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Regional Differences and Similarities in the Personality of New Zealanders

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The current study contributes to an emerging literature on regional differences in personality. We analyse data from a national probability sample of New Zealanders (N = 6,518) to examine differences and similarities in mean levels of Big-Six personality (Extraversion, Agreeableness, Conscientiousness, Neuroticism, Openness to Experience, and Honesty-Humility) across 63 geographical General Electorate Districts in New Zealand. Of these six core aspects of personality, only Honesty-Humility and Openness to Experience varied significantly across regions. Those from large cities (i.e., Auckland, Wellington, and Christchurch) were higher in Openness to Experience, whereas those from Palmerston North, and many regions of the South Island were higher in Honesty-Humility, relative to those living in other regions of New Zealand. However, regional differences explained only a trivial amount of variance in the two traits. This research speaks directly to anecdotes about regional differences across New Zealand, and shows that, for the most part, the strong regional similarities far outweigh alleged regional personality differences across the nation.

Keywords: Personality, Geography, Regional Differences, Big-Six, Mini-IPIP6

Any collocation of persons, no matter how numerous, how scant, how even their homogeneity, how firmly they profess common doctrine, will presently reveal themselves to consist of smaller groups espousing variant versions of the common creed; and these sub-groups will manifest sub-sub-groups, and so to the final limit of the single individual, and even in this single person conflicting tendencies will express themselves.

—Jack Vance, The Languages of Pao (1958)

Research on the extent to which nations have different 'personalities', or more accurately, whether the citizens from some nations tend to differ from those in other nations in terms of core personality traits, have been comprehensively explored (e.g., Terracciano et al., 2005). By and large, this literature demonstrates that personality differences across nations tend to be fairly trivial (Terracciano et al., 2005). As such, the stereotypes ascribed to different nationalities tend to be greatly exaggerated. Nevertheless, stereotypes about the personalities of people from different regions within a country still exist. To offer a few examples from New Zealand, anecdotal evidence would suggest that New Zealanders tend to talk about North Islanders and South Islanders, Aucklanders versus everyone else; and within Auckland, Westies, again perhaps, versus everyone else. However, despite what would seem to be a lively and robust anecdotal

corpus of information documenting such differences, empirical research in the area is lacking.

In the current paper, we aim to document the differences (or the lack thereof) in personality across different regions of New Zealand. To do so, we draw upon data from the first wave of New Zealand's own national longitudinal study, the New Zealand Attitudes and Values Study (NZAVS). In terms of regions, we focus on differences between people living in the 63 General Electoral Districts (GEDs) using the 2007 electoral boundaries. These area units provide a reasonably detailed level of differentiation between the regions of New Zealand and are also fundamentally important to the outcomes of elections in our nation.

We are unaware of any studies in New Zealand that have empirically tested whether there are regional differences in the personality of New Zealanders. Nevertheless, examining potential regional differences in personality is an important area of research for a number of reasons. First, empirical data can help refute laypeople's erroneous beliefs about the existence (and/or magnitude) of regional differences in personality. Second, research on aggregate personality scores across regions provides important baseline information that can be linked to future research on regional diversity, differences in voting patterns across electorates, regional differences in health and wellbeing, and possible differences in migration patterns. Research on regional differences in other nations, for example, has tended to focus on differences between states in the US, and has explored how state-level differences

in personality correlate with support for the Republican versus Democratic parties (e.g., Rentfrow, 2010; Rentfrow, Jost, Gosling, & Potter, 2009).

A Big-Six Model of Personality

Personality is generally defined as "relatively enduring styles of thinking, feeling and acting" (McCrae & Costa, 1997, p. 509). Personality traits can be thought of as conceptualisations of recurring characteristics across people and across cultures (McCrae & Costa, 1997). Contemporary personality research has largely focused on the Big Five model of personality (Goldberg, 1981, 1990, 1999). This model identifies personality through the following five distinct dimensions: (a) Openness to Experience, (b) Conscientiousness, (c) Extraversion, (d) Agreeableness, and (e) Neuroticism. Openness to Experience captures engagement in task-related endeavours and curiousness. Conscientiousness includes diligence, organisation, and motivation to carry out tasks. Friendliness and involvement in social activities are reflected in Extraversion, whereas Agreeableness covers tolerance and ingroup cooperation. The monitoring of inclusionary status through insecurity and anxiety is captured by Neuroticism. Recently, a sixth dimension of personality has been proposed, thereby rendering the Big-Six (or HEXACO) model of personality (Ashton & Lee, 2001, 2007, 2009). This sixth trait, Honesty-Humility, consists of reciprocal altruism, sincerity, and (the absence of) entitlement.

We examine regional differences in mean personality using this Big-Six framework that incorporates marker items assessing the Big-Five dimensions of personality, and also additional marker items indexing Honesty-Humility. We do so using the Mini-IPIP6 (Sibley et al., 2011). The Mini-IPIP6 is a public domain short-form personality instrument based on the original five-factor Mini-IPIP presented by Donnellan, Frederick, Oswald, and Lucas (2006) derived in turn from the broader item pool developed by Goldberg (1999). The Mini-IPIP6 provides four-item markers of six broad-bandwidth dimensions of personality: Extraversion, Agreeableness,

Conscientiousness, Neuroticism, Openness to Experience and Honesty-Humility (see also Sibley et al., 2011, for further details). The Mini-IPIP6 has been extensively validated for use in New Zealand, and shows a reliable factor structure and internal reliability (Sibley et al., 2011), good item response parameters and well-distributed test information functions (Sibley, 2012), well-documented and detailed norms for different demographic groups in New Zealand (Sibley & Pirie, 2013), extremely high levels of stability over a one-year test re-test period (Milojev, Osborne, Greaves, Barlow, & Sibley, 2013), and utility in predicting psychological outcomes associated with exposure to the Christchurch earthquakes (Osborne & Sibley, 2013).

Demographic differences in personality in New Zealand

Sibley and Pirie (2013) previously documented standard demographic differences in Big-Six personality in New Zealand using Time 1 NZAVS data. Their analysis focused on factors such as gender, age, income, deprivation, ethnicity, and so forth, but did not examine broader regional differences. Thus, while we have detailed information on personality differences across these standard demographics, very little is known about broader regional differences. Sibley and Pirie (2013) reported standard gender and age differences in personality, but noted that there were remarkably few other systematic group-based differences in personality. Moreover, the demographic differences that were detected were trivial in size, being small enough that they were effectively meaningless in any practical sense. Indeed, Sibley and Pirie (2013, p. 28) concluded that "The story these data tell, in our view, is one of the rich variety of individual differences in personality across New Zealand, and the fact that very little of the differences between people can be accounted for by the demographics that we commonly examine."

The exception to this general trend was in the fairly large and robust gender and age differences in personality. It seems that when it comes to differences in personality, gender and age have a more powerful effect than other

demographics. Sibley and Pirie (2013) reported that women were significantly higher than men in Extraversion, Agreeableness, Conscientiousness, Neuroticism and Honesty-Humility. Men were higher in Openness to Experience. With regard to age-based (cohort) differences, results indicated that Extraversion decreased over the 20-50 year old age range, and then tended to plateau. Agreeableness, in contrast, remained fairly similar across different cohorts. Conscientiousness increased over the 20-50 year old age range, and then plateaued. Neuroticism decreased continually across the age range, with the most pronounced reduction among middle to older age adults. Openness to Experience decreased in a relatively linear fashion across the age range. Finally, Honesty-Humility tended to be lower amongst younger cohorts, and was highest among older age groups.

The Geography of Personality

Inspired by questions about national stereotypes and potential differences in child-rearing styles, there is a plethora of research on cross-national differences in personality. The introduction of the Big Five model has resulted in renewed interest in cross-national personality differences, with Terracciano, McCrae, and colleagues leading the research in this area (e.g., Hofstede & McCrae 2004; McCrae, 2001; McCrae et al., 2005; McCrae & Terracciano, 2007; Schmitt, Allik, McCrae, & Benet-Martinez, 2007). Contrary to popular opinion, similarities in mean levels of personality traits have been found across neighbouring nations. For example, neighbouring countries tend to be more similar in personality than those that are geographically separated (Allik & McCrae, 2004). In a study examining differences in the Five Factor Model of personality across 36 cultures, Allik and McCrae (2004) found high mean levels of Extraversion and Openness to Experience in European and American cultures, whereas Asian and African cultures tended to be more introverted. Additionally, Schmitt and colleagues (2007) used the Big Five Inventory to measure personality traits across 56 nations and found that East and Southeast Asian nations tended to be higher in Neuroticism and lower in

Openness to Experience. Some of their findings, however, contradicted widely held beliefs about the typical personality trait in a given nation (e.g., mean levels of Agreeableness were relatively low in Japan).

Stereotypes about how people's typical personality structure may be based on their nation of residence fail to correspond with actual mean-levels of personality, as corroborated by Terracciano et al. (2005). Specifically, Terracciano and colleagues found that there is a lack of correspondence between mean levels of the Big Five within a nation and personality-based stereotypes that the nation holds of itself. Though these findings contribute to the literature on cross-national personality differences and stereotypes, differences at the regional level within nations are under-researched.

Following the line of research examining cross-national differences in personality, Rentfrow and colleagues (Rentfrow, 2010; Rentfrow, Jost, Gosling, & Potter, 2009; Rentfrow, Gosling, & Potter, 2008) renewed interest in this area by reasoning that regional differences in personality should exist within nations. Nations are often geographically and demographically diverse and, as such, contain a multitude of subcultures. Indeed, early research on within-nation personality differences showed that different geographical groupings of states varied on traits corresponding to intelligence, creativity, and neuroticism (e.g., see Krug & Kulhavy, 1973; Plaut, Markus, & Lachman, 2002). This suggests that there can be meaningful variability in mean levels of personality across regions within the same country.

Additionally, researchers have used the Five Factor Model to predict a range of regional-level outcomes including cancer rates, life expectancy, substance abuse, and obesity (McCrae & Terracciano, 2007). For example, Rentfrow, Gosling, and Potter (2008) showed that regional differences in personality can be used to predict real-life outcomes like higher crime rates (low Agreeableness), and support for the legalisation of marijuana (high Openness to Experience). Rentfrow and colleagues (Rentfrow, 2010; Rentfrow, Jost, Gosling, & Potter, 2009) extended

this work into state-level voting patterns and found that states with higher levels of Openness to Experience tend to have higher rates of voting for left-wing/Democratic party candidates. Conversely, states with higher mean levels of Conscientiousness have higher rates of voting for right-wing/ Republican party candidates. These studies provide a novel extension of the research on political preference and personality, while also highlighting the practical utility of investigating intra-national variation in personality.

Despite the utility of such an endeavour, we are unaware of any research within the New Zealand context that specifically examines regional differences in personality. There are, however, a few studies assessing regional differences in various other psychological variables that are informative. In a large national study of New Zealand, The Human Potential Centre (2013) found that there are differences between regions in a few critical outcome variables. Specifically, those from the West Coast of the South Island perceived themselves to be further from 'the top of society', whereas Northlanders, Aucklanders and those from the Bay of Plenty region rated themselves as closer to the top, than the rest of the country. The study also found that those from Taranaki reported a lower frequency of connecting with others, and that Aucklanders reported the lowest perceived social closeness, with West Coasters reporting the highest. All other differences across regions in the report were either non-significant or very small in magnitude.

Other research in New Zealand has found regional differences in stereotypes associated with psychological variables. As with many other nations, New Zealand regional stereotypes can be found throughout the media and historical texts (e.g., see Belich, 2002). These stereotypes have, however, never been subjected to empirical scrutiny with national-level data. Indeed, rather than assess actual levels of certain characteristics within distinct regions of New Zealand, most research in the area has used relatively small groups of New Zealanders to identify stereotypes associated with different regions of the country. For example, Nielsen and Hay

(2005) found that there were regional stereotypes associated with speech such that participants stereotyped people living in the Wellington, Canterbury and Nelson/Marlborough regions as being both pleasant and correct in their speech. In contrast, people living in Auckland were rated as considerably less pleasant, and people from Northland and Westland were seen as less correct. Finally, Greaves, Osborne, and Sibley (2014) found that there were higher rates of undecided voters in certain electorates across the country, although these did not geographically cluster into a meaningful pattern. Thus, while there have been some studies on regional variations in a few relevant variables across New Zealand, research has yet to examine the possibility that there is meaningful variability in personality traits across different regions of the country.

Aims and Hypotheses

The current study uses data from Wave I of the New Zealand Attitudes and Values Study (NZAVS) to examine personality differences in Big-Six personality traits across different geographic regions of New Zealand. The NZAVS is a 20-year longitudinal national probability study of social attitudes, personality and health outcomes. To examine such regional differences, we compared differences across residents who were living within the boundaries of the general electoral districts based on the 2007 boundaries, using 2009 data. Note that this is not the same as examining differences across people based on the electorate they were registered to vote in, as those registered to vote on the Māori roll were included as part of their geographical electorate from the general roll. Rather, we used the general electoral boundaries as a way to classify broad regions of New Zealand.

We hypothesise that differences in personality between regions will be small or non-existent. Based on research from the US (namely Rentfrow, 2010) and the small amount of New Zealand research (The Human Potential Centre, 2013), we suggest that there may be small effects for Openness to Experience, Neuroticism, and Honesty-Humility across regions. Critically,

however, we suspect that any differences in aggregate personality across regions will be small-to-trivial in magnitude. Rather, we expect that across general electoral districts, the mean personality scores of New Zealand residents will be far more alike than they are different.

Method

Sampling Procedure

Participants received a postal questionnaire with a personalised letter with their name and address visible in a windowed envelope. The envelope was printed using University of Auckland letterhead, as were both personalised letter (information sheet), and consent form/questionnaire. The questionnaire was eight pages in length. Participants were entered into a prize draw for a total prize pool of $1000 worth of grocery vouchers for participation.

The Time 1 (2009) NZAVS contained responses from 6,518 participants sampled from the 2009 New Zealand electoral roll. The electoral roll is publicly available for scientific research and in 2009 contained 2,986,546 registered voters. This represented all citizens over 18 years of age who were eligible to vote regardless of whether they chose to vote, barring people who had their contact details removed due to specific case-by-case concerns about privacy. The sample frame was split into three parts. Sample Frame 1 constituted a random sample of 25,000 people from the electoral roll (4,060 respondents). Sample Frame 2 constituted a second random sample of a further 10,000 people from the electoral roll (1,609 respondents).

Sample Frame 3 constituted a booster sample of 5,500 people randomly selected from meshblock area units of the country with a high proportion of Māori, Pacific Nations, and Asian peoples (671 respondents). Statistics New Zealand (2013) define the meshblock as "the smallest geographic unit for which statistical data is collected and processed by Statistics New Zealand. A meshblock is a defined geographic area, varying in size from part of a city block to large areas of rural land. Each meshblock abuts against another to form a network covering all of New Zealand including

coasts and inlets, and extending out to the two hundred mile economic zone. Meshblocks are added together to 'build up' larger geographic areas such as area units and urban areas. They are also the principal unit used to draw-up and define electoral district and local authority boundaries." Meshblocks were selected using ethnic group proportions based on 2006 national census data. A further 178 people responded but did not provide contact details and so could not be matched to a sample frame.

In sum, postal questionnaires were sent to 40,500 registered voters or roughly 1.36% of all registered voters in New Zealand. The overall response rate (adjusting for the address accuracy of the electoral roll and including anonymous responses) was 16.6%. We suspect that one reason for this relatively low response rate to the 2009 sample may be that our participants were explicitly signing up to a planned 20-year longitudinal study (of which the current data represent the first wave). They thus consented to being contacted for the next 19 years, and provided their name and full contact details.

The 2009 sample was reasonably representative of differences in the proportion of ethnic groups according to 2006 census figures (see Sibley, McPhee, & Greaves, 2014). However, Pacific and Asian respondents were underrepresented in the 2011 wave: people who identified with these groups were slightly more likely to drop out of the sample. The NZAVS also oversampled women relative to men; however, as we noted earlier, differential changes across regions in religious affiliation were consistent when examining men and women separately. These caveats should nevertheless be kept in mind when generalising from our sample to the New Zealand population.

Participant details

Complete responses to all of the relevant items analyzed here, including address details so that we could determine electoral district, were provided by 5,487 participants (84% of the total sample; 3,267 women, 2,220 men). Of those providing complete data, 72.4% were New Zealand European (n = 3,970), 17.3% were Māori (n = 950), 3.3% were of Pacific Nations ancestry (n

= 180), 4.4% were of Asian ancestry (n = 244), and 2.6% were coded as 'other' (n = 143). Participants' mean age was 47.01 (SD =15.53).

With regard to other demographics, 42.3% (n = 2,319) identified as religious, with the majority (79.0%) of participants having been born in New Zealand (n = 4,333). Most participants were in some form of romantic relationship (69.9%, n = 3,837) and 74.0% had at least one child (n = 4,060). The majority of participants were in paid employment (74.5%; n = 4,087). In terms of education, 21.5% had no qualification (or failed to report their highest qualification; n = 1,178), 29.6% completed at least some high school (n = 1,626), 16.3% studied towards a diploma or certificate (n = 896), 23.2% studied at the undergraduate level (n = 1,171) and 9.4% pursued post-graduate study (n = 515).

Regional differences

Participants provided their residential address, and we used this information to identify the regions in which they were living when completing their 2009 NZAVS data. We identified the General Electoral District in which each participant was living at the time of data collection based on the 2007 General Electoral boundaries. These General Electoral boundaries separated New Zealand into 63 distinct regions, and have the advantage that they are designed to be relatively comparable in population size. Our sample contained on average 100.9 people per general electoral region. The distribution of our sample, based on the density of people in different meshblock centroids is presented in Figure 1.

Materials

The 24-item Mini-IPIP6 personality scales (Sibley et al., 2011) were administered using the following instructions: "This part of the questionnaire measures your personality. Please circle the number that best represents how accurately each statement describes you." Items were rated from 1 (Very Inaccurate) to 7 (Very Accurate). The Mini-IPIP6 contained the 20-items developed by Goldberg (1999) as part of the International Personality Item Pool and included by Donnellan et al. (2006) in the original

Mini-IPIP. The Mini-IPIP6 also included four additional items used to index Honesty-Humility (see Sibley et al., 2011). Two of these items were adapted from the Narcissism scale developed by Campbell et al. (2004). The remaining two were adapted from Ashton and Lee's (2009) HEXACO measure of Honesty-Humility.

Extraversion was assessed by the following four items: "Am the life of the party"; "Don't talk a lot" (reverse scored); "Keep in the background" (reverse scored); "Talk to a lot of different people at parties" (α = .709). Agreeableness was assessed by the following four items: "Sympathize with others' feelings"; "Am not interested in other people's problems" (reverse scored); "Feel others' emotions"; "Am

Figure 1. Distribution of the Time 1 NZAVS sample across New Zealand. Dots represent at least one participant responding from a given meshblock, and are based on meshblock centroids (thus individual responses are anonymized in this figure; from Milfont, Evans, Sibley, Ries and Cunningham, 2014, p. 4).

not really interested in others" (reverse scored) (α = .661). Conscientiousness was assessed by the following four items: "Get chores done right away"; "Like order"; "Make a mess of things" (reverse scored); "Often forget to put them back in their proper place" (reverse scored; α = .649). The Neuroticism scale included the following four items: "Have frequent mood swings"; "Am relaxed most of the time" (reverse scored); "Get upset easily"; "Seldom feel blue" (reverse scored; α = .639). Openness to Experience was assessed by the following four items: "Have a vivid imagination"; "Have difficulty understanding abstract

ideas" (reverse scored); "Do not have a good imagination" (reverse scored); "Am not interested in abstract ideas" (reverse scored; α = .669). Finally, Honesty-Humility was assessed by the following four items: "Would like to be seen driving around in a very expensive car" (reverse scored); "Would get a lot of pleasure from owning expensive luxury goods" (reverse scored); "Feel entitled to more of everything" (reverse scored); "Deserve more things in life" (reverse scored; α = .776).

The Mini-IPIP6 has been extensively validated in New Zealand with Exploratory and Confirmatory Factor Analytic assessments showing that the 24 items reliably fit a six factor solution, with each item set reliably loading on their hypothesised factor (Sibley et al., 2011). Sibley et al. (2011) also showed that the Mini-IPIP6 predicted variation in hours spent performing activities, religious affiliation, belief in climate change, and political orientation. Furthermore, Sibley (2012) validated the precision of the Mini IPIP6 through the use of Item Response Analysis and showed that the scale is reasonably precise given its brevity. Importantly, the scale was also shown to be extremely stable across a one year assessment period (Milojev, Osborne, Greaves, Barlow, & Sibley, 2013).

Results

Table 1 shows the means and standard deviations for each of the six personality traits across New Zealand's 63 GEDs. Analysis of Variance (ANOVA) were conducted assessing mean differences in scores on each of the Big-Six personality dimensions across New Zealand's 63 GEDs to assess mean differences in personality. Given our extremely large sample size, and caution about detecting spurious effects, we adopt p < .01 as our criterion for statistical significance.

As expected, the ANOVAs for Extraversion (F(62,6285) = 1.19, p = .15, partial η2 = .012), Agreeableness (F(62,6285) = 1.26, p = .08, partial η2 = .012), Conscientiousness (F(62,6285) = 1.29, p = .61, partial η2 = .013), and Neuroticism (F(62,6285) = 1.30, p = .06, partial η2 = .013) were non-significant. These findings indicate that there were no significant personality differences

between regions for these traits. In contrast, our analyses indicated that mean levels of Openness to Experience differed across regions (F(62,6285) = 2.84, p < .001, partial η2 = .027). Mean levels of Honesty-Humility also differed significantly across regions (F(62,6285) = 2.43, p < .001, partial η2 = .023). Nevertheless, while reliable, geographical differences explained only a very small proportion of the variance in Openness and Honesty-Humility (2.8% and 2.3%, respectively).

To examine these differences in detail, we mapped mean differences in personality across GEDs. For presentation purposes, we rescaled the mean scores for each of the Big-Six personality scale to range from 0 (lowest possible value) to 1 (highest possible value). These scores were then centered so that the midpoint value of .50 represents the rescaled mean value for each personality scale (see Equation 1). Such an approach provides a standard metric for graphing personality differences across regions and facilitates visual comparisons across GEDs.

Figures 2-7 display mean level variation in personality across New Zealand using the following six gradients of our rescaled range: (a) 0.00-.47, (b) .47-49, (c) .49-.51, (d) .51-.53, (e) .53-.55, and (f) .55-1.00. These gradients were chosen to best differentiate between the observed variations in personality, although it should be noted that these differences are rather small in magnitude—they cover an effective range from .47 to .53, which represents only 6% of the total possible variation in each personality scale. As with the results produced from our formal ANOVAs, these differences across regions are fine-grained and small in size.

$$y = ((x - 1)/7) - (0 - (\bar{x} - .50))$$
[Equation 1.0]

Figures 2 through 7 show the mean levels of Extraversion, Agreeableness, Conscientiousness, and Neuroticism (respectively) across New Zealand. The darker the region is shaded on the map, the higher the mean level of the trait in that region. Because the differences in these personality traits between regions were not significant, little variation is observed on the four corresponding maps. Figure 6, however, shows the mean levels of Openness to Experience

Table 1.

Mean Levels of Each Big-Six Personality Trait by General Electorate District

GED	Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness		Honesty-Humility	
	M	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Auckland Central	4.26	1.22	5.22	0.88	4.96	1.09	3.62	1.03	5.18	1.12	5.05	1.21
Bay of Plenty	3.89	1.00	5.44	0.89	5.37	0.98	3.64	1.14	4.70	1.05	4.95	1.28
Botany	4.15	1.10	5.29	1.00	5.27	1.03	3.44	1.07	4.76	1.05	4.76	1.34
Christchurch Central	4.35	1.09	5.27	1.00	5.25	1.04	3.41	1.02	5.16	1.13	4.96	1.37
Christchurch East	4.18	1.23	5.18	1.14	4.91	1.05	3.29	1.06	4.91	0.98	5.01	1.41
Clutha-Southland	4.08	1.22	5.15	1.09	5.03	1.04	3.35	0.95	4.73	1.04	5.33	1.24
Coromandel	4.03	1.09	5.35	1.00	4.97	0.89	3.54	1.13	4.80	1.06	5.18	1.24
Dunedin North	3.93	1.37	5.36	1.01	4.97	1.06	3.25	1.18	4.91	1.21	5.48	1.31
Dunedin South	4.08	1.09	5.26	1.02	5.12	1.18	3.50	1.21	4.66	1.04	5.08	1.41
East Coast	4.11	1.20	5.35	0.93	5.11	1.10	3.37	1.13	4.89	1.14	5.03	1.44
East Coast Bays	4.38	1.27	5.19	1.16	5.14	1.14	3.21	1.18	4.90	1.15	5.09	1.40
Epsom	3.98	1.33	5.43	0.86	5.14	1.14	3.47	1.15	5.03	1.12	4.83	1.46
Hamilton East	4.15	1.11	5.21	1.02	5.05	0.96	3.56	1.09	4.79	1.13	5.17	1.35
Hamilton West	3.84	1.30	5.03	1.09	5.11	1.17	3.54	1.12	4.51	1.22	5.06	1.33
Helensville	4.06	1.00	5.11	1.01	5.10	0.96	3.47	1.08	4.91	1.00	5.17	1.16
Hunua	3.99	1.20	5.13	0.92	5.28	1.02	3.39	1.04	4.61	1.20	5.13	1.32
Hutt South	4.15	1.13	5.22	1.05	4.84	1.06	3.59	1.22	5.21	1.04	5.03	1.26
Ilam	4.18	1.26	5.50	0.99	5.13	1.00	3.38	1.14	4.88	1.10	5.10	1.31
Invercargill	4.08	1.25	5.24	0.97	5.21	1.03	3.35	1.08	4.57	1.19	5.14	1.34
Kaikoura	4.23	0.96	5.50	0.92	5.00	1.13	3.25	1.11	4.77	1.13	5.34	1.41
Mana	4.18	1.10	5.53	0.85	5.17	1.10	3.33	1.12	4.96	1.04	5.21	1.36
Mangere	4.03	1.16	5.05	1.02	5.29	0.95	3.60	1.02	4.64	1.08	4.96	1.40
Manukau East	3.98	1.16	4.99	1.24	4.93	1.12	3.54	1.13	4.76	1.07	4.73	1.45
Manurewa	4.06	1.13	5.18	1.01	5.05	0.98	3.74	1.04	4.81	1.08	4.55	1.49
Maungakiekie	4.15	1.06	5.24	1.06	5.01	1.10	3.48	0.98	5.05	0.97	4.72	1.25
Mt Albert	4.24	1.24	5.35	0.97	4.84	1.26	3.48	1.20	5.23	1.19	4.79	1.52
Mt Roskill	3.86	1.18	5.16	0.97	4.95	1.02	3.59	0.98	4.86	1.03	4.84	1.48
Napier	3.94	1.27	5.22	0.92	5.02	1.09	3.57	1.11	4.78	1.14	5.04	1.41
Nelson	3.97	1.15	5.47	0.95	5.26	1.06	3.43	1.10	4.83	1.14	5.49	1.15
New Lynn	4.17	1.22	5.39	0.93	5.25	1.00	3.48	1.02	4.73	1.11	4.73	1.51
New Plymouth	3.92	1.22	5.10	0.97	5.15	1.05	3.34	1.11	4.63	1.02	4.97	1.25
North Shore	4.11	1.36	5.48	0.85	5.35	1.03	3.24	1.17	5.10	1.02	5.10	1.20
Northcote	4.01	1.13	5.21	0.98	5.10	1.13	3.74	1.06	4.98	1.08	4.98	1.43
Northland	4.01	1.12	5.24	0.96	5.07	1.00	3.40	0.96	4.71	1.01	5.19	1.31
Ohariu	4.13	1.11	5.32	0.91	5.05	1.09	3.25	1.01	5.01	1.06	5.12	1.25
Otaki	3.66	1.23	5.15	1.10	5.19	1.03	3.51	1.05	4.73	1.13	4.82	1.29
Pakuranga	4.10	1.13	5.38	0.98	5.18	1.04	3.44	1.13	4.76	1.03	4.80	1.33
Palmerston North	4.04	1.07	5.38	0.84	5.19	0.88	3.49	1.11	4.66	1.19	5.32	1.22
Papakura	3.95	1.14	5.26	0.89	5.27	1.08	3.44	1.09	4.59	1.13	4.55	1.50
Port Hills	4.17	1.25	5.36	1.01	4.92	1.13	3.34	1.12	5.11	1.14	5.40	1.12
Rangitata	4.07	1.07	5.33	0.89	5.14	1.07	3.49	1.07	4.47	1.10	4.99	1.43
Rangitikei	4.08	1.22	5.18	1.01	5.12	1.07	3.24	1.04	4.61	1.07	5.19	1.28
Rimutaka	4.05	1.17	5.27	0.88	4.97	1.13	3.44	1.08	4.89	1.19	5.26	1.31

	Extraversion		Agreeableness		Conscientiousness		Neuroticism		Openness		Honesty-Humility	
GED	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*	*M*	*SD*
Rodney	3.98	1.10	5.22	1.01	5.36	1.06	3.43	1.05	4.76	1.15	5.11	1.23
Rongotai	3.97	1.21	5.32	0.81	5.01	1.09	3.59	1.19	5.26	1.08	4.94	1.47
Rotorua	3.97	1.27	5.24	1.00	5.27	0.98	3.34	1.04	4.74	1.07	5.32	1.29
Selwyn	3.94	1.15	5.23	1.02	5.09	1.16	3.39	1.03	4.55	1.07	5.23	1.26
Tamaki	4.24	1.15	5.06	0.86	5.19	0.93	3.06	0.97	4.98	1.16	4.90	1.32
Taranaki-King Country	4.02	1.14	5.25	1.01	5.30	0.97	3.32	1.08	4.71	1.07	4.90	1.24
Taupo	3.90	1.11	5.03	1.22	5.11	1.04	3.37	1.08	4.52	1.11	5.20	1.25
Tauranga	4.01	1.16	5.34	0.95	5.10	1.18	3.44	1.01	4.75	1.09	5.09	1.24
Te Atatu	3.95	1.27	5.11	1.01	5.02	1.19	3.84	1.23	4.71	1.11	4.78	1.38
Tukituki	4.15	1.15	5.20	0.84	5.22	1.01	3.27	1.02	4.58	1.14	4.87	1.40
Waikato	3.94	1.15	5.12	1.00	5.07	0.98	3.46	1.13	4.49	1.10	5.06	1.30
Waimakariri	3.80	1.10	5.32	1.07	5.04	1.20	3.62	1.05	4.68	1.03	4.91	1.51
Wairarapa	4.15	1.03	5.16	0.98	4.97	1.06	3.41	1.19	4.63	1.10	5.13	1.31
Waitakere	4.01	0.98	5.26	0.94	5.14	1.25	3.69	1.07	4.78	1.11	4.60	1.45
Waitaki	3.86	1.13	5.31	1.00	4.95	1.12	3.36	1.00	4.85	1.09	5.38	1.39
Wellington Central	4.12	1.07	5.13	1.00	4.96	1.05	3.52	1.06	5.33	1.06	4.87	1.36
West Coast-Tasman	3.70	1.03	5.30	1.00	5.09	1.15	3.23	1.17	4.67	1.09	5.27	1.12
Whanganui	3.94	1.21	5.07	0.89	5.11	1.00	3.54	1.12	4.57	1.24	4.96	1.30
Whangarei	4.14	1.08	5.20	1.04	5.19	1.03	3.21	1.09	4.67	1.18	5.27	1.23
Wigram	4.16	1.32	5.38	1.07	5.23	1.15	3.44	1.25	4.84	1.15	4.87	1.39
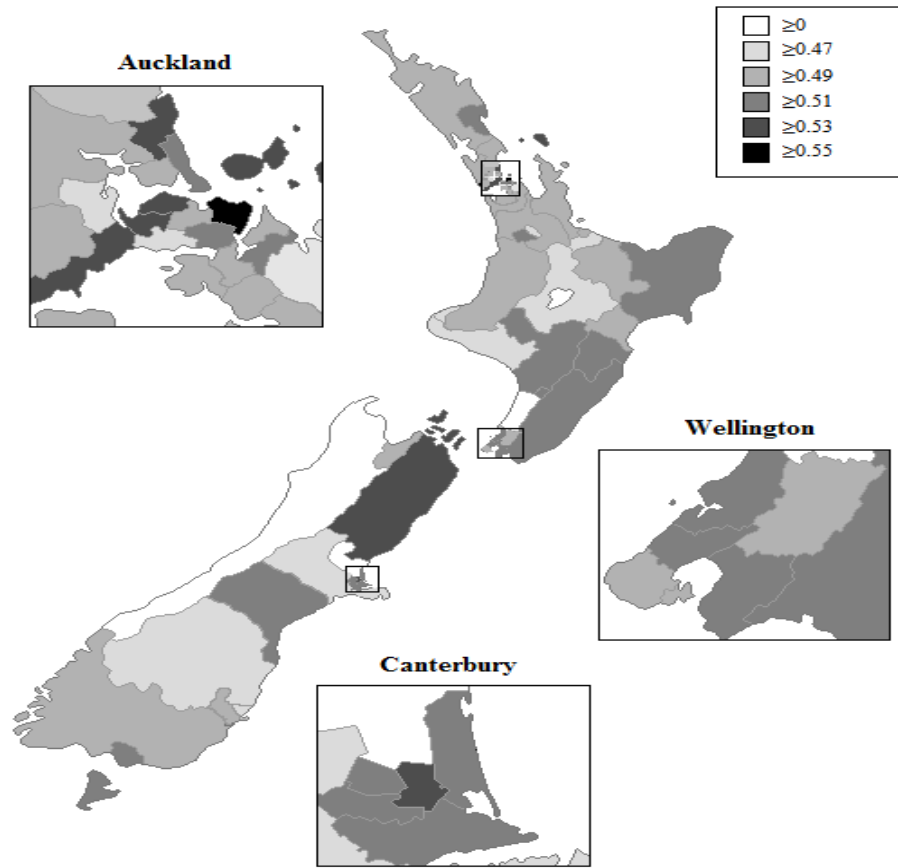
Figure 2. Mean levels of Extraversion over New Zealand's 63 General Electorate Districts
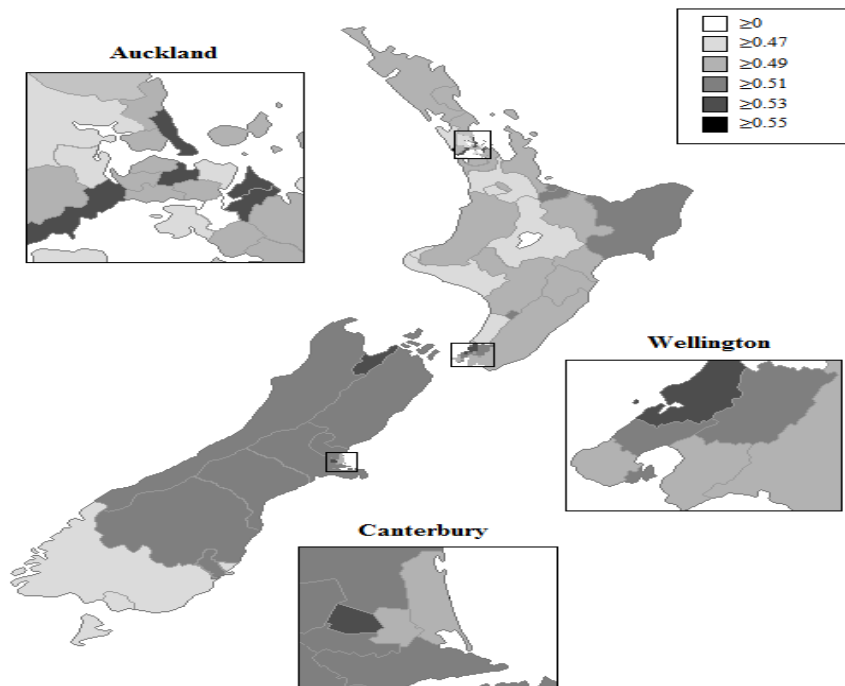
Figure 3. Mean levels of Agreeableness over New Zealand's 63 General Electoric

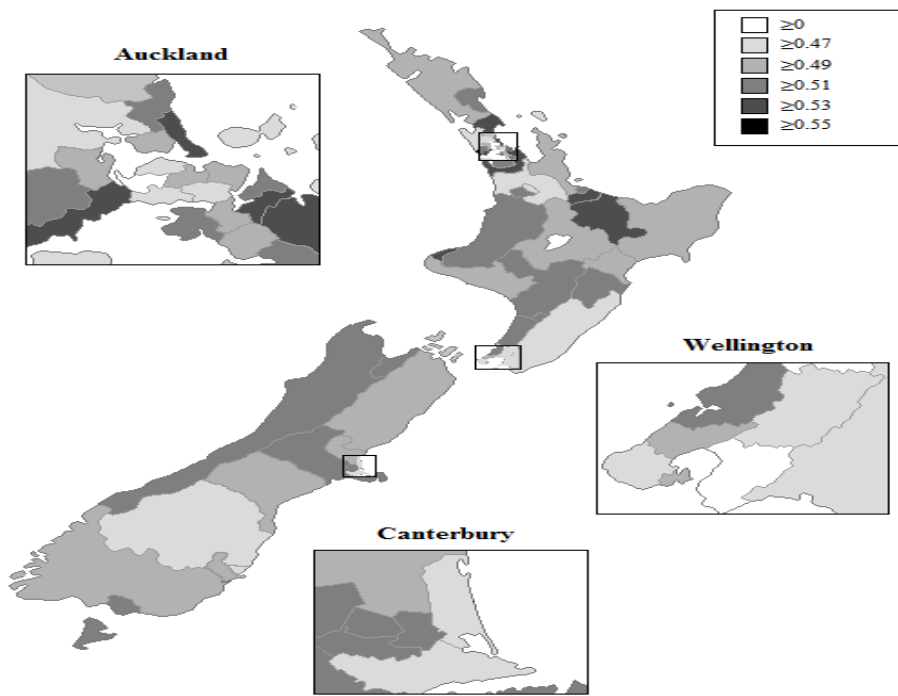*Figure 4*. Mean levels of Conscientiousness over New Zealand's 63 General Electorate Districts.
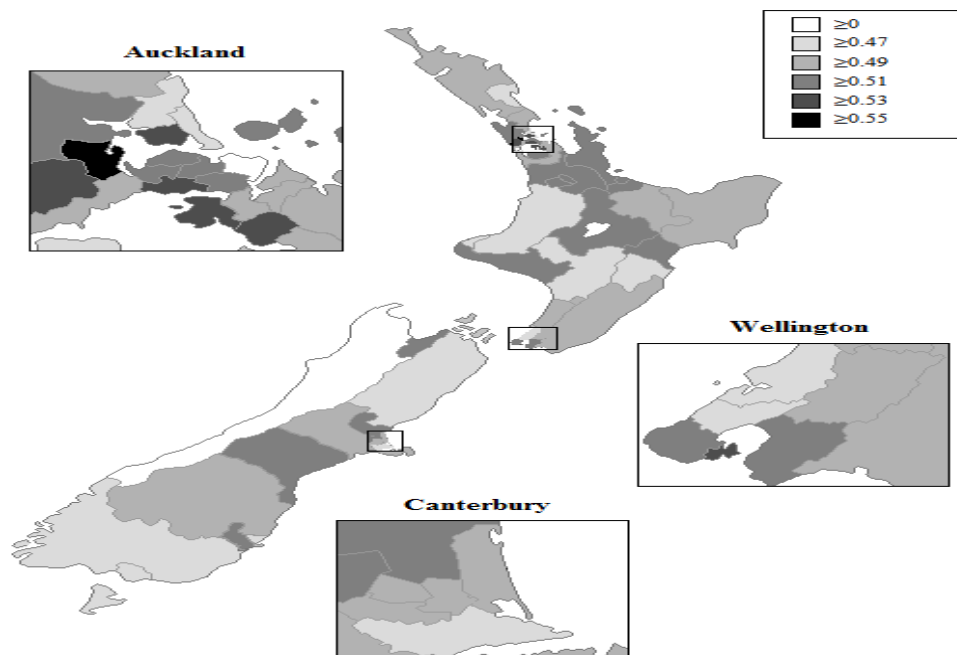

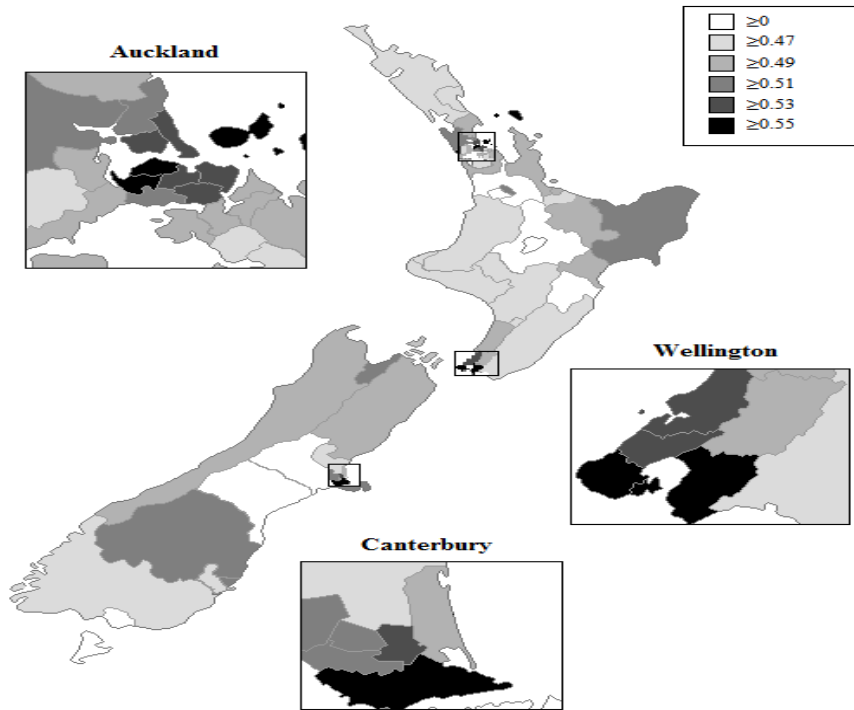*Figure 5*. Mean levels of Neuroticism over New Zealand's 63 General Electorate Districts.

Figure 6. Mean levels of Openness to Experience over New Zealand's 63 General Electorate Districts.
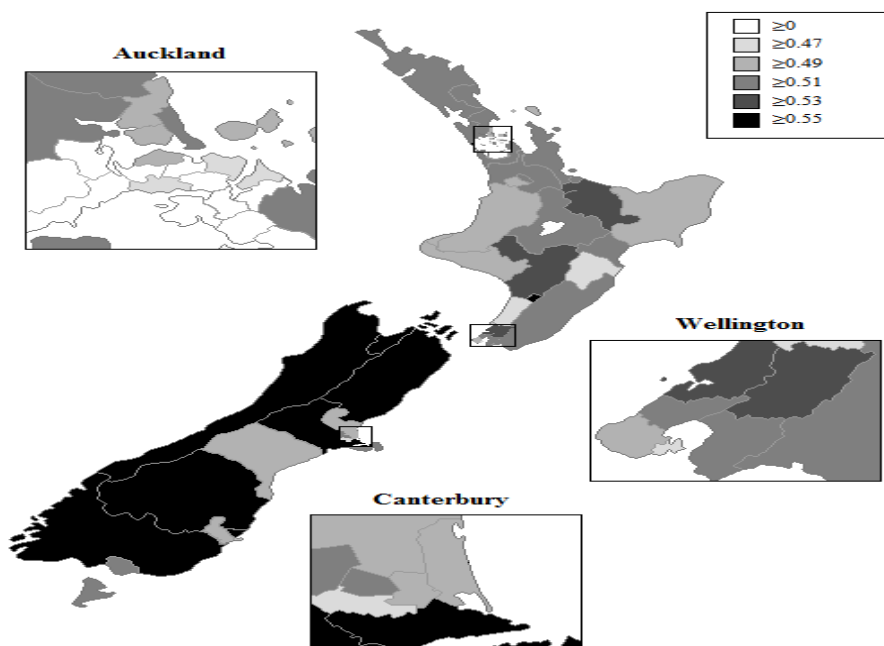

Figure 7. Mean levels of Honesty-Humility over New Zealand's 63 General Electorate Districts.

for each region. This map clearly shows that the regions containing New Zealand's three largest city centres (i.e., Auckland, Wellington, and Christchurch) tended to have the highest mean levels of Openness. Likewise, Figure 7 shows the mean levels of Honesty-Humility over these 63 regions. As can be seen, regions in the South Island and Palmerston North had the highest mean levels of Honesty-Humility, whereas the Auckland region tended to have the lowest level of this trait relative to the rest of the country.

Additional analysis of urban versus rural differences

The small but significant differences between regions in Honesty-Humility and Openness to Experience raise the possibility of a more general difference between those living in urban versus rural regions of New Zealand. To explore this possibility we conducted additional analyses assessing mean differences in Big-Six personality between urban versus rural regions of New Zealand. We determined whether each participant lived in an urban versus rural region by identifying the territorial authority within which each participant resided. Territorial authorities are defined as either districts (rural) or city (urban) units by the Local Government Act 2002 (Statistics New Zealand, 2014), and we used this information to thus assign an urban versus rural code to each participant.

There were no significant differences in Extraversion ($F(1,6347) = 6.55$, $p = .01$, $\eta2 = .001$), Agreeableness ($F(1,6347) = 2.87$, $p = .09$, $\eta2 > .001$), Conscientiousness ($F(1,6347) = 1.61$, $p = .21$, $\eta2 > .001$), and Neuroticism ($F(1,6347) = 4.03$, $p = .05$, $\eta2 = .001$) across urban versus rural regions of New Zealand. However, there were very small but significant effects indicating that those living in urban areas tended to be slightly higher in Openness to Experience relative to those living in rural regions ($F(1,6347) = 50.73$, $p < .001$, $\eta2 = .008$). In contrast, those living in rural regions tended to be slightly but significantly higher in Honesty-Humility relative to those living in urban regions ($F(1,6347) = 9.54$, $p = .002$, $\eta2 = .002$). Again, while significant, these differences were exceedingly small, and only explained 0.08% and 0.02% of the

variation in Openness to Experience and Honesty-Humility, respectively. This suggests that the difference we detected across electoral regions may reflect a more general difference across urban versus rural regions in particular.

Discussion

The quote that opened this paper highlights a common human tendency to place people into groups on the basis of perceived shared characteristics. Anecdotal evidence also suggests that we often attribute different personality traits to people based on where they reside. Accordingly, previous research has shown that personality does differ substantively between both nations (Hofstede & McCrae, 2004; McCrae, 2001; McCrae et al., 2005; McCrae & Terracciano, 2007; Schmitt, Allik, McCrae, & Benet-Martinez, 2007) and states within the US (e.g., see Rentfrow, 2010). The extent to which personality varies across relatively smaller regional units, however, has never been assessed—certainly not in New Zealand.

The present study aimed to address this oversight by testing potential personality differences across regions of New Zealand. This is important because we need valid and reliable data assessing such differences if we want to demonstrate, as we have done, that any apparent regional variation is trivial and for the most part, non-significant. Our findings indicate that the stereotypes of regional differences across New Zealand, at least insofar as they refer to mean differences in personality, are for the most part unfounded, or at the least that the differences are far smaller than what might be thought. We found that regions do not significantly differ in their mean levels of Extraversion, Agreeableness, Conscientiousness or Neuroticism. There were, however, very small but significant regional differences in Openness to Experience and Honesty-Humility. Specifically, geographical clusters in the South Island had higher mean levels of Honesty-Humility, whereas the regions concentrated around New Zealand's largest cities had higher mean levels of Openness to Experience relative to the rest of the country. Nevertheless, these differences in personality were trivial and suggest that New Zealanders across

the country tend to have more similarities than differences in their core personality traits.

Although there are several theories for why regions may have these small differences in mean levels of personality, research identifying the causal direction of these relationships is lacking (Rentfrow, Gosling, & Potter, 2008). It may be that people tend to be attracted to certain regions because they have a unifying trait – the old adage that 'birds of a feather flock together'. For example, those high on Openness to Experience may migrate to cities because they want to experience new opportunities and activities that are associated with large and diverse populations. On the other hand, residents of rural areas (such as those in the South Island) may become higher in Honesty-Humility due to environmental demands. Indeed, it is possible that sparse populations and hard-to-access resources facilitate cooperation, one of the primary adaptive benefits of Honesty-Humility (see Ashton & Lee, 2007). In the future, such questions might be addressed by the New Zealand Attitudes and Values Study as more time points in the longitudinal design are completed.

Although the longitudinal design of the NZAVS will eventually allow us to address questions about the direction of causation, the effects that we found were relatively small and speak to the lack of empirical support for regional stereotypes within New Zealand. We mentioned in the introduction that there are common beliefs about what a South Islander is like relative to a North Islander, or how a person from rural New Zealand compares to a city dweller. Contrary to these beliefs, we have shown that regional differences in personality only exist for Honesty-Humility and Openness to Experience. Moreover, these differences are very small in magnitude. As such, one would be hard-pressed to build a distinct personality profile of a region given such small differences in only two of the six broad personality dimensions.

It should be emphasised that we did not examine what people's perceptions are about those from different/other regions of New Zealand. That is, our interest was not in examining the nature or content of regional stereotypes in

New Zealand (e.g., see Terracciano et al., 2005). Rather, our results indicate that any such stereotypes are most likely unfounded, given that variation in personality across regions in New Zealand was relatively trivial, and for the large part, unsystematic. Put another way, our data indicate that there is far more variation between people within regions, regardless of the region they live in, than there is variation systematically across different regions. This raises the interesting possibility that while separating a nation like America into distinct regions (and/ or states) may help inform health and psychological research (e.g., McCrae & Terracciano, 2007), doing so in New Zealand appears to be less fruitful.

This is not to say that there may not be other reliable regional differences between people who live in different regions of New Zealand. Some very obvious ones are regional differences in the proportion of people working in different occupations (urban versus rural differences, for example). There are also well-documented regional differences in poverty (see Salmond & Crampton, 2012). Furthermore, the Human Potential Centre (2013) has also reported regional differences in factors such as belongingness. And of course, possibly the most widely discussed regional differences (at least in election years) are regional differences in support for different political parties. Greaves et al. (2014), for example, found that the proportion of Fence Sitting voters varies across electorates in New Zealand.

Critically, however, our results indicate that these other regional differences do not translate to core personality differences across people. In this regard, it seems that New Zealand may differ from the United States. Research into how personality varies across regions in the United States (e.g., Rentfrow, 2010; Rentfrow, Gosling, & Potter, 2008) attributes the differences across regions to migration patterns over varied ecologies, climate and the variability in genetics and culture. New Zealand, however, is a much smaller and relatively young nation. In fact, personality in New Zealand has shown remarkable consistency across time. Milojev, Osborne, and Sibley (2014) found that personality was stable in

New Zealand and the Canterbury region despite the traumatic Canterbury earthquakes of 2010/11. As such, regional distinctions appear to be less informative of a person's personality in relatively small nations like New Zealand.

Finally, it is worth discussing a possible caveat of our research. We cannot know if there may be systematic personality differences between those who completed the NZAVS questionnaire and those who did not. For instance, it is possible that those who opted to participate in our study may have been more conscientious that those who chose not to. Unfortunately, there is no census data on personality to compare our sample to. In fact, as far as we are aware, ours is the largest national probability sample of personality and values to be conducted in New Zealand in recent times. However, in prior analyses of the Time 1 NZAVS data, Sibley and Pirie (2013) examined the distributions of Big-Six personality scores, and showed that they were all reasonably normally distributed. Importantly, the distribution of Conscientiousness did not differ notably from the distribution of the other five core dimensions of personality, so it is unlikely that any such personality bias affected only Conscientiousness in particular. Regardless, we can reasonably assume that any systematic personality difference between respondents and non-respondents should be consistent across regions. Thus, to continue with our example, if people who are high on Conscientiousness are more likely to respond, then this should have been just as true of Aucklanders as people living in Kaikoura or Naenae. Thus, the relative comparison across regions should still be valid, as while it is possible that the overall level may be biased (although we think such bias unlikely), the estimate of relative differences across regions should be unaffected.

Conclusion

It seems to us that people like to talk about regional stereotypes, as the discussion of 'what people in different regions are like' pops up fairly regularly in the media, and other social discourse. The current study speaks directly to anecdotes about regional variation in

personality in New Zealand. We show that, for the most part, similarities in personality far outweigh any supposed regional differences. Although the public may hold beliefs and stereotypes about what people from different regions of New Zealand are like, there are trivial, and in most cases, no reliable differences in the Big-Six across the country. These findings refute some long-held stereotypes about our fellow New Zealanders. When it comes to personality, people in the south are just as likely to be extraverted or introverted, agreeable or disagreeable, as are people in the north. And, to reiterate once again, the differences in Openness and Honesty-Humility that we did detect, while reliable, are extremely small to the point that they should have no noticeable impact on social interaction.

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Socio-structural and psychological foundations of climate change beliefs

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Using a national probability sample of over 6,000 New Zealanders, this study examines socio-structural and psychological variables underpinning core climate change beliefs—"climate change is real" and "climate change is caused by humans". Analyses focused on four belief profiles: those who believe in the reality of climate change and its human cause (53%), those undecided (30%), the complete skeptics (10%) and those who believe the climate is changing but is not caused by human activity (7%). Results support and extend a "conservative white male" effect in doubts concerning the science of human-caused climate change. Uniformly high beliefs in climate change reality and human cause was observed among respondents who were younger, female, educated, politically liberal, belonged to minority groups and who perceived that they were able to influence environmental outcomes. Belief in climate change was also stronger for those who endorse altruistic and openness values and who were high in personality trait levels of Agreeableness and Openness to Experience. Theoretical and practical implications of the findings are discussed.

Keywords: climate change; beliefs; demographics; values; personality; latent profile analysis

Introduction

More than 100 Nobel laureates have singled out global warming as a danger to world peace in the coming years due to its consequences to the world's dispossessed (Nobel Laureates, 2001).The U.N. Secretary General has stated that climate change is the central challenge of our time (Ki-moon, 2009), and a report by the American Psychological Association stated that climate change is a pressing issue facing our planet and its inhabitants (Swim et al., 2009). Such worrying views about climate change are not limited to political figures or scientists. In the early 90s representative samples from six nations have rated "global warming or the greenhouse effect" as a very serious problem (Dunlap, 1998). More recent public opinion surveys have shown similar results (e.g., Eurobarometer, 2009; The World Bank, 2009). Despite these social markers and the weight of scientific evidence on the current existence and future worsening of climate change as well as its causes and consequences (IPCC, 2014), there is still some denial that the climate is changing and disbelief in human causation (Stoll-Kleemann, O'Riordan, & Jaeger, 2001; Whitmarsh, 2011).

The gap between scientific evidence and public awareness of existing risks is a multifaceted issue and research has identified a number of psychological barriers to perceiving, understanding and acting upon global environmental change (e.g., Milfont, 2010; Pawlik, 1991; Swim et al., 2011). However, such studies have generally not disentangled belief of climate change's existence from belief about its cause. Some people are convinced anthropogenic climate change is occurring and others are not, while others believe climate is changing but do not support the view that humans are driving these changes. Perhaps more importantly, such studies have not examined the core variables underpinning the belief in the reality of climate change and anthropogenic climate change. The level of distinct support to these critical climate change beliefs may influence not only the mitigation actions of a particular individual (Heath & Gifford, 2006), but also his or her views and support for the actions governments and other individuals take regarding climate change (Sibley & Kurz, 2013).

Using a national probability cross-sectional sample of over 6,000 respondents in New Zealand, we examine the foundations of two core climate change beliefs: the reality of climate change ("climate change is real") and anthropogenic climate change ("climate change is caused by humans"). Past studies have used segmentation strategies to identify coherent groups within a population to target and tailor climate change information (e.g., Barnes & Toma, 2012; Maibach, Leiserowitz, Roser-Renouf, & Mertz, 2011). However, to our knowledge no study has examined the extent to which particular demographic and psychological variables can explain these distinct climate change segments. Extending a recent study that used Latent Profile Analysis to segment New Zealand respondents according to their climate change beliefs (Sibley & Kurz, 2013), we assess whether the observed climate change belief profiles can be distinguished in terms of important socio-structural variables (age, gender, ethnicity, employment status, parental status, religiosity, neighbourhood deprivation level, political orientation, level of education, and perceived environmental self-efficacy) and two core psychological constructs (values and personality traits). By providing a demographic and cognitive-motivational analysis of climate change beliefs, this

study helps in the identification of substantive ideological differences between climate change believers and deniers. This investigation starts with a brief review of studies examining the correlates of these socio-structural and psychological variables with respect to environmentally friendly behaviours. Climate change is certainly not limited to environmental issues (United Nations, 2011), but we focus on environmental concern and pro-environmental engagement because this is the subject that has received more emphasis.

Socio-Structural Foundations of Climate Change Beliefs

Sociological and social psychological studies have traditionally examined the demographic variables underpinning pro-environmental engagement (e.g., Buttel, 1987; McFarlane & Hunt, 2006; Van Liere & Dunlap, 1980). Although the associations between socio-structural variables and pro-environmental engagement tend to be weak in terms of effect size (Fransson & Gärling, 1999) and oftentimes yield mixed results (e.g., Hines, Hungerford, & Tomera, 1987), some consistent overall patterns can be identified.

Age. Younger individuals are more likely to hold environmentally friendly positions than older individuals (Fransson & Gärling, 1999; Hines et al., 1987; Van Liere & Dunlap, 1980). However, age has also been found to be positively related to pro-environmental attitudes and behaviour (Korfiatis, Hovardas, & Pantis, 2004; Mayer & Frantz, 2004, Study 4), and with concern for nature across cultures (Schwartz, 2005).

Gender. Research examining the influence of gender has also found some mixed results (e.g., Arcury, Scollay, & Johnson, 1987; McFarlane & Hunt, 2006), but overall females tend to be more environmentally concerned than males (e.g., Korfiatis et al., 2004; Zelezny, Chua, & Aldrich, 2000). That females have stronger pro-environmental engagement may be a result of gender differences in values or personality traits (Borden & Francis, 1978; Dietz, Kalof, & Stern, 2002).

Parental status. Having children may contribute to overpopulation and resulting environmental consequences, which has led some individuals to decide not to reproduce (Arnocky, Dupuis, & Stroink, 2012). At the same time, parents may have a stronger motivation to care about the future of the planet for their offspring, with research showing that parents tend to be more environmentally concerned than non-parents (Dupont, 2004; Hamilton, 1985). That parents tend to have stronger pro-environmental engagement may result from an increase in generativity concerns (Milfont & Sibley, 2011), and research has shown the implication of parental status in relation to climate change (Milfont, Harré, Sibley, & Duckitt, 2012).

Religiosity. White (1967) argued that Christian religious traditions emphasize anthropocentric views of the environment, and a belief in human dominance over nature. Empirical studies have supported this claim with individuals from a Judeo-Christian tradition, and those expressing higher levels of religiosity, religious fundamentalism and literal beliefs in the Bible, having lower levels of pro-environmental engagement than their counterparts (Bulbulia, Troughton, Greaves, Miflont, & Sibley, in press; Gardner & Stern, 2002; Schultz, Zelezny, & Dalrymple, 2000). Higher levels of religiosity, measure by church attendance, has also been shown to be related to climate change denial (McCright & Dunlap, 2011a).

Social-economic status. Research has indicated a positive association between greater personal income and higher levels of pro-environmental engagement (Theodori & Luloff, 2002; Van Liere & Dunlap, 1980). However, negative associations between income and ecological behaviour have also been found (Korfiatis et al., 2004).

Political orientation. A number of studies have related political orientation to pro-environmental engagement. Research findings indicate that pro-environmental engagement is greater among those who endorse liberal political ideology (e.g., Buttel & Flinn, 1978; Fransson & Gärling, 1999; Kilbourne, Beckmann, & Thelen, 2002; Malka, Krosnick, & Langer, 2009; McCright & Dunlap, 2011b; Milfont, 2012a).

Education level. Schwartz (2005) has suggested that although education may broaden one's intellectual horizons, it does not necessarily increase concern for nature. Research seems to show, however, that more educated individuals are more environmentally concerned and attribute greater importance to biocentric orientations than less educated individuals do (Fransson & Gärling, 1999; Hines et al., 1987; Olofsson & Öhman, 2006).

Self-efficacy. Perceived personal efficacy is an important predictor of pro-environmental engagement (Bamberg & Möser, 2007). Research has also shown that perceived ability (or inability) to influence climate change outcomes impact concern and motivation to act in relation to this issue (Aitken, Chapman, & McClure, 2011; Milfont, 2012a).

To summarize, even though some mixed results have been reported, young and female individuals, the more highly educated, those with children, those with low levels of religiosity, those with higher incomes, people with liberal political ideologies, and those with perceived personal efficacy are more likely to express higher levels of pro-environmental engagement. Similar findings have also been reported in relation to the social-structural bases of climate change concern, with self-identified liberals, non-whites and females being more likely to express climate change concern compared to their politically conservative, white and male counterparts (e.g., Kellstedt, Zahran, & Vedlitz, 2008; Malka et al., 2009; Whitmarsh, 2011). These findings have led to the idea and empirical test of a "conservative white male" effect (McCright & Dunlap, 2011a) in which conservative white males in the USA are disproportionately more likely than are other adults to espouse climate change denial.

However, the socio-structural foundations of particular climate change beliefs might differ. For example, research with a community sample in Canada has shown that age was negatively associated to anthropogenic climate change but not to the belief that climate change is occurring, while income was positively associated with climate change reality but not anthropogenic climate change (Heath & Gifford, 2006). Therefore, here we

examine the social-structural bases of these distinct climate change beliefs. Besides providing an examination of the social-structural bases of these two core climate change beliefs, we also examine particular psychological variables that might underlie these beliefs.

Psychological Foundations of Climate Change Beliefs

A number of psychological theories and constructs have been used to understand pro-environmental engagement (see Bonnes, Lee, & Bonaiuto, 2003; Clayton, 2012). In the present article we focus on two important social psychological variables: values and personality. Since values and personality are a core part of what motivates our beliefs and attitudes, it seems reasonable to expect that basic differences in these constructs should influence climate change beliefs. To illustrate, the role of values in understanding and predicting pro-environmental engagement has been emphasised by both researchers (Schultz & Zelezny, 1999) and environmental NGOs (Crompton, 2008). Personality differences underpinning pro-environmental engagement have also been explored (Borden & Francis, 1978), with a recurrence of studies in the last few years (Hirsh & Dolderman, 2007; Milfont & Sibley, 2012). Below we describe the theoretical models on values and personality used in the present research.

Human Values

Other value models have been considered in the context of pro-environmental engagement (Dunlap, Grieneeks, & Rokeach, 1983), but we focus on the work by Shalom H. Schwartz who has proposed two social psychology theories used in this context. His norm-activation theory (Schwartz, 1977) explains altruistically motivated helping behaviour and has been extensively applied to explain and foster pro-environmental engagement (Heberlein, 1977; Milfont, Sibley, & Duckitt, 2010; Schultz et al., 2005; Van Liere & Dunlap, 1978), even leading to the development of a specific theoretical framework to explain environmentalism (Stern, Dietz, Abel, Guagnano, & Kalof, 1999). Another extension of the norm-

activation theory that has been widely used to explain pro-environmental engagement—Schwartz's (1992, 1994) theory of human values.

Schwartz (1992) identified 10 motivationally distinct types of values that individuals in virtually all cultures recognise: achievement, hedonism, stimulation, self-direction, universalism, benevolence, tradition, conformity, and security. These motivational types are, in turn, grouped into four higher order value clusters: Openness to Change (values favouring change and independent thought and behaviour), Conservation (preservation of traditional practices and stability), Self-Transcendence (concern for the welfare of others), and Self-Enhancement (pursuit of one's own relative success and dominance over others).

The value model proposed by Schwartz (1992) has been widely used to predict pro-environmental engagement (e.g., Coelho, Gouveia, & Milfont, 2006; Karp, 1996; Milfont & Gouveia, 2006; Schultz, 2001; Schultz et al., 2005; Schultz & Zelezny, 1999; Stern & Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995). Research has shown that Openness to Change and Conservation values are not consistently related to pro-environmental orientations. Notably, research has shown that Self-Transcendence values correlate positively with pro-environmental engagement, while Self-Enhancement values correlate negatively. Recent reviews of the literature have confirmed these general findings. The motivational underpinnings of pro-environmental attitudes are strongly linked to self-transcendence values (Boer & Fischer, 2013; Diniz, Fischer, Milfont, & McClure, 2012).

Personality

The Big-Five model of personality is one the most used personality models and has been employed to predict a wide range of outcomes (Goldberg, 1990; McCrae & Allik, 2002; McCrae & John, 1992). In brief, the Big-Five model proposes a structure of personality traits formed by the five broad trait dimensions of Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience. Extraversion includes traits such as being outgoing,

energetic and assertive, and reflects an orientation to maximise gains from social relations. Agreeableness includes traits such as being compliant, pleasant and cooperative, and to care strongly about the well-being of family and friends, reflecting a greater investment in reciprocal social arrangements. Conscientiousness includes traits of carefulness, responsibility and organisation, and reflects greater investment in long-term planning. Neuroticism includes traits such as depression, anxiety, anger and insecurity, and reflects investment in close relationships as well as greater monitoring of inclusionary status and signals of rejection from others. Finally, Openness to Experience is characterised by intelligence, imagination and engagement in ideas-related endeavours, and reflects tolerance for all people and investment in seeking novel solutions and gains.

A number of recent studies have examined the associations between the Big-Five personality traits and environmentally-related outcomes. Hirsh and Dolderman (2007) found that greater environmentalism was associated with higher levels of Agreeableness and Openness among Canadian undergraduate students. In two other studies conducted in Canada, Nisbet, Zelenski and Murphy (2009) found that greater perceived relatedness with nature was greater for those participants with higher levels of Agreeableness and Openness. In another study Hirsh (2010) found that greater environmental concern was significantly associated with higher levels of Agreeableness, Openness, Neuroticism and Conscientiousness in a community sample from Germany, but that the associations were much stronger for Agreeableness and Openness. The positive association between pro-environmental engagement and Openness was also observed in undergraduate and community samples in the USA (Markowitz, Goldberg, Ashton, & Lee, 2012). Extending these studies, Milfont and Sibley (2012) examined the associations between the Big-Five personality traits and pro-environmental engagement at the individual level of analyses (using national New Zealand samples)

as well as at the societal level of analyses. They found that across both individuals and nations, Agreeableness, Conscientiousness and Openness were the traits most strongly associated to pro-environmental engagement.

The HEXACO model of personality structure (Ashton & Lee, 2007) has extended the Big-Five model by adding a sixth broad dimension representing Honesty-Humility. The honesty aspect of this dimension includes traits such as sincerity and fairness, while the humility aspect includes traits such as modesty and greed-avoidance. The Honesty-Humility dimension reflects a fairness-based reciprocal altruism with investment in mutual help, non-aggression and non-exploitation of others. We also consider this sixth personality dimension in the present study.

The Present Study

The review presented above shows that pro-environmental engagement is underpinned by particular socio-structural variables as well as values and personality traits. Although not many studies have explored the associations between these variables and climate change beliefs, it is expected that the pattern of associations would be overall similar to those for pro-environmental engagement. At the same time, and in line with previous findings (Heath & Gifford, 2006), it is likely that individuals might differ in particular climate change beliefs and that the socio-structural and psychological foundations underpinning these distinct beliefs might also differ.

Using the same dataset considered in the present research, Sibley and Kurz (2013) performed Latent Profile Analysis to segment respondents in terms of their beliefs of climate change reality and anthropogenic climate change. They identified four distinct profiles of climate believers and skeptics in the New Zealand population. More than half of New Zealanders (53%) hold uniformly high beliefs that climate change is both real and caused by humans (labelled Climate Believers), while 30% had neutral or undecided views regarding both these climate change beliefs (Undecided/Neutral). This means that a large majority of the

New Zealand public hold neutral-to-high levels of beliefs in the reality of climate change and its anthropogenic cause. Among the smaller proportion of climate skeptics two distinct profiles emerged: those who believe climate change is occurring but not caused by human activity (7%; Anthropogenic Climate Skeptics), and those who are skeptical about both reality and human cause (10%; Climate Skeptics).

Here we extend the Sibley and Kurz (2013) work by examining whether distinct demographic, personal values and personality traits underpin the observed climate change belief profiles. National public opinion surveys have shown that a large proportion of the general New Zealand public agree about the reality of climate change and its human cause (New Zealand Institute of Economic Research, 2008; Stuart, 2009). However, the data reported in this study are the most comprehensive on climate change beliefs of New Zealanders.

Method

Sampling Procedure

Data used in the present study come from the first wave of the New Zealand Attitudes and Values Study (NZAVS) conducted in 2009. The NZAVS-09 questionnaire was posted to 40,500 New Zealanders randomly selected from the 2009 New Zealand electoral roll. Roughly 1.36% of all people registered to vote were contacted and invited to participate. The NZAVS-09 contained responses from 6,518 participants and the overall response rate (adjusting for the address accuracy of the electoral roll and including anonymous responses) was 16.6%. The overall NZAVS project was approved by the University of Auckland Human Ethics Committee.

Participant Details

Our analyses were limited to a total of 6,489 participants (3858 women and 2631 men) who responded to all the relevant measures. The mean age in the sample was 47.97 (SD = 15.76) and about 44% (n = 2814) of the sample identified as religious. Most participants were in some kind of paid employment (72.8%, n = 4724) and

74.9% (n = 4861) had at least one child. In terms of ethnicity 81.9% (n = 5316) identified as New Zealand European. In terms of education 23% (n = 1546) said they had no education or did not report their highest level of education, 29% (n = 1885) reported at least some high school, 15.7% (n = 1022) reported having studied towards a diploma or a certificate, 22.4% (n = 1454) reported having studied at an undergraduate level, and 9% (n = 582) reported having pursued post-graduate study.

Because participants' postal address was included in their contact details, we were able to use this information to identify the level of economic deprivation in the immediate area in which each participant resided based on the New Zealand deprivation index, which reflects the average level of deprivation of different area units across the country (Salmond, Crampton, & Atkinson, 2007). We used the percentile deprivation index, which gives an ordinal score from 1 (most affluent) to 10 (most deprived) for each area unit based on 2006 census data. The mean score on this measure of deprivation in our sample was 5.06 (SD = 2.85).

Questionnaire Measures

Climate Change Beliefs. Two questions were used to assess climate change beliefs. One question focused on the reality of climate change ("Climate change is real") and the second on anthropogenic climate change ("Climate change is caused by humans"). These single items were embedded in a large battery of Likert-type questions and were rated on a scale from 1 (strongly disagree) to 7 (strongly agree).

Socio-structural questions. Relevant demographic measures were assessed within the questionnaire and were included in the analyses as possible socio-structural determinants of the climate change beliefs. These were age, gender (dummy coded as 0 = female, 1 = male), ethnicity (0 = minority group member, 1 = NZ European majority), employment status (0 = unemployed, 1 = employed), parental status (0 = no children, 1 = parent), religious status (0 = not religious, 1 = religious), level of education (the highest level of education reported, recoded to range from -2 to 2), political orientation (1 = very liberal to 7

= very conservative), and neighbourhood deprivation (see Salmond et al., 2007). The NZAVS also measured perceived environmental efficacy using two items (Sharma, 2008): "By taking personal action I believe I can make a positive difference to environmental problems", and "I feel I can make a difference to the state of the environment." These items were rated on a scale from 1 (strongly disagree) to 7 (strongly agree). The two items intercorrelated strongly (r = .70) and were averaged to create a mean scale score.

Values. Schwartz's (1992) value dimensions of Openness to Change, Conservation, Self-Transcendence and Self-Enhancement were assessed using the shortened measure developed by Stern, Diez, and Guagnano (1998). Items were administered with the instructions: "Please circle the number that best represents how important each of the following values is for you as a guiding principle in your life. Use the scale below to rate these items." Items were rated on a scale which ranged from -1 (opposed to my values) to 0 (not important) to 3 (important) to 6 (very important) to 7 (of supreme importance).

Openness to Change value items included "A varied life (filled with challenge, novelty and change)", "An Exciting Life (stimulating experiences)", and "Curiosity (interest in everything, exploring)" (α = .73). Conservation value items included "Family Security (safety for loved ones)", Self-Discipline (self-restraint, resistance to temptation)", and "Honouring of Parents and Elders (showing respect)" (α = .56). Self-Transcendence value items included "Equality (equal opportunity for all)", "A World at Peace (free of war and conflict)", and "Social Justice (correcting injustice, care for the weak)" (α = .71). Self-Enhancement values included "Authority (the right to lead or command)", "Influence (having an impact on people and events)", and "Wealth (material possessions, money)" (α = .61).

Personality dimensions. The Mini-IPIP6 was used to assess the six personality dimensions (Sibley et al., 2011): Extraversion, Agreeableness, Conscientiousness, Neuroticism,

Openness to Experience, and Honesty-Humility. The items were administered with the following instructions: "This part of the questionnaire measures your personality. Please circle the number that best represents how accurately each statement describes you." Items were rated on a scale ranging from 1 (very inaccurate) to 7 (very accurate).

Extraversion was assessed by the following four items: "Am the life of the party", "Don't talk a lot" (reverse scored), "Keep in the background" (reverse scored), and "Talk to a lot of different people at parties" (α = .71). Agreeableness was assessed by the following four items: "Sympathize with others' feelings", "Am not interested in other people's problems" (reverse scored), "Feel others' emotions", and "Am not really interested in others" (reverse scored) (α = .66). Conscientiousness was assessed by the items: "Get chores done right away", "Like order", "Make a mess of things" (reverse scored), and "Often forget to put things back in their proper place" (reverse scored) (α = .65). Neuroticism included the following four items: "Have frequent mood swings", "Am relaxed most of the time" (reverse scored), "Get upset easily", and "Seldom feel blue" (reverse scored) (α = .64). Openness to Experience was assessed by the items: "Have a vivid imagination", "Have difficulty understanding abstract ideas" (reverse scored), "Do not have a good imagination" (reverse scored), and "Am not interested in abstract ideas" (reverse scored) (α = .67). Finally, Honesty-Humility was assessed using the following four reverse-scored items: "Would like to be seen driving around in a very expensive car", "Would get a lot of pleasure from owning expensive luxury goods", "Feel entitled to more of everything", and "Deserve more things in life" (α = .78).

Results

Estimation and Profiles of Climate Change Beliefs

We conducted a Latent Profile Analysis with a three-step distal approach investigating socio-structural and psychological differences in the

profiles first identified by Sibley and Kurz (2013). Analyses were conducted in Mplus 7.11. This analysis thus extended the preliminary model proposed by Sibley and Kurz (2013) by exploring the individual difference covariates of the distinct profiles they described. The covariates (or auxiliary variables) that we examined included the socio-structural variables, the four value dimensions, and the six personality dimensions. This approach allowed us to conduct univariate tests of the differences in terms of these auxiliary variables across the latent profiles of climate change beliefs. The descriptive statistics and bivariate correlations for all relevant variables are presented in Table 1. As reported by Sibley and Kurz (2013) and reviewed above, the four profiles and their respective proportion of participants were: Climate Believers (52.9%), Undecided/Neutral (30.5%), Climate Skeptics (9.9%), and Anthropogenic Climate Skeptics (6.7%). Extending their findings, we then examined whether the four climate change belief profiles statistically differ in terms of socio-structural and psychological variables.

Socio-Structural Differences

Age. There were significant differences in mean age across the four profiles of climate change beliefs as presented in Figure 1 ($\chi2(3, 6455)$ = 157.633, p < .001). The results showed that Climate Skeptics and Anthropogenic Climate Skeptics were the oldest, with comparable mean age (M = 52.461, SE = .624; and M = 54.238, SE = .751, respectively). Both of these profiles had significantly higher mean age than the Climate Believers and Undecided/Neutral profiles (M = 46.373, SE = .265; and M = 47.914, SE = .352, respectively). These results suggest that skepticism in terms of climate change reality or its human causes is associated with older age which support findings showing that younger individuals are more likely to hold environmentally friendly positions than older individuals (Fransson & Gärling, 1999; Hines et al., 1987; Van Liere & Dunlap, 1980).
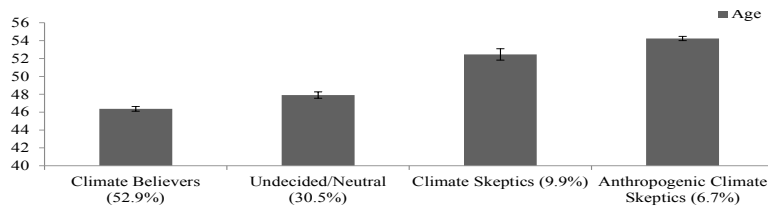
Figure 1. Mean age of people across the four climate change belief classes

to the three other profiles (37.5% unemployed). The results suggest that, in comparison to the other three climate change belief profiles, those who believe in the reality of climate change but not on its human cause are slightly more likely to be unemployed.

Parental Status. There were significant differences in the proportion of people with children and those

Gender. Significant differences in the proportions of men and women in each profile were observed ($\chi2(3, 6489) = 67.604$, $p < .001$). The weighted proportion of men and women in each profile are presented in panel a) of Figure 2. As shown, men are overrepresented only in the Climate Skeptics profile (54.2% men). Conversely, women constituted the majority of the participants of the other three profiles: Climate Believers (63.4%), Undecided/Neutral (58.4%), and Anthropogenic Climate Skeptics (53.5%). This suggests that those individuals who are skeptics in terms of climate change reality and its human causes are more likely to be male, while those classified in the other three climate change belief profiles are more likely to be women. This supports previous findings showing that females tend to be more environmentally concerned than males (e.g., Korfiatis et al., 2004; Zelezny et al., 2000)..

Ethnicity. Significant differences were also observed in the proportion of people identifying with a majority (NZ European) versus minority ethnic group across the four profiles ($\chi2(3, 6489) = 123.157$, $p < .001$). As shown in panel b) of Figure 2, majority group members were overrepresented in all of the four profiles; however, they constituted the largest proportion of the Climate Skeptics profile (91%), and the smallest proportion of the Climate Believers profile (77.4%).

As such, given the mean proportion of majority group members in the sample of 81.9%, Climate Skeptics are more likely to be members of the majority ethnic group while Climate Believers are by comparison less likely. These results are somewhat similar to previous findings showing that whites are less likely to express climate change concern compared to non-whites (Malka et al., 2009).
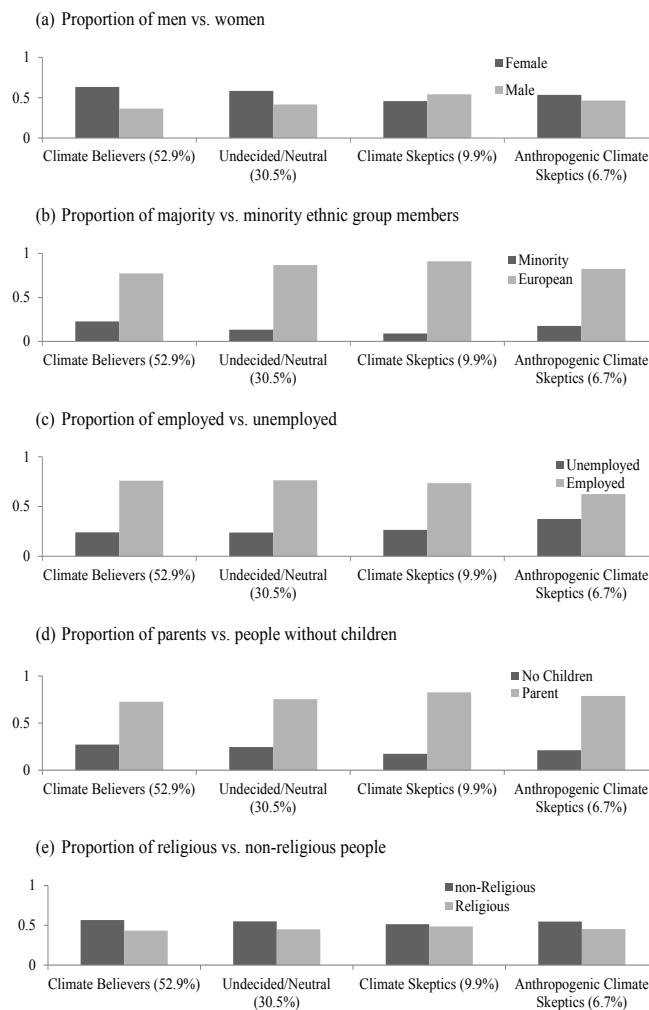
Figure 2. Weighted proportional differences in a) gender, b) ethnicity, c) employment, d) parental status, and e) religious status across the four climate change belief classes

Employment Status. In terms of employment, we observed significant differences in proportions of unemployed and employed people across the four profiles ($\chi2(3, 6310) = 22.073$, $p < .001$). As presented in panel c) of Figure 2, the majority of people in all four profiles were employed, with comparable proportions of unemployed participants across the Climate Believers (24.1%), the Undecided/Neutral (23.8%) and the Climate Skeptics (26.6%) profiles. However, the Anthropogenic Climate Skeptics profile showed slightly higher levels of unemployment compared

without across the four profiles ($\chi2(3, 6489) = 33.350$, $p < .001$). As can be seen in panel d) of Figure 2, parents were overrepresented in all four profiles. People with children constituted the majority of Climate Believers (72.7%), the Undecided/Neutral profile (75.4%), the Anthropogenic Climate Skeptics (78.8%), as well as the Climate Skeptics; however, at slightly greater proportions (82.7%). As such, Climate Skeptics are more likely to have children in comparison to the other three climate change belief profiles, which contradicts

Table 1. Descriptive statistics and bivariate correlations between the relevant variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Climate Change Reality	—																					
2. Climate Change Human Cause	.536*	—																				
3. Extraversion	.018	-.005	—																			
4. Agreeableness	.096*	.031*	.210*	—																		
5. Conscientiousness	.027*	.009	.006	.149*	—																	
6. Neuroticism	.055*	.069*	-.081*	-.025*	-.117*	—																
7. Openness to Experience	.110*	.032*	.251*	.246*	.013	-.015	—															
8. Honesty-Humility	-.022	-.044*	-.096*	.152*	.095*	-.187*	.023	—														
9. Gender (0 female, 1 male)	-.091*	-.060*	-.056*	-.295*	-.116*	-.120*	.012	-.119*	—													
10. Ethnicity (1 Maj., 0 Min.)	-.126*	-.122*	.007	.081*	-.019	-.029*	.048*	.174*	-.032*	—												
11. Employment (0 no, 1 yes)	-.012	.034*	.078*	.005	-.010	-.009	.109*	-.078*	.050*	-.001	—											
12. Parent (0 no, 1 yes)	-.059*	-.046*	-.021	.002	.083*	-.093*	-.141*	.095*	.002	.014	-.133*	—										
13. Religious (0 no, 1 yes)	-.030*	-.024	-.004	.090*	.056*	-.030*	-.068*	.048*	-.055*	-.142*	-.084*	.096*	—									
14. Age	-.081*	-.105*	-.127*	-.015	.089*	-.172*	-.188*	.253*	.088*	.092*	-.359*	.431*	.191*	—								
15. Deprivation (NZDep2006)	.099*	.073*	-.023	-.060*	-.055*	.063*	-.022	-.099*	.004	-.245*	-.100*	-.008	.040*	-.049*	—							
16. Education (from -2 to 2)	.084*	.048*	.039*	.128*	.016	-.017	.219*	.091*	-.090*	.091*	.210*	-.075*	-.016	-.145*	-.189*	—						
17. Political Conservatism	-.185*	-.147*	-.129*	-.081*	.083*	-.028*	-.218*	.025	.014	.039*	-.029*	.093*	.143*	.083*	-.068*	-.090*	—					
18. Environmental Efficacy	.239*	.194*	.111*	.160*	.084*	-.060*	.135*	.061*	-.073*	-.078*	.055*	.025*	.100*	.027*	-.008	.123*	-.141*	—				
19. Openness to change values	.092*	.059*	.262*	.114*	.035*	-.043*	.250*	-.116*	.026*	-.053*	.092*	-.062*	-.044*	-.082*	-.017	.074*	-.182*	.226*	—			
20. Conservation values	.037*	.018	.020	.164*	.219*	-.090*	-.053*	.043*	-.082*	-.126*	-.087*	.199*	.217*	.191*	.042*	-.154*	.121*	.163*	.295*	—		
21. Self-Transcendence values	.194*	.165*	.032*	.271*	.108*	-.016	.069*	.094*	-.163*	-.069*	-.078*	.070*	.103*	.135*	.057*	-.047*	-.168*	.237*	.324*	.467*	—	
22. Self-Enhancement values	.021	.031*	.180*	-.026*	.095*	.010	-.029*	-.383*	.074*	-.188*	.034*	.040*	.090*	-.010	.029*	-.090*	.044*	.101*	.424*	.373*	.208*	—
M	5.38	4.79	4.04	5.24	5.07	3.44	4.76	5.04	.41	.82	.75	.75	.44	47.97	5.06	-.36	3.75	4.82	4.78	5.74	5.69	3.72
SD	1.68	1.74	1.16	.99	1.08	1.09	1.13	1.35	.49	.39	.43	.43	.50	15.76	2.85	1.30	1.23	1.36	1.33	1.0	1.22	1.39

Note. N = 6,489.*p<.05.

previous findings (Dupont, 2004).

Religiosity. The analyses revealed that there were no significant overall differences across the climate change belief profiles in the proportions of religious to non-religious people ($\chi 2(3, 6332) = 5.702$, p = .127). As can be seen in panel e) of Figure 2, comparable proportions of religious individuals were observed in the Climate Believers (43.3%), Undecided/Neutral (45%), Anthropogenic Climate Sceptics (45.2%) and Climate Sceptics (48.5%) profiles. These results seem to contradict previous findings showing that higher levels of religiosity is associated to lower levels of pro-environmental orientations (Gardner & Stern, 2002) and climate change denial (McCright & Dunlap, 2011a). Here we speculate two possible explanations for these contradictories findings that could be explored in further research. First, we used a crude measure of religious status (i.e., "Do you identify with a religion and/or spiritual group?") and more nuanced measures of religiosity as well as religious and spiritual beliefs might provide a better examination of the associations between this important variable and climate change beliefs. Second, New Zealand is one of the most secular countries in the world and the number of non-religious individuals has risen in recent years (Heather, 2013), so associations between religiosity and climate change beliefs observed in more religious countries such as the USA might not be observable in this non-religious context.

Deprivation Level. There were significant differences in deprivation across the four profiles ($\chi 2(3, 6367) = 68.842$, p < .001). As can be seen in Figure 3, highest levels of deprivation were observed for the Climate Believers and the Anthropogenic Climate Skeptics, with the Undecided/Neutral and Climate Skeptics profiles showing comparably higher levels of affluence. These findings suggest that belief in the reality of climate change is real is associated with lower socioeconomic status as measured by higher neighbourhood deprivation, and contradicts previous findings suggesting a positive association between income and pro-environmental orientations (Theodori & Luloff, 2002; Van Liere &
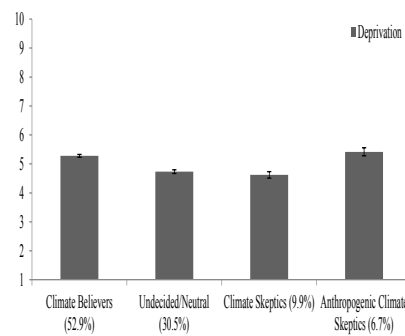
Dunlap, 1980).

Figure 3. Mean levels of socio-economic deprivation across the four climate change belief classes

Political Orientation. Significant differences in political orientation were also observed across the four profiles ($\chi 2(3, 6068) = 222.344$, p < .001). As shown in Figure 4, Undecided/Neutral and Climate Skeptics showed higher average levels of self-reported political conservatism, with Climate Believers and Anthropogenic Climate Skeptics showing higher levels of self-reported political liberalism. These findings suggest that belief in the reality of climate change is associated with a more liberal political orientation, which is in line with past research (e.g., Fransson & Gärling, 1999; McCright & Dunlap, 2011b).
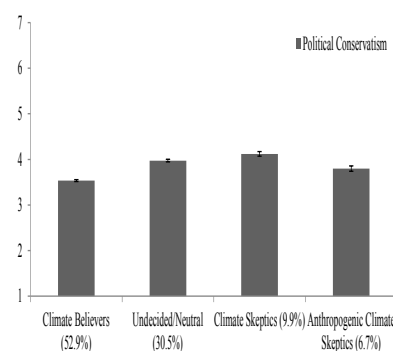

Figure 4. Mean levels of political conservatism across the four climate change belief classes

Education Level. Levels of education attainment also differed across the four profiles of climate change beliefs ($\chi 2(3, 6489) = 78.031$, p < .001). Figure 5 presents the levels of education for the four profiles, recalculated for presentation purposes so that 0 indicates no education (or not reported) and 4

indicates post-graduate level education (highest code in the sample). As can be seen in this figure, highest levels of education were associated with the Climate Believers, followed by the Undecided/Neutral profile. Climate Skeptics and Anthropogenic Climate Skeptics had comparably lower levels of education. This indicates that those who hold uniformly high beliefs that climate change is both real and caused by humans tend to be more educated than those form the other three climate change belief profiles.
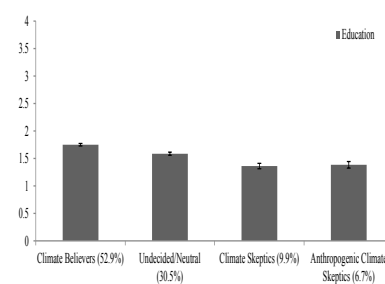
Figure 5. Education level across the four climate change belief classes (0 = no education/unreported and 4 = post-graduate education)

Environmental Efficacy. Significant differences in environmental efficacy were also observed across the four profiles ($\chi 2(3, 6473) = 432.984$, p < .001). As can be seen in Figure 6, Climate Skeptics had the lowest levels of self-reported environmental efficacy (M = 4.262, SE = .055), significantly lower than the levels associated with the Undecided/Neutral profile (M = 4.513, SE = .031; p < .001), the Anthropogenic Climate Skeptics (M = 4.527, SE = .065; p = .002), and the Climate Believers (M = 5.135, SE = .021; p < .001). Climate Believers reported the highest levels of environmental efficacy out of all the profiles (p < .05), while those classified as Undecided/Neutral and Anthropogenic Climate Skeptics did not differ in the levels of environmental efficacy reported (p = .843). These findings suggest that climate change belief is associated with higher levels of perceived environmental efficacy.
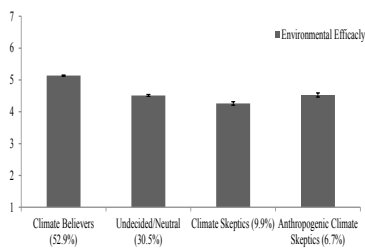
Figure 6. Mean levels of environmental efficacy across the four climate change belief classes

Psychological Differences

Values. Figure 7 presents the average levels of each of the value dimensions across the four profiles of climate change beliefs. Significant differences were observed in Openness to Change ($\chi2(3, 6444) = 67.744$, p < .001), Conservation ($\chi2(3, 6449) = 31.384$, p < .001), and Self-Transcendence values ($\chi2(3, 6448) = 314.440$, p < .001), with no significant differences in Self-Enhancement values across the four profiles. As can be seen in Figure 7, Climate Believers (M = 4.906, SE = .022) and Anthropogenic Climate Skeptics (M = 4.811, SE = .063) had comparable levels of Openness to Change values (p = .158). Similarly, Climate Skeptics and the Undecided/Neutral profile had comparable levels of Openness to Change values (M = 4.637, SE = .054; M = 4.616, SE = .031, respectively; p = .740), but lower levels than that shown by Climate Believers and Anthropogenic Climate Skeptics (p < .05).

The Undecided/Neutral profile of climate change beliefs had the lowest level of Conservation values (M = 5.640, SE = .024), significantly lower than those of Climate Believers (M = 5.782, SE = .017; p < .001), Climate Skeptics (M = 5.756, SE = .039; p = .011), and Anthropogenic Climate Skeptics (M = 5.863, SE = .045; p < .001); Climate Skeptics and Climate Believers did not differ in levels of Conservation values. Climate Believers showed the highest level of Self-Transcendence values (M = 5.939, SE = .018), significantly higher than shown by Undecided/Neutral (M = 5.410, SE = .030; p < .001), Climate Skeptics (M = 5.330, SE = .055; p < .001) and Anthropogenic Climate Skeptics (M = 5.516, SE = .062; p < .001). However,

Anthropogenic Climate Skeptics showed higher levels of Self-Transcendence values than the Climate Skeptics (p = .024). These findings indicate that compared to skeptics and undecided, climate believers tend to hold greater levels of Openness to Change and Self-Transcendence values. These findings support previous results showing that greater pro-environmental orientation is associated to Self-Transcendence values (e.g., Coelho et al., 2006; Milfont et al., 2010; Schultz et al., 2005).
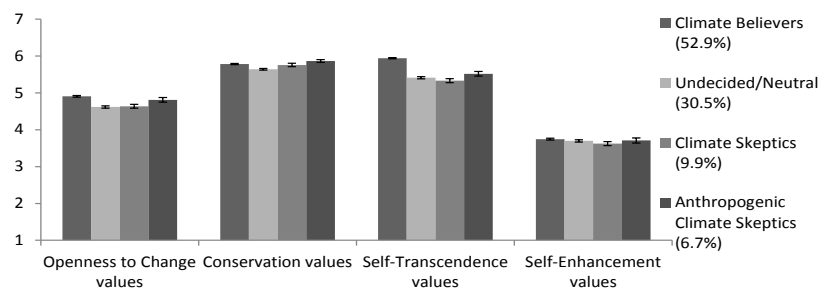

Figure 7. Sample weighted mean levels of value dimensions across the four climate change belief classes

The association with Openness to Change values seems related to a broader orientation favouring cognitive exploration, perhaps linked to the liberal political orientation observed above and Openness traits described below.

Personality dimensions. Figure 8 shows the average levels of each of the six personality dimensions across the four profiles of climate change beliefs. Significant differences across the four profiles were observed in levels of Agreeableness ($\chi2(3, 6447) = 61.418$, p < .001), Neuroticism ($\chi2(3, 6445) = 45.765$, p < .001), Openness to Experience ($\chi2(3, 6443) = 77.399$, p < .001), and Honesty-Humility ($\chi2(3, 6443) = 29.545$, p < .001). There were no significant differences in the levels of Extraversions or Conscientiousness across the four profiles.

As can be seen in Figure 8, the Climate Skeptics showed lower levels of Agreeableness (M = 5.073, SE = .040) compared to the Climate Believers (M = 5.331, SE = .017, p < .001) and Anthropogenic Climate Skeptics (M = 5.207, SE = .048, p = .033), but comparable levels with the Undecided/Neutral profile (M = 5.153, SE = .023, p = .085). On the other hand, Climate Believers had the highest

levels of Agreeableness compared to the other three profiles (p < .05). Climate Believers and Undecided/Neutral belief profiles showed comparable levels of Neuroticism (M = 3.491, SE = .019; M = 3.461, SE = .025, respectively; p = .335). Climate Skeptics and Anthropogenic Climate Skeptics had comparable levels of Neuroticism (M = 3.205, SE = .042; M = 3.307, SE = .052, respectively, p = .126), but lower levels than that shown by Climate Believers and Undecided/Neutral profiles (p < .05).

Figure 8 also shows that Climate Believers and Anthropogenic Climate Skeptics had comparable levels of Openness (M = 4.870, SE = .019; M = 4.816, SE = .054, respectively; p = .348). Similarly, Climate Skeptics and the Undecided/Neutral profile had comparable levels of Openness (M = 4.649, SE = .045; M = 4.605, SE = .025, respectively; p = .391), but by comparison lower than those associated with the Climate Believers and Anthropogenic Climate Skeptics (p < .05). Finally, Climate Skeptics had the highest levels of Honesty-Humility (M = 5.269, SE = .051), relatively higher than those of Climate Believers (M = 5.035, SE = .023; p < .001), Anthropogenic Climate Skeptics (M = 5.104, SE = .064; p = .044), and the Undecided/Neutral profile (M = 4.951, SE = .031; p < .001). The Undecided/Neutral profile of climate change beliefs was associated with the lowest levels of Honesty-Humility (p < .05).

Climate believers tend to have greater levels of Agreeableness and Openness to Experience compared to skeptics and undecided. These findings are in line with previous research showing that Agreeableness and Openness are related to pro-

environmental orientation (e.g., Hirsh, 2010; Milfont & Sibley, 2012). At the same time, we also observed the novel

The results suggest that particular socio-structural and psychological variables underpin the observed profiles

more likely than are their counterparts to espouse skepticism in the reality of climate change and its anthropogenic
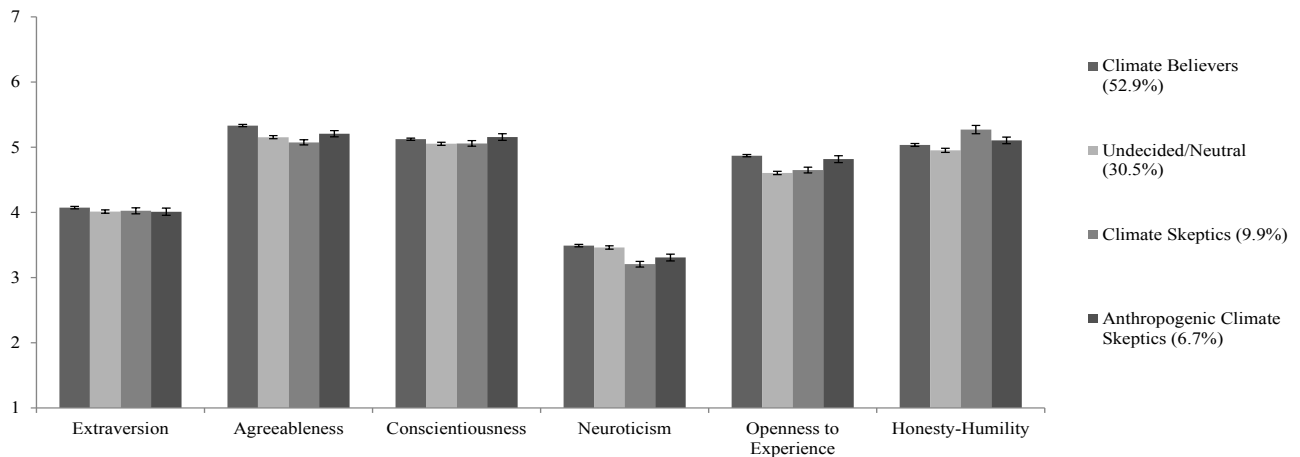

Figure 8. Sample weighted mean levels of the Big-Six personality dimensions across the four climate change belief classes

findings that climate believers and undecided tend to have greater levels of Neuroticism, while climate skeptics tend to have greater levels of Honesty-Humility.

Discussion

Climate change is regarded as one of the most serious challenges of our time. The reciprocal relations between human activity and climate change, in creating and being affected by it, means psychology can help understand and tackle this issue (e.g., Milfont, 2010; Pawlik, 1991; Swim et al., 2011). As stated in the report by the American Psychological Association: "a psychological perspective is crucial to understanding the probable effects of climate change, to reducing the human drivers of climate change, and to enabling effective social adaptation" (Swim et al., 2009, p. 165). Perhaps one first step is to provide an in-depth examination of distinct climate change beliefs and core socio-structural and psychological variables that might explain these beliefs. Beliefs about the reality of climate change and its anthropogenic cause were examined in a large national probability sample of New Zealanders, and the overarching goal of this study was to identify substantive socio-demographic and psychological differences between climate change believers and deniers.

of climate believers and skeptics reported by Sibley and Kurz (2013). Stronger beliefs in the reality of climate change and its anthropogenic cause were observed for younger individuals, female, members of minority ethnic groups, who endorse liberal political views, the more highly educated and who perceive he or she has the ability to influence environmental outcomes. Regarding the psychological variables, belief that the climate is changing and its human cause was higher among those who hold higher levels of Self-Transcendence (altruistic) and Openness to Change values, and the personality traits of Agreeableness and Openness to Experience.

Theoretical and practical implications

The socio-structural foundations of climate change beliefs are overall similar to those observed in relation to pro-environmental engagement (e.g., Fransson & Gärling, 1999; Hines et al., 1987; Milfont, 2012b; Schultz et al., 2000; Zelezny et al., 2000). In particular, our findings support and extend the "conservative white male" effect (McCright & Dunlap, 2011a) to the New Zealand context. We found that conservative white males—but also older individuals with high levels of socioeconomic status and less educated—are disproportionately

cause. This suggests that concern for environmental problems as well as concern for climate change can be characterised as a "sectarian" phenomenon (cf. Tognacci, Weigel, Wideen, & Vernon, 1972). The widespread consequences of climate change mean that overall belief and concern has to be broadened to a larger segment of the population if mitigation and adaptation are to be achieved.

It is important to highlight, however, that our results show that a large proportion of the New Zealand population hold neutral-to-high levels of beliefs in both the reality of climate change and its anthropogenic cause. Other public surveys also show that over half of the New Zealand populations support mitigation actions by the government and the public (Horizon Poll, 2012; Scoop Media, 2009). Overall these findings suggest that, although climate change believers and deniers differ in particular socio-demographic and psychological variables, there are high levels of climate change beliefs and support for action among the New Zealand population. This is particularly important because belief in climate change is intrinsically linked to pro-environmental action.

In the present study we only focused on beliefs and did not examine climate change mitigation and adaptation, but previous research has shown that

climate change beliefs are related to mitigation behaviour. In particular, research has shown that belief in the reality of climate change seems to be more strongly associated with pro-environmental engagement than belief in its human cause (Heath & Gifford, 2006; Sibley & Kurz, 2013).

Using the same data set reported in this study, Sibley and Kurz (2013) found that beliefs in the reality of climate change was a much stronger predictor of self-reports of having made sacrifices to one's standard of living, one's daily routine, and more general levels of support for government regulation of carbon emissions. Complementing these findings, they also observed that the two beliefs interacted so that belief in climate change reality was a stronger predictor of these actions when belief in anthropogenic climate change was also high. Caring for the environment and taking action is thus related to higher levels of both types of climate change beliefs but more so to the belief that the climate is changing. Other recent New Zealand research has shown that climate change mitigation and adaptation are intrinsically linked, with willingness to mitigate increasing after people have considered possible local adaptations to climate change (Evans, Milfont, & Lawrence, 2014).

It is also worth noting the observed associations with values and personality traits. As reviewed above, greater pro-environmental engagement has been shown to be associated with higher endorsement of Self-Transcendence values (e.g., Milfont et al., 2010; Schultz & Zelezny, 1999) and the personality traits of Agreeableness and Openness (Hirsh, 2010; Milfont & Sibley, 2012). Similarly, the present research showed that greater belief in climate change was associated with higher levels on these same values and personality traits. Therefore, the cognitive-motivational foundations and behavioural regularities underpinning climate change beliefs are similar to those observed in relation to pro-environmental engagement.

The associations between climate change beliefs with personal values and personality traits suggest that beliefs about the reality of climate change and its anthropogenic cause are stronger among individuals who are guided by altruistic values (i.e., equality, a world at peace, social justice), and by individuals who generally have positive social interactions and favour cooperation and social harmony (Agreeableness traits) and who generally have a wider range of interests and favour variety and intellectual curiosity (Openness values and traits). Recent cross-cultural work has also shown that "care for nature" is strongly associated to values and traits related to benevolence, self-actualization and tolerance of diversity (Donewall & Rudnev, 2014). The cognitive-motivational foundations and behavioural regularities underpinning pro-environmental engagement as well as climate change beliefs seem to centre on a selflessness orientation, inclination to act pro-socially, and openness to new and/or unconventional ideas. This is a very positive finding because tackling climate change will require consideration of novel social and technological solutions as well as recognition that climate change is certain and will affect people like oneself in our region and lifetime (Milfont, Evans, Sibley, Ries, & Cunningham, 2014).

The findings also have implications to the broad psychology literature relating values and personality. The Self-Transcendence value cluster is formed by the motivational types of universalism (understanding, appreciation and tolerance for all people and ideas) and benevolence (preservation and enhancement of the welfare of people with whom one has personal contact) (Schwartz, 1994). Research has shown that universalism is more strongly related to Openness whereas benevolence is more strongly related to Agreeableness (Roccas, Savig, Schwartz, & Knafo, 2002). That these values and traits have been found to be consistently associated to both pro-environmental engagement and climate change beliefs support research showing that environmentally friendly orientations are rooted in traits of being empathetic, tolerant, caring and concerned for others (Milfont, Richter, Sibley, Wilson, & Fischer, 2013). The available literature thus provides strong evidence for the cognitive-motivational bases of climate change beliefs and pro-environmental engagement.

Since other studies reporting segmentations related to climate change did not find systematic demographic differences among the identified profiles (Leiserowitz, Maibach, Roser-Renouf, Feinberg, & Howe, 2012; Leiserowitz, Thaker, Feinberg, & Cooper, 2013), it will be important to try and replicate the present findings in other contexts with representative samples. However, the pattern of associations between the climate change belief profiles and demographic and psychological determinants largely mirror findings of studies examining the socio-structural and psychological foundations of pro-environmental engagement. In other words, research findings suggest that climate change beliefs are thus related to overall pro-environmental orientation, and that both have similar associations to socio-demographic and psychological variables. Research findings thus suggest that climate change beliefs are related to overall pro-environmental orientation, and that both have similar associations to socio-demographic and psychological variables. In other words, climate change beliefs and overall pro-environmental orientation share the same nomological network (i.e., same interrelationships among and between them with other variables).

Future studies could also explore the extent to which climate change beliefs have motivational potency and behavioural significance to influence mitigation and adaptation actions. Such research could focus on those individuals who already have stronger beliefs regarding the reality of climate change and its human cause and would perhaps be more prone to act, but could also target skeptics. Recent research has shown that willingness to act can be fostered among individuals who might not be initially prone to act by using particular ideological or moral messages (Bain, Hornsey, Bongiorno, & Jeffries, 2012; Feinberg & Willer, 2013; Feygina, Jost, & Goldsmith, 2010). We believe these are very interesting avenues for future work.

Concluding Remarks

The present study identified socio-structural and psychological characteristics of climate change belief profiles. By and large, the ideologies underpinning climate change beliefs

are similar to those for general pro-environmental engagement, and seem to be linked with specific traits and moral foundations (Boer & Fischer, 2013; Feinberg & Willer, 2013; Milfont et al., 2013). Our findings show meaningful demographic and cognitive-motivational differences that characterise people who believe (or not) that the climate is changing and that such change is caused by human activity, suggesting a coherent ideological belief system for climate change believers and skeptics. This study contributes to the understanding of the ideological roots of climate change beliefs.

Acknowledgements:

Mplus syntax for the models reported here, including full syntax documenting the model constraint commands implemented in our analysis, is available on the NZAVS website (http://www.psych.auckland.ac.nz/uoa/NZAVS).

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PTSD and Resilience in Adolescents after New Zealand Earthquakes

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The psychological response of adolescents to several significant earthquakes in Canterbury, New Zealand was investigated. A survey questionnaire was completed by 525 adolescents at secondary schools in Christchurch 6 months after the February 22, 2011 earthquake which had a death toll of 185. Clinically significant PTSD symptoms were found amongst 24% of the sample, with females experiencing significantly greater levels of PTSD compared to males. Significant relationships were found between trauma exposure and PTSD, and fear and PTSD, whereas a significant negative relationship was found between psychological resilience and PTSD. Multiple regression analysis revealed that fear was the strongest predictor of PTSD symptoms, followed by trauma exposure. Resilience was found to moderate the relationship between fear and PTSD

Adolescent PTSD and Resilience after New Zealand Earthquakes

On September 4, 2010, New Zealand's Canterbury region was struck by a 7.1 magnitude earthquake. Widespread damage resulted, and although there were no casualties, this initial earthquake marked the beginning of a swarm of earthquakes and aftershocks. The most severe of these earthquakes occurred on February 22, 2011. The epicentre was located 6 km south-east of Christchurch's central business district at a depth of 2 km. One hundred and eighty five people were killed and over 3000 sustained injuries that required medical intervention. Thousands of aftershocks followed this earthquake and on June 13, 2011 there were two significant aftershocks that were 5.9 and 6.3 in magnitude. These aftershocks caused further damage to property, but no loss of life. Aftershocks continue at the time of writing, but their frequency and magnitude are diminishing.

It is plausible that a series of events such as these, including one where substantial loss of life and injury occurred would have a psychological impact on a proportion of people who experienced them. This assumption was tested by Norris et al. (2002a) who conducted a review of 160 studies and concluded that disasters have a persistent psychological effect on about 10% to 50% of survivors. This was true across all life stages, including adolescence which is the developmental stage that is the focus of this study.

Posttraumatic stress disorder (PTSD) is currently the most studied mental disorder in the wake of disasters (McFarlane, Van Hoof & Goodhew, 2009), the primary reason being that the classification of PTSD clearly links an experienced trauma to resultant psychological symptoms (Neria, Nandi & Galea, 2008). In a review of 160 disaster studies, Norris, Friedman, and Watson (2002b) concluded that the prevalence of PTSD varied greatly across different disasters. They attributed this variation to factors such as disaster type, severity of trauma experienced by the sample, and variability in methodological approaches. They noted that higher levels of PTSD were consistently found amongst youth samples (children as well as adolescents) in contrast to adult samples. This has been attributed to a smaller repertoire of lifetime stress exposure and therefore less developed coping skills in youth compared with adults (Goenjian et al., 2011), as well as neuro-cognitive differences in the developing brain (Lupien, McEwan, Gunnar & Heim, 2009). Adolescence is a period of significant neuro-cognitive development and is associated with an increase of both intrinsic and extrinsic stressors. It is therefore feasible that adolescents may be particularly vulnerable to stress following a disaster (Masten, Monn & Supkoff, 2011).

Despite conclusive evidence for the relationship between disasters and PTSD, most studies have found that only a minority of the affected population, including adolescents, develop PTSD after disasters (Norris et al., 2002a, 2002b), indicating the presence of resilience (Luther, Cicchetti & Becker, 2000). Resilience has been conceptualised in various ways, but for the purposes of this study it has been defined as the ability of individuals to cope with stress (Connor & Davidson, 2003). There have been few studies that have specifically measured resilience factors in relation to PTSD after disasters. Furthermore, no studies have been found that investigate the relationship between resilience and PTSD in an adolescent population after earthquakes.

The current study aimed to address this gap in the literature and hypothesised that:

1. Clinically significant PTSD symptoms would be present in more than 10% of the sample.

2. Resilience, trauma exposure, and fear would predict PTSD symptoms.

3. Resilience would moderate the relationship between the level of trauma exposure and PTSD symptoms.

Method

Participants

Of the 4,300 secondary school students invited to participate in the study, a total of 525 from six high schools consented and obtained parental consent. An 86 item self-report questionnaire which measured PTSD, resilience, trauma exposure, and fear, was completed by these participants. Fifty two percent of the sample was

female. The age of participants ranged from 13 to 20 years (M = 15.2 years; SD = 1.48). Seventy eight percent identified their ethnicity as New Zealand European, 6% identified as Maori, 5% as Pacific Islander, 7% as Asian, and 5% as other. Over 90% of the participants were within 25 km of the earthquake epicentre during the major earthquakes of September 4, 2010, February 22, 2011, and June 13, 2011.

Measures

Child PTSD Symptom Scale (CPSS). The CPSS (Foa, Johnson, Feeny & Treadwell, 2001) was designed to assess PTSD symptom severity in youth aged 8 to 18 years who had experienced a traumatic event. Responses were on a 4-point Likert scale, ranging from 0 (not at all), to 3 (almost always). Items were categorised into reexperiencing, avoidance, and hyperarousal subscales. Seven additional items were designed to elicit whether PTSD symptoms have affected daily functioning such as relationships with friends and general happiness with life. Foa et al. (2001) found satisfactory internal consistency, test–retest reliability, convergent and divergent validity for the CPSS. High internal consistency (α>.85) was found for the CPSS total scale as well as each of its subscales in the current study. A cut-off value of 15 was used to determine the presence of clinically significant PTSD symptoms (Nixon et al., 2013).

Connor-Davidson Resilience Scale (CD-RISC). The 10-item Connor-Davidson Resilience Scale (CD-RISC-10; Campbell-Sills & Stein, 2007), a shortened version of the original 25-item CD-RISC (Connor & Davidson, 2003), was used to assess psychological resilience. Responses were measured on a 5-point Likert scale from not true at all (0) to true nearly all the time (4), with total scores ranging from 0 - 40. Although the CD-RISC was originally developed for adults, it has been validated in studies with children and adolescents aged 10-18 years (e.g., Fincham, Altes, Stein, & Seedat, 2009). Cronbach alphas for the CD-RISC-10 have ranged from .80 - .96 in several studies (e.g., Khoshouei, 2009). Test-retest reliability of .87 and .88 was found by Connor and Davidson (2003)

and Khoshouei (2009) respectively. Construct validity has been supported by studies that have found the CD-RISC-10 scores to uniquely moderate between trauma and PTSD (Connor & Davidson, 2003; Fincham et al., 2009). A Cronbach's alpha of .88 was found for the CD-RISC-10 in the current study.

Trauma Exposure Scale (TES). The 9 items of the TES were adapted from the 28-item Survivor Information Form (SIF; Başoğlu, Kiliç, Şalcioğlu, & Livanou, 2004), which was designed to assess trauma exposure during earthquakes. Seven of the traumatic-exposure items used in the current study required a Yes/No response. The remaining two items of the Trauma Exposure Scale elicited data regarding the participant's house. The nine items of the trauma exposure scale have face validity for the assessment of this construct. A Cronbach's alpha of .79 was found for the scale in this study.

Fear Scale (FES). The highest level of fear experienced during any of the earthquakes and the highest level of fear during the most recent aftershock were measured using two items that comprised the Fear Scale. The first item was adapted from the SIF (Başoğlu et al., 2004), and the second item was developed specifically for this study due to the volume and frequency of significant aftershocks after the initial event. The items were scored using a 5 point Likert scale ranging from 1 (no fear at all) to 5 (extreme fear/terror). The construct validity of this scale is supported by findings that fear during earthquakes accounted for a significant variation in symptoms of PTSD and other psychopathology after earthquakes (Başoğlu et al., 2004; Basoglu & Salcioglu, 2011). Reliability analysis revealed a Cronbach's alpha of .78.

Validation items. Two items were included in the questionnaire in order to detect random or erroneous responding. Questionnaires were excluded if either of these items were endorsed. A total of sixteen questionnaires (3%) were excluded due to invalid responding. Ten of these were from male respondents and six were from female respondents resulting in a final sample size of 509 participants.

Procedure

Massey University's Human Ethics Committee granted ethical approval. Nonprobability purposive sampling (Spring et al., 2003) was used to select six high schools as a representation of the adolescent population in Christchurch. All students at these schools were invited to participate in the study. The questionnaire could be completed on paper or online. Data was entered from the completed and validated questionnaires into the Statistical Package for the Social Sciences (SPSS) version 18 for statistical analysis.

Results

Descriptive Statistics

Descriptive statistics are displayed in Table 1. Independent sample t-tests revealed that the difference in male and female mean scores were statistically significant for each of the five measures. The correlations between the primary measures in this study were investigated using Pearson product-moment correlation coefficients and are displayed in Table 2.

Prevalence of PTSD Symptoms

A frequency analysis ascertained that 24% of the sample had a CPSS score above 15, 95% CI [20%, 28%], indicating clinically significant PTSD symptoms. This confirmed the first hypothesis. Only 13% percent of males scored above the cutoff in contrast to 34% of females. A chi-square goodness-of-fit test confirmed the statistical significance of this difference, χ^2 (1, n = 513) = 9.1, p = .003. Five percent of the sample had a PTSD score above 29, a value indicating extremely severe symptoms (Rachamim, Helpman, Foa, Aderka, Gilboa-Schechtman, 2011), of which 65% were female. Over 40% of the sample had a score of less than 6, a value associated with low to negligible PTSD symptoms. Independent-samples t-tests were conducted to compare the mean CPSS scores found by Foa et al. (2001) in their validation study sample with the mean scores found in the current study. The total mean score in the current study (M = 10.3, SD = 9.8) was significantly higher than that found

by Foa et al. ($M = 7.6$, $SD = 8.1$), $t(109)$ = 2.52, $p = 0.01$ (two-tailed).

Relationship of Resilience, Trauma Exposure and Fear with PTSD

Pearson product-moment coefficients (see Table 2.) revealed a significant negative relationship of moderate magnitude between the CD-RISC-10 and the CPSS. Conversely, a significant positive relationship existed between the CPSS and the Trauma Exposure scale. Likewise, a significant positive correlation was found between the CPSS and the Fear scale.

Hierarchical multiple regression analysis was used to investigate the practical relevance of these correlations. Specifically, the ability of trauma exposure, fear and resilience to predict PTSD symptoms after controlling for the influence of gender and school was tested. The CPSS and Trauma Exposure variables were transformed to reduce skewness and improve the normality, linearity, and homoscedasticity of residuals (Tabachnick & Fidell, 2012). Square root transformations were found to be the most effective for both variables. With a criterion of p < .001 for Mahalanobis distance, no multivariate outliers among the cases were identified. Tolerance and VIF statistics indicated no violation of the multicollinearity assumption. Residual and scatter plots indicated the assumptions of normality, linearity and homoscedasticity were satisfied (Pallant, 2011).

A four step hierarchical multiple regression analysis was conducted with PTSD symptoms (square root of CPSS) as the dependant variable. Gender and school were entered at Step 1 to control for these variables. The square root of the Trauma Exposure scale was entered at Step 2, the Fear scale at Step 3, and the CD-RISC at Step 4. Variables were entered in this order since chronologically, trauma exposure precedes fear during an earthquake and resilience factors come into effect after an earthquake has occurred, possibly ameliorating the effects of the trauma (Masten, 2011).

The analysis revealed that at Step 1, gender and school contributed significantly to the regression model,

$F (2, 490) = 33.6$, $p < .001$, and accounted for 11% of the variation in PTSD symptoms. Introducing the trauma exposure variable explained an additional 7% of the variation in PTSD symptoms and this change in R^2 was also significant, $F (1, 489) = 32.4$, $p < .001$. Adding fear to the regression model explained an additional 20% of the variation in PTSD symptoms and this change in R2 was significant, $F (1, 488) = 158.4$, $p < .001$. Finally, the addition of resilience to the regression model explained a further 3% of the variation in PTSD symptoms and this change in

R² was also significant, $F (2, 486) = 28.1$, $p < .001$. The strongest predictor of PTSD was fear experienced during earthquakes, which uniquely explained 17% of the variance in PTSD symptoms once all variables had been entered. Together, the six independent variables accounted for 41% of the variance in PTSD symptoms. This multiple regression analysis revealed that trauma exposure and fear were significant predictors of PTSD symptoms after differences in gender and school had been accounted for. It further found that resilience measured by the CD-RISC

Table 1.

Summary of Descriptive Statistics, T-tests, and Effect sizes for Measurement Scales

Measure	N	Min-Max Score	M (SD)	t	d
Male Adolescents	245	0 - 44	7.6 (8.6)		
Female Adolescents	264	0 - 47	12.8 (10.2)		
Total Sample	509	0 - 47	10.3 (9.8)	6.6**	.57
Functional Impairment					
Male Adolescents	245	0 - 7	1.5 (2.0)		
Female Adolescents	264	0 - 7	2.0 (2.1)		
Total Sample	509	0 - 7	1.8 (2.0)	2.9*	.26
CD-RISC-10					
Male Adolescents	245	2 - 40	25.6 (7.6)		
Female Adolescents	264	1 - 40	24.1 (6.6)		
Total Sample	509	1 - 40	24.8 (7.2)	2.5*	.22
Trauma Exposure Scale					
Male Adolescents	245	0 - 5	1.2 (1.2)		
Female Adolescents	264	0 - 6	1.5 (1.3)		
Total Sample	509	0 - 6	1.4 (1.3)	3.0*	.27
Fear Scale					
Male Adolescents	245		2.6 (1.9)		
Female Adolescents	264	0 - 8	3.9 (2.0)		
Total Sample	509	0 - 8	3.3 (2.1)	7.9**	.70

Note. CPSS = Child Post-traumatic Symptom Scale; CD-RISC 10 = Connor-Davidson

10-item Resilience Scale; Min-Max Score = minimum and maximum scores obtained in

this study. *t* = t-test statistic for difference between male and female means; *p< .05.

**p< .001. *d*= Cohen's d.

Table 2.

Pearson Product-Moment Correlation for Primary Measurement Scales

Measure	1	2	3	4	5
1. CPSS	-				
2. Functional Impairment	.61**	-			
3. CD-RISC-10	-.31**	-.28**	-		
4. Trauma Exp.	.34**	.27**	-.18**	-	
5. Fear Scale	.57**	.28**	-.17**	.32**	-

Note. n = 509. CPSS = Child Post-traumatic Symptom Scale; CD-RISC 10 =

Connor-Davidson 10-item Resilience Scale; READ = Resilience Scale for

Adolescents. * *p* < .05 ***p* < .01 (2-tailed).

had a modest, but significant effect on PTSD symptoms after gender, school, trauma and fear had been accounted for. These results confirmed hypothesis 2.

Hypothesis 3 stated that resilience would moderate the relationship between trauma exposure and PTSD, so that higher levels of resilience would reduce the strength of the relationship between trauma exposure and PTSD symptoms. Moderation analysis was performed using the process outlined by Aitken (1991). The transformed variables described in the multiple regression analysis were used. The required assumptions of normality, linearity and homoscedasticity were met (Tabachnick & Fidell, 2012). The centred variable for the main effect of trauma exposure was entered at Step 1, the centred variable for the main effect of resilience was entered at Step 2, and the interaction term was entered at Step 3. Results of this analysis revealed that the interaction term between trauma exposure and resilience did not explain a significant increase in the variance of PTSD symptoms, R^2 change = .001, $F (1, 494)$ = .34, p = .56. Resilience, as measured by the CD-RISC did not moderate the relationship between trauma exposure and PTSD symptoms. Hypothesis 3 was therefore not supported.

Due to the large effect that fear during earthquakes had on the variance of PTSD symptoms, and the variance shared between this fear variable and the CD-RISC, a further moderation analysis was conducted to ascertain whether resilience, as measured by the CD-RISC, would moderate between fear and PTSD symptoms. For this analysis, the centred fear variable was entered at Step 1, the centred resilience variable at Step 2 and the interaction term of fear and resilience at Step 3. Results of the analysis showed that resilience did moderate the relationship between fear and PTSD. The resilience and fear interaction term explained a significant increase in the variance of PTSD symptoms, R^2 change = .008, $F (1, 491)$ = 6.78, p = .009. The moderation interaction was graphed using an online computer programme (Jose, 2008) and is displayed in Figure 1. It is evident that resilience had a modest moderating effect, where each level of

resilience (low, medium, high) alters the gradient of the slope, demonstrating that when resilience is at a high level, an increase in fear during earthquakes is associated with smaller increases in PTSD symptoms than when resilience was at a medium or low level.

Discussion

Posttraumatic Stress Disorder

Findings indicate that the Christchurch earthquakes had a significant adverse psychological impact on the sample with 24% reporting clinically significant PTSD symptoms. Consistent with this, Norris et al. (2002a) reported clinically significant PTSD in 21% to 56% of young people after certain high impact disasters. It could therefore be argued that the Canterbury earthquakes were a high impact disaster for adolescents, based on the proportion with clinically significant PTSD in this sample. Endorsement of the functional impairment scale, by 42% of the sample, provided further evidence that PTSD symptoms effected the day-to-day functioning of a large percentage of this sample.

Levels of PTSD symptoms in the current study were significantly higher than those found by Foa et al. (2001) with adolescents after a U.S. earthquake of similar magnitude and peak ground acceleration. A shorter time period between the event and data collection may partially account for the higher levels of PTSD found in the current study (Goenjian et al., 2011), but it is also probable that adolescents in Christchurch experienced higher levels of PTSD symptoms due to greater trauma exposure suggested by a higher death toll, more extensive damage, and higher magnitude aftershocks (Norris et al., 2002a, 2002b).

PTSD gender differences. The higher prevalence of PTSD amongst females in this sample is consistent with previous disaster research and PTSD research in general (e.g., Nemeroff et al., 2006; Shiromani, Keane, & LeDoux, 2009). Tolin and Foa (2008) confirmed a higher prevalence of PTSD amongst females and discussed several factors that contribute to the gender difference. Of relevance to the

current study are the following factors: (a) a higher prevalence of externalised symptoms such as anger, aggression and substance use amongst males after trauma, compared to a higher prevalence of internalised symptoms such as anxiety and depression in females; (b) genetic differences between males and females which result in different emotional and cognitive reactions during the trauma, with females experiencing a more pronounced fear response; (c) higher rates of prior sexual abuse amongst females, making PTSD in response to subsequent traumatic events more probable; and (d) under-reporting of symptoms by males, influenced by socially constructed gender roles. The under-reporting of symptoms, along with greater externalised symptoms amongst males, indicate the need for alternative post-disaster measurement approaches in order to detect the needs of male adolescents.

Resilience

While the absence of clinically significant PTSD symptoms amongst the majority of this sample is an indication of psychological resilience (Masten, 2011), identifying specific resilience factors is important for intervention. The CD-RISC-10 items measure the respondent's perception of their ability to cope with adversity or coping self-efficacy (Benight & Bandura, 2004). The inverse relationship between resilience and PTSD, as well as its ability to predict PTSD in multiple regression analysis, signals the role of coping self-efficacy in mitigating post-disaster trauma in adolescents.

Resilience as moderation variable. Contrary to the hypothesis, resilience did not moderate the relationship between Trauma Exposure and PTSD. This means that the effect of trauma exposure on PTSD symptoms remained constant irrespective of changes in the level of resilience, and higher resilience did not act as a buffer between trauma exposure and PTSD. This may be explained by the distribution of trauma exposure, where scores were congregated at both the low end and the high end of the scale rather than being evenly distributed. It may be that resilience did in fact protect against PTSD when trauma exposure was relatively low, but when trauma

exposure was particularly high then resilience no longer had a moderating effect. When the two extremes of trauma exposure were combined, resilience did not significantly moderate the trauma-exposure/PTSD relationship. Preliminary analysis supports this

Figure 1. Moderation of Fear and PTSD by Resilience
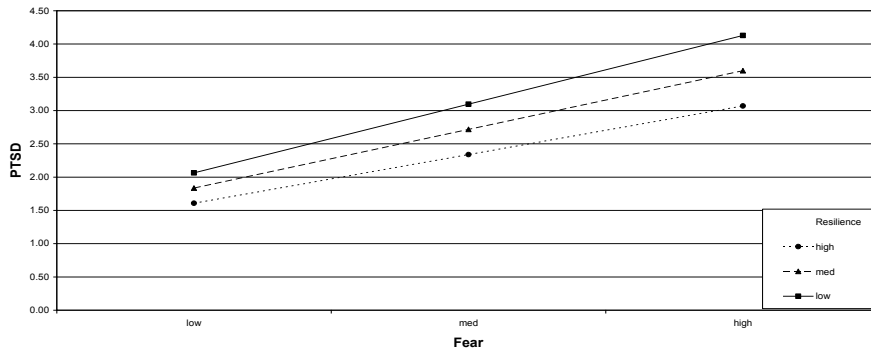
notion, but more targeted research is required to ascertain the variability of resilience as a moderating variable across different levels of trauma exposure.

The moderation of fear experienced and PTSD symptoms by resilience was an unexpected finding. This meant that higher resilience acted as a buffer between the level of fear experienced by the adolescent and their resulting PTSD symptoms. This can be interpreted in light of the cognitive mechanism of fear. Fear occurs as a reflexive reaction for many people during an earthquake and is largely outside the realm of conscious control (Mueller-Pfeiffer et al., 2010). Nevertheless, adaptive cognitions after trauma may mitigate the effects of the fear response, leading to more effective coping (Belus, Brown-Bowers, & Monson, 2012). The moderation of the fear/PTSD relationship by resilience supports this possibility.

Difference in resilience across gender. There was a significant difference in resilience between male and female adolescents and this difference had a small effect size. This gender difference has been found in some studies (e.g., Wrenn et al., 2011), but not others (e.g., Fincham et al., 2009). It may be that pre-disaster resilience base rates were higher for males than females in this sample. Systematic over-reporting by males due to culturally constructed gender

roles may be another explanation for the difference (Tolin & Foa 2008).

Trauma Exposure

As hypothesised, a positive relationship was found between trauma exposure during the Canterbury earthquakes and PTSD symptoms. This relationship remained constant when individual demographics were controlled. The relationship between trauma exposure and PTSD has been well established in a wide range of studies with various age groups across diverse types of trauma. Norris et al. (2002a, 2002b) concluded that factors such as the number of lives lost, injury, threat to life, witnessing of horror, resource loss, housing issues and displacement all have significant, quantifiable effects on PTSD after disaster, which held true for the current study.

Gender differences in trauma exposure. Females had a higher mean trauma exposure score than males. The difference in trauma exposure across gender is an unexpected finding, since there is little theoretical basis to suggest that females would be exposed to higher levels of trauma than males. Two items were the primary contributors to the overall difference in male and female scores: Thirty-eight percent of females knew someone who had died, whereas only 24% of males did. Similarly, 18% of females reported that someone in their family had been injured, whereas only 10% of males did. One explanation for the differences may be that female adolescents in general have larger social networks than males (Gorrese & Ruggieri, 2012), and a greater

sensitivity to the injury or pain of others (Mestre, Samper, Frías, & Tur, 2009). A combination of these two factors could explain why females reported having more people in their families who were injured. The significant difference in reported trauma exposure across gender is an area worthy of further research.

Fear during earthquakes

A positive relationship was found between fear experienced during the earthquakes and PTSD symptoms. Two items comprised the fear scale and hierarchical multiple regression revealed that together they accounted for more variance in PTSD symptoms than any other variable in this study. This finding was consistent with Başoğlu and Şalcioğlu (2011) who found that the level of fear experienced by an individual during an earthquake was a superior predictor of PTSD than trauma exposure. In light of these findings it is interesting that the latest *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; DSM-5; American Psychiatric Association, 2013) has excluded the DSM IV-TR's (2000) criterion requiring an experience of intense fear, horror or helplessness for the diagnosis of PTSD. A primary rationale for this exclusion (Friedman, Resik, Bryant & Brewin, 2011) is that not all PTSD sufferers experience intense fear, helplessness or horror in response to the original stressor (Brewin, Andrews, & Rose, 2000). This was true in the current study where a minority of adolescents who did not report intense fear reported clinically significant PTSD symptoms. Although intense fear, helplessness or horror are no longer a requirement for the diagnosis of PTSD, findings from this study suggest that adolescents who experience intense fear during a traumatic event are more likely to have higher levels of PTSD symptoms than those who do not experience such fear. The recollection of fear at the time of trauma therefore remains a relevant consideration for clinicians.

Although both items of the Fear Scale had a significant relationship with PTSD symptoms, the item that assessed the level of fear at the most recent aftershock had a stronger relationship with PTSD (r=.61) than the other item which assessed the highest level of

fear during a major earthquake (r=.54). Ongoing fear at aftershocks may be seen as a failure to habituate to the stressful stimulus (Shiromani et al., 2009) and can be viewed as a form of learned helplessness (Maier, 2001). It is likely that adolescents with more significant PTSD symptoms would have more difficulty in habituating to aftershocks (Rachmin & Levitt, 1988) which explains the strength of the relationship between these two variables.

Gender differences in fear. Females had significantly higher fear scores than males. This finding contributes to the literature on gender differences in psychopathology after exposure to trauma (Tolin & Foa, 2008; Nemeroff et al. 2006). Higher levels of fear and PTSD symptoms amongst females suggest that fear experienced during earthquakes is a mechanism in the development of PTSD. Higher levels of fear experienced by females is most likely explained by a combination of causal factors relating to genetics and learned behaviour (Galli, Wolpe, & Otten, 2011; Lebron-Milad et al., 2012). Findings from the current study suggest that by the stage of adolescence differences in fear reactions are firmly entrenched and these are related to different psychological outcomes for male and female adolescents who experienced the Canterbury earthquakes.

Practical Application

The findings of this study can be applied to intervention planning. First, fear experienced in relation to earthquakes should be a target for intervention. This is supported by the relationship between fear experienced during earthquakes and PTSD symptoms. Cognitive-behavioural interventions that target earthquake-related fear through various forms of exposure and cognitive restructuring have been used effectively with adolescents, and hold the most promise for effective outcomes (Başoğlu & Şalcıoğlu, 2011; Cohen, Mannarino, & Deblinger, 2010). Second, an adolescent's perception of their ability to cope with adversity is a worthwhile target for intervention. The relationship between resilience and PTSD symptoms, as well as the moderating effect of resilience on fear

and PTSD symptoms provide evidence of this. Since these perceptions of ability to cope have a cognitive behavioural basis (Benight & Bandura, 2004), effective intervention would use cognitive-behavioural processes in order to enhance these abilities (Cohen et al., 2010). Third, intervention should address the unique needs of male and female adolescents separately. Females have higher PTSD symptom scores, whereas males are likely to have higher externalising symptoms not detected by PTSD measures (Tolin & Foa, 2008). Interventions for males should therefore not be neglected. The difficulty in identifying male adolescents who require intervention is a challenge highlighted by this study and previous research evidence (Haen, 2011).

Study limitations

There are several limitations inherent in this study. First, a cross-sectional design was used where data was collected at a single time-point. This does not allow for conclusions to be made about the direction of relationship between variables, the causality of variables or the change in variables over time (Bowman & Hertzog, 2011) Further longitudinal study of the same population would yield worthwhile results. Second, sampling bias was likely in this study. Although an effort was made to select a sample that would be representative of the population, and some indication of its representativeness was ascertained, a non-probability sampling method was used which is vulnerable to sampling bias (Christensen, 2011). Self-selection bias may also have occurred, since for ethical reasons, adolescents could choose whether or not to participate. Third, the study relied solely on self-report data which has various inherent weaknesses (Bowman & Hertzog, 2011). In addition, retrospective fear measured in this study is subjective, and a person's memory of their fear at time of trauma may be influenced by multiple factors (Rubin, Berntsen & Johansen, 2008). It is possible that higher levels of PTSD may have influenced adolescents' recollection of the fear they experienced at the time of the earthquake, thus posing a threat to validity. Finally, no validation studies had been carried out for any of

the measures with adolescents in New Zealand and no norms exist for the New Zealand adolescent population. This could be remedied by conducting well-designed validation studies of PTSD and resilience measures with adolescents in New Zealand.

Conclusion

The findings of this study highlight the substantial psychological impact that the Christchurch earthquakes have had on the adolescents who experienced them. This is evident from the fact that 24% of the sample reported clinically significant PTSD symptoms and 42% reported some impairment in daily functioning because of these symptoms. Resilience is evident from the absence of significant PTSD symptoms in the majority of the sample, and the extent to which CD-RISC items were endorsed. The perception of ability to cope with adversity holds promise as a buffer against PTSD. The robust relationship found between fear and PTSD symptoms suggests that fear experienced during earthquakes acts as a mechanism in the development of PTSD, making it a worthy target for further research and intervention. The moderation of this relationship between fear and PTSD by resilience further emphasises the importance of resilience factors that were measured. The correlation of trauma exposure with PTSD is congruent with previous research and suggests that the degree of trauma an adolescent has been exposed to during earthquakes plays a critical role in the development of PTSD. It was clearly evident that females experienced higher levels of PTSD symptoms than males in this sample. This was also true for levels of trauma exposure and fear experienced during the earthquakes. These findings add to the extant literature on gender differences in relation to the psychological impact of trauma and the psychological impact of earthquakes on adolescence.

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CALL FOR SUBMISSIONS

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The *New Zealand Journal of Psychology* has traditionally focused on the publication of manuscripts in an academic style, that is, written as standard scientific reports of group data. Although we have occasionally been asked if we publish case studies or other short/brief reports the *Journal* has not published single subject case studies the past, despite there being several reasons to do this. These include the growing interest in single case research designs, linking research and practice, providing practitioners an opportunity to share their work, and educational utility.

At this time the *Journal* would like to invite the submission of single subject case studies for a Special Section. Case studies can be drawn from any domain of applied psychology. A Guidelines document outlining the required format for submissions is available from the NZPsS National Office. All case study manuscripts will be subjected to the same peer-review process as regular submissions.

It is a condition of review that proof of the client's/subject's fully informed consent is provided.

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A study to assess the acceptability of adding Home Parent Support along with the Incredible Years® parent programme

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Abstract

Objective. To assess the acceptability of adding Home Parent Support (HPS) for parents of children aged 3-7 years with high-risk factors for conduct disorder, while they attend the Incredible Years® Parent programme (IYP).

Methods. Data from 48 high-risk parents attending IYP and receiving additional HPS were analysed. Data included pre-test and post-test scores on the Eyberg Child Behavior Inventory and Child Social Competence Scale, and responses from HPS follow-up questionnaire.

Results. HPS was highly acceptable for families with 94% of eligible participants recruited and 91% of these completing IYP. Average attendance was 80% of sessions and 5 participants dropped out. Families made significant progress across treatment for child behaviour and social competence (p<0.000). Effect sizes were between 0.72 and 1.10. Families were very satisfied with HPS intervention and reported positive changes in parent-child relationships and family functioning.

Conclusions. The addition of HPS alongside IYP was highly acceptable as evidenced by good recruitment and retention, significant improvement in child behaviour and high levels of parent satisfaction. The extra support in the home helped the most vulnerable families to implement parenting strategies and remain engaged in IYP. However, any additional effectiveness of HPS over and above IYP cannot be concluded from this study. A prospective randomised control trial to evaluate the efficacy of HPS is required.

Keywords: Conduct problems, Early childhood, High-risk families, Home coaching, Incredible Years®, Parenting management.

There is an increase in the incidence and intensity of child conduct problems affecting 5-10% of children internationally (Boden, Fergusson, & Horwood, 2010; Church, 2003; Maughan, Rowe, Messer, Goodman, & Meltzer, 2004; Pilling, Gould, Whittington, Taylor, & Scott, 2013; Scott, 2007). Severe conduct and behavioural problems in young children are an important predictor of later chronic antisocial and criminal behaviour in adolescents (Blissett et al., 2009; Boden et al., 2010; Church, 2003; Fergusson, Boden, & Hayne, 2011) and are costly to individuals, families and communities (Bonin, Stevens, Beecham, Byford, & Parsonage, 2011; Church, 2003; M. Cohen, 2005; Scott, Knapp, Henderson, & Maughan, 2001). It is therefore, essential that evidence-based interventions are introduced early in the life of the child and are targeted at children with identified risk factors for developing serious conduct problems.

The Incredible Years® parent management programme (IYP) is an evidence based parenting programme designed to address conduct problems in young children. International research on the efficacy of IYP consistently demonstrates positive outcomes in terms of fewer child externalising behaviours, improvements in parent-child relationships, child problem solving skills, emotional regulation, and parental confidence (Bywater et al., 2011; Kaminski, Valle, Filene, & Boyle, 2008; Webster-Stratton, 2000). The literature also demonstrates the effectiveness of IYP programmes in New Zealand (Berryman, Woller, & Glyn, 2009; Fergusson, Stanley, & Horwood, 2009; Lees & Ronan, 2008; Sturrock et al., 2013; Sturrock, Gray, Fergusson, Horwood, & Smits, 2014).

While evidence based parent management programmes have good outcomes for most families, not all families make the same improvement. Follow-up studies show that up to one third of families still experience clinically significant child behaviour problems post-treatment, and this was a predictor of adolescent engagement in delinquent acts (Reyno & McGrath, 2006; Webster-Stratton, Rinaldi, & Reid, 2011). Identifying families vulnerable for poorer response to IYP and providing them with additional in home support is expected to improve outcomes.

The factors predicting poor treatment outcomes can generally be identified as child factors (e.g. high levels of externalising behaviour); parent factors (e.g. mental health, parenting style); family demographics (e.g. single parent, family size, education/socioeconomic), and participation (attendance, barriers to participation). Families with several of these factors are more likely to drop out of treatment (Bagner & Graziano, 2012) and are therefore more vulnerable to poorer treatment response. It is these families who may benefit from extra support to address barriers for change and to maximise the benefits from attending a parenting programme.

Having support in the home enables the therapist to personalise the parenting strategies for the particular needs of each family and to implement them effectively. Additionally, the therapist is able to observe participants in their homes and support them to address barriers preventing change such as; substance abuse, poor parental mental health, and domestic violence (Gomby, 2005). It is expected that combining an evidence based parent programme with a home visiting intervention would improve outcomes.

Incredible Years® Parent Programme in New Zealand.

The Child and Adolescent Mental Health Service in the Bay of Plenty District Health Board was the first hospital service in New Zealand to introduce IYP as a treatment pathway for parents of children with conduct problems. IYP was first delivered and evaluated in 2001, and results showed improvement in child behaviour and family functioning (Lees & Ronan, 2008) which reflected international outcomes (Jones, Daley, Hutchings, Bywater, & Eames, 2008; Kaminski et al., 2008; Webster-Stratton, 2000). In 2004 Auckland University sponsored the first training for Incredible Years® facilitators in New Zealand. Since then, there has been a rapid expansion of training and an increase in the number of agencies delivering Incredible Years® programmes in New Zealand (Anstiss, 2013).

The Incredible Years® Specialist Service.

In recent years Government departments in New Zealand have been concerned about the increasing incidence and severity of conduct problems in young people. An expert advisory group recommended an interagency response to intervene early in the life of the child with an evidence based programme, and to provide extra support for the most vulnerable families (Church et al., 2007). In response to this advice the Incredible Years® Specialist Service was established in the Bay of Plenty region as a pilot service. This was a collaborative intervention between the Ministry of Education and the Ministry of Health to address conduct/antisocial

behaviour and associated mental health problems in young children (Church et al., 2007). The aim was to enhance the effectiveness of IYP by providing additional support in the home for the most vulnerable families.

Against this background, this paper reports on a pilot study of 48 families who received HPS as an additional intervention while they attended IYP. The aim of this study was to review the acceptability of adding HPS in terms of: (i) recruitment and retention, (ii) improvement in child behaviour, and (iii) parent satisfaction with HPS.

Method

Treatment

HPS is a home visiting intervention to support the most needy families to effectively implement the Incredible Years® parenting strategies in their family while they attend the group based Incredible Years® programme. All families who met the criteria for HPS were invited to participate. Health professionals who were also accredited IYP facilitators made weekly visits to participants in their home to review IYP content, rehearse skills, and address barriers for implementation. After the initial assessment session each visit was approximately 60 minutes and began by checking in with the family to hear what was working well and any challenges they were experiencing. Time was spent reviewing goals from their IYP group, and reviewing the key parenting principles. Barriers to making change were identified and families were supported to address these as appropriate. It was hypothesised that HPS would be acceptable and improve outcomes in terms of child behaviour, family functioning and retention in IYP.

HPS Participants

Participants were parents/carers attending IYP delivered by the Ministry of Education or Ministry of Health, had children aged 3-7 years with serious behaviour problems, and had signed consent to participate.

Inclusion criteria for HPS.

Participants were eligible for HPS if they had any of the following:

o Eyberg Child Behavior Inventory Total Problem scale T>70

o Eyberg Child Behavior Inventory Intensity scale T>70

o Social Competence scale <17

o One of the following risk factors:

- Child Youth and Family involvement

- School exclusion

- Diagnosis of parental mental health

Measurements

IYP facilitators visited participants in the two weeks prior to the IYP course commencement and administered base line measures using the Eyberg Child Behavior Inventory and Social Competence Scale.

Eyberg Child Behaviour Inventory (ECBI) (Eyberg & Pinus, 1999).

The ECBI is a parent rating scale that measures total problem (type and frequency of behavior problems), and intensity (degree to which parents find the behaviours problematic) of child behaviour. The recognised clinical cut off for the Eyberg scale scores is T>60. For this study a T score of T>70 on either scale was set as the criteria for HPS to ensure the most challenging children were identified.

Social Competence Scale - Parent Version (SCS) (Corrigan, 2002).

The SCS is a 12-item measure that assesses a child's pro-social behaviors, communication skills, and self-control on a five point Likert scale. A total score <17 identified poor social skills and was set as the criteria for HPS.

Follow-up questionnaire.

This is a 12-item questionnaire administered to all participants to assess participants' views on helpful aspects of HPS and changes in family functioning.

Statistical Analysis

Last observation carried forward was used where data were missing. This means if a person drops out of the

study the last observed score is used for all subsequent observation points. The statistical significance of changes in mean scores from pre-treatment to post-treatment was calculated using t test, and the effect size was assessed using Cohen's d.

Results

Participants

The average age of HPS participants was 38 years with a range from 20 years to 60+ years. The largest proportion (40%) was in the 30-39 year age range. Women represented 75% of participants, however, boys were over represented (82%) as the focus child. This is consistent with international and national data showing a greater incidence of conduct problems in boys than girls (Church et al., 2007). The average age of the focus child was 4 years 9 months. Four participants (7%) identified as Maori and eight (17%) children were Maori.

Recruitment

Table 1 shows recruitment for HPS. There were 12 IYP groups each of which received between 14-17 IYP sessions of two and a half-hours. The total number of participants in IYP was 175 and 51 (29%) met the criteria for HPS. HPS was offered to all those who meet the criteria and 48 (94% of those eligible) accepted. The main reason for not accepting additional support was due to the number of agencies already supporting these families.

Table 1.

HPS Participant Recruitment and Retention

Category	Number
Participants	175
Meet Criteria for HPS	51
Accepted HPS	48
Completed IYP programme	43
Average number of IYP* sessions attended	12

*Total session range 14-17

Attendance and Retention

HPS attendance and retention in IYP is shown in Table 1. HPS participants had high levels of attendance with an average attendance rate of 12 sessions (80% of sessions). High attendance was reflected in course completion with 43 (91%) participants completing the IYP programme. There were five participants who did not complete IYP due to family responsibilities, health and transport issues, and/or employment. HPS families participated in an average of 14 (range 12-15) home coaching sessions in addition to attending IYP. This suggests a high level of acceptability for HPS in addition to IYP.

Progress

Table 2 shows pre- and post-test mean scores on EBCI Problem and Intensity scales and the SCS for HPS participants. Participants made significant improvement across treatment on all scales. The EBCI Problem scale mean score improved to within the normal range at T=58.31 (p=0.00) at post-treatment. Improvement on the EBCI Intensity scale was also significant (p=0.000) but the post-treatment mean score remained in the clinical range at T=63.27. The SCS mean score improved significantly (p=0.000) to be in the normal range (17.73) at post-treatment. Cohen's d for EBCI Problem Scale (d= 1.10) and SCS (d=1.09) indicated a large effect size. A medium effect size was achieved for EBCI Intensity Scale (d=0.72) (J. Cohen, 1992).

Table 3 shows the number of participants with scores in the clinical range at pre- and post-treatment. At pre-treatment the number of participants with scores in the clinical range, ranged between 40 (83%) on the EBCI Intensity Scale, 41 (85%) on the ECBI Problem Scale and the largest proportion was on the Social Competence scale with 46 (95%) participants. Additionally there were 40 (83%) participants with scores in the clinical range on all three scales. At post-treatment the proportion in the clinical range decreased on all scales. However there were still 16 (33%) in the clinical range on all three scales. While most participants achieved post-treatment scores in the non-clinical range, not all participants were able to achieve this.

Satisfaction

HPS Evaluation Questionnaire.

Responses showed 90% of participants found HPS helpful and reported positive improvements in their child's behaviour, and in relationships within the family. Child behaviour improvements included less aggression, improved communication, and being more settled. Participants' comments on

Table 2.

Pre-Post-Test Mean Scores for HPS Participants

Scores	N	Pre-Test Mean (SD)	Post-Test Mean (SD)	d	p
ECBI Problem T Scores	48	69.46 (8.78)	58.31 (10.23)	1.10	0.000
ECBI Intensity T Score	48	69.60 (8.55)	63.27 (9.04)	0.72	0.000
Social Competence	48	11.81 (4.74)	17.73 (6.08)	1.09	0.000

Note: Eyberg clinical range T>60. Social Competence Scale clinical range <17

Table 3.

HPS Participants with Scores in the Clinical Range at Pre-and Post-Intervention

Scales	Total N=48	Pre-Test n	%	Post-Test n	%
ECBI Problem T >60		41	85	16	33
ECBI Intensity T >60		40	83	10	20
Social Competence <17		46	95	18	37
ECBI Problem and ECBI Intensity and Social Competence Scale		40	83	16	33

Note. Eyberg clinical range T>60. Social Competence Scale clinical range <17

changes they noticed in themselves included "taking time to have fun", "listening more", "being calm myself", and "having confidence to implement the strategies effectively". Changes in parent behaviour indicated a greater understanding of child development and the importance of parents as role models for behaviour change. Five participants reported minimal or no change in child behaviour or in their own behaviour.

Discussion

This study shows that the addition of HPS was both acceptable and made a difference for most families with additional high risk factors. The high uptake and retention of HPS demonstrates that parents did not find the additional commitment to home visits onerous, but rather found it beneficial to have regular support, encouragement and coaching. Parents also achieved high course completion rates which is likely to result in better long-term outcomes as attendance at parent training programmes has been identified as a predictor of treatment outcomes, with poor attendance associated with poorer outcomes (Reyno & McGrath, 2006).

The HPS families in this study represent a sample of the most vulnerable families with high levels of behaviour problems. They represented 29% of the families attending IYP courses. These parents reported substantial improvement in their child's behaviour that was similar to other outcome studies on efficacy of IYP (Fergusson et al., 2009; Jones et al., 2008; Sturrock et al., 2013; Webster-Stratton et al., 2011). For these families to match outcomes similar to other studies suggests the addition of HPS has benefits for high-risk families. However, there were still some participants with post-treatment scores in the clinical range. This is concerning, as post-treatment scores in the clinical range are an indication that children are more likely to engage in delinquent acts in adolescence and are a predictor of poorer long-term outcomes (Webster-Stratton et al., 2011). Further refinement of the intervention may improve effectiveness for more families.

Parents who received HPS were highly satisfied with the intervention and appreciated the regular encouragement and support. Increasing parents understanding of behavioural principles and how they can support behaviour change helped parents reflect on their own behaviour and cognitions. This promoted more positive parent-child connections with fewer critical interactions. It is known that improving the parent-child relationship and reducing coercive interactions predicts better outcomes (Gardner, Hutchings, Bywater, & Whitaker, 2010; Webster-Stratton et al., 2011)..

In summary HPS was highly acceptable and was accompanied by good rates of retention and high parent satisfaction scores. There was evidence from both quantitative and qualitative measures that most of those receiving HPS experienced benefits that extended to the whole family. Improvement for HPS families is evident from this study, however it cannot be concluded that the additional support from HPS made the difference. The only definitive way to test this hypothesis is to carry out a prospective randomised controlled study. This is currently being carried out to test the additional benefit of adding HPS to IYP.

Limitations

There are a number of limitations to this study that need to be considered. Different people in various services collected the data. The timing of data collection and referral for HPS varied between group facilitators. There were no follow-up data to assess the maintenance of behaviour change. Some pre-course data were lost and these participants could not be included in the review resulting in a smaller sample size. The issues of retention were not always identified and addressed. Measures used were only parent report and thus vulnerable to reporting bias. Additional independent observations or reports would address this. The HPS intervention was exploratory and needs to be refined and standardised to ensure fidelity.

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Identifying Distinct Subgroups of Green Voters: A Latent Profile Analysis of Crux Values Relating to Green Party Support

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Abstract

The Green Party experienced unprecedented support in the 2011 New Zealand General Election. However, people may vote Green for very different reasons. The Green voter base is thus likely to be comprised of a number of distinct subpopulations. We employ Latent Profile Analysis to uncover subgroups within the Green voter base (n = 1,663) using data from the New Zealand Attitudes and Values Study at Time Four (2012). We delineate subgroups based on variation in attitudes about the environment, equality, wealth, social justice, climate change, and biculturalism. Core Green Liberals (56% of Green voters) showed strong support across all ideological/value domains except wealth, while Green Dissonants (4%) valued the environment and believed in anthropogenic climate change, but were low across other domains. Ambivalent Biculturalists (20%) expressed strong support for biculturalism and weak support for social justice and equality. Greens in Principle (20%) supported equality and social justice, but were less supportive of biculturalism. Our study identifies points of convergence (such as environmental values) and crux values that represent points of divergence (such as valuing social justice and Māori rights) across distinct subpopulations of Green voters. These results highlight the diversity of the Green voter base and identify different crux points the Green Party must manage in order to maintain and grow their diverse voter base.

Keywords: The Green Party, Latent Profile Analysis, Values, Voter Behaviour.

> These islands shine in the world for a tradition of ecological living, fair trade, human rights and peace.
> —Green Party of Aotearoa Vision Statement (2014)

The Green Party of Aotearoa benefitted greatly from the introduction of Mixed Member Proportional representation (MMP) in New Zealand in 1996. In the elections since, the party has consistently attained at least five percent of the party vote and thus reached the threshold to gain seats in Parliament. In the recent 2014 General Election, the Greens cemented their position as the third largest political party in New Zealand with 10.7% of the vote (New Zealand Electoral Commission, 2014). However, since the introduction of MMP, the Greens have arguably undergone fundamental shifts in policy priorities, most of which relate to an increasingly diverse focus that includes a strong voice on social policy.

We argue that the Green Party must maintain a careful balance in representing the interests and values of a potentially diverse voter base with varying levels of concern for ecological living, social justice, and human rights. As the party grows in appeal to a larger voter base, there may, however, be difficulties in maintaining this balance. It is possible, for example, that the party may risk fragmenting or losing part of their potential voter base as a result of alienating more conservative environmentalists through liberal social policies in non-environmental domains.

In the present study we aim to explore this possibility by assessing whether there are distinct subgroups of Green voters who differ in terms of their core social values and level of environmental concern.

The Green Party of Aotearoa

A brief history and context of the Green Party is warranted at this point. The Green Party of Aotearoa can be traced as far back as May 1972 to the formation of the New Zealand Values Party, which won 2% of the vote in the 1972 election (Bale & Wilson, 2006). Although the Values Party obtained an increased share (5.2%) of the vote in the 1975 election, the electoral system of the time (First Past the Post) meant that this did not translate into any seats in parliament. In 1990, members of the Values Party, including future co-leaders Jeanette Fitzsimons and Rod Donald, formed the Green Party (Green Party of Aotearoa, 2015). Under this new banner, the Green Party won 6.8% (and no seats) in the 1990 election. In 1993, the Greens entered into an alliance with a number of other left-wing parties, including NewLabour, the Democratic Party (previously Social Credit) and Mana Motuhake. Under the Alliance, the Greens successfully campaigned for the introduction of MMP and won three of the thirteen Alliance seats at the introduction of MMP in 1996. However, in 1997 the Greens announced that they would leave the Alliance and contest the 1999 election in their own right (Bale & Wilson, 2006). While the Alliance was later disestablished, the Greens continued on to consistently win at least 5% of the vote (and therefore win seats in Parliament) at each election since the 1999 election (Wilson, 2010).

The core policy priorities of the Greens have undergone a number

of changes since the establishment of the Party. In our reading of the political landscape, the Greens have shifted from primarily emphasising environmental concerns to being increasingly committed to issues which reflect broader social values, such as strong opposition to neoliberal reforms, militarism, and inequality. Although this can be seen as a way to potentially increase their voter base, broadening the platform also comes with a number of risks. For example, this diversification risks diluting the core message of the Green Party, thereby undermining their ability to make tangible changes or attract voters. The incorporation of left wing social values also risks alienating those who may be more conservative environmentalists, as they could be attracted by a purely environmental focus. Furthermore, the Green Party may be wary that this broadening of focus may lead to a schism within the Party (much like that of the Alliance) whereby the Party becomes divided over issues such as social justice, wealth or Māori rights.

Uncovering the configuration of Green voters' values is of fundamental interest to both the strategists of the Green Party, and political psychologists, whose primary interests include the ideological underpinnings of vote choice. Research within political psychology has tended to explore this question by investigating variables which may predict voting for one party instead of another. Here, we investigate within group differences to uncover whether or not subgroups of voters exist who all vote for the Greens but are distinct from one another in terms of key attitudes and values. For example, just how diverse is the Green voter base in terms of its values? Are there genuinely distinct subpopulations who voted Green for different reasons? And what are the core points of convergence and divergence for such subpopulations? Empirical research exploring such questions is scant at best. Here, we present a statistical model identifying sub-groups of Green Party voters from a nationally representative sample of New Zealanders, the New Zealand Attitudes and Values Study (N = 12,182). We utilise Latent Profile Analysis (LPA), to create a model of subgroups of Green

Party voters based on different patterns of endorsement for various attitudes and values relevant to the Green Party. LPA enables us to test the premise that when it comes to attitudes and values, Green voters are not all similar. Instead there may be distinct subgroups, which all voted for the Green Party, but who differ across key values and attitudes, and may vote Green for quite different reasons.

Previous opinion on the configuration of Green Party voters has been divided. For example, in the Australian context, Manning (2002) suggested that Green parties may lose support from their traditional voter-base through liberal social values. In comparison, Carroll, Casswell, Huakau, Perry, and Howden-Chapman (2009) tested a similar hypothesis in the New Zealand context by exploring social values as a possible reason for the relatively weak support for the Green Party in the 2005 election. Carroll et al. showed that support for environmental policies was correlated with support for social justice. They concluded that Green voters are likely to be liberal environmentalists. Thus, there seem to be two diverging perspectives on the possible nature and composition of the Green voter base. On the one hand, the Green Party may risk being divided over social justice issues. On the other, previous data implies that there may be a reasonably homogenous core group of liberal environmentalists who form the backbone of the Green voter base. Our use of LPA allows us to explicitly test these possibilities.

Latent Profile Analysis (LPA)

To examine Green Party support, we apply LPA to uncover subgroups of Green voters who show a similar pattern of responses across a range of theoretically relevant variables. LPA is a statistical method which is used to uncover different groups or profiles within a population (Hagenaars & McCutcheon, 2002). LPA uses response patterns from multiple continuous variables to group together participants into profiles, which we will refer to as latent subgroups. In our case, these variables are a range of theoretically relevant attitudes and values, rated by the extent that each participant endorses that attitude or value. LPA

builds a model by creating a latent variable which accounts for the hidden structure of response patterns across manifest variables, thus uncovering distinct sub-populations, or subgroups of Green voters. Furthermore, this method estimates the fit of the model to the given data, thereby allowing various models to be compared (Nylund, Asparouhov & Muthén, 2007).

Here, we employ LPA to determine the number of subgroups which best represents the data. Importantly, LPA identifies subgroups (or latent categories) without enforcing *a priori* pattern of profiles, thus summarising the variability of the data rather than restraining the data to what has been hypothesised (see Liu & Sibley, 2013, 2015; for discussion of the application of LPA in the social sciences). The application of LPA in the social sciences remains relatively novel, and has been used to examine patterns and variation in topics such as types of paranormal belief (Wilson, Bulbulia, & Sibley, 2014), attitudes toward bicultural policy (Sibley & Liu, 2013), experiences of deprivation (Osborne, Sibley, Smith, & Huo, in press), beliefs about climate change (Milfont, Milojev, Greaves & Sibley, in press), representations of historical figures (Hanke et al., 2015), and types of sexism (Sibley & Becker, 2012). In the context of the attitudes and values of Green voters, LPA allows for the identification of subgroups 'hidden' within the data, without relying on our ability to necessarily hypothesise their existence or directly measure them a *priori*.

Having identified distinct subpopulations of Green voters based on diverging patterns of values (what we refer to as latent subgroups), we then explore demographic differences amongst the subgroups, such as differences in education level, income, age, gender and ethnicity in order to identify the defining features of these profiles. These demographic differences between subgroups may have important implications for the stability and future direction of the Green Party of New Zealand.

Our use of LPA in this context provides a novel contribution to the study of politics, as statistical modelling of possible subpopulations is simply

not possible using earlier (and more well-known) ordinary least squares regression-based approaches. Previous studies, for example, have tended to assess the extent to which variation in attitudes and values may predict support for different political parties using more well-known regression-based models. For example, Cutts, Ford and Goodwin (2011) explored the values of the British National Party to ascertain the unifying features of the party. They showed that a range of different demographic and attitudinal variables predicted support for the British National Party, including racial prejudice and anti-immigrant sentiment. Although informative of the general or average extent to which different attitudes predict support for a given party, analyses of this type assume a 'one-size fits all model'. Thus, they do not allow for the possibility that there may be distinct subgroups who express different combinations of strong and weak support for a diverse range of issues.

LPA has been previously utilised to investigate political behaviour in New Zealand more generally. Greaves, Osborne, and Sibley (2014), for example, developed a model assessing the extent to which New Zealanders could be reliably categorised into different voter profiles depending upon the types of parties they tended to support (e.g., Sole-National supporters, National and ACT supporters, Labour and Green supporters, Sole-Labour supporters). Using LPA, Greaves and colleagues (2014) also identified a distinct latent voting bloc representing nearly a third of the sample, which they referred to as a 'Fence-Sitter' profile. This group of voters tended to be apathetic or neutral in terms of their support for all political parties. This work by Greaves and colleagues demonstrates that LPA can be successfully utilised to explore political party support in New Zealand. Our study represents a novel extension of this as we explore converging and diverging values within a political party to uncover whether or not subgroups exist within that party.

Additionally, LPA has also been used to uncover a variety of latent profiles in other domains. Notably, Weber and Federico (2013) examined the endorsement of 19 policy issues among North American undergraduates. Their results demonstrate significant heterogeneity in policy endorsement on each side of the political spectrum, but especially on the right. This suggests that people across the spectrum support political ideologies as a result of a vast range of attitudes and beliefs. However, Weber and Federico grouped participants according to where they fell on the political spectrum. In comparison, we use a manifest behaviour, vote choice, to group participants and uncover their values. Application of LPA to a group which is defined by vote choice will reveal whether or not heterogeneity exists within a distinct voting bloc.

In sum, LPA has proven fruitful for identifying different distinct categories of people who support different political parties (Greaves et al., 2014) and different combinations of social policy (Weber & Federico, 2013). However, as far as we are aware, LPA has not been previously used to look at the different categories of people who may vote for a political party for heterogeneous reasons. To uncover classes which are significant to the Green Party, we seek to build a latent profile model that identifies 'hidden' or latent subgroups within the population of Green voters by differentiating them on a set of core attitudinal and social values which are all relevant to the Green Party's vision statement and policy.

Green Party Values

Our analysis should help to resolve the contention within the literature and the media surrounding division within the Green Party over social issues (e.g., Manning, 2002; Carroll et al., 2009; Edwards, 2014). If our analysis identifies two large groups that are divided across value for social issues and value for the environment, this will provide empirical evidence for the hypothesis that social issues are crux issues separating distinct camps of Green voters. In comparison, if a majority group emerges which displays strong support for both social and environmental domains, this would provide support for the Greens' current balanced approach. However, it is also important to test a variety of other factors, such as support for Māori rights and value for wealth, so as to uncover whether these are further crux issues

within the Green voter base.

Importance of Values

There are a number of reasons to test values as points of convergence or divergence within political parties like the Greens. Here, we have chosen to utilise the widely-used Schwartz values as our measures of environmentalism, support for social justice and value for wealth (Schwartz, 1992). This framework theorises value for social justice, equality and the environment as being part of the domain of "universalism" which has been associated with left-wing parties in the past (Schwartz, Caprara & Vecchione, 2010). In comparison, value for wealth comes from the domain of "power" which is more likely to be supported by right-leaning/conservative parties (Schwartz, 2010). It is thus possible that many Green Party voters may value social justice, equality and environmentalism as they go hand-in-hand as universalism values. In comparison, Green voters (especially the most committed Green voters) may not value wealth to the same extent, as it comes from a domain which is not as aligned with Green Party values.

The alignment of New Zealand political parties with various values has also been explored (e.g., Wilson, 2004). Vowles, Aimer, Catt, Lamare, and Miller (1995), for example, argued that New Zealand's political parties can be understood using a model of "old" and "new" politics. These old political attitudes include issues such as state ownership of resources, welfare, regulation and unions. In comparison, social justice and ecological values, along with attitudes towards Māori, are framed as new political attitudes. Vowles et al. (1995) argue that the Green Party (at that time part of the Alliance) were primarily focussed on these new political attitudes. Thus, in our model we test environmentalism, value for social justice and attitudes towards Māori as new values which are crucial to understanding the Green Party.

Value for the Environment

As environmental issues are a primary concern of the Green Party, and what they are largely known for, we would expect Green voters to value

the environment to a greater degree than the average person. This is in line with O'Brien (2012), who argues that the success of the Green Party is contingent on their ability to maintain a consistent environmental message which provides a link to more mainstream concerns. Thus, it is possible that environmental support is a non-negotiable value of Green Party supporters which links in to more diverse issues. However, the extent to which they are homogenous in their support is unclear and it is possible that there are within group differences in terms of the degree to which Green voters value the environment.

Belief in Anthropogenic Climate Change

In line with its environmentalism, the Green Party asserts that climate change is caused by humans and is a genuine threat (Green Party of Aotearoa, 2014). Although there has been some evidence that the New Zealand population is not thoroughly convinced the climate change is anthropogenic (Sibley & Kurz, 2013), it is unlikely that this applies to Green Party supporters due to the party's unwavering stance on the issue.

The centrality of climate change as a core platform for the Green Party is further supported by Milfont, Harré, Sibley, and Duckitt (2012) who provide evidence that support for climate change actions predicts support for the Green Party. If there are indeed different latent subgroups within the Green voter base, it is possible that all of these subgroups will express strong support for polices that address climate change and protect the natural environment. In comparison, we might expect them to differ in key ways when it comes to support for Indigenous rights, value for wealth and value for social justice.

Value for Wealth

Although Green voters are likely to have relatively strong belief in anthropogenic climate change and high regard for the environment, it remains an open question as to whether they will be similar in the extent to which they value wealth. It may be, for example, that there is one core subgroup which is pro-environmental and anti-materialist. This is perhaps the most salient stereotype

that many people may have of the 'prototypical Green voter.' However, it is also possible that there are other voter profiles within Green supporters who value wealth to a greater degree. This possibility is highlighted by the Greens' billboard campaign during the lead up to the 2014 General Election, which advocates for a "smarter economy" (Green Party of Aotearoa, 2014). Furthermore, the continued existence of "eco-consumerism", by which environmentally-friendly products are sold at a premium, suggests that some environmentally minded people may hold and value wealth.

Relatively high value for wealth is an important possibility to explore, as if this is the case, then this may point to a so-called 'fracture-point' or division within Green voters that the party may need to carefully manage. In such a case, the Green Party may have to walk a fine line in satisfying their supporters who value economic prosperity and those that would sacrifice it (if it were a simple trade off), if it wants to retain support from both groups. The potential for disagreement on this point is highlighted by Milfont and colleagues (2012), who argued that fear of a reduction in standards of living inhibits people's support for parties who are actively challenging climate change.

Value for Social Justice and Equality

Values of social justice and equality tend to be endorsed by all New Zealanders, and are seen as a core part of New Zealand identity (Sibley, Hoverd, & Liu, 2011). Although there may still be variation in these values within the Green Party, it will tend to be in the range of strong support to those expressing extremely strong support. In our view, it is unclear as to whether Green voters, in particular, will be unified in their level of support for social justice issues (keeping in mind that this is a question about relative levels).

Historical events inform understanding of the position of social justice within Green parties. At the introduction of MMP in New Zealand in the 1996 election, a number of environmentally-focussed parties formed as centrist and moderate-right alternatives to the left-wing Green Party

(at that time part of Alliance). While these centrist and right-wing environmental parties experienced a low level of support and consequently dissolved, the Green Party has continued with a commitment to social justice issues above and beyond its environmental focus. However, as these alternative parties are no longer options, it is possible that the Green Party has gained some highly environmentally-focussed voters who do not necessarily view social justice concerns as being comparatively as important as other values. Moreover, there are potentially a number of voters who are attracted to the Green Party purely for their environmentalism and are either unaware of or unconcerned with their liberal social values. Thus, it is important that we test value for social justice and equality as possible divisive factors within Green voters. Along with wealth, we suspect that such values may provide another crux value which may differentiate profiles, although perhaps may not differentiate them quite as strongly given that we expect the overall level of support for social values and equality to be fairly strong (Sibley et al., 2011).

Support for Māori Rights and Representation

Although Sibley et al. (2011) found social justice to be endorsed to a large extent by all New Zealanders, attitudes towards Māori were more contentious. Thus, it is possible that Green Party voters' attitudes towards Māori may also reflect this division. Although we suspect that there may be a group of Green voters who see support for Māori culture and political power as in line with their support for social justice and equality, we doubt that similarly strong levels of support will be shared across the party. Importantly, these attitudes may be heterogeneous in themselves. Sibley (2010) argued that there are two ideologies which work together to legitimise material and symbolic inequality in post-colonial countries like New Zealand. Symbolic Projection versus Exclusion indexes the degree to which Māori culture is seen as central to New Zealand identity, while Historical Recognition versus Negation indexes the degree to which historical injustices experienced by Māori are seen

as relevant to contemporary society. Thus Symbolic Projection refers to the symbolic domain of intergroup relations, while Historical Recognition describes the material. Although Greaves, Osborne, Sengupta, Milojev, and Sibley (2014) found that overall increases in Green Party support are associated with decreases in Historical Negation and Symbolic Projection over time, it is unclear if Green Party voters will be unified in supporting these ideologies.

Furthermore, Sibley and Liu (2013) provide evidence that people fall into distinct profiles of beliefs about Māori culture and the relevance of past injustices. They utilised LPA to test attitudes towards biculturalism, with four classes forming; Pro-Bicultural, Moderate Differentiated, Bivalent Bicultural, and Anti-Bicultural. Sibley and Liu (2013) reported the percentage of people who voted Green in the 2008 election who fit each of these profiles. Their results suggest that almost half of Green Party voters adopted the Moderate Differentiated profile with moderate support across material and symbolic domains. Only a few were opposed across domains, or Anti-Bicultural, while Pro-Bicultural made up almost 20% of Green voters. The remaining 28% supported Māori symbolically but not materially, which suggests that there is a high level of diversity within the Green Party voter base. However, as this measured voters at the 2008 election, the impact of the increase in support for the Green Party in the 2011 election remains unclear. Moreover, it is important to investigate whether these attitudes, specific to Māori rights, align significantly with other attitudes, most notably broader concerns for social justice and equality.

Overview and Guiding Hypotheses

The current paper uses LPA to investigate patterns of support for ideologies and values of those who gave their party vote to the Greens in the 2011 election. Using the responses of those who indicated they gave their party vote to the Greens in the 2011 General Election in the fourth wave of the New Zealand Attitudes and Values Study (NZAVS), we modelled latent profiles. These profiles describe groups who share similar levels of support across seven domains: value for the environment, belief in anthropogenic climate change, support for equality, support for social justice, support for Māori culture, recognition of colonial history and material rights for Māori, and value for wealth. As strong support across all of these variables except value for wealth is best representative of Green Party policy, this allowed us to determine whether those who vote Green are unified in their values, or if they are a diverse group with different motivations for supporting the Green Party.

We expected there to be some heterogeneity in domain support within the Green Party, thus several distinct profiles should emerge. We predicted that a large primary subgroup reflecting the Green Party position of strong support across all domains except wealth would emerge, thereby giving the party its mandate for policy. However, we further hypothesised the emergence of a smaller subgroup with weak support across all domains except support for the environment and belief in anthropogenic climate change, representing a group who are purely motivated by environmental concerns. This group would encompass those who are primarily focussed on environmental issues but not concerned with social issues, and those who are unaware of the Green Party's position on social issues. Lastly, we expected there to be a group which is defined by their support for Māori culture and political rights, so as to provide a mandate for the Greens' supportive position on these issues (Green Party of Aotearoa, 2014). Although we did not predict any further distinct groups, LPA allows latent subgroups to emerge without a priori predictions. As there have been no Latent Profile models done on the diversity of values within the Green Party or within political parties generally, it was unclear as to how many distinct profiles would emerge, and what form they would take.

Method

Participant Details

We limited our analyses to the 1,663 participants (1,135 women and 528 men) who completed the NZAVS at Time 4 (2012) and stated that they had voted for the Green Party with their party vote in the 2011 General Election. This constituted 13.6% of the full NZAVS sample. It is worth noting here that The Green Party won 11.1% of the overall vote in the 2011 election, so the NZAVS oversampled Green voters by a margin of 2.5%.

The mean age of participants in our sample of Green voters was 46 years (SD = 14.10). In terms of ethnicity, 94% of Green voters identified as European (n=1,563), 12.7% as Māori (n=211), 2.2% as Pacific (n=37), 2.7% as Asian (n=45) and 2.5% reported another ethnicity or did not answer (n=41). The majority of Green voting participants were in paid employment (77.1%, n=1,283). In addition, 28.1% identified as religious (n=467).

With regards to education, 4.8% did not report their highest level of education or said they had no education (n=79), 15.6% reported finishing some high school (n=259), 12.6% reported having studied towards a diploma or certificate (n=209), 37.1% reported that they had studied at undergraduate level (n=617), and 30.0% reported studying at the post-graduate level (n=499).

Sampling Procedure

The Time Four (2012) NZAVS contained responses from 12,182 participants (6,805 retained from one or more previous waves, 5,377 new participants). This sample was drawn from two sources. Of the sample analysed here, 4,051 of these participants were retained from the original Time 1 (2009) NZAVS sample of 6,518 participants. These participants were randomly selected from the electoral roll (a national registry of voters, available for research purposes). The initial response rate of the original sample was 16.6%, with a retention rate of 62.2% over three years. 2,705 participants were also retained from earlier samples, having entered through non-random recruiting through a newspaper website, recruiting through Pasifika networks

and self-selecting in at previous years. Participants were posted a copy of the questionnaire, followed by a second copy two months later. Those who provided an email address were also invited to complete the questionnaire online instead.

Secondly, participants in Time Four (2012) of the NZAVS were drawn from five independent booster samples aimed at increasing sample diversity. The first of these consisted of a randomly selected sample of 20,000 people from the 2012 New Zealand Electoral Roll, of which 2,431 responded (representing a response rate of 12.34%). The second frame consisted of a regional booster of 10,000 people who lived in the Auckland region, randomly selected from the New Zealand Electoral Roll. 890 participants responded to this regional booster, representing a response rate of 9.04%. The third frame was also a regional sample. 3,000 people living in Christchurch who were randomly selected from the Electoral Roll, of whom 333 responded (adjusted response rate = 13.52%). The fourth frame randomly selected 9,000 people who lived in mesh block units which rated moderate to high in deprivation on the New Zealand Deprivation Scale on the Electoral Roll. Of these, 767 responded, representing an adjusted response rate of 9.73%. The fifth sample frame represented a random sample of those who identified as Māori on the 2012 Electoral Roll. Of the 9,000 randomly selected, 690 responded (adjusted response rate = 7.79%).

Deprivation at the Local Area Unit

We measured the affluence of participants' immediate (small area) neighborhood using the 2013 New Zealand Deprivation Index (Atkinson, Salmond, Crampton, 2013; see also Salmond, Crampton & Atkinson, 2007). New Zealand is unusual in having rich census information about each area unit/ neighborhood of the country available for research purposes. The smallest of these area units are meshblocks. The NZAVS includes the meshblock code for each participant. The geographic size of these meshblock units differs depending on population density. Each unit tends to cover a region containing

a median of roughly 81 residents (M = 95.95, SD = 73.49, range = 0-1899). In 2013, at the time of the latest census, there were a total of 44,211 meshblocks for which data was available.

Statistics New Zealand (2013) defined a meshblock as "a defined geographic area, varying in size from part of a city block to large areas of rural land. Each meshblock abuts against another to form a network covering all of New Zealand including coasts and inlets, and extending out to the two hundred mile economic zone. Meshblocks are added together to 'build up' larger geographic areas such as area units and urban areas."

The New Zealand Deprivation Index (Atkinson et al., 2013; Salmond et al., 2007) uses aggregate census information about the residents of each meshblock to assign a decile-rank index from 1 (most affluent) to 10 (most impoverished) to each meshblock unit. Because it is a decile-ranked index, the 10% of meshblocks that are most affluent are given a score of 1, the next 10% a score of 2, and so on. The index is based on a Principal Components Analysis of the following nine variables (in weighted order): proportion of adults who received a means-tested benefit, household income, proportion not owning own home, proportion single-parent families, proportion unemployed, proportion lacking qualifications, proportion household crowding, proportion no telephone access, and proportion no car access.

The New Zealand Deprivation Index thus reflects the average level of deprivation for small neighborhood-type units (or small community areas of about 80-90 people each) across the entire country. The index is a well-validated index of the level of deprivation of small area units, and has been widely used in health and social policy research examining numerous health outcomes, including mortality, rates of hospitalization, smoking, cot death, and access to health care, to name just a few examples (e.g., HURA Research Alliance et al., 2006; Mitchell, Stewart, Crampton, & Salmond, 2000; Salmond & Crampton, 2000; Crampton, Salmond, Woodward & Reid, 2000). In our sample, Green voters' mean score on this scale was 4.67 (SD=2.66), indicating

a moderate level of deprivation

Questionnaire Measures

Participants were asked "did you vote in the last (2011) New Zealand general election?" Those who answered yes (89.7% of the sample) also then answered the open-ended question "If yes, to which party did you give your electorate vote?" We selected only participants who had indicated that they had voted for the Green Party.

Social values were assessed using specific items from the Schwartz Values Scale (Schwartz, 1992) on a nine point scale, with -1 representing opposition to values and all other values falling between 0 (not important) to 7 (of supreme importance). Value for the environment was assessed by the statement "Protecting the environment (preserving nature)", value for equality was assessed by the statement "Equality (equal opportunity for all)", social justice was phrased as "Social justice (correcting injustice, care for the weak)" and wealth was assessed by "Wealth (material possessions, money)". Ratings were rescaled so that they ranged from 1 (low value) to 7 (high value) so that they had the same range as other item responses in our model.

Belief in anthropogenic climate change was assessed using the item from Sibley and Kurz (2013): "Climate change is caused by humans" on a scale of 1 (strongly disagree) to 7 (strongly agree).

Beliefs about the role of Māori culture in contemporary society were measured using three items from Symbolic Projection versus Exclusion scale developed by Sibley (2010). The items were: "New Zealand would be a better place to live if we forgot about trying to promote Māori culture to everyone", "I think that Māori culture helps to define New Zealand in positive ways" (reverse coded) and "I reckon that Māori culture should stay where it belongs – with Māori. It doesn't concern other New Zealanders". These were rated on a scale of 1 (strongly disagree) to 7 (strongly agree) and averaged to give an overall mean scale score.

Beliefs about the relevance of injustices experienced by Māori in today's society were assessed by the

Historical Recognition versus Negation scale (Sibley, Liu, Duckitt, & Khan, 2008). Items included "We should all move on as one nation and forget about past differences and conflicts between ethnic groups", "We should not have to pay for the mistakes of our ancestors" and "People who weren't around in previous centuries should not feel accountable for the actions of their ancestors". Items were rated on a scale ranging from 1 (strongly disagree) to 7 (strongly agree) and averaged to give an overall mean scale score.

Support for the Green Party was measured with the instruction to "Please rate how strongly you oppose or support each of the following political parties." The Green Party was listed as one of these parties and responses were measured on a scale of 1 (strongly oppose) to 7 (strongly support).

In terms of demographic features, gender was asked with the question "Are you male or female?" participants could tick a box indicating that they identify as female (coded as 0) or male (coded as 1). Education level was measured by "what is your highest level of qualification?" and coded as an ordinal variable, with -2 as no qualification, 0 as having obtained or studied toward a diploma/certificate, and 2 indicating the participant had obtained or studied towards a post graduate qualification. Age was measured with the question "What is your date of birth?" and was then coded in years.

Religion was gathered by the question "Do you identify with a religion and/or spiritual group?" and employment was measured with the question "Are you currently employed?", with both being coded with no as 0 and yes as 1. Birthplace was asked with the question "Where were you born?", with all answers that were "New Zealand" being coded as a 1 and all others as a 0. Ethnicity was measured with the standard NZ Census question "Which ethnic group(s) do you belong to?" with those who answered New Zealand European being coded as a 1 and all others being coded as a 0 for the New Zealand European demographic item. For the Māori ethnicity question, those who answered Māori were coded as one and all others were coded as a 0. For parenthood, participants were asked

"How many children have you given birth to, fathered, or adopted?" and those who answered 1 or above were coded as 1, and those who answered none were coded as 0. Participants were asked "what is your relationship status?" and those who answered that they were married, civil union, de facto, living together, or engaged were coded as 1, with single, dating, separated, and widowed being coded as 0.

Analytic Approach

Latent Profile Analysis (LPA) was used to examine the number of distinct subgroups emerging from the analysis of values, beliefs about climate change and attitudes toward biculturalism and Māori. In essence, this analysis allowed us to test the core premise that when it comes to these attitudes and values, not all Green voters are similar. Instead, there may be distinct subgroups, which all voted for the Green party, but who differ statistically in their values and attitudes, and may vote Green for quite different reasons. Having identified whether there are distinct subgroups, we extended our analysis to explore how

these different subgroups differ in core demographics, such as the proportion of men and women, levels of socio-economic deprivation, age, ethnicity, birthplace, parenthood, and education.

Results

Model Estimation

Latent Profile solutions ranging from two to seven profiles were specified in Mplus 7.2. Fit statistics for these models are presented in Table 1. Bayesian Information Criterion (BIC), the Akaike Information Criterion (AIC), and the sample size adjusted BIC (aBIC) are relative fit indices that compare each

model run on the sample to one another in terms of which model best explains the data (Nylund, Asparouhov, & Muthén, 2007). As more parameters are included, more variance is explained. The BIC is known to penalise these increases more harshly, while AIC is more liberal. Thus, a focus on the BIC tends to lead to the selection of simpler models, while a focus on the AIC in isolation is more likely to lead to the selection of more complex models (Posada & Buckley, 2004).

In interpreting the BIC and AIC, smaller values suggest that more variance has been accounted for. Results indicated that a four profile solution provided a good fit to the data. The final fit index we used to assess model performance was entropy. Entropy values range from 0 - 1.0, with higher values representing improvements in prediction (see Vermunt & Magidson, 2004, for discussion). Entropy indices for our analysis suggested that a four profile model was as effective as a six profile model and performed better than a five profile model. Thus on the basis of parsimony we opted for a four

Table 1. *Model fit for the different class solutions of the LPA.*

Class Solution	BIC	AIC	aBIC	Entropy
Two	33372.391	33253.257	33302.500	.778
Three	32877.191	32714.735	32781.885	.790
Four	32623.789	32418.013	32503.069	.814
Five	32490.401	32241.303	32344.266	.791
Six	32405.338	32112.918	32233.788	.814
Seven	32313.994	31978.253	32117.029	.825

profile solution. A four profile solution also provided a clear and interpretable solution, with the identification of additional profiles simply extracting more fine grained distinctions in the relative level of all indicators (with one profile splitting into two, both following the same pattern, but in which one profile reflected people with slightly higher scores than the other), rather than qualitatively distinct patterns of combinations of high/low belief.

Finally, we estimated the probability that each participant belonged to each of the four classes. The probabilities (averaged across participants) that a given participant belonging to a given

class would be correctly categorized are presented on the diagonal in Table 2. This provides an intuitive way to assess the reliability of the latent class model. As shown, these probabilities are all well above .85, indicating excellent classification likelihood and only a small average likelihood of incorrect classification.

Latent Subgroups

Means for the levels of support across the seven attitudes and values domains for each of the subgroups and the overall NZAVS sample are shown in Figure 1. All latent subgroups were relatively similar in three of the seven domains; with high value for the environment, strong belief in anthropogenic climate change and low value for wealth. However, value placed on social justice and equality, along with support for Māori culture and recognition of the importance of past injustices against Māori proved to be issues which differentiated the groups

The largest of the subgroups made up 56% of the sample. This group had relatively strong support across all domains except value for wealth and thus they were labelled as Core Green

domains of value for social justice, value for equality, Symbolic Projection

social issues when voting, and those with no awareness of the Green Party

Figure 1. Mean levels of support across attitude and value variables for the four subgroups and the overall NZAVS sample.
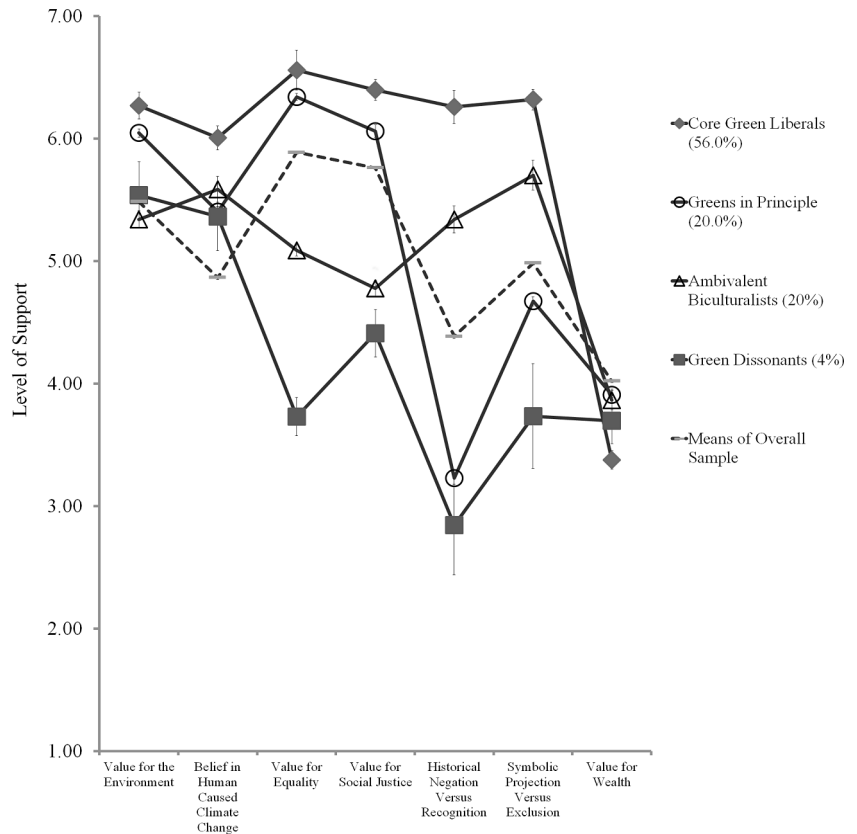

Table 2. Latent Class probabilities for most likely classification by latent class membership (row) and latent class (column).

	1.	2.	3.	4.
1. Green Dissonants	**.898**	.066	.000	.035
2. Ambivalent Biculturalists	.021	**.860**	.075	.044
3. Core Green Liberals	.000	.053	**.918**	.029
4. Greens in Principle	.018	.052	.066	**.864**

Values along the diagonal (shown in bold) represent the average probability that a person in a given latent class was correctly categorized as belonging to that class.

Liberals, as the values of this subgroup best reflected current Green Party policy. This subgroup was higher across all domains except value for wealth (on which they were lower) in comparison to all other subgroups. In comparison, the smallest subgroup, making up just 4% of the sample, was labelled Green Dissonants. This group had relatively weak support across the four contentious

and Historical Negation. They were strong in their value for the environment and belief in human caused climate change, but were weaker in all other domains. The small size of this subgroup suggests that very few people who vote Green do so purely for environmental concerns, as we expect this small group to encompass those who knowingly prioritise environmental concerns above

position on these social issues.

The two remaining latent subgroups were of equal size and in direct contrast to each other across the four disputed domains of value for social justice, value for equality, Symbolic Projection, and Historical Negation. The first of these groups were labelled Greens in Principle, due to their value for

social justice and equality being relatively strong but their support for Symbolic Representation and Historical Recognition being relatively weak. This pattern represented the values of 20% of the sample. In comparison, the final group we detected made up the final 20% and were labelled Ambivalent Biculturalists. This group valued social justice and equality to a weaker extent, but had strong support for symbolic Māori culture, and relatively strong support for material support for Māori when compared to the other subgroups.

Demographic Differences

Having identified a solution that performed well in terms of model fit while also making theoretical sense, we then examined differences in the demographic features of each group. We conducted a multinomial logistic regression predicting the likelihood of differential profile membership based on participants' demographic features of age, deprivation, gender, ethnicity, religious status, birthplace, employment, relationship status, and education levels. This regression analysis used a three-step approach which weighted the parameters based on classification likelihoods from our

LPA and is presented in Table 3. We assigned the majority group, the Core Green Liberals, as the reference class due to their size and alignment with Green Party policy. A significant effect of gender was found for each of the groups, with more men in the Greens in Principle (b = .394, p = .024), Green Dissonants (b = .696, p = .044) and Ambivalent Biculturalist (b = .402, p = .032) groups relative to the Core Green Liberals. This means that the Core Green Liberal group had a significantly higher proportion of women than any other group.

Table 3. Multinomial logistic regression predicting likelihood of differential profile membership (reference category is Core Green Liberals)

	b	se	t	p
Green Dissonants				
Intercept/Threshold	-2.065	1.503	-1.367	.172
Gender (0 female, 1 male)	.696	.346	2.011	.044
Age (years)	-.014	.015	-.953	.340
NZ Deprivation Index 2013 (1 – 10)	-.042	.061	-.688	.491
New Zealand European (0 no, 1 yes)	1.155	1.208	.956	.339
Māori (0 no, 1 yes)	-.887	.672	-1.320	.187
Born in New Zealand (0 no, 1 yes)	-.618	.361	-1.710	.087
Religion (0 no, 1 yes)	.045	.350	.127	.899
Parent (0 no, 1 yes)	-.397	.399	-.995	.320
Relationship (0 no, 1 yes)	.218	.394	.554	.580
Employment (0 no, 1 yes)	-.306	.366	-.836	.403
Education (ordinal -2 to 2)	-.535	.135	-3.957	.000
Greens in Principle				
Intercept/Threshold	-.954	.583	-1.637	.102
Gender (0 female, 1 male)	.394	.175	2.249	.024
Age (years)	.021	.007	3.003	.003
NZ Deprivation Index 2013 (1 – 10)	-.009	.032	-.286	.775
New Zealand European (0 no, 1 yes)	-.390	.372	-1.048	.294
Māori (0 no, 1 yes)	-1.067	.363	-2.937	.003
Born in New Zealand (0 no, 1 yes)	-.503	.191	-2.638	.008
Religion (0 no, 1 yes)	.119	.177	.673	.501
Parent (0 no, 1 yes)	-.333	.191	-1.740	.082
Relationship (0 no, 1 yes)	.210	.195	1.075	.282
Employment (0 no, 1 yes)	-.072	.206	-.352	.725

	b	se	t	p
Education (ordinal -2 to 2)	-.350	.076	-4.622	.000
Ambivalent Biculturalists				
Intercept/Threshold	-.368	.566	-.651	.515
Gender (0 female, 1 male)	.402	.188	2.140	.032
Age (years)	-.012	.007	-1.599	.110
NZ Deprivation Index 2013 (1 – 10)	-.043	.035	-1.238	.216
New Zealand European (0 no, 1 yes)	-.484	.393	-1.231	.218
Māori (0 no, 1 yes)	-.710	.313	-2.270	.023
Born in New Zealand (0 no, 1 yes)	.579	.250	2.313	.021
Religion (0 no, 1 yes)	-.515	.209	-2.464	.014
Parent (0 no, 1 yes)	.175	.216	.812	.417
Relationship (0 no, 1 yes)	-.118	.198	-.595	.552
Employment (0 no, 1 yes)	.029	.224	.131	.896
Education (ordinal -2 to 2)	.090	.079	1.129	.259

Note. These results employed a three-step approach which weighted the estimates based on the likelihood of profile membership.

Education levels also significantly predicted differential group membership. Lower levels of education predicted membership in the Greens in Principle (b = -.350, p < .001) and Green Dissonants (b = -.535, p < .001). There was no significant difference between the Ambivalent Biculturalist group and the Core Green Liberals (b = .090, p = .259). Thus, those in the Core Green Liberals are more educated than those in the Greens In Principle and Green Dissonants profiles, but not those in the Ambivalent Biculturalist subgroup.

A significant effect of age was only found for one profile, with older people being more likely to fall in the Greens in Principle group (b = .021, p = .003) than the Core Green Liberals. Age did not significantly predict membership into any other profile.

Māori ethnicity predicted group membership for the Greens in Principle (b = -1.067, p = .003) and Ambivalent Biculturalist (b = -.710, p = .023) profiles. Therefore, the Core Green Liberals has a significantly higher percentage of people identifying as Māori than the Greens in Principle and Ambivalent Biculturalist groups, but not the Green Dissonants.

Country of birth also had a significant effect in predicting profile membership. Those in the Greens in Principle group were significantly less likely to be born in New Zealand (b = -.503, p = .008), while those in the Ambivalent Biculturalists were significantly more likely to be born in New Zealand (b = .579, p = .021) when compared to the Core Green Liberals. There was no significant effect for the Green Dissonants.

Religious affiliation significantly predicted group membership for the Ambivalent Biculturalist group (b = -.515, p = .014). This means that the Core Green Liberals had a significantly higher proportion of religious members than the Ambivalent Biculturalist group. This was not the case when compared to any other profile.

The remaining demographic variables included in the model were unassociated with class membership. Thus, socioeconomic status (as assessed by the NZDep 2013 measure), employment, parenthood, relationship status, and European ethnicity did not uniquely predict profile membership.

The proportion of men, women, European and non-European, and so forth, in each of the latent profiles are presented in Table 4. Analyses of the proportion of people in each profile were based on a secondary analysis in which demographic variables were entered into a regression analysis predicting the classification probabilities of each of the four classes in turn (which were estimated and saved as scores in the primary analysis). We then used the values from this regression equation to estimate the proportion of each demographic group classified as belonging to each class, following the approach implemented in Milojev et al. (2014). Note that these proportions are based on the unique associations of each demographic, adjusting for all other demographics listed in Table 3. These results provide a descriptive supplement to the inferential statistics presented in the formal multinomial logistic regression model presented in Table 3. The overall proportion of each demographic who voted for The Green Party or another party in the NZAVS sample is also included in Table 4. As shown, and consistent with logits reported in Table 3, women were more likely to be Core Green Liberals, whereas men tended to be more highly concentrated in the other subgroups. Similarly, those of Māori ethnicity were more highly concentrated in the Core Green Liberal subgroup than any other subgroup.

Table 4. Proportion of men, women, European and non-European, and so forth, in each of the latent profiles, and that voted for The Green Party or not in the total NZAVS sample (analysis of demographic proportions in each latent profile are based on a secondary analysis of classification likelihoods from the primary logistic regression model).

		Green Subtype Classification Likelihoods			Total NZAVS		
		Green Dissonants	Ambivalent Biculturalists	Core Green Liberals	Greens In Principle	Not Voted Green	Voted Green
Gender							
	Men	.052	.222	.496	.231	.867	.133
	Women	033	.192	.589	.186	.822	.178
European							
	Yes	.040	.199	.563	.197	.926	.074
	No	.012	.239	.493	.255	.826	.174
Māori							
	Yes	.024	.192	.674	.111	.871	.129
	No	.041	.203	.543	.213	.833	.167
Born in NZ							
	Yes	.036	.212	.566	.186	.840	.160
	No	.052	.158	.535	.255	.835	.165
Religion							
	Yes	.037	.162	.581	.219	.891	.109
	No	.039	.217	.551	.193	.802	.198
Parent							
	Yes	.036	.214	.567	.183	.868	.132
	No	.044	.180	.546	.230	.741	.259
Partner							
	Yes	.038	.197	.554	.210	.847	.153
	No	.040	.210	.571	.178	.821	.179
Employed							
	Yes	.037	.202	.562	.199	.826	.174
	No	.046	.200	.550	.203	.872	.128
N		60	309	859	307	8683	1663

Note. Analyses of the proportion of people in each profile were based on a secondary analysis in which demographic variables were used to simultaneously predict each classification probability (CPROB in Mplus, saved as part of the output of the primary model). We then estimated predicted values (proportions) for each classification probability at (centered) conditional values for each categorical covariate. The predicted values thus adjusted for all other demographics included in the model. Note that we did not estimate conditional values for continuous covariates included in the primary model. 126 cases were excluded from this secondary analysis due to missing data on one or more demographic variable, yielding N = 1,535 for model predicting classification likelihoods.

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Differences in Support for the Green Party

We conducted additional analyses examining whether the different Green voter subgroups varied in their mean level of support for the Green Party. To examine this issue, we conducted a LPA which again estimated the same solution as our primary analysis, but modelled ratings of support for the Green Party as a continuous outcome variable using the three-step procedure developed by Lanza, Tan, and Bray (2013) to estimate distal outcome scores in LPA. At step one, this approach allowed us to estimate a standard latent profile model independent of covariates. Step two then estimated the most likely class variable, or the likelihood of each person's classification in a profile. In the third step, when using a distal approach, profile membership was used to predict covariates (here, demographic factors) that were weighted to adjust for misclassification in profile membership. The extent to which people in one profile differed from those in other profiles was then assessed using equality tests of the means and probabilities (for continuous and categorical covariates) across profiles.

The overall test for mean differences in support for the Green Party between the four Green voter subtypes was significant ($\chi^2(3)=221.38$, p<.001). Of the four classes, Green Dissonants (M = 5.52) reported weakest support for the Green Party, being significantly lower than the Core Green Liberals, who had the strongest support (M = 6.41; $\chi^2(1)=37.19$, p<.001). The Greens in Principle also expressed weaker support for the Green Party (M = 5.63), and this group did not differ in mean support from the Green Dissonant class ($\chi^2(1)=.49$, p = .483). Finally, the Ambivalent Biculturalists (M = 5.82) sat in the middle of the range, expressing significantly weaker support for the Green Party relative to the Core Green Liberals ($\chi^2(1)=90.37$, p < .001), but stronger support than the Greens in Principle ($\chi^2(1)=5.32$, p =.021) and also (marginally) the Green Dissonants ($\chi^2(1)=3.77$, p =.052).

In sum, while the people in each of these profiles all voted for the Green Party in the 2011 General Election, they expressed significantly different mean levels of support for the party overall. Put another way, strong support for the Greens was not homogenous across different profiles of Green voters.

Discussion

The current study investigated the attitudes and values of Green voters to uncover whether or not subgroups of Green voters exist. Over the past ten years the Green Party has arguably shifted to represent broader social values. This shift could in turn risk alienating more hardline environmentalists and thereby lose the Greens an important voter base. At the same time, the broadening of their policy platform away from a primarily environmental focus may, we suggest, put the Greens at risk of creating a schism within their voter base, should their voter base be divided on social issues. It is thus important to explore the values of Green voters to uncover whether or not distinct subgroups of Green voters exist, all of which vote for the Greens for different reasons.

Our analysis identifies four distinct subpopulations of people who all vote Green but who differ from one another in core social values and attitudes in key ways. Although all four of the subgroups that we identified valued the environment, believed in anthropogenic climate change valued social justice and equality, and placed relatively little importance on wealth, support for Māori culture and recognition of past injustice against Māori proved to be issues that distinguished the subgroups from one another. Thus, our first hypothesis that there would be heterogeneity in attitudes and values within Green Party voters was supported.

As we predicted, the largest of the groups reflected Green Party policy, with strong support across all domains except wealth. This group was labelled the Core Green Liberals and constituted 56% of the sample. The formation of this majority subgroup demonstrates that a large proportion of Green voters have values which align with current Green Party Policy. This group tended to be more educated when compared to the Greens in Principle and Green Dissonant subgroups, and had a significantly higher proportion of women when compared to any other group.

Consistent with our predictions, a small group formed which did not align with Green Party values except in their support for the environment and belief in anthropogenic climate change. This group was labelled Green Dissonants and made up 4% of the sample. Although small, this group remained stable across different profile solutions, suggesting that it exists and is distinct from the other groups within the voter base. The Green Dissonants profile would encompass those who are unaware of the Greens' social policy, along with those who are aware but purely motivated by environmental concerns. This group was significantly less educated than the Core Green Liberals. This suggests that there are distinct groups of voters who have diverse motivations for voting Green.

The last two groups each made up 20% of the sample and were divided across support for Māori culture and recognition of past injustice and value for social justice and equality. The first of these profiles, the Ambivalent Biculturalists, consisted of those who were strongly supportive of Māori culture and recognised past injustice against Māori. Interestingly, they had relatively low value for social justice and equality, suggesting that they were largely motivated by their concern for Māori issues. This is in contrast to the Green Party position, which situates broader social justice principles as underlying support for Māori (Bale & Wilson, 2006). Members of this group were significantly more likely to have been born in New Zealand but less likely to be religious. This subgroup were significantly less likely to be of Māori ethnicity when compared to the Core Green Liberals, suggesting that this subgroup is not motivated by self-interest as could be suggested.

Although we hypothesised the existence of these first three subgroups, we did not predict a specific profile evidenced by the Greens in Principle subgroup. The uncovering of unforeseen subgroups is made possible by LPA, which creates models which best explain the heterogeneity of manifest variable and how they interact with each other, rather than enforcing an *a priori* pattern on the data. The Greens in Principle subgroup represented those who had strong support for social justice and

equality, but weaker support for Māori culture and lower recognition of past injustice against Māori. This subgroup had significantly lower proportions of those born in New Zealand and people of Māori ethnicity. They also had significantly lower education levels in comparison to the Core Green Liberals. These last two groups provide further evidence for our first hypothesis, that there are distinctly different groups within the Green Party who vote for the Greens for diverse reasons.

Our findings would seem to contradict the argument that the Green Party would benefit from maintaining a primarily environmental stance (Manning, 2002; Edwards, 2014). The Core Green Liberals embody the vision statement quoted in our epigraph, with attitudes and values consistent with a desire for New Zealand to embrace "a tradition of ecological living, fair trade, human rights and peace" (Green Party of Aotearoa, 2014). This subgroup constituted 56% of the Green voter base. As show in Figure 1, the Greens in Principle (20%) were similar to the Core Green Liberals in their expressions of strong support for social justice and equality. Put another way, roughly three quarters of Green voters thus expressed strong support for social justice and equality. The Ambivalent Biculturalist (20%) subgroup were similar to the Core Green Liberals in a different domain, in their expressions of strong support for Māori rights. Thus, three quarters of Green voters also expressed strong support for Māori rights, although the people doing so only partially overlapped with those expressing strong support for social justice and equality (i.e., those in the Core Green Liberal subtype who were high on both). This implies that if the Green Party were to change their position in any of these domains, it may risk departing from the values held by roughly three quarters of their voter base, just a different three quarters depending on the position in question.

We also provide empirical support for O'Brien's (2012) position that the success of the Green Party is contingent on their ability to maintain a consistent environmental message which provides a link to more mainstream concerns. The unifying factors of the party were

high value for the environment, high belief in anthropogenic climate change and relatively low value for wealth. These were supported universally by the four latent subgroups. Thus, it appears there is not a group within the Green Party who vote for only non-environmental factors. The lack of a non-environmental group suggests that the Greens are able to attract supporters by linking environmental concern with more diverse issues, such as social policy and support for Māori. Attracting supporters in this way has some interesting implications for the future positioning of the Green Party, as attracting new voter bases may rely on the Greens' ability to link their environmental position with economic or geopolitical concerns.

These findings highlight the nuances of the relationship between values and voting behaviour. For example, we have found that the vast majority of Green supporters do not vote purely as a result of their environmental values, but in unison with other concerns, such as concern for Indigenous rights and culture, or value for social justice and equality. Furthermore, no group had weak support for the environment, suggesting that people do not vote for the Greens if they do not value the environment. However, it is unclear as to whether or not this is their primary motivation for voting Green. Although we determined the extent to which voters endorsed various attitudes and values, we were unable to explore how these attitudes and values were weighted in relation to their vote choice. For example, those in the Ambivalent Biculturalist group may choose to vote Green primarily as a result of their attitudes towards Māori, with the environmentalism as a secondary concern.

Whether or not environmental concerns are primary motivation for vote choice, or a secondary concern, has important implications for both the Greens and larger parties. For example, if future research uncovers that the environment is not a crucial motivation for voting it may shift how environmental issues are treated in the lead up to future elections and during governmental terms. Researchers should seek to uncover the extent to which

people weigh various attitudes and values when voting, especially in a multi-party system, so as to explore this relationship further.

Our findings speak to this question to some extent. Our model indicates that only 4% of Green Voters (those belonging to the Green Dissonant profile) are motivated purely by their concern for the environment. On the one hand, this could be seen to support Manning's (2002) position that the Greens have alienated a voter base of centrist environmentalists, as this group of solely environmentally concerned Green voters is small. However, it is unclear as to whether there is a group of people in the voter base who would vote for the Greens should they shift to a primarily environmental focus. Instead, it appears likely that most people are mobilised by a number of values, all acting in unison to provide the foundation for vote choice.

This position is in line with the findings of Carroll et al. (2009) that environmentalism was correlated with left wing social values. Vowles and colleagues' (1995) work provides further support for this position, as they provide evidence that certain values cluster together, into groups of old and new political attitudes. Thus, the Greens' environmentalism can be seen as working in unison with a number of other new political attitudes (such as support for Māori and social justice) to motivate people to vote Green. Thus, it appears risky for the Greens to become a primarily environmentalist party, as it is likely that very few people would be motivated purely by environmentalism. Rather, it appears that people vote as a result of a number of attitudes and values, all acting in unison.

The Green Dissonants profile includes voters who choose to vote for a party which does not represent their social values and attitudes towards Māori, and also those who perhaps have no knowledge of the Greens' policies of strong support for social justice, equality and Māori rights and are only aware of the Greens' environmental position. As the fourth wave of the NZAVS did not test political sophistication or knowledge, we are unable to differentiate between these two groups. Future research could answer

this theoretically interesting question by testing the political sophistication of Green voters to see whether this group is itself heterogeneous in non-environmental values.

Our secondary analysis of party support can provide some insight into these issues of political knowledge and identification. We found that those in the Core Green Liberal group expressed stronger support for the Green Party than any of the other three subgroups. This finding is not surprising, as this group is voting for a party which fits with their position across a range of attitudes and values. However, it is interesting to note that the Greens in Principle subgroup expressed a similarly weak level of support for the Greens as that of the Green Dissonants class, while the Ambivalent Biculturalist class was in the middle of the range. This suggests that the Greens in Principle and Green Dissonants subgroups do not identify with the Greens as much as those in the Ambivalent Biculturalist, or to a greater degree, the Core Green Liberals. This is of interest to strategists of the Green Party and rival parties, as it suggests that those in the Green Dissonants and Greens in Principle profile are not as supportive of the Green Party and thus more likely to change their vote in future elections.

Conclusion

Our analysis indicates that there may be distinct Green policies that attract quite distinct types of voters. The Green voter base, in other words, is composed of a number of distinct subpopulations who differ across a number of crux values. We employed Latent Profile Analysis to model these different subpopulations and examine their values, attitudes and demographic characteristics using data from the Green voter base sampled from the broader and nationally representative New Zealand Attitudes and Values Study. We uncovered four distinct profiles that differed in their pattern of support across seven attitudinal domains; value for the environment, equality, social justice, wealth, belief in anthropogenic climate change, views about historical injustice and reparations for Māori, and value for Māori culture.

The largest of these profiles, the Core

Green Liberals (56%), showed strong support across all ideological/value domains except wealth. By comparison, the smallest, Green Dissonants (4%), valued the environment but expressed less support for the other ideological/value domains we examined. Ambivalent Biculturalists (20%) valued equality and social justice to a lesser extent, while they had relatively strong support for Māori culture and reparation for past injustice. Greens in Principle (20%) expressed strong support for equality and social justice, but weaker support for the rights of Māori. Our study identifies points of convergence (such as environmental values) and crux values that represent points of divergence (such as valuing social justice and Māori rights) across distinct subpopulations of Green voters. As political parties generally seek to increase their market share (see Lees-Marshment, 2001), a key challenge for the Green Party will be continuing to grow its voter base while representing the interests of the diverse subpopulations of Green voters.

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The Pacific Identity and Wellbeing Scale – Revised: Comparisons across Pacific groups

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We test the factorial equivalence of the Pacific Identity and Wellbeing Scale – Revised (PIWBS-R) across the four largest Pacific Nations groups in New Zealand (Samoa, Cook Islands, Tonga, Niue). Using Multigroup Confirmatory Factor Analysis (N = 684) we show that the PIWBS-R exhibits similar properties within each Pacific group. Results indicate that across the four groups, the PIWBS-R shows the same basic factor structure, item factor loadings and intercepts. We also compare the group means for the individual factors of the PIWBS-R, whilst statistically adjusting for demographic covariates. Results showed a small but significant difference in Religious Centrality and Embeddedness, where Tongan participants scored higher relative to both Cook Island and Niuean participants. These results mirror population proportions of religious affiliation within Pacific groups in NZ. There were no other significant differences between groups in the other factors of the PIWBS-R. Together, these results provide strong evidence of the PIWBS-R as a valid tool for research with Pacific peoples at a general level, and within specific Pacific ethnic groups.

Keywords: Pacific Nations, Identity, Wellbeing, Measurement Equivalence

Introduction

Quantitative research on Pacific identities and wellbeing is a growing area of interest for Pacific researchers (Savila, Sundborn, Hirao & Paterson, 2011). One advancement in this area is the development and revision of the Pacific Identity and Wellbeing Scale (*PIWBS-R*: Manuela & Sibley, 2015). The *PIWBS-R* is the first psychometric measure developed specifically for Pacific peoples in New Zealand (NZ) and provides researchers with alternative avenues to explore Pacific identities and wellbeing. Here we test the measurement equivalence of the *PIWBS-R* and provide evidence to show it holds similar psychometric properties across the largest Pacific Nations groups represented in NZ (people from Cook Islands, Niue, Samoa and Tonga). We also compare the *PIWBS-R* across the Pacific Nations groups while controlling for key demographic variables that may influence identity and wellbeing.

The *PIWBS-R* is a culturally appropriate measure that assesses six factors of Pacific identity and wellbeing. It was developed through an integration and synthesis of both Pacific and psychological research concerning ethnic identity and subjective wellbeing (See Manuela & Sibley, 2013, 2014a, 2014b). It is a unique tool as it provides a quantitative approach to understanding the holistic conceptualisation of the Pacific self (see for example the Fonofale model of health: Crawley, Pulotu-Endemann & Stanley-Findlay, 1995). The *PIWBS* has six factors assessing *Perceived Familial Wellbeing, Perceived Societal Wellbeing, Group Membership Evaluation, Pacific Connectedness and Belonging, Religious Centrality* and *Embeddedness* and *Cultural Efficacy*. A formal list of construct definitions for the six PIWBS subscales is presented in Table 1 (see next page) and a list of items is presented in the appendix

The *PIWBS-R* is both a specific and general measure of identity and wellbeing (Manuela & Sibley, 2015). On the one hand, the *PIWBS-R* is specifically tailored to Pacific peoples. In this instance, it has more nuanced representations of ethnic identity and wellbeing pertinent to Pacific peoples. This separates it from more general measures such as the Multigroup Ethnic Identity Measure (Phinney, 1992) that assesses ethnic identity as a general phenomenon across all groups, and does not take on a holistic approach that includes measures of wellbeing or religion. On the other hand, the *PIWBS-R* was not developed for any one specific Pacific ethnic group. Instead, it is based on the common elements of identity and wellbeing across Pacific groups. In this way, the *PIWBS-R* is a general measure of ethnic identity and wellbeing specific to Pacific peoples.

In the initial development of the tool, Manuela & Sibley (2013) reflected on how it is "*a pan-Pacific scale in construct, aimed at being relevant equally for all Pacific peoples*" (p. 99). This paper seeks to test this earlier aim and with causes that extend beyond the psychometric. The *PIWBS-R* is a tool that is responsive to the needs of Pacific communities and Pacific researchers. One such need is a call for more ethnic specific interventions for Pacific communities, for example Pacific community perspectives on suicide prevention that include ethnic specific approaches and the importance of a secure cultural identity (Le Va, 2014). By providing evidence that a pan-Pacific measure can be used with single Pacific groups, we attempt to answer this call.

Testing Factor Equivalence

Because the *PIWBS-R* is developed for research with Pacific peoples at a general level, we need to show that it is suitable for use across Pacific groups. In other words, do the psychometric properties of the *PIWBS-R* hold across individual Pacific groups represented in NZ? Pacific peoples, as a group are a diverse population, so we need to show that the *PIWBS-R* is actually assessing the same constructs for different groups. That is, do Samoan people, for example, respond to the items in a similar way, or interpret them as referring to the same Pacific concepts, as Tongan

Table 1. Construct definitions for the Pacific Identity and Wellbeing Scale – Revised (PIWBS-R; from Table 1. Manuela & Sibley, 2015).

Factor	Construct Definition
Perceived Familial Wellbeing (PFW)	Perceived satisfaction with one's family. Indicated by satisfaction with familial relationships, respect, happiness and security.
Perceived Societal Wellbeing (PSW)	Perceived satisfaction with NZ society. Indicated by satisfaction with support from government, local communities and one's position in NZ society.
Group Membership Evaluation (GME)	Subjective evaluations of one's perceived membership in the Pacific group. Indicated by positive affect derived from group membership.
Pacific Connectedness and Belonging (PCB)	A sense of belonging and connections with Pacific others and the Pacific group at a general level.
Religious Centrality and Embeddedness (RCE)	The extent to which an individual feels that religion is intertwined with one's Pacific culture and identity.
Cultural Efficacy (CE)	The extent to which an individual feels they have the personal and cultural resources to act within a Pacific cultural or social context.

peoples, Cook Island peoples, or Niuean peoples? This is the same conceptual problem that cross-cultural research faces when aiming to compare scores on the same scale, for example self-esteem, across different cultural contexts, nations and languages (Farruggia, Chen, Greenberger, Dmitrieva & Macek, 2004; Schmitt & Allik, 2005).

MCFA is an extension of Confirmatory Factor Analysis (CFA – see Kline, 2005, for an introduction to CFA and Walkey & Walch, 2010, for an introduction to EFA). MCFA provides a way to test factorial equivalence by estimating a CFA model for separate groups (in our case, Pacific Nations groups) at the same time (Jöreskog, 1971). Factorial equivalence (otherwise known as measurement invariance) in a specific sense is defined by Kline (2005) as "*whether a set of indicators assesses the same constructs in different groups*" (p. 295) and can be assessed at three levels: configural, metric and scalar. These three levels increase in how stringent a test they provide for equivalence.

Configural equivalence assesses the extent to which the same basic factor structure, or loading pattern, holds across different groups. In our case, configural equivalence reflects the extent to which all the items assessing each factor hang together; or the extent to which the measurement model is similar across groups. Metric equivalence (or measurement unit equivalence/construct equivalence) is a step up from configural equivalence because it tests the extent to which the factor loadings themselves are similar. In the case of the *PIWBS-R*, metric equivalence would thus indicate that the actual values for the factor loadings are comparable. This would imply that different groups are interpreting the questions in the same way, or that the same construct is being assessed across groups. Scalar equivalence is more restrictive again. Extending the assumptions for configural and metric equivalence, tests of scalar equivalence assess whether the intercepts for the indicators are comparable across groups. In the case of the *PIWBS-R*, scalar equivalence would indicate that in addition to the pattern and values for factor loadings being similar, the intercept (mean) scores on the actual

PIWBS-R items are comparable too. This is important because in addition to the same intervals, if the model shows scalar invariance, then the scales share the same origins across groups thus indicating that comparisons of mean differences in the latent scale scores are valid.

Pacific Peoples, Identity and Wellbeing

We compare mean scores on the PIWBS-R constructs across four Pacific Nations in NZ (Cook Islands, Niue, Samoa and Tonga). Although we only focus on the four largest Pacific groups, there are numerous groups represented in NZ. As a whole, Pacific peoples make up approximately 7.4% of the NZ population, and consist of communities from Samoa (49%), Cook Islands (21%), Tonga (20%), Niue (8%), Fiji (4%), Tokelau (2%), Tuvalu (1%), in addition to smaller communities from other Pacific Nations (3%).

While the specific Pacific Nations communities deserve to have their unique cultures and histories recognised within research, quite often it can be difficult to collect large enough samples to reach statistical power. As such, Pacific peoples are often systematically categorised into a single group in research which can conceal inter-group differences, such as variability in Pacific peoples' mortality rates (Statistics New Zealand and Ministry of Pacific Island Affairs, 2011). This can lead to a misconception of a single group. However, there are shared histories and experiences of Pacific peoples that have allowed them to develop a unique identity that is different from the first Pacific migrants (see Macpherson, 1996 for an extensive review and history of Pacific peoples in NZ). We do not aim to define or test this theorized collective identity. We do note, however, that the *PIWBS-R* was explicitly designed to draw on and represent identity and wellbeing common across the Pacific groups (Manuela & Sibley, 2013).

The demographic characteristics of initially immigrant populations, such as Pacific peoples, are important to consider when conducting research. For example, in a study of discrimination and psychological distress for Asian adults in America, ethnic identity

buffered the effect of discrimination for middle-aged individuals born in America, whilst exacerbating the effect for American-born individuals above and below middle age (Yip, Gee & Takeuchi, 2008). It is possible that demographic characteristics of Pacific peoples may also influence relationships between ethnic identity and wellbeing in a similar manner. As a general group, Pacific peoples are young and highly religious relative to the overall NZ population, with an increasing proportion born in NZ (Statistics New Zealand, 2014). To account for this, we will compare group means whilst statistically adjusting for gender, age, country of birth and religious status. We provide a brief outline of how these variables could influence Pacific identities and wellbeing

Age

As a group, Pacific peoples are very young. Pacific peoples have a median age of 21.1 years (compared to 41 years for Europeans), giving them the highest proportion of young people of any ethnic group in NZ (Statistics New Zealand, 2014). Research from a national study on NZ youth shows that Pacific secondary school students report high levels of ethnic pride and the importance of being recognised as a member of their ethnic group relative to other non-Pacific ethnic groups in NZ (Clark et al., 2013).

There have been suggestions of intergenerational differences within Pacific communities. Pacific cultures are generally gerontocratic where the voices of elders are given authority over the voices of youth. This can potentially lead to cultural conflicts with Pacific youth in NZ feeling marginalised within their own cultural contexts (Tiatia, 1998). However the influences of older Pacific generations are crucial for the identity development of many Pacific youths. It is very common for Pacific families to have multiple generations within a single household, with older generations usually instilling cultural values into younger generations (Pene, Peita & Howden-Chapman, 2009). Previous research with the *PIWBS-R* has also shown that age is associated with confidence in speaking a Pacific language (Manuela & Sibley, in press)

which may also assist in the transfer of cultural knowledge to younger generations.

Age is an interesting covariate for Pacific peoples as it shows how demographic variables are related to each other, the combination of which could influence scores on the *PIWBS-R*. For example, older Pacific individuals are more likely to have been born overseas and more likely to identify with a religion (Statistics New Zealand, 2007) both of which are outlined in more detail below. As such, we control for age in our analyses to adjust for potential differences in our scores.

Country of Birth

The country of birth of Pacific peoples highlights the biggest change among Pacific communities in NZ. Originally a migrant group in the 1950's, approximately 60% of the Pacific populations that reside in NZ are now NZ-born and this is likely to increase. There are also more Cook Islands and Niue peoples born and/or living in NZ than there are born and/or living in the Cook Islands and Niue. The increasing proportion of Pacific peoples being born and raised in NZ has led to changes in the ways that Pacific identities are expressed and conceptualised.

Early Pacific settlers tended to identify their selves along their village and familial lines as they did in their respective mother-nations (Macpherson, 1996) despite being viewed as a homogenous group by non-Pacific others in NZ. The subsequent generations of the early Pacific migrants found themselves in a social context markedly different to the one the previous generation grew up in, where they interacted with others from a variety of Pacific and non-Pacific backgrounds in a largely multicultural setting. The subsequent NZ-born generations found they had common experiences with each other that differed from those of the Island-born generation before them. Although there are first-generation Pacific migrants and NZ-born Pacific peoples of all ages, the majority of Pacific youth are born in NZ.

The influence of the NZ context on the identities of Pacific peoples born highlights the complexity of Pacific identities in NZ. For example,

Anae (1998) explored the identity journey of NZ-born Samoans within the church setting, and how individuals came to what she defined as a 'secure identity' in which one readily defined their self as Samoan. Similarly, Tiatia (1998) explored the experiences of NZ-born Pacific peoples, highlighting experiences of being caught between cultures; trying to navigate what it means to be engaged in both Pacific culture and NZ society when the cultural values of both may contradict each other. Furthermore, Mila-Schaaf (2010) explored the experiences of NZ-born Pacific peoples and how exposure to both Pacific and NZ social spaces was advantageous to individuals.

There are noted differences in mental health between Pacific peoples born in NZ and in the Pacific. Findings from Te Rau Hinengaro, a NZ mental health survey, show that 31.4% of NZ-born Pacific people had a mental disorder within the past 12 months of the time of the survey relative to 15.1% of those born in the Pacific (Foliaki, Kokaua, Schaaf, & Tukuitonga, 2006). It is important to note that age at the time of migration to NZ was influential in the experience of mental disorder rather than the time since migration. For example, of those born in NZ, 93.6% were aged under 45 compared to 47.1% of those who had migrated at 18 years or over.

These findings could represent the immigrant paradox, a counter-intuitive finding that second-generation individuals experience more negative outcomes than their immigrant counterparts (Sam, Vedder, Ward, & Horenczyk, 2006). The results of Te Rau Hinengaro show some evidence of the immigrant paradox with NZ-born Pacific peoples experiencing higher prevalence of mental disorders (Foliaki, Kokaua, Schaaf, & Tukuitonga, 2006). Additional research with Pacific youth has found evidence of first and second generation immigrants reporting higher levels of wellbeing than their NZ-born peers (Spijkers, 2011). This highlights a need to understand how both Pacific identities and wellbeing may be influenced within an acculturative process, and how taking into account one's country of birth may provide a more nuanced approach to understanding wellbeing outcomes. It is also possible that the experience and development of ethnic identity and wellbeing differs between NZ-born and Pacific-born individuals. As such, we control for birthplace in our analyses to adjust for potential differences in scores.

Religion

Religion plays a crucial role in many Pacific cultures in New Zealand.

Table 2

Proportion of religious affiliation and non-religious affiliation by Pacific ethnic groups in New Zealand from each census year (Data from Statistics New Zealand).

	At least one religion				No Religion			
Year	1996	2001	2006	2013	1996	2001	2006	2013
Cook Is.	.82	.77	.70	.65	.18	.21	.24	.31
Fijian	.85	.79	.82	.83	.15	.15	.15	.15
Niuean	.82	.76	.70	.66	.18	.22	.24	.30
Samoan	.92	.90	.86	.83	.08	.09	.11	.14
Tokelauan	.95	.91	.86	.83	.05	.09	.10	.14
Tongan	.94	.92	.90	.88	.06	.07	.08	.10
Tuvaluan	-	.97	.96	.93	-	.02	.02	.05

The Pacific group at a general level is highly religious with approximately 82% of Pacific peoples affiliating themselves with at least one religion in the 2006 NZ census (compared to 61% of the total NZ population). Religion, religious practices and spirituality have been widely researched in Pacific communities, largely in regards to the role of religion in culture. For example, Macpherson (1996) notes that many early Pacific migrants to NZ viewed their church as a village away from the islands. In their explorations of ethnic identity for NZ born Pacific peoples, identity narratives were explored within Church settings (Anae, 1998; Tiatia, 1998). Religious practices such as church attendance have also been seen as an avenue to promote and improve health outcomes for Pacific peoples (Dewes, Scragg& Elley, 2013) and recognised as a critical aspect of counselling for Pacific clients (McRobie & Makasiale, 2013).

The NZ population as a whole has seen a steady decline in religious affiliation. It appears that the Pacific population has followed suit, although to a lesser extent. Over the 10 year period from 1996 to 2006, the proportion of Pacific peoples that affiliated with at least one religious group decreased from 89% to 83%. A more nuanced look into religious affiliation across Pacific communities shows that the proportion of people that affiliate with at least one religious group has decreased across most Pacific groups, but this decrease is more pronounced amongst Cook Island and Niuean communities (see Table 2). Furthermore, the proportion of Pacific peoples that identified with no religion has increased across all Pacific groups (except Fiji which has remained relatively consistent) with the highest proportions in the Niue and Cook Islands groups. It is interesting to note that those that do not affiliate with any religion tend to be younger and New Zealand born, which suggests that there may be a change in the role of the church in the lives of Pacific youth in NZ (Anae, 2011). Despite the decreasing proportion of religious affiliation and increasing proportion of religious non-affiliation, the Pacific groups are still the most religious in New Zealand, even amongst Niue and Cook Islands groups

As the proportion of Pacific peoples affiliating with a religion is changing and the suggestion of a change in the role of churches (and potentially religion) in the lives of Pacific peoples, we opt to include religious status as a covariate in our analyses. It is possible that identification with a religion may influence scores of the *PIWBS-R*, particularly the Religious Centrality and Embeddedness factor.

Overview and Guiding Hypotheses

To show that the *PIWBS-R* is a suitable pan-Pacific tool for identity and wellbeing research, it is imperative that the scale is suitable for the groups it was developed for. Here, we will test the measurement properties of the *PIWBS-R* with the four largest Pacific groups in NZ: Cook Islands peoples, Niuean peoples, Samoan peoples and Tongan peoples. We will first conduct a MCFA to see if the relationship between the scale items and their latent constructs hold across the four Pacific groups. As the *PIWBS-R* was developed upon general aspects of identity and wellbeing pertinent to Pacific peoples, we expect that we will find evidence of measurement invariance for the *PIWBS-R* across the four Pacific groups.

In addition to testing the measurement invariance of the *PIWBS-R*, we compare the mean scores across the Pacific groups for the *PIWBS-R* subscales. Further to this, it is important to note potential influences of demographic factors such as age, place of birth and religious status on the *PIWBS-R* scores. As the *PIWBS-R* is assessing general aspects of identity and wellbeing that are specific to Pacific peoples, we expect to see no difference in mean scores on the *PIWBS-R* constructs, in as much as one can predict the null hypothesis. We do however expect there to be a difference in scores on the Religious Centrality and Embeddedness factor that will reflect the current proportions of religious affiliation within the specific Pacific groups. We conduct a Multivariate Analysis of Covariance (MANCOVA) to simultaneously test for differences between the means of the *PIWBS-R* constructs for Cook Islands, Niuean, Tongan and Samoan peoples, whilst controlling for demographic covariates

of gender, age, birthplace and religious status.

Method

Participants and Procedure

Participants were 684 (530 female, 154 male) members of the NZ public who took part in the Pacific Identity Study, and identified as being of Pacific Nations ancestry (106 Cook Islands, 89 Niuean, 294 Samoan, 195 Tongan). Participants had a mean age of 29.49 years (SD = 10.43). Other analyses of the Pacific Identity Study are reported in Manuela and Sibley (2013; 2014a; 2014b). Pacific peoples are a notoriously difficult to reach population, and as far as we are aware, our survey represents the largest social psychological survey of Pacific identity and well-being ever conducted in New Zealand

Participants responded to an email advertisement inviting them to be part of an online study on Pacific identity and wellbeing. The email was sent to a variety of Pacific groups, organizations and community networks. A snowballing sampling method was also employed, where participants were asked to invite others in their networks to participate in the study. These data thus cannot be considered representative of the Pacific population in New Zealand. Participants were entered into a draw to win $300 grocery vouchers.

Materials

Participants completed the 35-item *PIWBS-R* (Manuela & Sibley, in press). The *PIWBS-R* contained seven items assessing Perceived Familial Wellbeing (PFW, α = .86), seven assessing Perceived Societal Wellbeing (PSW, α = .87), six items assessing Pacific Connectedness and Belonging (PCB, α = .78), five items assessing Group Membership Evaluation (GME, α = .87), six items assessing Religious Centrality and Embeddedness (RCE, α = .84) and four items assessing Cultural Efficacy (CE, α = .75). Items were rated on a Likert scale for both the identity related constructs (PCB, GME, RCE and CE; 1 = strongly disagree to 7 = strongly agree) and the wellbeing related constructs (PFW, PSW; 1 = completely dissatisfied to 7 = completely satisfied).

Results

Multigroup CFA

We conducted a MCFA assessing the configural, metric and scalar invariance of the *PIWBS-R* across four Pacific Nations groups in New Zealand (Cook Islands, Niue, Samoa, Tonga). We estimated our model using Maximum Likelihood with robust error estimation (MLR) using *MPlus 7.2*. The analysis involved several steps; a) investigating the independent CFA for each Pacific group; b) testing the measurement model specifying configural equivalence across the four groups; c) testing the measurement model imposing metric equivalence across the groups by constraining the factor loadings to equality between groups; and d) testing the measurement model imposing scalar equivalence across the groups by further constraining item-level intercepts to equality between groups. Table 3 presents fit indices for configural, metric and scalar tests of the model, as well as the fit indices when each group were examined independently. In the interpretation of model fit we rely on the recommendations of Hu and Bentler (1999) and present the Standardised Root Mean Square Residual (SRMR) and the Root Mean Square Error of Approximation (RMSEA), assuming the RMSEA of around .06 and the SRMR around .08 as indicators of acceptable model fit. We further present the model $\chi 2$ and the associated degrees of freedom, as well as the Akaike Information Criterion (AIC).

As shown in Table 3, independent CFAs for each specific group indicated that the *PIWBS-R* fit reasonably well when used within each group independent of the others. The *PIWBS-R* also provided reasonable fit when assessed across our sample of Pacific people as an overall group.

Critically, tests of the multi-group CFA indicated the *PIWBS-R* exhibited similar properties within each Pacific

group. The model tests configural equivalence performed reasonably well, with an RMSEA of .064 and sRMR of .072. This suggests that the overall measurement model, or pattern of loadings, for the *PIWBS-R* is fairly similar across different Pacific groups.

Even more important, chi-square difference tests indicated that more constrained models imposing metric and scalar equivalence did not differ in their fit from the less restricted configural model (Metric against Configural model, $\chi 2$ (87) = 99.05, p = .18. Scalar against Configural model, $\chi 2$ (174) = 199.58, p = .09). The scale and metric model also did not differ significantly in fit ($\chi 2$ (87) = 100.93, p = .15). As reported in Table 3, the fit indices for the metric and scalar models were consistent with these non-significant Chi-square tests, and indicate that the *PIWBS-R* performed reasonably well under these additional restrictive assumptions.

Table 3

Mean differences in the PIWBS-R

A one-way MANCOVA compared mean levels of *Perceived Familial Wellbeing, Perceived Societal Wellbeing, Pacific Connectedness and Belonging, Group Membership Evaluation, Religious Centrality and Embeddedness*, and *Cultural Efficacy* across four Pacific Nations groups in New Zealand (Cook Islands, Niue, Samoa, Tonga). Gender, age, religious status and birthplace were entered as covariates. Raw and covariate-adjusted means and standard errors are presented in Table 4.

The only significant difference across the four ethnic groups occurred for the *Religious Centrality and Embeddedness* (RCE) factor (F(3, 681) = 4.903, p = .002, partial η^2 = .021). Bonferroni-corrected post hoc tests indicated that there was a significant difference in the mean levels of RCE between

Fit indices for Multigroup CFA assessing the equivalence of the PIWBS-R across different Pacific groups.

	x^2	*df*	AIC	RMSEA	90% CI $\varepsilon_a\Delta$	SRMR
Standard CFAs						
Cook Island	922.35	545	12706.58	.077	[.068, 0.085]	.087
Samoan	1241.70	545	37793.05	.061	[.056, .065]	.060
Niuean	963.50	545	11300.97	.088	[.079, .097]	.086
Tongan	1100.57	545	23439.25	.068	[.063, .074]	.073
Overall model	4482.00	2354	85145.74	.068	[.065, .071]	.088
Multigroup CFA						
Configural model	3923.07	2180	85239.85	.064	[.061, .067]	.072
Metric model	3998.63	2267	85218.69	.062	[.059, .066]	.086
Scalar model	4103.93	2354	85145.74	.062	[.058, .065]	.088

Metric against Configural model, χ^2 (87) = 99.05, *p* = .18. Scalar against Configural model, χ^2 (174) = 199.58, *p* = .09. Scalar against Metric model, χ^2 (87) = 100.93, *p* = .15. Multigroup model estimated using Maximum Likelihood with robust error estimation (MLR). Standard CFAs estimated using Maximum Likelihood (ML), as all fit indices for standard CFA models are not available under MLR.

Tongans (M = 5.638, SE = .093) and Cook Islanders (M = 5.106, SE = .123, p = .004), and between Tongans and Niueans (M = 5.174, SE = .136, p = .035).

There were no significant differences across ethnic groups for *Perceived Familial Wellbeing* (F(3, 676) = .242, p = .867, partial η² = .001), *Perceived Societal Wellbeing* (F(3, 681) = .1.227, p = .299, partial η² = .005), *Pacific Connectedness and Belonging* (F(3, 681) = .159, p =.924, partial η² = .001), *Group Membership Evaluation* (F(3, 681) = 1.795, p = .147, partial η² = .008) and Cultural Efficacy (F(3, 681) = .712, p = .545, partial η² = .003).
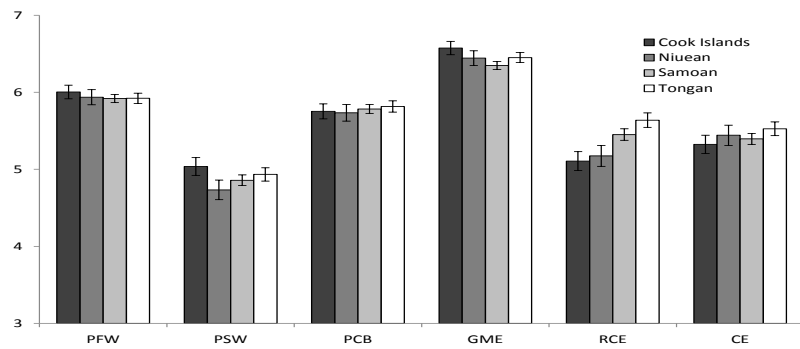

Fig. 1

Mean levels of the PIWBS-R constructs across ethnic groups. Means have been adjusted for gender, age, religious status and birthplace covariates (error bars represent the standard error of the mean, y axis ranged from 1 to 7; PFW = Perceived Familial Wellbeing; PSW = Perceived Societal Wellbeing; PCB = Pacific Connectedness and Belonging; GME = Group Membership Evaluation; RCE = Religious Centrality and Embeddedness; CE = Cultural Efficacy).

Table 4

Raw means, covariate-adjusted means and standard errors of the PIWBS-R factors.

Raw Means	PFW	PSW	PCB	GME	RCE	CE	*N*
Cook Islands	5.97 (.08)	5.01 (.11)	5.72 (.10)	6.55 (.07)	4.96 (.16)	5.30 (.12)	106
Niuean	5.90 (.11)	4.70 (.14)	5.69 (.12)	6.40 (.11)	4.93 (.15)	5.41 (.15)	89
Samoan	5.92 (.05)	4.86 (.07)	5.80 (.06)	6.35 (.06)	5.48 (.08)	5.41 (.07)	294
Tongan	5.95 (.07)	4.96 (.09)	5.83 (.07)	6.47 (.06)	5.78 (.09)	5.54 (.08)	195
Total	5.94 (.04)	4.89 (.05)	5.78 (.04)	6.42 (.03)	5.41 (.05)	5.43 (.05)	684
Covariate Adjusted Means							
Cook Islands	6.00 (.09)	5.04 (.12)	5.75 (.10)	6.57 (.09)	5.11 (.12)	5.32 (.12)	106
Niuean	5.94 (.10)	4.73 (.13)	5.73 (.11)	6.44 (.10)	5.17 (.14)	5.44 (.13)	89
Samoan	5.92 (.05)	4.86 (.07)	5.78 (.06)	6.35 (.05)	5.45 (.07)	5.40 (.07)	294
Tongan	5.92 (.07)	4.93 (.09)	5.82 (.07)	6.45 (.07)	5.64 (.09)	5.53 (.09)	195
Total	5.95 (.04)	4.89 (.05)	5.77 (.04)	6.45 (.04)	5.34 (.05)	5.42 (.05)	684

PFW = Perceived Familial Wellbeing; PSW = Perceived Societal Wellbeing; PCB = Pacific Connectedness and Belonging; GME = Group Membership Evaluation; RCE = Religious Centrality and Embeddedness; CE = Cultural Efficacy. Values in brackets represent the standard error of the means.

Discussion

We tested the measurement equivalence of the *PIWBS-R* to see if the psychometric properties of the *PIWBS-R* hold for Cook Islands, Niuean, Samoan and Tongan peoples in NZ. Our results indicate that the *PIWBS-R* provides a reliable measure of pan-Pacific identity which holds across the four largest Pacific Nations groups in NZ. The *PIWBS-R* can thus be used with confidence to make comparisons across these four groups.

We also compared covariate-adjusted mean scores of the *PIWBS-R* constructs across the Pacific groups. Our results indicate that after adjusting for differences in gender, age, country of birth and religious status, there were no significant differences between Cook Islands, Niuean, Samoan and Tongan peoples on their mean scores for five out of six of the *PIWBS-R* constructs. That is, there were no significant differences in covariate-adjusted mean scores for *Perceived Familial Wellbeing, Perceived Societal Wellbeing, Pacific Connectedness and Belonging, Group Membership Evaluation*, and *Cultural Efficacy.*

We did however find a significant difference in the mean scores for the *Religious Centrality and Embeddedness* (*RCE*) factor. Our results show that as a group, Tongans scored higher on the *RCE* factor relative to their Cook Island and Niuean counterparts, even after statistically adjusting for gender, age, birthplace and religious status. There were no other differences in adjusted mean scores between the Pacific groups on the *RCE* factor. The *RCE* factor reflects the extent to which individuals feel their Pacific culture is intertwined with religion. As mentioned earlier, there has been a decline in religious affiliation across all Pacific groups, and this is more pronounced among Cook Islands and Niuean groups. It is likely that our findings are reflecting this trend. Pacific groups with a higher proportion of individuals not affiliating with a religion are more likely to, on average, score lower on the *RCE* factor relative to Pacific groups with a lower proportion of religious non-affiliation. In other words, Cook Islands and Niuean peoples view religion as an integral aspect of their Pacific identity to a marginally lesser extent than Tongan peoples.

Despite the significant difference in *RCE* scores, the effect size is small. All Pacific groups that were included in this study have moderate/high mean scores on this factor. At a general level, this would suggest that all Pacific groups surveyed here view religion as an integral component of their Pacific culture. A more specific intra-Pacific view shows that although scores on *RCE* are relatively high overall, some groups score higher relative to others. Exploring the other factors of the *PIWBS-R*, we see that there are no significant differences in the covariate-adjusted means. This shows that participants were responding to the scale items in a similar way, regardless of what Pacific group they identified with, their gender, age, place of birth and religious status. We can also see an important difference in the two wellbeing measures of the *PIWBS-R*. Firstly, we can see that participants score high on *Perceived Familial Wellbeing*, indicating that participants are generally highly satisfied with their family relationships. In comparison, we see that participants scored moderately, but relatively lower than *Perceived Familial Wellbeing*, for *Perceived Societal Wellbeing*. This indicates that Pacific participants are moderately satisfied with NZ society. Moreover, this comparison is showing that Pacific peoples in general are reporting more satisfaction from micro-level wellbeing domains relative to macro-level wellbeing domains.

Exploring the other identity domains of the *PIWBS-R*, there were no significant differences between the ethnic groups on their mean scores. Focussing on *Pacific Connectedness and Belonging*, we see that participants are scoring moderate/high. This indicates that participants generally feel a sense of belonging and a sense of connections to other Pacific peoples at a general level. Looking at *Group Membership Evaluation*, participants scored very high regardless of their ethnicity. This indicates that Pacific peoples have a lot of positive affirmations about their self-perceived membership within the Pacific groups. This finding is similar to that of the Youth '12 research that shows that large proportions of Pacific youth reported high levels of ethnic pride relative to other ethnic groups (Clark et al., 2013).

It appears that regardless of what

Pacific ethnic group one belongs to, self-perceived membership within that group or identification with the Pacific group at a general level is rated as a highly positive aspect. Finally, focussing on *Cultural Efficacy*, our results show that participants scored moderate/highly on this factor. This indicates that participants feel they have the personal and cultural resources to express their selves in a Pacific cultural or social context to a moderate-high extent. It is interesting to note that scores on *Cultural Efficacy* were lower relative to *Group Membership Evaluation*. This indicates that despite Pacific individuals' self-perceived capacity of participating in a cultural context, or their cultural efficacy, self-perceived membership in one's Pacific group is still regarded as a positive aspect of identity. Similar findings have been found by Manuela and Sibley (2013), who found that *Cultural Efficacy* was positively associated with confidence in speaking one's Pacific language, whilst *Group Membership Evaluation* was negatively associated.

The results presented here provide evidence that the *PIWBS-R* is performing equally well across groups. This is important for two reasons. Firstly, the *PIWBS-R* was explicitly designed as a pan-Pacific research tool. As the scale was developed based on common elements of identity and wellbeing across the Pacific Nations, we argue that it can be used to pursue identity and wellbeing research for the Pacific group at a general level. This is the first psychometric tool developed specifically for Pacific peoples that incorporates a holistic view of the self from a Pacific perspective. Although the individual factors of the *PIWBS-R* can be used independently for researchers' purposes, the overall model provides the best psychometric and quantitative equivalent to the holistic conceptualisation of the Pacific self to date.

Secondly, the evidence presented here shows that the *PIWBS-R* performs well for the groups assessed this may lead to even more specific measures of identity and wellbeing for the Pacific groups. The *PIWBS-R* as it stands provides an avenue for intra-ethnic Pacific research to understand identity

and wellbeing within the Pacific group at a general level and potential differences and similarities between the groups. It is also possible, as shown by our tests of configural, metric and scalar equivalence, that the *PIWBS-R* can be used for research with specific Pacific ethnic groups in NZ. For example, should one wish to conduct research specifically with Cook Islands communities in NZ, our findings lend support to the *PIWBS-R* provides a valid assessment of ethnic identity and wellbeing for them

Limitations

Our findings provide evidence that the *PIWBS-R* works well for research with Pacific groups in NZ. However, we had to limit the groups included in our analyses to the four largest Pacific groups represented here. As such, we are unable to provide evidence of measurement equivalence for the numerous other peoples from Pacific Nations represented in NZ such as Fiji, Tokelau and Tuvalu. This was due to inadequate sample sizes for the other Pacific Nations groups represented in NZ to conduct our analyses. One option would have been to combine the smaller numbers of the other Pacific Nations groups into another "Other Pacific" category. However, as part of the aim of this study was to test measurement equivalence across groups, combining groups into a single category would be inappropriate. Further research with large enough samples could test this again to see how the *PIWBS-R* performs within the smaller Pacific groups represented in NZ. We would expect to observe similar findings for the other Pacific groups not represented in this study.

Concluding comments

The Pacific Identity and Wellbeing Scale—Revised (*PIWBS-R*) is a measure of ethnic group identification and wellbeing designed specifically for Pacific peoples living in New Zealand. A copy of the original PIWBS is presented in Manuela and Sibley (2013), and a copy of the *PIWBS-R* in Manuela and Sibley (2015). Here, we document the measurement properties of the *PIWBS-R*, and show that the scale performs well with different Pacific groups. Our

analyses indicate that participants that identify with the four largest Pacific Nations groups in NZ (Samoa, Cook Islands, Tonga and Niue) are responding to, and interpreting, items of the *PIWBS-R* in a similar way to each other. This allows researchers using the *PIWBS-R* to make meaningful comparisons of group means between the Pacific groups assessed here. Furthermore, we found a small but significant difference in the Religious Centrality and Embeddedness factor where Tongan participants scored higher relative to their Cook Island and Niuean counterparts, even after controlling for gender, age, place of birth and religious status. This finding was consistent with patterns of religious affiliation within Pacific groups in NZ. There were no other differences between groups in other constructs of the *PIWBS-R*. These findings show that the *PIWBS-R* provides an important and psychometrically sound tool to advance psychological knowledge concerning the ethnic identity and wellbeing of Pacific peoples in NZ.

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Appendix. Item content for the PIWBS-R

Perceived Familial Wellbeing (PFW)

Your relationship with your parents.

Your position in your family.

Communication with your family.

The respect you give for your parents.

The respect you receive from your family.

Your family's happiness.

Your family's security.

Perceived Societal Wellbeing (PSW)

Support provided to you by the New Zealand government to you as a Pacific Islander.

Your position in New Zealand as a Pacific person.

The support you receive as a Pacific Islander in New Zealand.

Your personal needs being met by New Zealand.

Your relationship with New Zealand society.

The support you receive as a Pacific Islander in the community you live in.

The support you receive in the community you live in.

Pacific Connectedness & Belonging (PCB)

I feel at home around other Islanders, even if they are not from my island.

I feel connected to other Pacific peoples in general.

I feel connected to people from a different Pacific Island to myself.

I feel comfortable in places with lots of other Pacific peoples.

I feel most comfortable in Pacific communities.

I don't get along with other Island groups (r).

Group Membership Evaluation (GME)

The fact that I am an Islander is an important part of my identity.

Being an Islander is an important part of how I see myself.

Being a Pacific Islander gives me a good feeling.

I am glad to be a Pacific Islander.

I am proud to be a Pacific Islander.

Religious Centrality & Embeddedness (RCE)

Going to church is part of my culture and religion.

God has a strong connection to my culture.

Religion is not important for my culture (r).

Our religion is the centre of our culture as Pacific Islanders.

Religion is the root of our Pasifika culture.

Part of being a Pacific Islander is having a connection with God.

Cultural Efficacy (CE)

I find it easy to participate in Pacific cultural events.

I feel I am easily able to express who I am as a Pacific person.

I enjoy participating in Pacific cultural events.

I find it difficult to express my Pacific culture (r).

(r) Indicates a reverse coded item.