like "act" and "real Māori" inappropriate in items such as "I don't know how to act like a real Māori on a marae" (reverse coded; in MMM-ICE & MMM-ICE2). This was revised to "I don't know how to behave on a marae" (reverse coded; in MMM-ICE3), as part of the Cultural Efficacy and Active Identity Engagement factor.

Overview and guiding hypotheses

The current research aims to validate a revised version of the MMM-ICE (the MMM-ICE3) which includes a subscale assessing an eighth proposed factor of Māori identity – Whānau Efficacy. Here, we evaluate the measurement properties of the MMM-ICE3 using data from the largest national probability self-report questionnaire study of Māori identity and psychology ever conducted - the Māori Identity and Financial Attitudes

Study (MIFAS; see Houkamau, Sibley & Henare, 2019). The factor structure of the MMM-ICE3 will be assessed by Confirmatory Factor Analysis, this examines how well the eight-factor model representing each of the eight theorised dimensions of Māori identity fit the data. It was hypothesised that the proposed eight-factor solution would provide a reasonable approximate fit to the data, with a relatively low level of residual variation unexplained by the model.

The new Whānau Efficacy subscale will be tested to see whether it predicts unique variance in two criterion outcomes: (a) hours spent with whānau in the previous week and (b) perceived support from others. We reasoned that if a person is confident in their whānau ability to work together (or identifies as having higher Whānau Efficacy), that they would be more likely to spend time with their whānau, in comparison to someone who may feel their whānau would struggle in the face of tasks or challenges (have lower Whānau Efficacy) and therefore be less inclined to spend time with them. It was also assumed that people who were likely to believe that their whānau work well together (high Whānau Efficacy) may also sense that they are able to rely on others in times of need (high perceived support). Whereas Māori who feel that their whānau are less capable of working together (low Whānau Efficacy) may be more likely to feel that they do not have anyone to depend on (low perceived support).

These predictions that the Whānau Efficacy subscale of the MMM-ICE3 should predict unique variance in (a) hours spent with whānau and (b) perceived social support will be tested using path analysis. Note that the path model tests the hypotheses that Whānau Efficacy would significantly predict these two criterion outcomes when statistically adjusting for the other seven existing dimensions of the MMM-ICE2. That is, the Whānau Efficacy subscale is expected to predict variance in these two outcomes that would have remained unexplained (and thus have appeared as residual error) had the earlier seven-factor MMM-ICE2 scale been used.

METHODS

Participants

Participants were 7019 self-identified Māori who completed the MMM-ICE3 measures as part of the larger MIFAS survey (see Houkamau, Sibley & Henare, 2019). Note that adjusting for address inaccuracy yields an estimated response rate of 7% (7,019/98,500; see Houkamau, Sibley & Henare for further MIFAS response rate discussion). Only 15 participants filled out the te reo Māori version of the survey (see Table 3 for the te reo version of the MMM-ICE3 items). Participants were 4335 women, 2675 men and 4 gender diverse (5 unreported) with a mean age of 48.85 years (SD = 14.81). The MMM-ICE3 scale norms for Māori men and women across different age brackets are presented in Appendix A. 3019 solely identified as Māori, 3765 also identified as Pākehā, 314 identified as being also of Pacific nations descent, 119 identified as also having Asian ancestry and 87 reported other mixed ethnic affiliation. Scale norms for Māori who solely identify as Māori or identify as Māori and Pākehā are presented in Appendix B. Almost all were born in Aotearoa New Zealand (n = 6260) with only 122 born outside the country. Participants came from all over

Aotearoa New Zealand, with scale norms by iwi region detailed in Appendix C.

Participants reported an average education level of about NCEA Level 4 ($M = 4.04$, $SD = 2.77$). Participants had a mean New Zealand Deprivation score of 6.48 ($SD = 2.88$). The New Zealand Deprivation index is a socio-economic, decile-ranked score ranging from 1 to 10 which indexes the levels of material deprivation for each participant's immediate neighbourhood area based on census data (Salmond et al. 2007). As the index is decile ranked from 1 to 10 (i.e., each unit represents 10% of the population), a mean score of 6.48 indicates a moderate or mid-range level of deprivation relative to others in Aotearoa New Zealand.

Whether people lived rurally or in urban areas was almost evenly split, with 3453 living rurally and 3566 residing in urban centres. 2989 participants identified with a religious or spiritual group compared to 3668 who did not. Most participants ($n = 5262$) were parents whereas 1396 reported that they were not parents. Majority were in a serious romantic relationship ($n = 4241$) and 2252 were single. Most participants were employed, including self-employment or casual work ($n = 4553$) and 1888 were unemployed. 40% of participants indicated that they at least often talk about and build links through exploring whakapapa, whereas 40% reported they rarely do and 10% report they never do.

RESULTS

A key strength of Confirmatory Factor Analysis is that it provides indicators of both approximate model fit and the ability to test exact model fit. Tests of approximate model fit provide a general indicator of how closely the proposed model fits the data. The χ^2 of model fit, in contrast, provides a formal test assessing whether the hypothesised model departs significantly (at greater than chance) from the observed data. Two commonly used indicators of approximate fit are the Standardized Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA). When evaluating model fit, Hu and Bentler (1999) suggested that reasonable models should have an SRMR below .09 and a RMSEA below .06. These are of course 'rules-of-thumb.'

Fit indices for the hypothesised eight-factor MMM-ICE3 indicated reasonable level of approximate fit (SRMR = .070, RMSEA = .068; 90% Confidence Interval for RMSEA = [.067, .069]; Comparative Fit Index (CFI) = .834, Tucker-Lewis Index (TLI) = .817; AIC = 986393). The CFI and TLI indicated that the model fit was less than ideal regarding these indicators, which ideally should be close to or above .95 (Hu & Bentler, 1999). The hypothesised model also deviated significantly from the observed data [$\chi^2(1,713) = 23617.73$, $p < .01$]. Thus, while our model did differ significantly from the data, the model provided reasonable approximation of the variation in item ratings, with the SRMR indicating that the model would allow the correlation matrix to be reproduced with an average accuracy to within roughly .070 units.

Comparison with alternative models

In addition to providing information on relative and absolute fit, Confirmatory Factor Analysis provides a method for formally evaluating whether a given proposed

factor structure fits the data better than alternative structures. The hypothesised eight-factor MMM-ICE3 was compared with a variety of alternative models. The hypothesised eight-factor model fit better than a single-factor model in which every indicator freely loaded on every factor, and thus factors were not distinct [$\chi^2_{d,ff}(11) = 40409.02$, $p < .001$]. Relative fit indices for this alternative model were: (RMSEA = .113, SRMR = .100, CFI = .519, TLI = .492).

The hypothesised eight-factor model fit better than an alternative two-factor model in which aspects of Māori identity can be grouped into those that reflect the experiences of the self (GME, CEAIE, S, PA) and beliefs about the wider group, Māori (ISC, WE, SPC, AB; RMSEA = .111, SRMR = .098, $\chi^2_{d,ff}(12) = 38134.8$, $p < .001$).

The hypothesised eight-factor model also fit better than an alternative three-factor model in which aspects of Māori identity can be grouped into those that reflect the experiences of the self (GME, CEAIE, S, PA), how aspects of whānau relate to one's Māori identity (ISC, WE) and beliefs about the wider Māori group (SPC, AB; RMSEA = .109, SRMR = .099, $\chi^2_{d,ff}(14) = 35161.62$, $p < .001$).

The hypothesised eight-factor model was compared to and fit better than an alternative four-factor model loosely based on the Te Whare Tapa Whā health model (Durie, 1998). The four factors were taha tinana (PA, CEAIE), taha hinengaro (AB, GME), taha wairua (S, SPC) and taha whānau (ISC, WE; RMSEA = .096, SRMR = .114, $\chi^2_{d,ff}(17) = 22293.57$, $p < .001$).

The hypothesised eight-factor model fit better than an alternative five-factor model divided into concepts about whānau (WE, ISC), Māori-specific cultural experience (CEAIE, S), support for Māori political rights (SPC), positive identification with the wider Māori group (GME) and endorsement of stereotypical beliefs about what Māori do and look like (AB, PA; RMSEA = .084, SRMR = .088, $\chi^2_{d,ff}(21) = 11611.64$, $p < .001$).

A six-factor model that consisted of factors looking at Whānau Efficacy (WE), the importance of other Māori to the self (ISC), cultural and spiritual engagement (CEAIE, S), stereotypical views of Māori (PA, AB), how important positive a member values the group Māori (GME), and standing up for Māori political rights (SPC) did not fit better than the hypothesised eight-factor model (RMSEA = .080, SRMR = .086, $\chi^2_{d,ff}(26) = 7561.436$, $p < .001$).

The following alternative seven-factor models each assessed model fit when the items assessing Whānau Efficacy were modelled on to one of the factors from the MMM-ICE2. The hypothesised eight-factor model significantly fit better than every seven-factor alternative model when the Whānau Efficacy items were loaded on to; Group Membership Evaluation (RMSEA = .074, SRMR = .074, $\chi^2_{d,ff}(32) = 3455.927$, $p < .001$), Cultural Efficacy and Active Identity Engagement (RMSEA = .074, SRMR = .073, $\chi^2_{d,ff}(32) = 2894.882$, $p < .001$), Interdependent Self-Concept (RMSEA = .074, SRMR = .072, $\chi^2_{d,ff}(32) = 2986.306$, $p < .001$), Spirituality (RMSEA = .074, SRMR = .074, $\chi^2_{d,ff}(32) = 3814.17$, $p < .001$), Socio-Political Consciousness (RMSEA = .075, SRMR = .075, $\chi^2_{d,ff}(32) = 4025.116$, $p < .001$).

Table 3. Te reo Māori version of MMM-ICE3 survey items.*Group Membership Evaluation (GME)*

1. He rawe te tū hei Māori.
2. Ka nui taku aroha ki taku Māoritanga.
3. EHARA tōku Māoritanga i tētahi wāhanga nui o tōku tuakiri.
4. He pai te tū hei Māori.
5. EHARA tōku Māoritanga i te wāhanga nui o tōku tuakiri.

Cultural Efficacy and Active Identity Engagement (CEAIE)

6. Kāore au e mōhio me aha au i runga i te marae.
7. Ngana ai au ki te kōrero Māori i ngā wā katoa.
8. Kāore au e whai i te ahurea Māori, e kōrero Māori rānei.
9. Kei te mōhio ahau me aha ahau i runga i te marae.
10. E mārāma ana au ki tōku whakapapa Māori me te hāngaitanga mai ki a au.

Interdependent Self-Concept (ISC)

11. Mā aku hononga ki ētahi atu Māori (ngā hoa me te whānau) e Māori ai au.
12. Ko tōku katoa e whaipānga ana ki ōku hono ki ōku hoa me tōku whānau Māori.
13. Ki a au, he wāhanga nui o tōku Māoritanga aku hononga ki tōku whānau.
14. Ko te tūāpapa o tōku Māoritanga ko aku hononga ki ētahi atu Māori.
15. Kāore taku Māoritanga e pā ana ki aku hononga ki ētahi atu Māori.

Spirituality (S)

16. Ki a au ka taea e ngā tūpuna te kōrero mai ki te hiahia rātou.
17. E whakapono ana au he wāhanga nui o taku tuakiri Māori taku taha wairua.
18. He wā ōna ka rongohia ahau i ōku tūpuna e titiro mai ana i a au.
19. Kāore anō au kia rongohia i tētahi hononga ā-wairua ki ōku tūpuna.
20. He horihori noa iho te tapu. Nōhea e pā ki te tangata.

Socio-Political Consciousness (SPC)

21. Tū ai au mō ngā mōtika Māori.
22. Ka pai noa ake te Māori mēnā i wareware ngā rā o mua, ka kōkiri whakamua kē.
23. Kua hōhā au i te whakarongo ki ngā kōrero mō Te Tiriti o Waitangi me ngā whenua Māori i raupatungia.
24. Kāore i te pā ki a au ngā mahi a ngā Pākehā ki ngā Māori i mua. Kāore au i reira, nō reira kāore e pā mai ki a au.
25. Ki a au i tūkinotia te Māori i mua, nō reira me whawhai tātou mō ā tātou taonga.

Authenticity Beliefs (AB)

26. Ki a au nei, he rite tonu te haere a ngā Māori tūturu ki te marae.
27. E Māori tūturu ai koe me mōhio koe ki tō whakapapa me ngā kōrero hitori mō tō iwi.
28. Karakia ai te Māori tūturu i mua i ngā kaupapa nui.
29. Ko te whānau te mātāmua ki te Māori tūturu.

Perceived Appearance (PA)

30. Mā te titiro noa iho mai e mōhiohia ai au he Māori.
31. Ki a au, ka kitea au e ētahi atu ka mōhio noa mai rātou he whakapapa Māori ōku.
32. E kore te tangata e mahara he Māori ahau mā te titiro noa mai.
33. Kāore pea te tangata e mōhio he Māori ahau mā te titiro noa mai.
34. Ka tūtaki ana au ki ētahi atu, me uaua ka mōhio mai rātou he Māori ahau.

Whānau Efficacy (WE)

35. Ki te toko ake tētahi raruraru kāore e taea e te tangata kotahi te rongohia, ka riro mā te whānau katoa e rongohia.
36. He uaua ki ngā tāngata o taku whānau te taotohe.
37. Ka taea noatia e ngā tāngata o taku whānau te kōrero mō ngā raru ka pā ki tēnā me tēnā.
38. Ka puta he raru i waenga i tōku whānau, kāore au e kaha ki te whakapono ka taea e mātou te whakatika.
39. Ka tahuri ana taku whānau ki te whakatutuki ngātahi i tētahi kaupapa, e mōhio ana mātou ka pukumahi te katoa kia tutuki noa taua kaupapa.

Note: All items in the te reo version were numbered the same as the English version.

Table 4. Regression slopes and odds ratios for the models assessing the extent to which each MMM-ICE3 mean subscale score predicted hours spent with whānau and perceived support.

	Model predicting hours spent with whānau				Model predicting perceived support			
	b	se	β	z	b	se	β	z
Group Membership Evaluation (GME)	.894	.821	.029	1.089	.137	.023	.149	5.986*
Cultural Efficacy and Active Identity Engagement (CEAIE)	3.462	.957	.110	3.617*	.066	.027	.070	2.487*
Interdependent Self-Concept (ISC)	-2.022	.902	-.079	-2.240*	-.046	.025	-.059	-1.797
Spirituality (S)	1.273	.472	.059	2.699*	-.018	.013	-.028	-1.374
Socio-Political Consciousness (SPC)	.227	.796	.007	.286	-.071	.022	-.074	-3.192*
Authenticity Beliefs (AB)	-1.626	1.031	-.040	-1.578	-.239	.029	-.197	-8.305*
Perceived Appearance (PA)	.701	.288	.037	2.435*	-.027	.008	-.048	-3.377*
Whānau Efficacy (WE)	2.759	.609	.079	4.534*	.429	.018	.405	23.328*

R² for model predicting hours spent with whānau =.039, se=.005, p<.001.
R² for model predicting perceived support =.202, se=.011, p<.001

Authenticity Beliefs (RMSEA = .074, SRMR = .075, $\chi^2_{d.f.}$ (32) = 3127.889, p < .001) and Perceived Appearance (RMSEA = .077, SRMR = .087, $\chi^2_{d.f.}$ (32) = 5186.833, p < .001).

Predicting criterion outcomes

The construct validity of the newly added factor was assessed by testing whether Whānau Efficacy was linked with unique variance in two criterion outcomes: hours spent with whānau in the previous week and perceived support from others. These predictions were tested by estimating a model in which mean scale scores for each of the eight MMM-ICE3 subscales predicted the two criterion outcomes. Maximum Likelihood with robust estimation of the standard errors was used.

Table 4 presents the regression models assessing the extent to which each MMM-ICE3 mean subscale score uniquely predicted (a) hours spent with whānau in the previous week and (b) perceived support from others. Whānau Efficacy predicted significant unique variance in both criterion outcomes when adjusting for scores on the seven other MMM-ICE subscales. (a) People high in Whānau Efficacy (or more likely to believe that their whānau can work together to overcome obstacles), tended to report more hours spent with whānau in the previous week to filling out the survey (b = 2.759, se = .609, β = .079, z = 4.534, p < .001). (b) People who identified with high Whānau Efficacy were also more likely to report that they have people they can depend on if they needed (b = .429, se = .018, β = .405, z = 23.328, p < .001).

DISCUSSION

Māori are the diverse indigenous people of Aotearoa New Zealand, and the Multidimensional Model of Māori Identity and Cultural Engagement aims to appraise that diversity. The quantitative self-report questionnaire is intended for use in statistical models to predict and understand the outcomes and potentially protective function(s) of different aspects of Māori identity. Participant feedback from the MMM-ICE2 suggested that some items needed to be rephrased and these changes were included as part of the MMM-ICE3. The shortened and refined MMM-ICE3 builds upon the earlier MMM-ICE2 survey (Houkamau & Sibley, 2015) by adding an eighth domain that is relevant to Māori identity -Whānau Efficacy- to the existing seven subscales. We evaluated the measurement properties of the MMM-ICE3 utilising data from the MIFAS - a large-scale, national probability study of Māori identity and psychology (Houkamau, Sibley & Henare, 2019). Here we provide analyses that indicate that the MMM-ICE3 reliably indexes the eight hypothesised dimensions of Māori identity and cultural engagement, and that the eight factors provide a better fit than a variety of alternative theoretical factor structures. All eight subscales showed internal reliability and the newly developed measure of Whānau Efficacy showed good evidence of construct validity as it predicted unique variation in time spent with whānau and perceived social support. Critically, we provide extensive MMM-ICE3 scale norms and psychometric details based on national data, along with a copy of the scale in both te reo Māori and English in the hopes that the MMM-ICE3 is useful to others researching Māori identity.

Factor structure of the MMM-ICE3

The factor structures of both the six-factor MMM-ICE (Houkamau & Sibley, 2010; 2011; Sibley & Houkamau, 2013) and seven-factor MMM-ICE2 (Houkamau & Sibley, 2015) have been extensively validated. The current study extended these prior analyses by using Confirmatory Factor Analysis to formally test and statistically compare alternative factor structures of Māori identity with the eight-factor MMM-ICE3 model. For instance, a four-factor model loosely based on the Te Whare Tapa Whā health model by Durie (1998) might have represented the data better than the proposed eight-factor model, however, analyses did not support this four-factor model. Evidence from the alternative seven-factor models, where Whānau Efficacy was measured as part of an existing MMM-ICE2 subscale, suggested that Whānau Efficacy measures unique content not captured by the previous MMM-ICE2 subscales. All analyses of alternative theoretical models (ranging from one factor to seven factors) indicated that the eight-factor model, where each of the hypothesised subscales represented a distinct aspect of Māori identity, provided the most appropriate fit to the observed data.

Construct validity of the Whānau Efficacy subscale

The construct validity of the newly developed Whānau Efficacy subscale of the MMM-ICE3 was assessed using two criterion outcomes. The two outcomes considered were (a) hours spent with whānau and (b) level of perceived social support. As hypothesised, regression models indicated that Whānau Efficacy was significantly and positively associated with both increased hours spent with whānau and increased levels of perceived social support. Note that the association of Whānau Efficacy with the two criterion outcomes held when adjusting for scores on the other seven MMM-ICE2 subscales. This indicates that Whānau Efficacy predicted variance that could not be captured by the other MMM-ICE subscales.

The causal pathway between Whānau Efficacy and time spent with whānau cannot be determined from the current study but it may be a valuable contribution to research looking at time spent with whānau. Qualitative and quantitative research with young Māori suggests that some youths want to spend more time with their whānau (Edwards, McCreanor, & Moewaka-Barnes, 2007; Adolescent Health Research Group, 2004; Crengle et al., 2013). Since results from the current study indicate a positive link between Whānau Efficacy and time spent with whānau, strategies that foster whānau cohesion, like that of the Whānau Ora Outcomes Framework (Te Puni Kōkiri, 2018), might also encourage whānau to spend more time together. It is quite possible that the reverse works too where spending more time with whānau boosts whānau efficacy or that a third variable not measured here affects both variables for example wanting to spend time with whānau may increase both time spent with whānau and Whānau Efficacy. Note that the regression model indicated that the Cultural Efficacy and Active Identity Engagement factor was the strongest predictor of reported time spent with whānau, reflecting Kukutai and colleagues (2018) observation that cultural connection may strengthen whānau connection. Thus, both the Whānau Efficacy subscale tested and validated in the

current study and the previously validated Cultural Efficacy and Active Identity Engagement factor (Houkamau & Sibley, 2010) could be useful measures for the Whānau Ora initiative and those looking to support Māori who want to spend more time with their whānau.

The link between Whānau Efficacy and perceived support is consistent with literature that explains that whānau are an important source for supportive relationships (Cram & Kennedy, 2014). The current research takes this a step further by providing evidence that specifically shows that an individual's subjective views about how well their whānau can work together is positively correlated with how much social support they feel they have access to. This link might be intuitive and obvious for some, nonetheless we contribute this statistical evidence to the whānau support literature. Note again that it is not possible from the current study to determine the direction of causality.

Whānau Efficacy as a Māori-specific measure may be a valuable contribution to the collective efficacy literature and especially relevant in terms of indigenous collective efficacy. A sense of collective efficacy has been shown to be beneficial for indigenous communities to contest the centuries of dispossession and disempowerment of colonisation (Tiessen, Taylor, & Kirmayer, 2009). Adams, Fryberg, Garcia, and Delgado-Torres (2006) found that for indigenous students in the United States (N=124), indigenous identity engagement was positively correlated with community efficacy. That is, the study confirmed a link where indigenous students that strongly identified with their ethnicity tended to report greater regard and belief in their community's ability to take action. Tiessen and colleagues (2009) reported an association between collective efficacy and positive self-esteem for indigenous youth (N=82), which taken together with the previous research could suggest that collective efficacy is pertinent to indigenous peoples and related to positive well-being. Knowing that one's whānau can find solutions (or having high Whānau Efficacy) could be a source of support and confidence for the Māori individual. Future research could see whether there are any links between Whānau Efficacy and potentially daunting situations such as completing secondary or tertiary education or travelling overseas.

Concluding comments

Ehara taku toa i te toa takitahi, engari he toa takitini
My success/strength is not mine alone, but the success/strength of many.

The above Māori whakataukī can be interpreted to mean that relationships and the support of many contribute to the outcomes and growth of an individual. As past literature and knowledge from the Māori community suggests, whānau realities and aspirations will shape and be shaped by an individual's identity as Māori. The current study contributes to this wealth of knowledge, in regard to the importance of whānau for Māori identity and wellbeing. Importantly, we acknowledge the thousands of Māori who were part of the MMM-ICE3, who shared their identities and provided us researchers the means to not only validate the scale but to also contribute to Māori identity and cultural engagement research.

Over time, understanding what is appropriate and relevant for Māori identity will be key when using and improving questionnaires for Māori. Research looking at the experiences and outcomes of the Māori population will need to accommodate the many different and complex identities, and lives, of Māori. The MMM-ICE3

aims to appreciate the diverse realities of identity expression and cultural engagement within the Māori population. We hope that the research community will find the MMM-ICE3 to be of use and ultimately valuable for Māori.

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1

Glossary

Māori	English
hapū	kinship group, clan
iwi	extended kinship group, tribe
kapa haka	Māori performance
kaupapa	purpose, issue, agenda
te ao Māori	the Māori world(view)
Te Kupenga	the Māori Social Survey
Te Puni Kōkiri	Ministry of Māori Development
tūpuna	ancestors
waka	canoe
whakapapa	genealogy
whānau	descent- or purpose-oriented group members

Appendix A. MMM-ICE3 scale norms for Māori men and women in different age brackets in New Zealand.

Gender	Age	N	Cultural Efficacy and Active Identity															
			Group Membership Evaluation		Identity Engagement		Interdependent Self-Concept		Spirituality		Socio-Political Consciousness		Perceived Appearance		Authenticity Beliefs		Whānau Efficacy	
			M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Women	18-25	384	5.60	1.20	4.85	1.30	3.81	1.20	4.88	1.53	5.30	1.26	3.20	1.76	3.43	1.03	4.95	1.55
	26-35	616	5.50	1.30	4.91	1.34	3.75	1.25	5.14	1.56	5.18	1.42	3.74	1.91	3.35	1.08	4.85	1.18
	36-45	844	5.50	1.31	5.05	1.31	3.97	1.33	5.37	1.50	5.40	1.35	4.07	1.95	3.46	1.15	4.72	1.18
	46-55	1009	5.40	1.36	4.92	1.41	4.03	1.40	5.46	1.43	5.34	1.40	4.40	2.02	3.55	1.16	4.71	1.18
	55+	1385	5.30	1.40	5.00	1.41	4.32	1.42	5.43	1.50	5.31	1.42	4.34	1.96	3.95	1.20	4.78	1.13
	Subtotal	4238	5.40	1.33	4.97	1.37	4.50	1.37	5.34	1.50	5.31	1.40	4.11	1.98	3.63	1.17	4.78	1.16
Men	18-25	180	4.90	1.35	4.50	1.25	3.51	1.39	3.93	1.78	4.72	1.51	3.24	1.84	3.36	1.13	4.76	1.18
	26-35	289	5.21	1.34	4.67	1.35	3.64	1.38	4.40	1.70	4.71	1.48	3.94	1.90	3.40	1.12	4.73	1.21
	36-45	403	5.32	1.34	4.71	1.41	3.76	1.30	4.70	1.76	5.08	1.43	4.04	1.87	3.53	1.15	4.61	1.08
	46-55	645	5.30	1.34	4.77	1.42	4.08	1.40	4.90	1.70	5.21	1.50	4.50	1.99	3.71	1.15	4.61	1.14
	55+	1105	4.93	1.40	4.60	1.50	4.11	1.44	4.73	1.70	5.05	1.50	4.18	1.99	3.93	1.10	4.60	1.08
	Subtotal	2622	5.10	1.37	4.65	1.42	3.95	1.42	4.68	1.73	5.03	1.48	4.14	1.97	3.72	1.14	4.63	1.12
Overall		6869	5.28	1.35	4.84	1.40	4.01	1.40	5.09	1.62	5.21	1.43	4.12	1.98	3.70	1.16	4.72	1.15

Appendix B. MMM-ICE3 scale norms for Māori who solely identify as Māori or identify as Māori and Pākehā in New Zealand.

Ethnicity	N	Cultural Efficacy and Active Identity															
		Group Membership Evaluation		Identity Engagement		Interdependent Self-Concept		Spirituality		Socio-Political Consciousness		Perceived Appearance		Authenticity Beliefs		Whānau Efficacy	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Sole-identified Māori	2943	5.67	1.19	5.36	1.24	4.52	1.32	5.62	1.38	5.55	1.27	5.10	1.67	3.87	1.23	4.84	1.14
Māori Pākehā	3696	4.97	1.39	4.42	1.38	3.60	1.30	4.65	1.67	4.94	1.49	3.31	1.85	3.49	1.07	4.63	1.14

Appendix C. MMM-ICE3 scale norms by iwi region in New Zealand.

Iwi Region	N	Cultural															
		Group Membership Evaluation		Efficacy and Active Identity Engagement		Interdependent Self-Concept		Spirituality		Socio-Political Consciousness		Perceived Appearance		Authenticity Beliefs		Whānau Efficacy	
		M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD	M	SD
Te Tai Tokerau/Tāmaki-makaurau (Northland/Auckland)	1701	5.49	1.28	5.06	1.32	4.19	1.35	5.35	1.55	5.41	1.33	4.34	1.87	3.68	1.15	4.79	1.15
Hauraki (Coromandel)	125	5.42	1.32	5.15	1.26	4.30	1.40	5.50	1.52	5.52	1.41	4.14	1.94	3.76	1.32	4.90	1.26
Waikato/Te Rohe Pōtae (Waikato/King Country)	591	5.68	1.22	5.38	1.27	4.32	1.37	5.61	1.37	5.58	1.30	4.82	1.82	3.76	1.17	4.90	1.13
Te Arawa/Taupō (Rotorua/Taupō)	295	5.60	1.21	5.11	1.31	4.20	1.28	5.32	1.55	5.57	1.23	4.27	1.89	3.50	1.13	4.78	1.10
Tauranga Moana/Mātaatua (Bay of Plenty)	790	5.64	1.23	5.30	1.30	4.40	1.40	5.54	1.46	5.56	1.30	4.70	1.90	3.76	1.22	4.81	1.18
Te Tai Rāwhiti (East Coast)	828	5.60	1.26	5.16	1.30	4.27	1.34	5.33	1.53	5.45	1.34	4.49	1.87	3.61	1.17	4.81	1.15
Te Matau-a-Māui/Wairarapa (Hawke's Bay/Wairarapa)	156	5.86	1.13	5.50	1.07	4.27	1.35	5.77	1.25	5.86	1.12	4.61	1.82	3.60	1.03	4.74	1.22
Taranaki	300	5.43	1.30	4.95	1.38	3.95	1.40	5.18	1.56	5.36	1.38	4.21	2.03	3.60	1.17	4.65	1.15
Whanganui/Rangitīkei (Wanganui/Rangitīkei)	163	5.70	1.23	5.30	1.20	4.36	1.35	5.52	1.37	5.53	1.41	4.57	1.90	3.62	1.13	4.82	1.16
Manawatū/Horowhenua/Te Whanganui-a-Tara (Manawatū/Horowhenua/Wellington)	85	5.86	1.14	5.24	1.25	4.44	1.27	5.51	1.45	5.81	1.25	4.50	2.02	3.61	1.12	4.73	1.17
Te Waipounamu/Wharekauri (South Island/Chatham Islands)	824	4.91	1.41	4.30	1.50	3.52	1.34	4.46	1.73	4.94	1.50	2.98	1.90	3.53	1.07	4.66	1.14