He Piki Raukura: Assessing Ao Māori developmental constructs – Part II: Mapping positive change over 10 months among preschool Māori children

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Supporting positive early childhood development is important for both short and long-term outcomes. This paper is the second of two papers examining the measurement of four Māori constructs underpinning positive child behaviours – tuakiri (secure local Māori identity); whānauranga (acting as a member of a whānau); manawaroa (persisting despite difficulty); and piripono (having integrity, commitment and responsibility). Here, we describe changes in measures of these constructs over a 10 month period. Whānau (families) and kaitiaki (teachers) completed questionnaires and video observations were made of 28 Māori children aged 0-5 years. Growth curve analysis revealed significant positive change in each construct across five timepoints, even controlling for age differences. These findings provide proof-of-concept that our novel measures of the four constructs are sensitive to change in positive child behaviours among preschool Māori children.

Keywords: *Māori child behaviour, Māori child development, kaupapa Māori, early childhood assessment, indigenous measurement tools, growth curve models*

Introduction

Evidence generated over recent decades demonstrates positive effects of well-designed preschool education programmes on children's developmental and behavioural outcomes in the short-term, and on their potential life trajectories over the longer term (Bakken, Brown, & Downing, 2017; Barnett, 2008; Camilli, Vargas, Ryan, & Barnett, 2010; Isaacs & Roessel, 2008; Watts, Gandhi, Ibrahim, Masucci, & Raver, 2018; Wylie & Thompson, 2003). Early childhood is regarded as a critical period where the foundations of children's emotional well-being and social development are laid (Bakken et al., 2017; Barnett, 2008; F. A. Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; K. Campbell, Chen, Shenoy, & Cunningham, 2019; Gomajee et al., 2018; McCoy et al., 2017; Schindler et al., 2015). In Aotearoa, early years interventions are deemed pivotal to positive life outcomes (Horwood, Gray, & Fergusson, 2011; Sturrock, Gray, Fergusson, Horwood, & Smits, 2014). Furthermore, kaupapa Māori early years initiatives, grounded within Māori worldviews, are considered appropriate interventions that can improve life outcomes for Māori (Durie, Cooper, Grennell, Snively, & Tuaine, 2010; King & Turia, 2002). To date, there are few published evaluations of such programmes. Given the wide and enduring inequities in education for Māori (Bishop, Berryman, Cavanagh, & Teddy, 2009; Bishop & Glynn, 2003; Mahuika, Berryman, & Bishop, 2011) there is an urgent need for studies investigating the impacts of early years kaupapa Māori approaches. Our study seeks to help address this gap.

Recent international research about the positive long-term benefits of early years programmes, is mixed. Past research has identified several methodological features that confound interpretation including: a) reductions in early academic advantage once children attend school (Ansari, 2018; Claessens & Garrett, 2014; Hill, Gormley Jr, & Adelstein, 2015; Schimmel, 2018); b) older studies that do not account for current educational policies and practices; and c) evaluations that have to navigate differences in early years settings, learning standards, curriculums, programme quality and access for young children (Black et al., 2017; Cortázar, 2015; Felfe & Lalive, 2018). Another limitation of the research to date is that many studies have tended to focus on socially and economically disadvantaged children and address deficits or delinquent behaviours in children, rather than positive behaviours or strengths-based approaches (Bakken et al., 2017; Burger, 2010; Murray et al., 2018; Sylva, Melhuish, Sammons, Siraj-Blatchford, & Taggart, 2004). Furthermore, it has been argued that previous research evaluating early learning approaches has lacked thorough analysis of diverse curriculum content and culturally responsive teaching practices (Schimmel, 2018). These issues highlight the need for more systematic evaluation of strengths-based culturally-centred indigenous early years programmes.

Longitudinal studies where participants are examined using the same measurement tools at regular timepoints over a designated period can be used to identify changes in child development (McArdle & Nesselroade, 2003; Zhang, McArdle, & Nesselroade, 2012). One way of doing this is the technique of growth curve modelling to explore the impact of interventions, as well as describing developmental trajectories. There are a number of studies that have used growth curve modelling to evaluate change (or 'growth') in children's development over a series of timepoints. Most of this research has tended to focus on longitudinal academic outcomes, such as numeracy and literacy (Burchinal, Peisner-Feinberg, Pianta, & Howes, 2002; Hojnoski, Silberglitt, & Floyd, 2009). Growth curve modelling has also been used to track conduct problems and internalising behaviours (Mathiesen, Sanson, Stoolmiller, & Karevold, 2009; Yew & O'Kearney, 2015), as well as adaptive learning behaviours and prosocial trajectories (Domínguez, Vitiello, Maier, & Greenfield, 2010; Gomajee et al., 2018). Interestingly, some studies of preschool children have not found gender differences (Knafo & Plomin, 2006; Mathiesen et al., 2009; Sharp, Croudace, Goodyer, & Amtmann, 2005; Venker, Ray-Subramanian, Bolt, & Weismer, 2014). Age, on the other hand, has been found to be a factor in significant positive change over time for a range of constructs in young children, including social competence, autism, hyperactivity/inattention and conduct problems (Domínguez et al., 2010; Gomajee et al., 2018; Santos, Vaughn, Peceguina, Daniel, & Shin, 2014; Venker et al., 2014).

Māori children are typically tested and evaluated using Western-derived measurement tools, such as the social competence scale (Horwood et al., 2011), Parents' Evaluations of Developmental Status (Glascoe, 1997), and the Strengths and Difficulties Questionnaire (SDQ) (Goodman, 1997). A systematic review of the psychometric properties of the SDQ raised questions about its cultural validity including parent disquiet about its deficit approach (Kersten et al., 2016). To attain cultural validity in measures for tamariki Māori, there is a need to include measures that are developed by Māori, for Māori (Elder & Kersten, 2015). Issues have also been raised about the SDQ's concurrent validity in preschool Māori children, highlighting concerns about developmental or behavioural problems going undetected and children not getting the support they need (Kersten, Vandal, Elder, Tauroa, & McPherson, 2017). The above issues raise questions about the types of measures and approaches currently used to screen young Māori children and why Māori-created measurement tools that focus on behaviours of interest for Māori have yet to be developed and applied.

One local research project that has used the SDQ is the longitudinal study, Growing Up in New Zealand (GUINZ), where ethnic disparities and mother-reported behavioural difficulties were identified and examined (D'Souza, Underwood, Peterson, Morton, & Waldie, 2019; Morton et al., 2018). The GUINZ study was set up to be broadly representative of the national demographic by including 'ethnically diverse' participants from four groups – European, Māori, Pasifika and Asian (Morton et al., 2017; Peterson et al., 2018, p. 436). In an exploration of persistence and change, D'Souza et al. (2019) found that most young children who displayed 'abnormal' behaviours at age two typically improved by 4.5 years, while a significant proportion still persisted in these difficulties, over the same period. Also reported was an association between ethnicity and behavioural difficulties, particularly for Māori or Pasifika children (D'Souza et al., 2019; Peterson et al., 2018). European ethnicity was a consistent predictor of fewer behavioural problems, such as hyperactivity, emotion, peer and conduct problems, among the 2 year olds (Peterson et al., 2018, p. 444). According to D'Souza et al. (2019) this could have been due to greater exposure to certain factors such as early adversity or socioeconomic disadvantage, prompting the authors to advise that the results be treated with caution. They also argued the need for further research to explore the underlying 'causes' of such ethnic disparity including broader social and historical factors.

In the current feasibility study, we address the gap that remains in child behaviour research in Aotearoa by intentionally working within a Māori worldview (Rameka, 2011, 2012; Sibley & Houkamau, 2013). Māori researchers have long argued the importance of culturally valid pedagogies, measures and assessments that 'make sense' to Māori (Bishop, 1999; Mahuika et al., 2011; Rameka, 2011, p. 246; Sibley & Houkamau, 2013). There are also limitations of research intended to make a difference in children's lives that does not include cultural and ethnic groups (Denham et al., 2003). The design of assessment tools and measures for young Māori children needs to mirror 'culturally-located interpretive systems, and that these are different for Māori and non-Māori,' (Rameka, 2012, p. 34). Based on our searches of the literature we determined that there have been no longitudinal studies specifically on the behaviour of tamariki Māori, that have used a strengths-based approach or have focussed on Māori constructs of children's behaviour.

Our previous work has identified four Māori child behaviour constructs – tuakiri (a secure local Māori identity); whānauranga (feeling and acting, as a member of a whānau/community); manawaroa (having courage in adversity, persisting despite difficulty and a positive outlook); and piripono (having integrity, commitment and responsibility for a shared kaupapa/purpose) (Tamati et al., 2021a). This paper documents a continuation of the study, He Piki Raukura, which is part of a longitudinal Māori community-initiated research programme, Te Kura Mai i Tawhiti (TKMT) (for further details see Ratima et al., 2019). A key aim of the overall research programme is to explore the impact of kaupapa Māori early life and whānau programmes on positive life outcomes for young children and their whānau. An important step in achieving this long-term objective is to test whether culturally-relevant outcome measures of the four Māori child behaviour constructs are sensitive to change over time. Having created, tested and validated our measurement tools in the previous paper in this series (Tamati et al., 2021b) we next sought to identify whether we could measure change in behaviour over a period of 10 months.

preschool tamariki Māori would show an increase over the five timepoints across all four constructs (i.e., intra-individual change with a child acting as their own

Table 1: Participation over five timepoints

T1 7-11 Mar			**T2** 13-17 Jun			**T3** 29Aug-2Sep			**T4** 31 Oct-4 Nov			**T5** 5-9 Dec		
W	K	**R**	W	K	R	W	K	R	W	K	R	W	K	R
25	25	25	28	26	23	28	28	23	26	23	22	28	23	22

W= Māori Child Behaviour Whānau Questionnaire, K = Māori Child Behaviour Kaitiaki Questionnaire, R = Māori Child Behaviour Rating Schedule

control). We also hypothesised that there would be differences in the changes over time in the four Māori constructs by age and gender. We do not have directional hypotheses for these associations as this is the first study of these constructs.

METHODS

Participants

As described in the accompanying paper, He Piki Raukura: Assessing Ao Māori developmental constructs - Part I: Reliability of novel strengths-based measures among preschool Māori children (Tamati et al., 2021b), this study involved the same 28 tamariki, aged between 11 months and 5 years of age, and their immediate whānau. These children were enrolled at Te Kōpae Piripono, a Taranaki-based Māori-medium early childhood programme (Tamati, Hond-Flavell, & Korewha, 2008), during the 2016 school year. Parents were aged from 22 years to 41 years (median 35). The median age of the children was 3 years 5 months. Fourteen girls and 12 boys participated in the research. Most of the children were enrolled full-time (i.e., 35 hours per week). A small number of children attended for fewer hours (approximately 30 hours per week) due to being younger or because of distance (i.e., some children travelled up to 90 kilometres each day to attend).

The study received ethics approval from the University of Otago Human Ethics Committee - 16/003. All participating whānau gave written consent. Whānau members answered questions about their tamariki and their family at five timepoints in the year: T1 (7-11 March), T2 (13-17 June), T3 (29 August - 2 September), T4 (31 October - 4 November) and T5 (5-9 December). One parent from each whānau agreed to answer the questions at each of the data points (81% of these were the mothers). Kaitiaki (teachers) of Te Kōpae Piripono answered questions about tamariki who were randomly allocated to them. During these data collection periods, tamariki were also video recorded participating in both structured and day-to-day activities at Te Kōpae Piripono. All 28 tamariki and their whānau enrolled at Te Kōpae Piripono participated in the study. At T1, 25 children and their whānau participate, and three additional children from one whānau started at T2. Full data for all measures was collected on at least 19 of the tamariki at any one of the five timepoints. Occasional data points are missing at random and were not imputed.

Measures

We applied a repeated measures design, whereby our novel measurement tools were used at each of the five data collection timepoints. These measures included the Māori Child Behaviour Questionnaire – whānau version (MCBQ-W) and kaitiaki (teacher) version (MCBQ-K) – and the Māori Child Behaviour Rating Schedule (MCBRS), which are described in detail in the accompanying paper (Tamati et al., 2021b). Our previous analyses demonstrated the reliability and concurrent validity of the measures (Tamati et al., 2021b). Parents and kaitiaki rated items that described children's behaviour in relation to the four Māori constructs of interest – tuakiri, whānauranga, manawaroa and piripono (Tamati et al., 2021b). Additionally, the video observations were recorded and rated at a later date on the same four constructs. The video ratings were carried out by three researchers, trained to criterion on the Māori constructs of interest, using the MCBRS. An average rating was given for each of these constructs across different contexts including structured and unstructured activities. An analysis of the consistency across video raters found good to excellent inter-rater reliability for each of the four constructs (Tamati et al., 2021b).

Data Analysis

Data analysis involved individually modelling the growth in each of the four constructs over time to test the significance of any changes over the five timepoints. A sequence of linear mixed effects growth models was conducted, as described by Ghisletta, Renaud, Jacot, and Courvoisier (2015). This included a random effects component for variation across individuals, namely for age and gender. Age was analysed as three levels, according to children's year of birth, that is, for children born in 2010/11, 2012/13, and 2014/15. The aim of this approach was to represent children's developmental phases.

A step-wise approach was used to first test a direct relationship, in terms of whether the outcome variables (tuakiri, whānauranga, manawaroa and piripono) increased over time. Next, we tested whether age or gender of the children influenced the way they responded over the five measurement phases. The model sequence was: Unadjusted Model 1, a mixed effects growth model across different phases with independent residuals across phases; Adjusted Model 2, as for Model 1 with age added; and Adjusted Model 3, as for model 2 with gender also added.

RESULTS

The unadjusted and adjusted rates of change over time increased significantly over the five timepoints for all four Māori constructs across all three sources of information – the whānau ratings on the MCBQ-W, kaitiaki ratings on the MCBQ-K and child behaviour observational ratings on the MCBRS - with the single exception of kaitiaki ratings for tuakiri, which did not increase significantly (p=0.175) (Table 2).

After controlling for age or age and gender, the patterns of significance changed little in the four constructs over the five timepoints for whānau, kaitiaki and child behaviour observational ratings (Table 2). The adjustment for children's age led to a slight reduction in the coefficients for increase in mean scores across timepoints (adjusted 2). Further adjustment for gender made little change to the coefficients for increase in mean scores across timepoints (Table 2, adjusted 3).

Associations for age and gender reported in the models adjusting for these two variables (adjusted 3) were generally significant for age across the four Māori constructs but less often for gender differences (Table 3). The association of age with whānau rating of the constructs was positive, as indicated by significantly negative coefficients (because age was coded in terms of year of birth), meaning the older the child the higher the average scores. The direction of age influence was not consistent for the other sources of ratings. Older children had higher whānauranga and piripono scores across all sources of ratings.

While few significant gender differences were observed overall, kaitiaki ratings and child behaviour ratings were significantly lower for girls than boys for tuakiri and manawaroa constructs. This is in contrast to other gender differences that, while not significant, were all in the opposite direction.

DISCUSSION

Kaupapa Māori early years initiatives are argued as having considerable potential to make a difference in the lives of tamariki Māori (Durie et al., 2010; King & Turia, 2002). However, there are few studies evaluating children's development in kaupapa Māori early years settings, particularly studies that follow children over time. Such evaluation matters. Wide and enduring inequities persist for Māori across wide-ranging areas including wealth, health, wellbeing and education (Bishop et al., 2009; Mahuika et al., 2011; Ratima & Jenkins, 2012). Our feasibility study contributes preliminary evidence that can help address this gap in knowledge. We sought to establish proof-of-principle that four newly developed and validated measures of key Māori constructs – tuakiri, whānauranga, manawaroa and piripono – were able to detect positive change through time among children attending a Māori immersion early child educational setting (Te Kōpae Piripono). Our findings showed the anticipated developmental progression for all four Māori constructs, even when controlling for age and gender. This suggests that increases in positive behaviour might result from other factors including the content, approach and character of kaupapa Māori early years settings, that foster the development of these constructs from a very young age and regardless of gender.

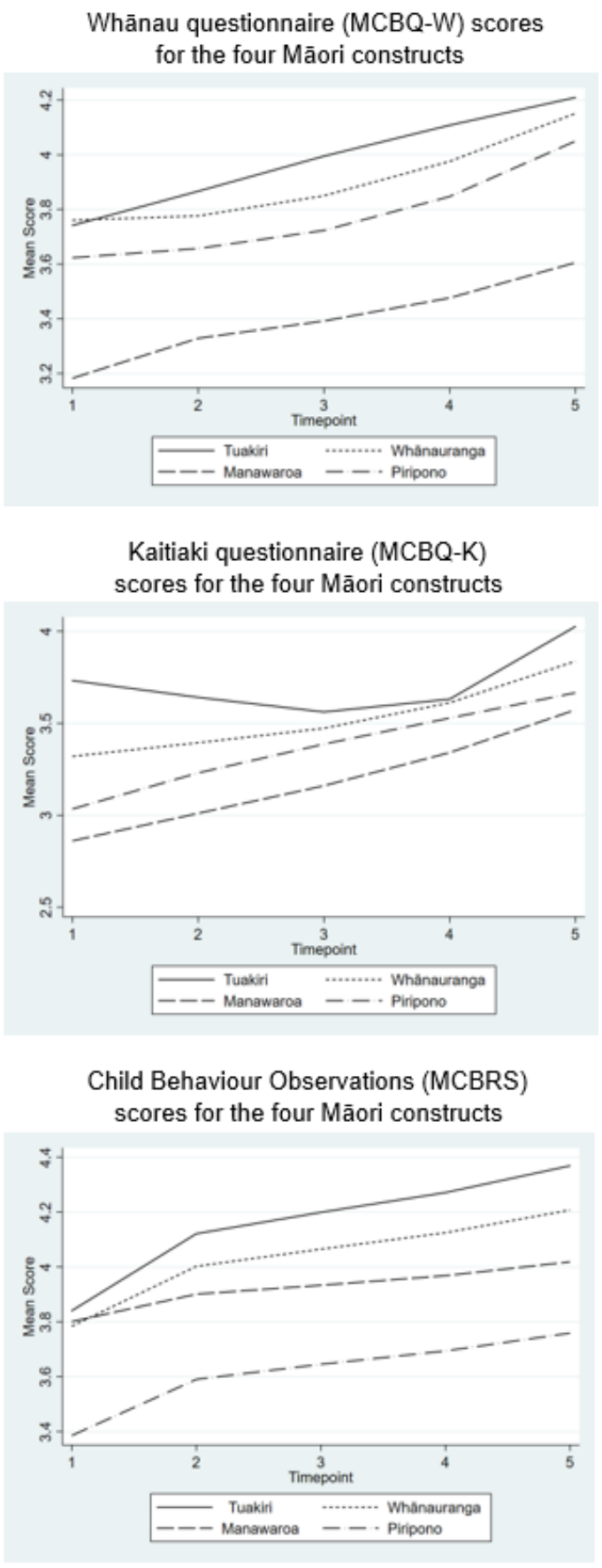

Figure 1: Change over time for each of the four Māori constructs

Table 2: Model coefficients and p-values for change over time for whānau, kaitiaki, and child behaviour observational ratings (unadjusted and adjusted for age and gender).

		Whānau (MCBQ-W)			Kaitiaki (MCBQ-K)			Child Behaviour Observational Ratings (MCBRS)		
		Coef.	***z***	***P>|z|***	**Coef.**	***z***	***P>|z|***	**Coef.**	***z***	**P>|z|**
Tuakiri	Unadjusted	0.0834	2.68	0.007	0.0465	1.36	0.175	0.1425	4.08	<0.0001
	Adjusted 2 *for age*	0.0811	2.69	0.007	0.0599	1.7	0.089	0.1547	4.73	<0.0001
	Adjusted 3 *age & gender*	0.0816	2.7	0.007	0.0609	1.73	0.083	0.1549	4.76	<0.0001
Whānauranga	Unadjusted	0.0821	5.19	<0.0001	0.1270	5.45	<0.0001	0.0000	0	<0.0001
	Adjusted 2 *for age*	0.0797	5.25	<0.0001	0.1354	6.11	<0.0001	0.1404	4.04	<0.0001
	Adjusted 3 *age & gender*	0.0801	5.26	<0.0001	0.1400	6.24	<0.0001	0.1417	4.08	<0.0001
Manawaroa	Unadjusted	0.0803	4.18	<0.0001	0.1893	7.93	<0.0001	0.0905	2.53	0.012
	Adjusted 2 *for age*	0.0790	4.13	<0.0001	0.1957	7.86	<0.0001	0.1042	3.19	0.001
	Adjusted 3 *age & gender*	0.0791	4.13	<0.0001	0.1976	7.79	<0.0001	0.1033	2.91	0.004
Piripono	Unadjusted	0.0752	3.14	0.002	0.1441	5.21	<0.0001	0.1192	3.39	0.001
	Adjusted 2 *for age*	0.0728	3.06	0.002	0.1478	5.21	<0.0001	0.1387	4.09	<0.0001
	Adjusted 3 *age & gender*	0.0728	3.06	0.002	0.1508	5.36	<0.0001	0.1394	4.14	<0.0001

Table 3: The coefficient of mean scores, associated with age and gender

		Whānau			Kaitiaki			Child Behaviour Observational Ratings		
		Coef.	*z*	*P>|z|*	Coef.	*z*	*P>|z|*	Coef.	*z*	*P>|z|*
Tuakiri	Age	-0.2389	-3.25	0.001	0.0609	1.73	0.083	0.1549	4.76	<0.0001
	Gender	0.1148	0.53	0.595	-0.5256	-4.49	<0.0001	-0.4168	-5.56	<0.0001
Whānauranga	Age	-0.2580	-4.40	<0.0001	-0.3744	-4.81	<0.0001	-0.4075	-5.33	<0.0001
	Gender	0.1446	0.84	0.398	0.4152	1.93	0.053	0.1702	0.78	0.436
Manawaroa	Age	-0.2289	-3.31	0.001	0.1976	7.79	<0.0001	0.1033	2.91	0.004
	Gender	0.0418	0.21	0.837	-0.4054	-6.00	<0.0001	-0.4611	-6.35	<0.0001
Piripono	Age	-0.3460	-4.82	<0.0001	-0.4811	-7.16	<0.0001	-0.5686	-6.73	<0.0001
	Gender	0.0074	0.04	0.972	0.2367	1.23	0.217	0.2391	0.99	0.323

The association with age in the current study is similar to other studies where, as to be expected, age has been found to be a factor in significant change in young children for a range of behavioural and neurodevelopmental constructs such as social competence, autism, hyperactivity/inattention and conduct problems (Domínguez et al., 2010; Gomajee et al., 2018; Santos et al., 2014; Taylor, Eisenberg, Spinrad, Eggum, & Sulik, 2013; Venker et al., 2014). Most of these studies are deficit-based and focus predominantly on problem behaviours. In contrast, our study is strengths-based and emphasises prosocial behaviours from an Ao Māori worldview, in the form of the four Māori constructs.

Our findings about gender differences for the four Māori constructs are preliminary but suggest there are few significant differences between boys and girls and only on the ratings by kaitiaki or of the video observation and not the whānau ratings. This general lack of gender differences is consistent with findings from a number of studies (Hojnoski et al., 2009; Knafo & Plomin, 2006; Mathiesen et al., 2009; Sharp et al., 2005; Venker et al., 2014). One longitudinal study using growth curve modelling that is similar to ours reported strong evidence for the importance of genetics and environment in the development of prosocial behaviour in 9424 sets of twins, aged from 2 to 7 of age and that except for what they describe as the 'usual finding' of a mean difference favouring girls in terms of prosocial behaviours, the results for gender were 'strikingly similar' (Knafo & Plomin, 2006, p. 782).

The increase in the scores on each of the four Māori constructs over time is an important finding. This means that we are able to see growth in the levels of strengths-based child behavioural constructs - tuakiri, whānauranga, manawaroa and piripono - that are strongly grounded in te ao Māori. This is first such demonstration as a far as we are aware. Moreover, we had hypothesised directional change (i.e. improvements represented by higher scores) across the 10-month period and this was confirmed. Critically, the change appeared to occur independent of normal ageing/developmental processes. That is, some developmental milestones appear to occur as function of maturation or aging (Lightfoot, Cole, & Cole, 2018). This could not be assumed for these specific constructs, hence the novelty and utility of this finding. With regard to the latter, the findings suggest that these constructs can now be safely usefully incorporated into larger interventions in which appropriate comparison groups are included.

These constructs take a clearly different approach to behaviour, with a particular focus on collectivity and relationality, rather than individuality (Brayboy, Gough, Leonard, Roehl, & Solyom, 2012; Higgins & Kim, 2019; Smith & Smith, 2018; Wilson & Kamana, 2001). Take the construct of whānauranga, for example. In terms of child development, this means that a child is displaying observable behaviours that demonstrate they increasingly feel and act as a member of a whānau or community. Observable behaviours for whānauranga include prosocial characteristics such as manaaki and tiaki - showing respect, generosity, sharing and caring, and being helpful, reassuring and kind to others (Hond, 2017; Moorfield, 2019; Noddings, 2012; H. W. Williams, 1957). These characteristics resonate with other Western prosocial constructs including self-regulation, mindfulness and kindness (Flook, Goldberg, Pinger, & Davidson, 2015) self-control (Moffitt et al., 2011); social-emotional skills (Nix, Bierman, Domitrovich, & Gill, 2013) decision making and self-efficacy (Domitrovich, Durlak, Staley, & Weissberg, 2017); ego-resiliency and empathy (Taylor et al., 2013) and patience (Barragan-Jason & Atance, 2017). The above research indicates that these types of behaviour have positive impacts for children.

Strengths and Limitations

The main limitation of this overall study was that it comprised a single sample, thereby constraining the generalisability of the findings beyond this specific early childhood setting (Te Kōpae Piripono). However, we thought it prudent to provide 'proof-of-principle' i.e. sensitivity to change through time, before enrolling participants in a larger and more ambitious study in which comparisons are made across different types of service provision. Our group was not large, however the total enrolled tamariki at Te Kōpae Piripono (N=28) participated and there were high levels of commitment over the 10 month period. It was also noteworthy that there was sustained whānau participation for the duration of the study, providing a comprehensive picture of all the tamariki and their whānau who took part.

The main goal in this study was to test the feasibility of using Maori constructs to capture change over time, in order to carry out future work on a larger scale. Although the sample size may appear low, power calculations (available on request) revealed that we had sufficient numbers to detect significant change over time, while controlling for age. This shows that, even with small numbers of children, medium to large effects could be detected for all the Māori constructs. This outcome is reflected in similarly-sized studies (of children aged 3-5 years) where significant growth was also detected (K. Campbell et al., 2019; Kan & Kohnert, 2012).

The comparatively short duration of the study (i.e. data collected over 10 months) is also a potential limitation of this work because it represents a relatively brief snapshot of development. On the other hand, showing that it was possible to measure change in this reasonably short period speaks to the sensitivity and potential utility of the scales. Additionally, this feasibility study provided a much needed focus on 'deeper' measurement by applying a multi-measure, multi-source assessment approach, which is an established process for longitudinal research (Poulton, Moffitt, & Silva, 2015).

We acknowledge that, from a Western research methods perspective, the non-randomised methodology we applied in this study may have limitations in terms of how definitive the conclusions can be. However, our interface research approach accesses two legitimate knowledge systems. Randomised-control methodologies raise complicated questions about tikanga Māori including the concept of whai wāhi, an imperative of inclusion of all participants (Moorfield, 2019).

There are a also number of strengths of the study. First, the study involved the exploration of a unique set of constructs that were created within a Māori/Indigenous worldview (Tamati et al., 2021a). Second, the work was also innovative in taking an interface approach and

applying psychometric methods to explore measurement of the novel Māori constructs (Durie, 2004; Edwards, 2010; Nakata, 2016; Ratima et al., 2019). This interface approach enables the research to draw on the strengths of both mātauranga Māori and Western science approaches to address research questions in a way that leverages from both knowledge systems as being of relevance in kaupapa research Māori. Third, as noted in the accompanying paper on the psychometrics of our novel measures (Tamati et al., 2021b), our study has an intentionally strengths-based orientation. This is in contrast to considerable literature that has tended to focus on identifying or analysing problem behaviours (Achenbach & Ruffle, 2000; Goodman, 1997; Honig, 2009; Keenan & Wakschlag, 2000; L. R. Williams et al., 2009). However, our study is in keeping with current trends in psychology where there is more of an emphasis on children's abilities and also on positive approaches to children's development (Aspinwall & Staudinger, 2003; Craven et al., 2016; Fenton, Walsh, Wong, & Cumming, 2015).

Implications for policy and practice

This study's value is based on use of reliable and culturally-appropriate Māori child behaviour measurement tools to begin to explore ways kaupapa Māori early years approaches may impact on the development of positive Māori child behaviours. In doing so, the study breaks new ground by providing evaluation and assessment tools to other researchers looking to work with Māori children and their whānau. This is in line with the long-held call from Māori researchers that Māori-focussed childhood research is needed (Neha, 2016). The tools may also potentially be used to help generate an evidence base around the importance and value of quality kaupapa Māori early years initiatives.

Our research demonstrates innovative ways of examining how indigenous constructs that can be practically operationalised and measured in whānau and Māori community settings, particularly using quantitative methods and in relation to children's behaviour. Furthermore, as well as developing novel tools to measure the short-term impact of quality (Meade, 2010; Ritchie, 2008) early years kaupapa Māori programmes on children's development, the present feasibility study lays the groundwork for further research. In particular, there is potential for exploring the longer-term effects of the development and expression of children's behaviours and the positive impact of kaupapa Māori interventions over time (Hond-Flavell, Ratima, Tamati, Korewha, & Edwards, 2017; Ministry of Education, 2013, 2018; Munford, Sanders, Maden, & Maden, 2007; Theodore et al., 2019).

Future research is needed to expand on this feasibility study by systematically assessing tamariki changes on these important constructs in a larger comparison study. This future work will ultimately provide a richer evidence base about programmes or approaches that are effective for Māori, resulting in the long-term positive outcomes which are an essential goal for research in this field (Ratima et al., 2019).

This study is also important in its contribution to the development of novel Māori theoretical frameworks for lifecourse research, as well as Māori-specific research processes, protocols and tools. The work has relevance for early years kaupapa Māori early childhood education provision in Aotearoa, and for indigenous peoples and communities internationally. Indeed, there is potential that this study can help create the best evidence for early years interventions for all New Zealanders, as per the ongoing goals of Vision Mātauranga and of Māori researchers (Ministry of Research Science and Technology, 2007; Rauika Māngai, 2020). Specifically, this study derives new knowledge, distinctly grounded in an Ao Māori worldview, that advances mātauranga about culturally-appropriate ways of working with and assessing young Māori children, acknowledging and respecting children's own cultural backgrounds and supporting children's development from their own cultural lens. This is important, particularly as approximately 80 percent of Māori children attend mainstream early years education settings (Ministry of Education, 2019).

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Māori Glossary

Ao Māori	Māori world; Māori worldview
Aotearoa	Indigenous name for New Zealand
He Piki Raukura	one of the projects of Te Kōpae Piripono's longitudinal research, that focusing Māori child behavioural constructs
Kaitiaki	teacher at Te Kōpae Piripono
Kaupapa	purpose, objective, topic, philosophy
Kaupapa Māori	a Māori philosophical framework
Kōpae	shortened name of Te Kōpae Piripono (Taranaki-based Māori immersion early childhood centre)
Manawaroa	the notion of having courage in adversity, persisting despite difficulty and a positive outlook
Mātauranga Māori	Māori Indigenous knowledge systems
Piripono	the notion of having integrity, commitment and responsibility for a shared kaupapa/purpose
Tamariki	children
Tamariki Māori	Māori children
Taranaki	a tribe; a region in the west of the North Island
Te Kōpae Piripono	Taranaki-based Māori immersion early years and whānau initiative
Te Kura Mai i Tawhiti	the name given to Te Kōpae Piripono's longitudinal research programme
Te Pou Tiringa	Governing board of Te Kōpae Piripono
Tuakiri	the notion of a secure local Māori identity
Whai wāhi	inclusion
Whānau	family, usually encompassing wider membership than the nuclear family
Whānauranga	the notion of feeling and acting, as a member of a whānau/community