

# Trends in social support experienced by Pacific men and women in New Zealand over the adult lifespan: An age-based Latent Growth Model

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## **Abstract**

**Introduction:** Our study investigated the development of social support experienced by Pacific men and women across the adult lifespan in New Zealand (18 to 65 years of age).

**Methods:** We examined differences in social support using data from the first six annual waves of the New Zealand Attitudes and Values Study (N = 501 women and 238 men) using an age-based latent growth model.

**Results and Discussion:** Mean levels of social support decreased as Pacific peoples aged. More specifically, Pacific men demonstrated a significant decrease in social support and older Pacific men demonstrated the lowest levels of support of all Pacific peoples. In comparison, Pacific women maintained higher levels of social support compared to Pacific men, with social support remaining relatively stable across the lifespan of Pacific women.

**Conclusion:** Our research explores the importance of social support and its link to health and wellbeing among Pacific communities in New Zealand. This is important because we need to understand the factors that could buffer outcomes of low social support such as mental illness and possibly suicide among Pacific peoples.

**Keywords:** Social support, Pacific peoples, Lifespan development, Latent growth model.

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## **Introduction**

The term *Pacific peoples* is used to describe a group of people who originate from the Pacific Islands in the South Pacific. Pacific peoples are a diverse population and in New Zealand (NZ) the largest Pacific groups are Samoan (47.8%), Tongan (21.6%), Cook Island Māori (21.1%), and Niuean people (8.1%) (Statistics NZ, 2018). At a high level comparison, Pacific peoples comprise just over 8% of the NZ population with the other major ethnic groups being NZ European (70.2%), Māori (16.5%) and Asian (15.1%) (Statistics NZ, 2018).<sup>1</sup> With the growing (11% growth between 2006 and 2013) and youthful nature (median age = 22.1 years) of our Pacific peoples (Statistics NZ, 2013), research for Pacific and by Pacific is imperative to preserve our place in the world and promote cultural intelligence.

*Social support* or *social capital* are terms used to describe the perception of having available assistance from other people and/or the effective networks of relationships among people in a community (Langford, Bowsher, Maloney & Lillis, 1997). Given the link that social support has demonstrated towards mental health outcomes, our study explores normative changes in perceived social support across the lifespan of Pacific peoples in NZ. We leverage data from the first six waves of the New Zealand Attitudes and Values Study (NZAVS), an annual longitudinal study, and because it uses probabilistic sampling, it includes a substantive sample of Pacific peoples in NZ.

### ***Social support and health outcomes***

International research has demonstrated the positive impact of social support on psychological health and wellbeing (Beautrais et al., 2005; Langford et al., 1997). Higher levels of social support have been associated with a decreased likelihood of attempting suicide across the lifetime (Kleiman & Liu, 2013), and better reported general and emotional health (Heinze, Kruger, Reischl, Cupal, & Zimmerman, 2015). In NZ, the Social Report highlighted that high levels of social support foster an effective functioning society through enhancing social connectedness, quality of life and provide a buffer towards adverse life events (MSD New Zealand, 2016; Umberson, Crosnoe, & Reczek, 2010). Despite what we know about social support, mental health disparity and suicide prevail amongst Pacific peoples in NZ (Foliaki, Kokaua, Schaff, & Tukuitonga, 2006; Tiatia-Seath, Lay-Yee, & Von Randow, 2017). By examining changes in social support across the lifespan for Pacific peoples, we hope to be able to predict future changes in social capital for younger generations of Pacific peoples as they continue to age.

### ***Gender and age difference in social support***

Research suggested that women tended to receive greater support than men across the lifespan, and the type of support can also differ (Antonucci, 1994; Keith & Krause, 1989; Olson & Shultz, 1994). Women tended to receive greater levels of emotional support (i.e. listening, empathy) whereas men tended to receive greater levels of instrumental support (i.e. physical assistance, financial aid) (Matud, Ibáñez, Bethencourt, Marrero, & Carballeira, 2003). Further research pointed out that women seemed to have more close

<sup>1</sup> The population percentage values add up to more than 100% as respondents were able to identify with more than one ethnic group.

relationships, whereas men had larger social networks but less close relationships (Fuhrer, Stansfeld, Chemali, & Shipley, 1999; Olson & Shultz, 1994). Women also tended to maintain social and familial connections as they aged (Schultz, 1991). Such gender differences are believed in part to be due to modelled gender specific socialization skills from a young age, which have transpired into adulthood (Hall, 2011; Lee & Goldstein, 2016; Shulman & Scharf, 2000; Stansfeld, 2006). This is often eminent in Pacific cultures where Pacific girls are often encouraged to take on tasks that are deemed as being 'inside the home' i.e. cooking, cleaning and caring for family members. In contrast, Pacific boys often take on tasks that are deemed as being 'outside the home' i.e. laborious jobs such as construction and/or farming (Griffen, 2006).

In NZ, younger age groups (15-24 and 25-44 years) reported having the largest social networks (Statistics NZ, 2016). During this age bracket, life changing events (career advancements, marriage) are not uncommon and may take a priority, leading to less social interaction and subsequently less social support (Cowan & Cowan, 1992; Ingersoll-Dayton & Antonucci, 1998; Lynch 1998). Middle aged adults (particularly women) may experience increased stress but reduced time for wider social networking when called upon to provide support to children and/or aging parents (Belle, 1987; Ishii, 1990; Troll, 1987). Delayed reciprocity in caring for aging parents is also evident in Pacific culture (Beautrais & Fergusson, 2006; Tamasese, Parsons, Sullivan, & Waldegrave, 2010).

There is a limited amount of research examining social support and its interaction with age and gender across the lifespan, even more so for Pacific peoples. However, a recent study exploring NZ born Cook Island youth highlighted that social support is crucial among younger age groups as it was deemed to have a buffering effect against poor mental health and suicidal behaviours (Puna & Tiatia-Seath, 2017). Such valuable findings reaffirm the importance of tracking developmental changes across time and demonstrate the necessity of social support in maintaining positive mental wellbeing for Pacific peoples in NZ.

### ***Social support for Pacific peoples in NZ***

*Vā* is a central concept in the worldview of Pacific peoples, and loosely describes a relational space, which fosters connectedness with one another and facilitates individual and collective wellbeing. This is crucial in communal cultures that value group and unity. So what the Western world might understand as social support, we as Pacific peoples understand as *vā*. Despite the idea that social support contributes to a positive wellbeing, low levels of wellbeing and mental health issues are almost twice as likely in Pacific peoples compared to the rest of the NZ population (MoH New Zealand, 2013). Our Pacific women have higher prevalence of anxiety, mental illness and suicide ideation, planning and attempts. Our Pacific men have higher rates of death by suicide. Our Pacific young people (16 to 24 years) have the highest reported rates of mental illness and suicide. Our NZ born Pacific peoples have higher prevalence of mental health issues (Foliaki et al., 2006; Statistics NZ and Ministry of Pacific Island Affairs 2011; Tiatia-Seath et al., 2017).

The mental health disparity seen among Pacific peoples could be described as a product of our NZ health service environment that lacks in incorporating indigenous cultural worldviews (Agnew et al., 2004; Gunther, 2011). Traditional health models do not take into account the societal, collectivist,

and cosmological beliefs connected to cultural ancestry and *tapu* (sacredness). Pacific research continues to highlight the need for culturally appropriate health services and many of the culturally based frameworks being developed are incorporating *vā* (alongside family, culture and spirituality) to explore health holistically (Bush, Collings, Tamasese, & Waldegrave, 2005; Bush, Chapman, Drummond, & Fagaloa, 2009; Tamasese, Peteru, Waldegrave, & Bush, 2005).

NZ born Cook Island youths outlined that social support from family, friends and their wider community was instrumental in maintaining a positive wellbeing and was a stronger motivator to work towards success (Puna & Tiatia-Seath, 2017). Although these findings are not generalisable, it could be a common perception for many Pacific young peoples, and one that could continue into adulthood. Further research exploring cultural competencies in Pacific mental health suggests caution in relation to the assumption that all Pacific peoples have supportive families and that social support is derived from various avenues, and not just family (Samu & Suaalii-Sauni, 2009). This reaffirms the need and importance for examining *vā* (or social support) and how this could change across the lifespan, particularly when navigating relationships, changing worldviews, and our health system.

### ***Hypotheses***

We expected the cohort effects generally observed in previous cross-sectional and longitudinal research with Pacific peoples may reflect, at least in part, developmental changes that occur in social support across the lifespan (Satherley et al., 2015; Tautolo, Schluter, & Sundborn, 2009). As such, we hypothesized that social support should decrease over time as people age. Previous research indicates that women generally experienced higher levels of social support than men (Fuhrer et al., 1999; Matud et al., 2003; Olson & Shultz, 1994; Schultz, 1991). We thus further hypothesized that the decrease in social support would be more pronounced for Pacific men and that Pacific women may generally tend to experience higher levels of social support because they are more likely to retain their social networks, and hence derive social support from them, as they age.

### **Method**

#### ***Participants***

The age-based Latent Growth Model (LGM) presented here is based on 739 participants (501 women and 238 men, refer to Table 1) that identified with a Pacific Island ethnicity and who responded to at least two out of the first six waves of the NZAVS. The average age of the sample in 2009 (Time 1) was 38.36 (SD = 13.63, refer to Table 1).

The NZAVS is an ongoing longitudinal study that has been collecting survey data from adult New Zealanders since 2009 (Time 1) and subsequent years of 2010 (Time 2), 2011 (Time 3), 2012 (Time 4), 2013 (Time 5) and 2014 (Time 6). Participants responded to an average of 3.04 waves (SD = 1.28), with 336 responding to 2 waves, 218 responding to 3 waves, 74 responding to 4 waves, 39 responding to 5 waves and 72 responding to all six waves. There was no significant difference between the mean number of waves completed by men and women ( $F_{(1,737)} = 1.46, p = .227$ ).

Table 1. Sample sizes by cohort.

Birth Cohort	Gender		Age at Wave 1		N
	F	M	M	SD	
1921-1930	1	0			1
1931-1940	6	3	70.21	1.05	9
1941-1950	21	14	62.82	2.67	35
1951-1960	76	67	53.14	2.88	143
1961-1970	113	59	43.93	2.95	172
1971-1980	119	49	33.72	2.76	168
1981-1990	130	33	23.42	3.12	163
1991-2000	35	13	16.68	1.47	48
Total	501	238	38.36	13.63	739

*Note.* Mean age is reported as it would have been for people at Wave 1, based on their Date of Birth. Everyone included in the study was aged 18 or older. The mean for the youngest cohort was less than 18 because these participants were recruited during a refresher/booster wave at a later time point.

### ***Sampling procedure and sample***

The Time 1 (2009) NZAVS contained responses from 6,518 participants (Sibley, 2014b) sampled from the 2009 electoral roll. Each subsequent wave of the NZAVS includes participants retained from a previous wave or obtained through booster samples from the electoral roll. The Time 6 (2014) wave contains responses from 15,822 participants. For full sampling details for the NZAVS at each time-point, copies of the full questionnaire and any other materials, please see the NZAVS website (Sibley & Greaves, 2014; Sibley, 2014a; Sibley, 2014b). For this study, we employed an age-based LGM, for more information on this method please see Appendix 1.

### ***Measures***

The 3-item measure of social support used was adapted from the Social Provisions Scale developed by Cutrona & Russell (1987) and was rated across a scale from 1 to 7. Please refer to Table 2 for the full list of measures used.

Table 2. 3-item measure of social support details adapted from the Social Provisions Scale

Item content	Units	Reference
There are people I can depend on to help me if I really need it	1 (strongly disagree) to 7 (strongly agree) (reverse scored)	Cutrona & Russell (1987)
There is no one I can turn to for guidance in times of stress	1 (strongly disagree) to 7 (strongly agree)	
I know there are people I can turn to when I need help	1 (strongly disagree) to 7 (strongly agree)	

### **Analytic Strategy**

Scale means were assessed in an age-based LGM. Our model was estimated in MPlus 8.3 (Muthén & Muthén, 1998-2019) using maximum likelihood with robust estimation of standard errors (Milojev & Sibley, 2017). (See also Preacher, Wichman, MacCallum, & Briggs, 2008). For a detailed overview of the age-based LGM used in this study, please see Appendix 1.

### **Results**

Bivariate correlations between gender, participant age at wave 1 and perceived level of social support during each wave are presented in Table 3. These are reported for descriptive purposes.

Table 3. Bivariate correlations between gender, age at wave 1, and social support during each wave.

Variables	1.	2.	3.	4.	5.	6.	7.
1. Gender							
2. Age at wave 1	.175*						
3. Social support during wave 1	-.239*	-.137*					
4. Social support during wave 2	-.146*	-.102	.535*				
5. Social support during wave 3	-.248*	-.088	.501*	.560*			
6. Social support during wave 4	-.137*	-.130*	.473*	.415*	.586*		
7. Social support during wave 5	-.088*	-.068	.573*	.507*	.541*	.583*	
8. Social support during wave 6	-.134*	-.015	.446*	.415*	.548*	.499*	.563*

\*  $p < .05$ . Ns ranged from 109-739 depending on response rate at each wave.

Parameters for the overall and multi-group age-based LGMs are presented in Table 4. As reported (see Appendix 1), the overall model collapsed across men and women indicated that social support decreased as people aged ( $b = -.062$ ,  $se = .025$ ,  $z = -2.496$ ,  $p = .013$ ). The growth parameter of  $-.062$  thus indicates that for each 10-year change, social support decreased by  $.062$  units (keeping

in mind that social support was measured on a scale from 1-7). The random effect for the intercept was also significant, indicating that there were significant individual differences in mean levels of social support between people ( $b = .763$ ,  $se = .102$ ,  $z = 7.495$ ,  $p < .001$ ).

Table 4. Parameter coefficients for the single-group age-based Latent Growth Model for men and women estimating the change trajectory from age.

	<i>Estimate</i>	<i>se</i>	<i>z</i>	<i>95% CIs</i>		<i>Variances</i>
				<i>Low</i>	<i>High</i>	
<b>Overall Model</b>						
Intercept	5.895	.048	123.65*	5.802	5.989	.763*
Linear Effect	-.062	.025	-2.496*	-.110	-.013	.042
Quadratic Effect	.017	.016	-.052	-.014	.047	.006
<b>Multi-group gender model</b>						
<b>Women</b>						
Intercept	6.018	.059	102.209*	5.903	6.134	.734*
Linear Effect	-.025	.030	-.835	-.085	.034	.041
Quadratic Effect	.012	.020	.587	-.028	.052	.006
<b>Men</b>						
Intercept	5.676	.078	72.527*	5.523	5.829	.734*
Linear Effect	-.085	.043	-1.964*	-.170	.000	.041
Quadratic Effect	.028	.027	1.042	-.025	.081	.006

*Notes.* \*  $p < .01$ . Fit statistics for overall model: Akaike Information Criterion (AIC) = 6336.85, Bayesian Information Criterion (BIC) = 6382.91. Fit statistics for multi-group model: AIC = 6319.33, BIC = 6379.20. N = 739 (501 women, 238 men).

The lower section of Table 4 reports the growth parameters for men and women based on our multi-group model. As reported in Table 4, the linear ( $b = -.025$ ,  $se = .030$ ,  $z = .835$ ,  $p = .034$ ) and quadratic ( $b = .012$ ,  $se = .020$ ,  $z = .587$ ,  $p = .052$ ) growth parameters for women were both non-significant. However, for men the linear growth component was significant ( $b = -.085$ ,  $se = .043$ ,  $z = -1.964$ ,  $p < .001$ ), although the quadratic factor was not ( $b = .028$ ,  $se = .027$ ,  $z = 1.042$ ,  $p = .081$ ). These results indicate that social support decreases linearly with age across the lifespan for Pacific men. For Pacific women, in contrast, social support appears to remain higher than for men and does not tend to change over the lifespan as women age. Or at least, if women do change in their social support over the lifespan, then the effect is subtler than the changes experienced by men, and we could not detect such small changes in our data. The linear growth parameter for Pacific men indicates that for each decade that men age, their level of social support decreases on average by .085 units (keeping in mind that social support was measured on a scale from 1-7).

The model-implied rates of change in social support for Pacific women and men from age 18-65 are presented in Figure 1. These estimates represent the rate of change over time derived from a multi-group age-based LGM assessing change over a six-year period (see Table 4 for parameter estimates). As shown in Figure 1, younger Pacific peoples tended to have higher levels of social support, though Pacific women tended to remain higher in their social support

that remained relatively stable across the lifespan. In contrast, young Pacific men held values of social support similar to young Pacific women, but as they aged, social support gradually declined. These results suggest that Pacific women tend to strongly agree that they have a support network they can turn to if in need, whilst the same can be said for men, this is at a lesser degree.

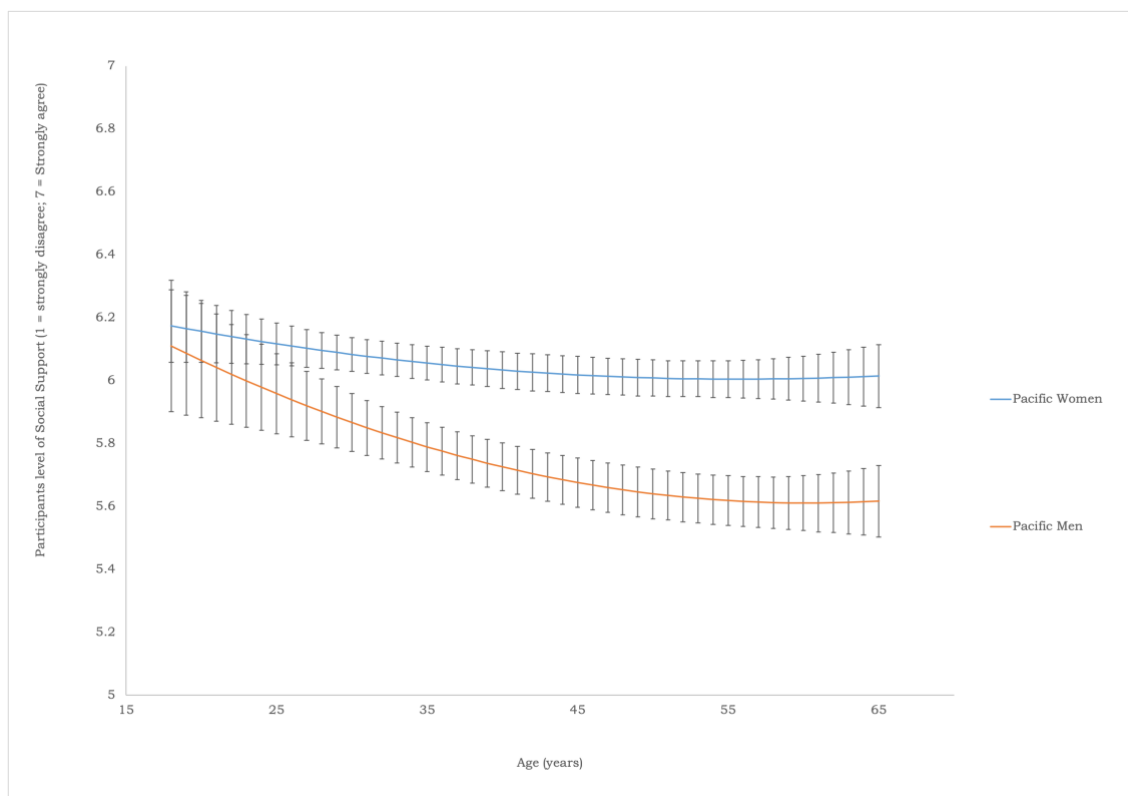


Figure 1. Model-implied mean social support scores for Pacific women and men by age.

## Discussion

There is a limited yet informative history of research examining aspects of wellbeing across different cohorts of Pacific peoples (for example, Foliaki et al., 2006; Kapeli, Manuela & Sibley, 2019; Suaalii-Sauni et al., 2009; Sundborn et al., 2007; Tiatia, 1998). Our study aimed to build on this tapestry of past research by modelling—for the first time—the change in social support, a strong correlate of wellbeing experienced by Pacific peoples as they age.

Pacific women were found to experience higher levels of social support than Pacific men consistently across the lifespan. As mentioned, gender distinct experiences and perceptions of relationships continue to develop from childhood to adulthood (Hall, 2011; Lee & Goldstein, 2016; Shulman & Scharf, 2000; Stansfeld, 2006). Generally, young women come to value and subsequently devote more time to developing close relationships, translating to higher levels of perceived social support (Bowker & Ramsay, 2011; Levesque, 2011; Rafaelli & Duckett, 1989; Adamczyk, 2015; Teevale, et al., 2016; Weckwerth & Flynn, 2006). It seems that women are primed from an early age to be more attentive and nurturing, supporting the idea that Pacific women will experience higher levels of social support as they retain their social



networks and derive social support from them as they age.

Despite Pacific women retaining their social networks, overall social support progressively decreased with age for Pacific men and women. We know that younger groups tend to belong to larger social networks (Statistics NZ, 2016). Research demonstrates that the sources of derived support may determine degree of stress experienced differentially (Lee & Goldstein, 2016), and of course, this experience can differ due to cultural and traditional expectations and understandings. Although our study does not differentiate between sources of support, it is understood that social support is predominantly derived from friends rather than family earlier in life, despite having access to both sources. The contexts of family and school have been highlighted as the two prime areas of social capital derivation for Pacific youth (Puna & Tiatia-Seath, 2017; Teevale et al., 2016). Although youth are not in our sample age range, such research provides relevant contextual information for maintaining social networks throughout life, and consequently, how risk factors can be isolated during youth to understand diminished social networks into adulthood.

These findings are important because they address an essential area concerning the value and wellbeing of our Pacific communities within NZ, and possibly for Pacific communities in other Western countries. Historically, NZ European and Māori analyses have dominated research output in NZ. Current research has responded with the rise of Pacific research (this research article included), but there is still more to be done. Public health measures will continue to miss opportunities to enhance community wellbeing if diversity-sensitive approaches are not promoted (Edwards, McCreanor, & Moewaka-Barnes, 2007; Goldston et al., 2008; Rogers & Whitehead, 2008; Teevale et al., 2016)– this extends far beyond our Māori and Pacific peoples to also be inclusive of Asian peoples, gender diverse peoples and other diverse groups. Given the overrepresentation of Pacific peoples in mental health statistics and growing evidence about the protective function of social support, research examining social networks within Pacific communities is important. A positive way forward would be our relational sense of *vā* being more readily integrated into healthcare settings and the wider community to support our Pacific communities to thrive. With the growing and youthful nature of the Pacific population in NZ, suicide rates are expected to increase and research that could build mental health literacy and inform suicide prevention strategies for Pacific peoples are vital (MoH New Zealand, 2008; Tiatia-Seath et al., 2017).

## **Conclusion**

We found that levels of perceived social support decrease across the lifespan among Pacific peoples, with differences between genders. Pacific women remained relatively stable across the lifespan and Pacific men demonstrated a developmental change over time. This is important because it highlights that older Pacific men are decreasing in levels of perceived social support over time. Older Pacific men could be at risk of the negative effects associated with lower social support. It is important to know about this developmental change to assess future trends. High levels of social support are influenced by a large range of positive outcomes across the lifespan, such as strong relationships with others and enhanced self-esteem. In order to promote a better understanding of developmental changes in social support among Pacific peoples, we need to understand the factors that could buffer the adverse

effects of low social support such as social isolation or outcomes such as mental illness.

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## References

- Adamczyk, K. An investigation of loneliness and perceived social support among single and partnered young adults. *Current Psychology*. 2015.
- Agnew, F., Pulotu-Endemann, F. K., Robinson, G., Suaalii-Sauni, T., Warren, H., Wheeler, A., & Schmidt-Sopoaga, H. (2004). *Pacific models of mental health service delivery in NZ ("PMMHSD") project*. Auckland: Health Research Council of NZ.
- Antonucci, T. C. A life-span view of women's social relations. In B. F. Turner & L. E. Troll (Eds.), *Crowing older female: Theoretical perspectives in the psychology of aging*. New York: Sage Publications, Inc; 1994.
- Beautrais, A., Collings, S., Ehrhardt, P., & Henare, K. (2005). *Suicide Prevention: A review of evidence of risk and protective factors, and points of effective intervention*. Wellington: Ministry of Health, New Zealand.
- Beautrais, A., & Fergusson, D. (2006). Indigenous suicide in New Zealand. *Archives of Suicide Research*, 10(2), 159-168.
- Belle, D. (1987). The stress of caring: Women as providers of social support. In Coldberger & Breznitz (Eds.), *Handbook of stress: Theoretical and clinical aspects*, 496-505.
- Bowker, A., & Ramsay, K. (2011). Friendship characteristics. In R. J. R. Levesque (Ed.), *Encyclopedia of adolescence* (pp. 158-185). New York: Springer.
- Bush, A., Chapman, F., Drummond, M., & Fagaloa, T. (2009). Development of a child, adolescent and family mental health service for Pacific young people in Aotearoa/NZ. *Pacific Health Dialog*, 15(1), 138-146.
- Bush, A., Collings, S., Tamasese, K., & Waldegrave, C. (2005). Samoan and psychiatrists' perspectives on the self: Qualitative comparison. *Australian and NZ Journal of Psychiatry*, 39(7), 621-626.
- Cowan, C., & Cowan, P. (1992). *When partners become parents: The big life change for couples*. New York: Basic Books.
- Cutrona, C., & Russell, D. (1987). The provisions of social relationships and adaptation to stress. *Advances in Personal Relationships*, 1, 37-67.
- Edwards, S., McCreanor, T., & Moewaka-Barnes, H. (2007). Māori family culture: A context of youth development in Counties/Manukau. *Kōtuitui: New Zealand Journal of Social Sciences Online*, 2(1), 1-15.
- Foliaki, S., Kokaua, J., Schaaf, D., & Tukuitonga, C. (2006). Twelve-month and lifetime prevalences of mental disorders and treatment contact among Pacific people in Te Rau Hinengaro: The New Zealand Mental Health Survey. *Australian and New Zealand Journal of Psychiatry*, 40(10), 924-934.
- Fuhrer, R., Stansfeld, S., Chemali, J., & Shipley, M. (1999). Gender, social relations and mental health: prospective findings from an occupational cohort (Whitehall II study). *Social Science & Medicine*, 48, 77-87.
- Goldston, D., Molock, S., Whitbeck, L., Murakami, J., Zayas, L., & Hall, G. (2008). Cultural considerations in adolescent suicide prevention and psychosocial treatment. *American Psychologist*, 63(1), 14-31.

- Griffen, V. (2006). Gender relations in Pacific cultures and their impact on the growth and development of children. *Paper Prepared for a Seminar on Children's Rights and Culture in the Pacific 30th October 2006*.
- Gunther, S. (2011). Disparity in mental health provision for Maori and Pacific: A nursing response. *Whitireia Nursing Journal*, (18), 39.
- Hall, J. (2011). Sex differences in friendship expectations: A meta-analysis. *Journal of Social and Personal Relationships*, 28, 723-747.
- Heinze, J., Kruger, D., Reischl, T., Cupal, S., & Zimmerman, M. (2015). Relationships among disease, social support, and perceived health: A lifespan approach. *American Journal of Community Psychology*, 56(3-4), 268-279.
- Ingersoll-Dayton, B., & Antonucci, T. (1988). Reciprocal and nonreciprocal social support contrasting sides of intimate relationships. *Journal of Gerontology: Social Sciences*, 43, S65-S73.
- Ishii-Kuntz, M. (1990). Social interaction and psychological well-being: Comparison across stages of adulthood. *International Journal of Aging and Human Development*, 30(1), 15-36.
- Kapeli, S. A., Manuela, S., & Sibley, C. G. (2019). Perceived discrimination is associated with poorer health and well-being outcomes among Pacific peoples in New Zealand. *Journal of Community & Applied Social Psychology*.
- Keith, V., & Krause, N. (1989). Gender differences in social support among older adults. *Sex Role* 21(9-10), 609-628.
- Kleiman, E., & Liu, R. (2013). Social support as a protective factor in suicide: Findings from two nationally representative samples. *Journal of Affective Disorders*, 150(2), 540-545.
- Langford, C. P. H., Bowsher, J., Maloney, J. P., & Lillis, P. P. (1997). Social support: a conceptual analysis. *Journal of advanced nursing*, 25(1), 95-100.
- Lee, C., & Goldstein, S. (2016). Loneliness, Stress, and Social Support in Young Adulthood: Does the Source of Support Matter? *Journal of Youth and Adolescence*, 45(3), 568-580.
- Levesque, R. (2011). Loneliness. In R. J. R. Levesque (Ed.), *Encyclopedia of adolescence* (pp. 1624-1626). New York: Springer.
- Lynch, S. (1998). Who supports whom? How age and gender affect the perceived quality of support from family and friends. *The Gerontologist*, 38(2), 231-238.
- Matud, M., Ibáñez, I., Bethencourt, J., Marrero, R., & Carballeira, M. (2003). Structural gender differences in perceived social support. *Personality and Individual Differences*, 35(8), 1919-1929.
- Milojev, P., & Sibley, C. G. (2017). Normative personality trait development in adulthood: A 6-year cohort-sequential growth model.
- Ministry of Health (MoH) New Zealand. (2008). *Pacific Peoples and Mental Health: A paper for the Pacific Health and Disability Action Plan review*. Wellington: Ministry of Health.

- Ministry of Health (MoH) New Zealand. (2013). New Zealand Suicide Prevention Action Plan 2013–2016. Wellington: Ministry of Health
- Ministry of Social Development (MSD) New Zealand. (2016). The Social Report 2016: Te pūrongo oranga tangata. Wellington: Ministry of Social Development. Available from [www.socialreport.msd.govt.nz](http://www.socialreport.msd.govt.nz).
- Muthén, L.K. & Muthén, B.O. (1998-2019). *Mplus user's Guide*. Eighth edition. Los Angeles, CA: Muthén & Muthén.
- Olson, D., & Shultz, K. (1994). Gender differences in the dimensionality of social support. *Journal of Applied Social Psychology, 24*, 1221-1232.
- Preacher, K., Wichman, A., MacCallum, R., & Briggs, N. (2008). Latent growth curve modelling. Thousand Oaks, CA: Sage Publications
- Puna, E. P., & Tiatia-Seath, S. (2017). Defining positive mental wellbeing for New Zealand-born Cook Islands youth. *Journal of Indigenous Wellbeing, 2*(1), 97-107.
- Rafaelli, M., & Duckett, E. (1989). “We were just talking...”: Conversations in early adolescence. *Journal of Youth and Adolescence, 18*, 567-582.
- Rogers, J., & Whitehead, D. (2008). Ethnic considerations in intervention and treatment with suicidal people. In F.T.L. Leong & M. M. Leach (Eds.), *Suicide among racial and ethnic minority groups* (pp. 225-273). New York: Routledge.
- Samu, K. S., & Suaalii-Sauni, T. (2009). Exploring the ‘cultural’ in cultural competencies in Pacific mental health. *Pacific Health Dialog, 15*(1), 120-130.
- Satherley, N., Milojev, P., Greaves, L.M., Huang, Y., Osborne, D., Bulbulia, J., & Sibley, C.G. (2015). Demographic and psychological predictors of panel attrition: Evidence from the New Zealand Attitudes and Values Study. *PLoS one, 10*, e0121950.
- Schultz, K. (1991). Women's adult development: The importance of friendship. *Journal of Independent Social Work, 5*(2), 19-30.
- Shulman, S., & Scharf, M. (2000). Adolescent romantic behaviors and perceptions: Age- and gender-related differences, and links with family and peer relationships. *Journal of Research on Adolescence, 10*, 99-118.
- Sibley, C. G., & Greaves, L.M. (2014). NZAVS content rotation and planning document. NZAVS Technical Documents, e02.
- Sibley, C. G. (2014a). Archive of NZAVS questionnaires. NZAVS Technical Documents, e06.
- Sibley, C. G. (2014b). Sampling procedure and sample details for the New Zealand Attitudes and Values Study. NZAVS Technical Documents, e01.
- Stansfeld, S. (2006). Social support and social cohesion. In M. G. Marmot & R. G. Wilkinson (Ed.), *Social determinants of health* (2nd ed). Oxford, New York: Oxford University Press.
- Statistics New Zealand (NZ). (2016). How we interact with family and friends. Retrieved from [www.stats.govt.nz](http://www.stats.govt.nz).

- Statistics New Zealand (NZ). (2018). 2018 Census population and dwellings counts. Wellington: Statistics New Zealand.
- Statistics New Zealand (NZ). (2013). 2013 Census of populations and dwellings: ethnic groups. Wellington: Statistics New Zealand.
- Statistics New Zealand (NZ) and Ministry of Pacific Island Affairs. (2011). Health and Pacific peoples in New Zealand. Wellington: Statistics New Zealand and Ministry of Pacific Island Affairs
- Suaalii-Sauni, T., Wheeler, A., Saafi, E., Robinson, G., Agnew, F., Warren, H., Erick, M., Hingano, T. (2009). Exploration of Pacific perspectives of Pacific models of mental health service delivery in New Zealand. *Pacific Health Dialog*, 15(1), 18-27.
- Sundborn, G., Paterson, J., Jhagroo, U., Taylor, S., Lusitini, L., Tautolo, E., Savila, F., Hirao, A., & Oliver, M. (2007). Cohort profile: A decade on and strong - The Pacific Islands Families (PIF) Study. *International Journal of Epidemiology*, 37(2), 273-279.
- Tamasese, T., Parsons, T., Sullivan, G., & Waldegrave, C. (2010). *A qualitative study into pacific perspectives on cultural obligations and volunteering*. Wellington: Pacific Section and the Family Centre Social Policy Research Unit.
- Tautolo, E., Schluter, P., & Sundborn, G. (2009). Mental health well-being amongst fathers within the Pacific Island Families Study. *Pacific Health Dialog*, 15(1), 69-78.
- Teevale, T., Lee, A., Tiatia-Seath, J., Clark, T. C., Denny, S., Bullen, P., Fleming, T., & Peiris-John, R. (2016). Risk and Protective Factors for Suicidal Behaviors Among Pacific Youth in New Zealand. *The Journal of Crisis Intervention and Suicide Prevention*, 1-12.
- Tiatia, J. (1998). Caught between cultures: A New Zealand-born Pacific Island perspective. Ellerslie, Auckland: Christian Research Association.
- Tiatia-Seath, J., Lay Yee, R., & Von Randow, M. (2017). Suicide mortality among Pacific peoples in New Zealand, 1996–2013. *New Zealand Medical Journal*, 130(1454), 21-29.
- Troll, L. (1987). Gender differences in cross-generational networks. *Sex Roles*, 77(11-12), 751-766.
- Umberson, D., Crosnoe, R., & Reczek, C. (2010). Social relationships and health behavior across life course. *Annual Review of Sociology*, 1(36), 139-157.
- Weckwerth, A., & Flynn, D. (2006). Effect of sex on perceived support and burnout in university students. *College Student Journal*, 40, 237-249.

## **Appendix 1**

### ***Overview of the present study methodology***

We employed age-based latent growth modelling to examine change in rates of social support for Pacific peoples across the lifespan. A recent personality study by Milojev & Sibley (2017) also implemented an age-based latent growth model, an approach first suggested by Preacher, Wichman, MacCallum and Briggs (2008). Our model utilizes a multi-group age-based latent growth modelling that estimates two growth factors, one

for men, and one for women. There are no previous studies that have looked at the rate of change in social capital among Pacific peoples as they age. Perhaps these differences represent a developmental process that people naturally go through as they age, or a cohort-specific process, where younger generations will retain their high level of social support as they age. Pacific peoples are one of the youngest and fastest growing populations in NZ. By modelling change in social support over the lifespan among Pacific peoples, we hope to be able to observe future changes in the growth and possible decline in social capital coming as younger generations of Pacific peoples continue to age.

### ***Sampling***

We employed age-based latent growth modelling. A traditional (chronological-based) latent growth model would typically use the time of measurement (for e.g., measures each year, 2000, 2001, 2002... etc.) as the time variable. This approach allows one to estimate the rate of change over time, say over a span of years. An age-based latent growth model, in contrast, uses participants' age over their repeated assessments as the timing variable. So, for example, in a longitudinal study such as the NZAVS, if person one was 18 in 2009, and 19 in 2010, 20 in 2011, and so on, then the time variable for this person would be 18, 19, 20, and so forth. If person two were 40 in 2009, 41 in 2010 and 42 in 2011 and so forth, then the time variable for this person would be 40, 41, 42, and so forth. The approach therefore represents a compromise between having access to full longitudinal data for a cohort across their entire adult life span (which would require a 60-70 yearlong longitudinal study), and access to longitudinal data for a range of cohorts across all ages, and simultaneously tracking each cohort over a shorter period of time, such as six years (this is what the NZAVS does). Please refer to Table 2 for sample sizes by cohort.

### ***Analytic strategy***

The age-based latent growth model was estimated using each of the annual assessments over the six time waves. Each annual assessment corresponded to the years 2009 (Time 1), 2010 (Time 2), 2011 (Time 3), 2012 (Time 4), 2013 (Time 5) and 2014 (Time 6). Scale means were used as a basis for the models at each time point. To estimate the developmental change across the age range of the adult lifespan, the age of each participant at each assessment time was used as an individual varying time indicator. For ease of interpretation, we scaled age so that each 1.0 units represented 10 years.

By estimating the exact age at each time point, we allowed for variation in age due to the varying intervals of assessment. If a person were 20.50 at Time 1, that person's responses would then inform the estimation of the growth curve in that particular age range. Similarly, a person who was 40 at their first response time would then inform a later portion of the growth curve. We modelled the rate of development in social support as a second-order polynomial growth function including both a linear and quadratic component. The quadratic components in these models were non-significant in all cases; however, we retained them in the model in order to adjust for possible quadratic effects when estimating the linear component of the growth model. This recognizes the possibility that change could be curvilinear, even if we were not able to statistically detect such patterns, and provides a more robust test of the linear component of the model by adjusting the quadratic component.

We first estimated an overall (single-group) model collapsed across men and women. We then extended the analysis by estimating a multi-group model allowing for differences between men and women. The multi-group model allowed the intercept and growth factors (both linear and quadratic components) to differ for men and women. However, we constrained the variances (or random effects) for the intercept and growth factors to equality across gender. We also constrained the covariance between the intercept, linear growth component and quadratic growth component to equality across gender. The variances for the growth factors were non-significant (see

results below), and by constraining them to equality we assume that the level of individual differences in rates of change over time (due to other potential factors) are equal for men and women.

### ***Discussion***

We utilized an age-based latent growth model, a model that has not been used to examine social support or any other field within Pacific research. It is important to note that our model estimates a general developmental trend across the adult age range and may still be partially contaminated by cohort effects. This contamination may occur because we did not track the same cohort across the entire lifespan, but rather tracked a sample of people of all ages across a six-year period (see Milojev & Sibley (2017) for detailed commentary on this issue). That said, our model does still estimate the average rate of change in social support over a six-year period, for people over the adult lifespan, and is the first model of its type ever to do so with a Pacific sample, and as best we know, in the study of social support more generally.