Methods and procedures for the
2018 International Social Survey Programme (ISSP) for New Zealand

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This report summarises the sampling procedures for the New Zealand ISSP survey (religion) in 2018. Unlike previous years, sampling did not involve over-sampling groups of individuals hypothesised to respond at lower rates and under-sampling groups hypothesised to respond at higher rates. Instead, we sought to use the ISSP 2018 sampling as a pilot to estimate response numbers for ethnicity, gender and age for an online panel that is being set up (POPNZ). Specifically, there were 32 strata: 4 'ethnic' (Māori descent, high Pacific meshblocks, high Asian meshblocks, remainder) × 2 gender (male, female) × 4 age (18–30, 31–45, 46–60, 61-75). The electoral roll, our sampling frame, identifies Māori descent directly. To try to identify Pacific and Asian ethnicities, we used the published random rounded counts of ethnicities in each geographical meshblock. In order to have sufficient numbers to sample in every stratum, we described "High Pacific" meshblocks as those where Pacific ethnicities made up at least 15% of the population, and "High Asian" meshblocks as those where Asian ethnicities made up at least 25%. In so doing we hope to achieve good number of Pacific and Asian participants – something that sampling for New Zealand ISSP surveys have not typically achieved. Note also that unlike in previous years, participants over 75 were excluded, in line with the planned sample for the POPNZ panel.

The procedure was as follows. Names and addresses were obtained for all those on the electoral roll. We randomly selected n = 100,000 aged 18–75 from this list in order to (i) get sufficient numbers (n=15) for each of 32 strata, assuming a response rate as low as 10% for some strata; and (ii) make the task of coding factors to test representativeness not too onerous (two factors needed to be coded: deprivation, coded from electoral roll address and occupational categories, coded from electoral roll occupation free-text).

Each of the n = 100,000 was categorised into one of the thirty-two strata, and a random sample from each stratum was selected to be mailed a survey. The distribution of these strata in the n=100,000 randomly selected from the electoral roll are shown in Figure 1 below.
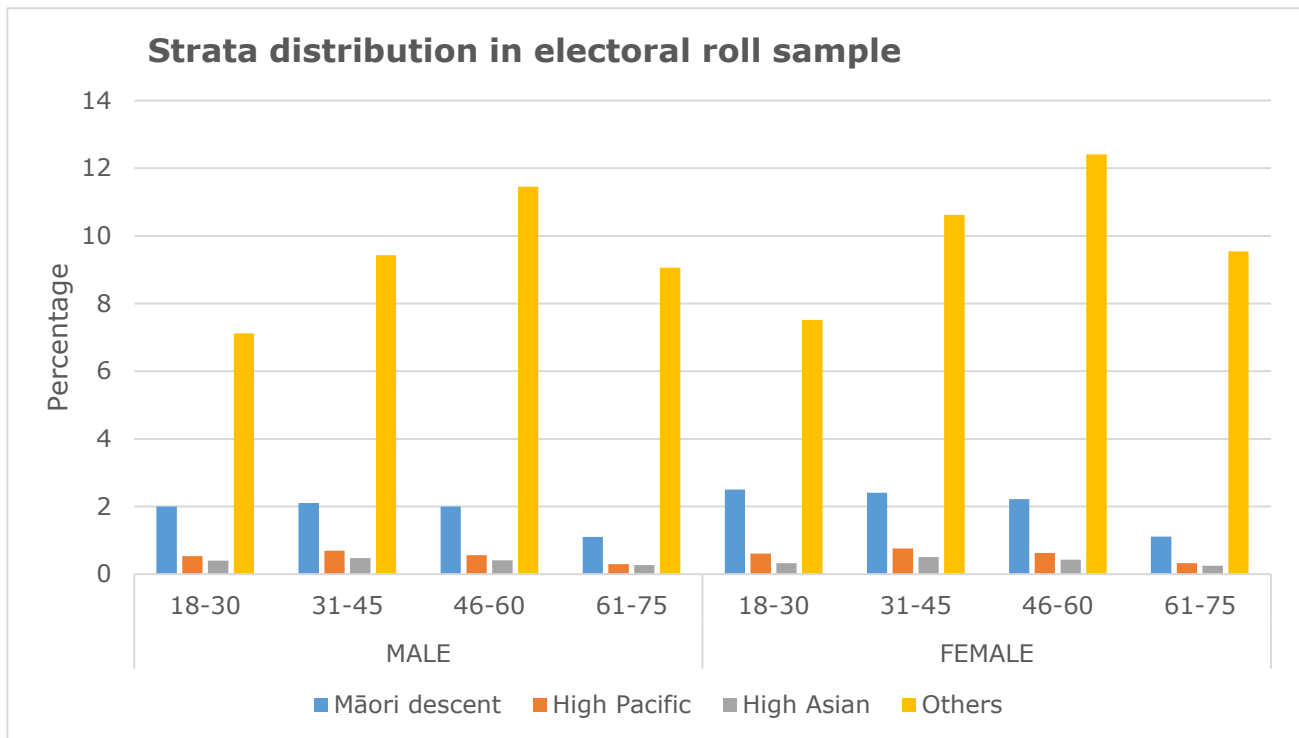

Figure 1. Strata distribution in random n=100,000 taken from electoral roll

The number selected to be mailed from each stratum is shown in Table 1. Note that, unlike sampling methods for previous ISSP surveys, we did not expect to achieve a representative sample using this stratification. Instead, we hoped to oversample groups that are typically under-represented in surveys (and survey panels), specifically, Pacific, Asian, and (to some extent) Māori participants. Nonetheless, the weighting procedure detailed in this report aims to produce results that are representative across key variables: age, gender, Māori descent, region, deprivation, occupation and urbanicity. In line with the requirements of the ISSP Secretariat, the final sample target was n ≥ 1200.

Table 1. Number selected to be mailed from each stratum.

Age	Māori descent	High Pacific meshblocks	High Asian meshblocks	Other Initial	Topup	Total
Male						
18–30 years	200	200	200	150	150	**900**
31–45 years	200	200	200	100	100	**800**
46–60 years	150	150	150	100	100	**650**
61–75 years	150	150	150	100	100	**650**
Female						
18–30 years	200	200	200	150	150	**900**
31–45 years	150	150	150	100	100	**650**
46–60 years	100	150	150	100	100	**600**
61–75 years	100	100	150	100	100	**550**
Total	**1,250**	**1,300**	**1,350**	**900**	**900**	**5,700**

An initial n = 4,800 individuals were mailed and, upon realising that we were tracking below our final sample target of n ≥ 1,200, we doubled the numbers in the "Other" ethnic strata through a top up sample, two months into the process. The final n = 5,700 selected individuals were sent the International Social Survey Programme (ISSP) questionnaire and cover sheet. The cover sheet invited participants to take part, and also: (i) described the survey and explained that participation was optional, confidentiality of participants was guaranteed, and that the survey was approved by the University of Auckland Human Participants Ethics Committee (reference number 021621); (ii) explained that all respondents go into a draw to win one of four $100 gift cards ('Prezzy' cards); (iii) explained how the participants were selected and how their names and addresses were obtained; (iv) explained that the survey was being managed at the University of Auckland by the Centre of Methods and Policy Application in the Social Sciences (COMPASS), with collaborators from Department of Theological and Religious Studies at the University of Auckland; (v) explained that funding was received from the Templeton Religion Trust; and (vi) explained that after the data have been analysed, an

anonymised data set will be permanently stored in both New Zealand and international data archives, as a historical record of the 2018 ISSP.
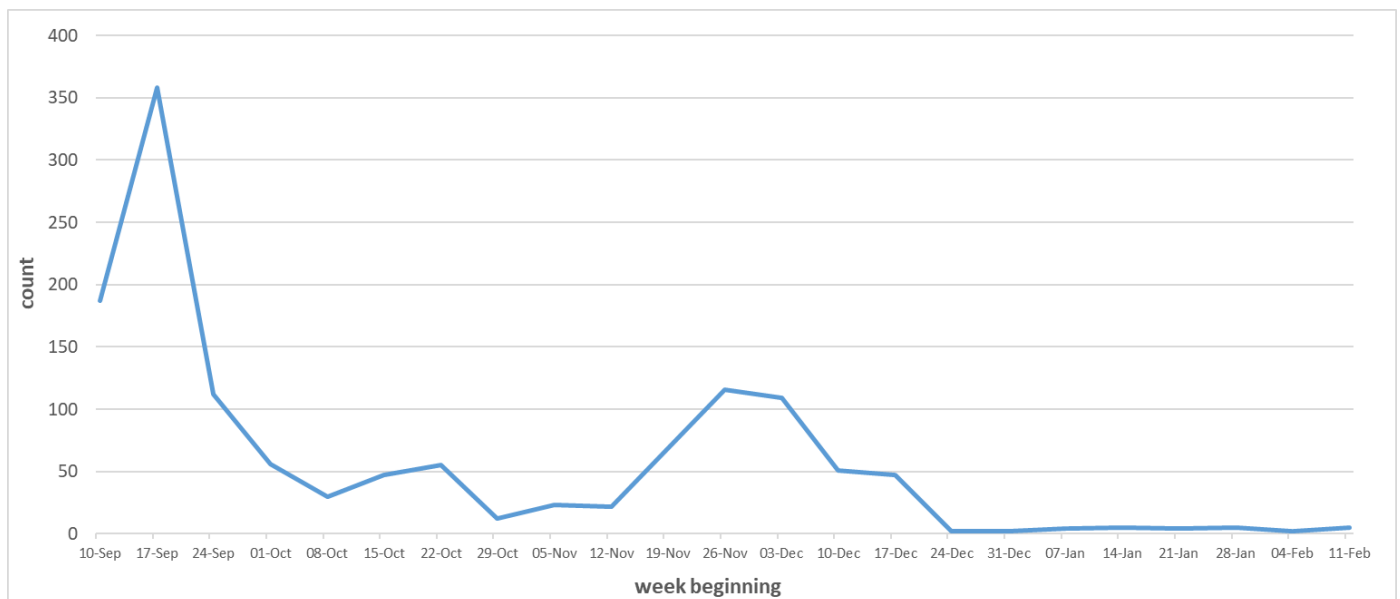

Figure 2. Questionnaires returned by date

The first mailout of 4,800 took place on Friday 7 September. Participants could complete the survey either on the questionnaire provided or online via Qualtrics. For those yet to complete the survey, a reminder postcard was sent on Wednesday 10 October, and a second questionnaire was sent on Wednesday 21 November to those that still had not responded. As stated above, a top sample was conducted once we realised that we tracking below our desired sample of at least 1,200 participants. This was achieved by doubling the numbers in the "Other" ethnic strata as shown in Table 1, mailing out to 900 new people on Thursday 8 November. This group did not receive any reminder mailings.

A total of n = 1,334 participants returned surveys between Monday 10 September 2018 and Sunday 17 February 2019, giving a raw response rate of 23.4% (1,334/5,700), and a standardised response rate of 27.9% (i.e. the response rate that would have been achieved had each stratum been mailed surveys proportional to their share of the population). Note that this represents a

sharp drop from previous ISSP surveys, which had been trending upwards (e.g. 41.2% in 2017, 38.7 in 2016, and 36.0% in 2015). One possible reason for this drop is that previous ISSP mailouts included a pen as part of the mailed envelope. The inclusion of a pen was discontinued in 2018 in response to NZ Post's modified charging structure which vastly increased the price of mailing for envelopes that are not uniformly flat.

Table 2 presents the number of respondents within each stratum. As shown in Figure 2, there were spikes in returns following the postcard mailout, and the top up and second questionnaire mailouts. Most returns were through the post; n = 210 (15.7%) completed the survey online.

Table 2. Number of respondents within each stratum

Age	Māori descent	High Pacific	High Asian	Other	Total
Male					
18 – 30 years	32	22	33	60	**147**
31 – 45 years	30	21	35	44	**130**
46 – 60 years	34	26	36	53	**149**
61 – 75 years	57	51	57	74	**239**
Female					
18 – 30 years	29	20	43	61	**153**
31 – 45 years	37	31	27	55	**150**
46 – 60 years	26	36	39	74	**175**
61 – 75 years	32	29	46	84	**191**
Total	**277**	**236**	**316**	**505**	**1334**

Representativeness

1. Did the sampling strategy oversample Māori, Pacific and Asian strata?

Figure 3 shows the proportion of each stratum within the electoral roll and ISSP samples. A comparison of strata percentages between the electoral roll and ISSP samples indicates that sampling strategy resulted in an over-sampling of males and females of Māori descent aged 61–75 years and all strata relating to high Pacific and high Asian meshblocks in the ISSP sample. As the aim of the 2018 ISSP sampling was to oversample groups that are under-represented in surveys, specifically Pacific, Asian and Māori participants, our results indicate that the sampling strategy generally achieved this goal. All strata related to the 'Other' group were under-sampled in the ISSP sample.
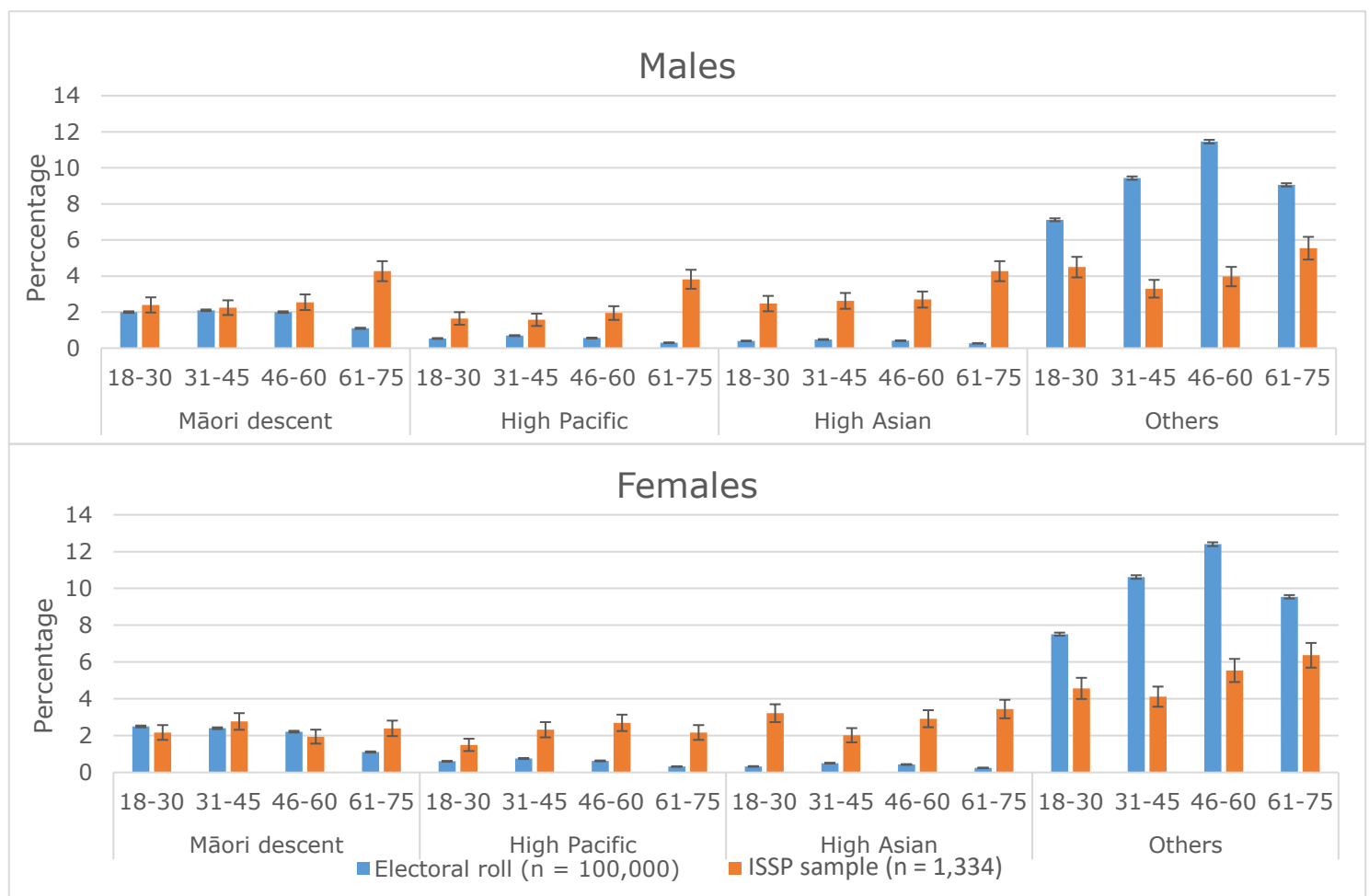

Figure 3. Proportion of each stratum within the electoral roll and ISSP samples.

2. What were the response rates of strata and across gender, ethnic indicators, and age group?

As indicated in Figure 4, response rates were higher for males and the 'Other' ethnic group. Response rates also increased as age increased. Individuals from high Pacific meshblocks had the lowest response rate relative to other ethnicity groups. These differences are also reflected in the strata response rates, presented in Figure 5. Females aged 18–30 years from high Pacific meshblocks had the lowest response rate (10%) while Females aged 61–75 years from the 'Other' ethnic group had the highest response rate (42.5%).
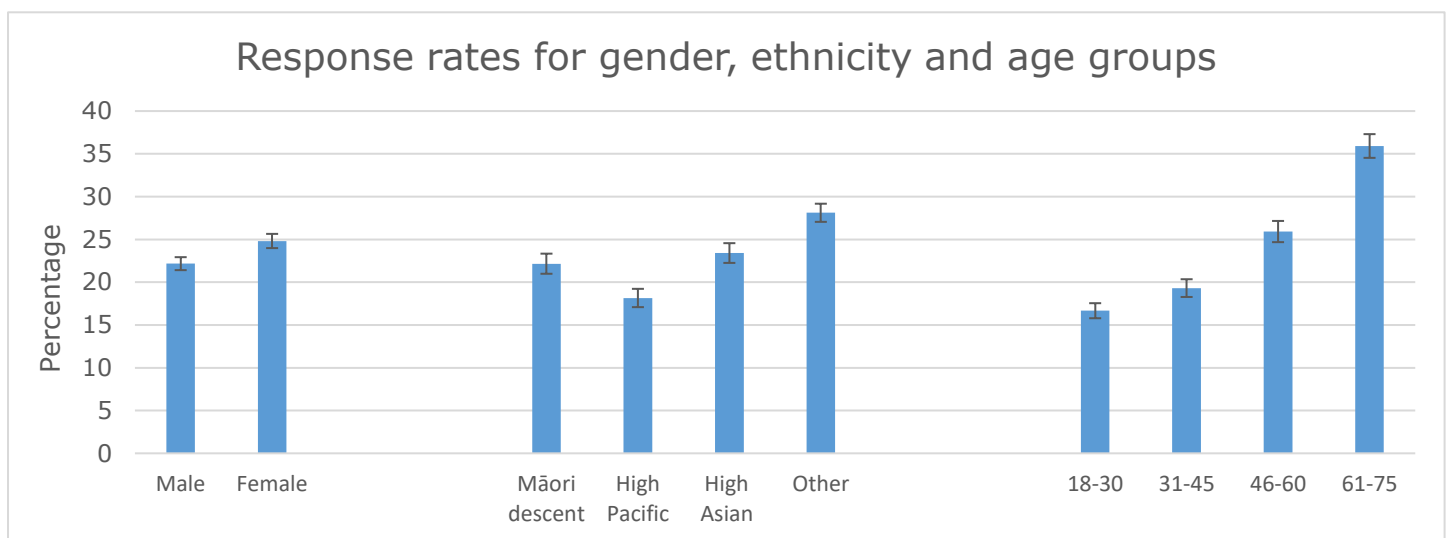

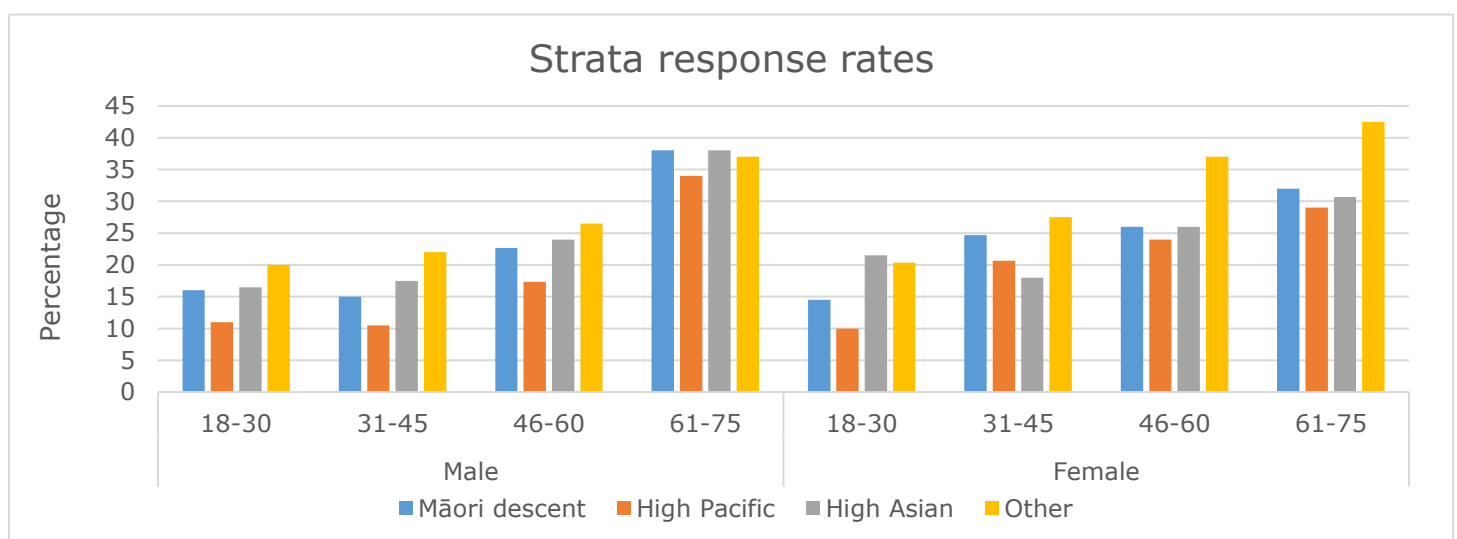*Figure 4. Response rates for major demographic groups.*

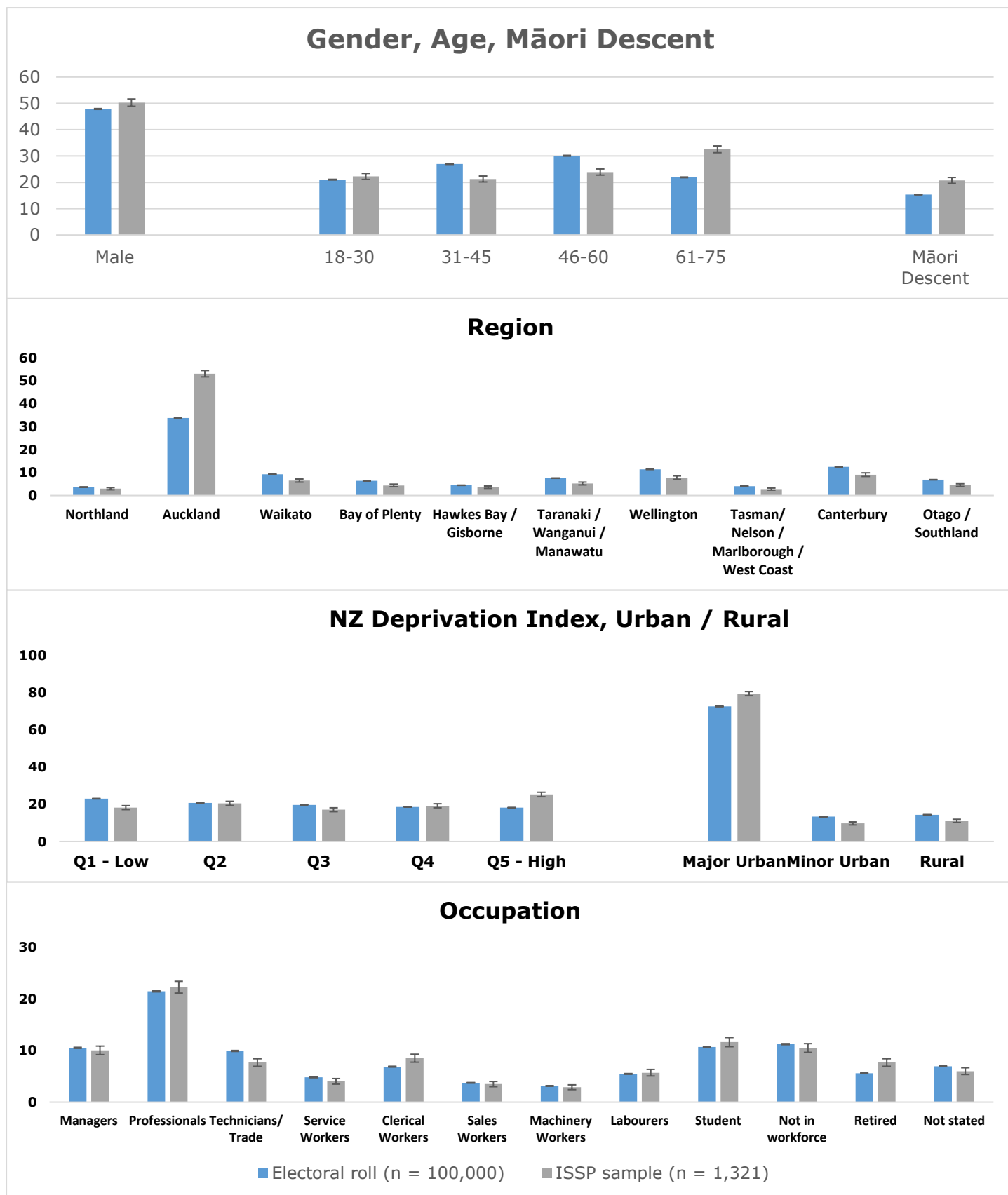*Figure 5. Response rates for each stratum.*

Figure 6. Comparison between Electoral Roll sample (n = 100,000) and ISSP Sample Respondents (n = 1,321) on demographic and geographic data available through the electoral roll.

3. What was the distribution of our responses across key demographic variables?

Key demographic variables were obtained from the electoral roll and included gender, age, Māori descent, region, urbanicity, New Zealand (NZ) Deprivation Index quintiles and occupation. Comparisons are shown in Figure 6. Note that while the final ISSP sample consisted of 1,334 respondents, only 1,321 respondents were able to be matched to their electoral roll data because the linking ID could not be determined for n=13 respondents. A comparison of individuals in the ISSP sample to those not in the sample from the electoral roll revealed that all except one of the sample characteristics (gender) differed slightly from the electoral roll. Chi-square tests revealed that the sample was over-represented in terms of Māori descent and the highest deprivation quintile. The sample also over-represented those living in Auckland and from major urban areas, but under-represented individuals from most other regions and those from minor urban and rural areas. Clerical and administrative workers as well as retired individuals were over-represented, whereas technicians and trade workers were under-represented.

Weighting

To account for this pattern of differences, weights were computed based on the inverse probability of responding. This was achieved by conducting a logistic regression with responded (yes/no) as the outcome, and age group, Māori descent, region, NZ Deprivation Index quintiles, urbanicity and occupation as predictors. Gender was excluded based on the results of the chi-square test. A main effects model was computed and then fifteen two-way interactions were tested in separate models. Five interactions was found to be significant: age group × Māori descent, region × Māori descent, NZ deprivation × Māori descent, urbanicity × Māori descent, region × NZ deprivation, region × urbanicity. These interactions and all the

main effects were included in the final model, and have been presented in Table A1 in the Appendix.

From the final model, a predicted probability of response was generated for each respondent based on their covariates. This probability was then inverted and standardised to have mean = 1 to form a response weight. The weights for respondents that were not able to be matched to the electoral roll were imputed based on their survey responses. Specifically, we were able to identify these individuals' age, occupation and Māori descent from their survey responses, and use this information to impute the mean weight for their combination of characteristics from the 1,321 respondents used for weighting. This weight was once again standardised to provide a mean = 1, which ranged from 0.10 – 9.43 across the final n = 1,334 respondents. Figure 7 shows the effect of weighting by this variable on the comparison variables from the electoral roll. This reveals that all variables are now similar between the weighted ISSP sample and the electoral roll, suggesting that the weighted ISSP sample is representative of the electoral roll, at least for the variables tested.
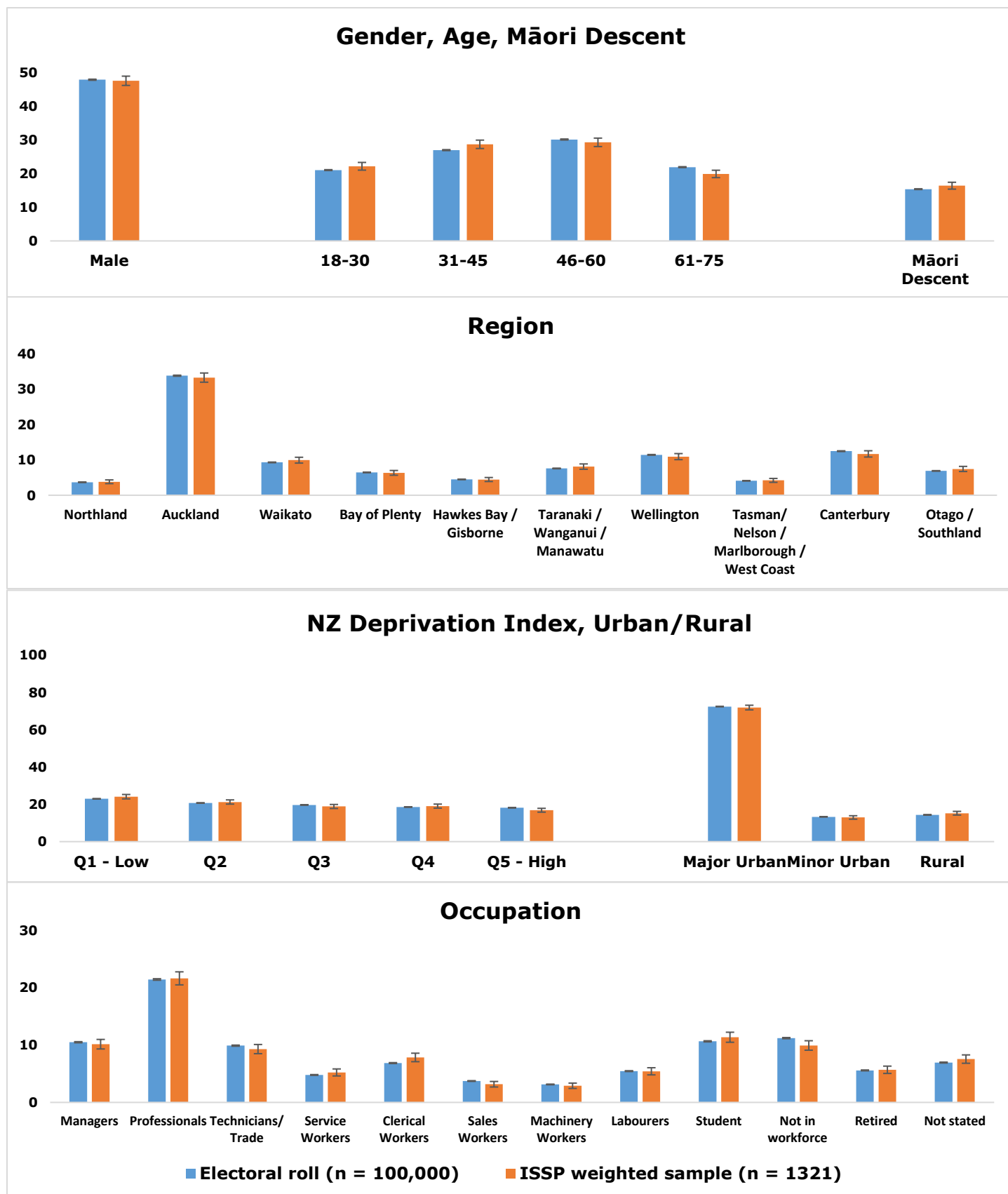
Figure 7. Comparison between Electoral Roll sample (n = 100,000) and ISSP Sample Respondents (n = 1,321), weighted for non-response, on demographic and geographic data available through the electoral roll.

Further, there were external validation variables in the survey. Respondents were asked: (i) which party they voted for the 2017 General Election and (ii) their ethnicity or ethnicities. The weighted responses for (i) was compared to the confirmed results from the 2017 General Election in Figures 8 below. Figure 8 shows that party voting of the weighted ISSP sample over-estimated Labour voters but under-estimated National, Green, and NZ First voters. Note, however, that we are unable to compare the ISSP sample against voting patterns just for those aged 18–75 (the age range of the ISSP sample). Comparison of the weighted responses for (ii) against the 2013 Census results for 18–75 year olds shown in Figure 9 below indicates that there is an overrepresentation of Māori in the weighted ISSP sample, but a representative proportion of respondents of European, Asian and Pacific descent.
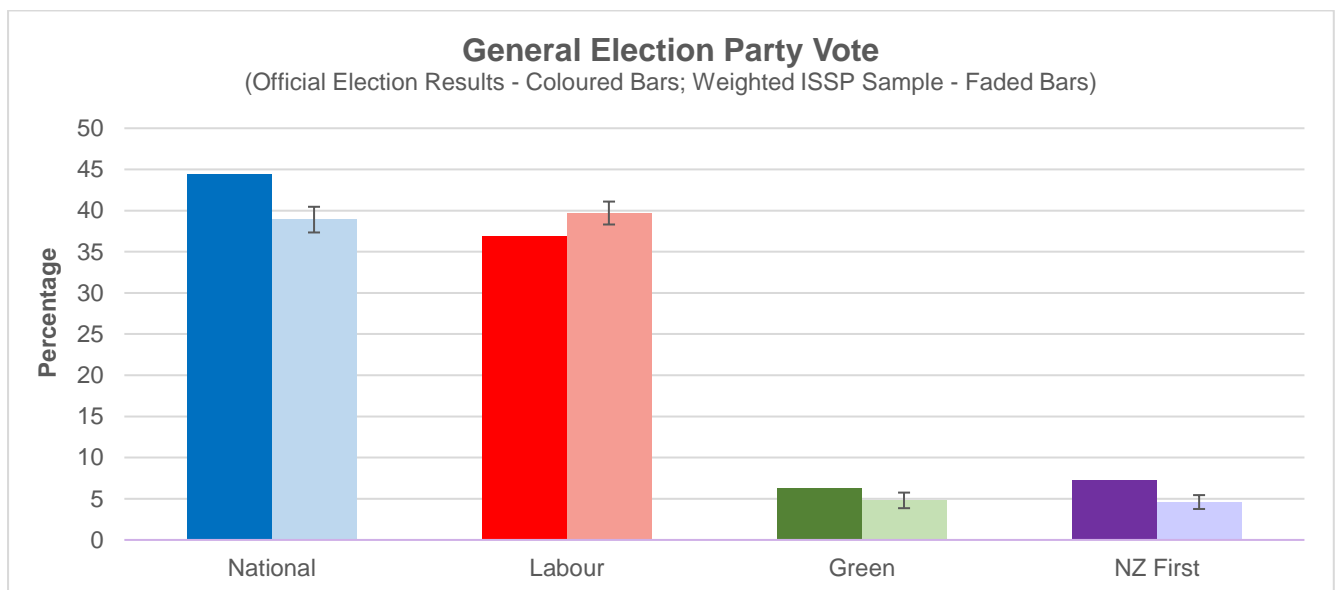

Figure 8. Comparison between 2017 General Election Party Vote Results and ISSP Sample Party Vote (n = 1,334), weighted for non-response.
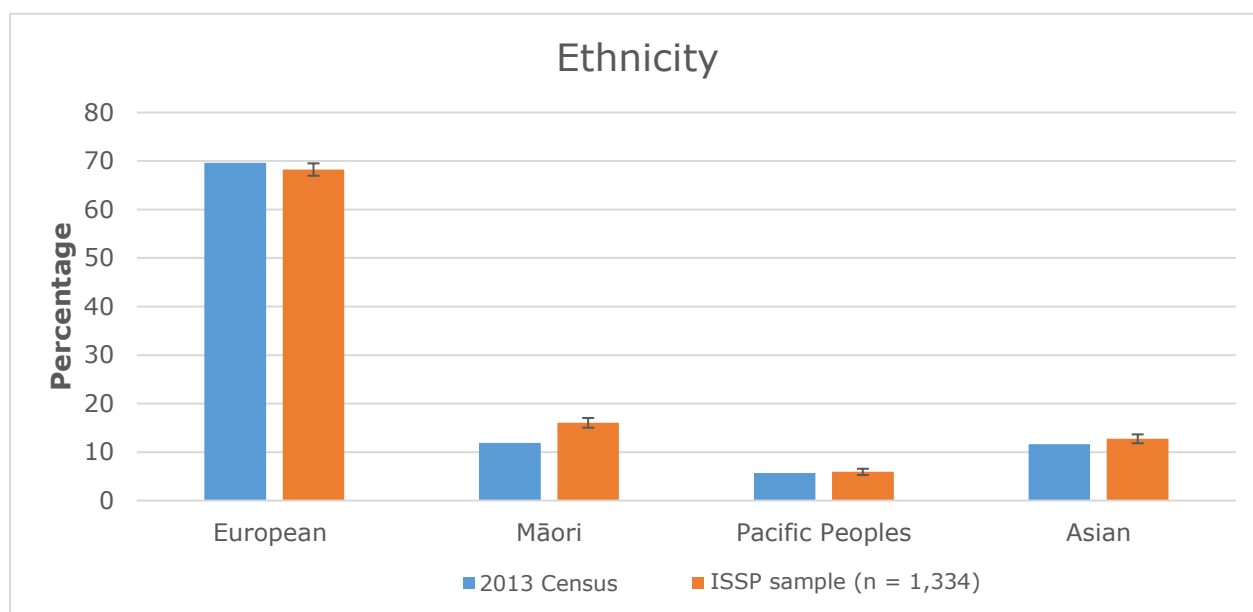
Figure 9. Comparison of ethnicity between 2013 Census and ISSP Sample (n = 1,334), weighted for non-response

Conclusions

The different sampling strategy for the ISSP 2018 meant that we were able to oversample groups that are generally under-represented in surveys. We were also able to estimate response rates for important demographic groups in NZ (i.e. gender, ethnicity, age). Weighting the ISSP survey based on the characteristics that predict response allowed us to achieve a sample that is representative across a number of factors, including gender, age, Māori descent, region, urbanicity, deprivation and occupation – as well as Pacific ethnicity and Asian ethnicity, (a first for the ISSP), according to external validation. However, external validation also indicated that general election voting may not be representative of the whole population – with the caveat that the reported voting of 18–75 year olds from the ISSP sample was compared against the entire voting population in 2017, and so some differences might be expected give that those aged >75 years vote in different ways to those aged 18–75.

It is important to note that the weighting allows for sample respondents from under-represented groups to act as 'spokespeople' for others like them for all responses in the survey (e.g. the respondent with the lowest weight 'speaks' for 0.10 people who share the same demographic characteristics as them, while the respondent with the highest weight 'speaks' for 9.43 people who share the same demographic characteristics as them). This may or may not be appropriate depending on how strongly sample responses in the population are determined by the demographic characteristics used to calculate weights, and this cannot be fully known. Nonetheless, given that the demographic characteristics used to calculate weights explain *some* variation in survey responses, weighted responses are likely to give descriptive and analytic results *closer to those* of the population.

Appendix

Table A1. Logistic regression model predicting response for those who responded to the ISSP survey (n = 1,321), of individuals from electoral roll (n = 100,000).

Parameter	Odds Ratio (95% Confidence Interval)
Age group	
18–30 years	Reference
31–45 years	1.08 (0.76 – 1.55)
46–60 years	0.95 (0.65 – 1.38)
61–75 years	2.96 (2.09 – 4.18)
Māori descent	
Yes	Reference
No	0.52 (0.21 – 1.25)
Region	
Northland	Reference
Auckland	0.80 (0.19 – 3.33)
Waikato	2.11 (0.47 – 9.53)
Bay of Plenty	2.91 (0.60 – 14.14)
Hawke's Bay/Gisborne	3.09 (0.64 – 14.90)
Taranaki/Wanganui/Manawatu	1.27 (0.25 – 6.44)
Wellington	1.65 (0.38 – 7.24)
Tasman/Nelson/Marlborough/West Coast	1.74 (0.32 – 9.55)
Canterbury	1.48 (0.34 – 6.43)
Otago/ Southland	1.75 (0.37 – 8.36)
NZ Deprivation Index	
Q1 – Low	Reference
Q2	0.24 (0.04 – 1.50)
Q3	0.81 (0.21 – 3.19)
Q4	0.72 (0.19 – 2.73)
Q5 – High	0.49 (0.13 – 1.83)
Urban/Rural	
Major urban	Reference
Minor urban	1.65 (0.55 – 4.96)
Rural	2.21 (0.94 – 5.23)
Occupation	
Not stated	Reference
Managers	1.54 (1.16 – 2.06)
Professionals	1.66 (1.29 – 2.15)
Technicians/Trade workers	1.19 (0.88 – 1.60)
Service workers	1.21 (0.85 – 1.72)
Clerical workers	1.87 (1.40 – 2.51)
Sales workers	1.36 (0.94 – 1.97)
Machinery operators/drivers	1.13 (0.77 – 1.68)
Labourers	1.38 (1.00 – 1.91)
Student	1.37 (1.03 – 1.83)
Not in workforce	1.21 (0.91 – 1.61)
Retired	1.46 (1.07 – 2.01)

Age group × Māori descent	
18–30 years × Yes	Reference
31–45 years × No	0.59 (0.40 – 0.88)
46–60 years × No	0.81 (0.54 – 1.22)
61–75 years × No	0.50 (0.35 – 0.74)
Region × Māori descent	
Northland × Yes	Reference
Auckland × No	2.56 (1.17 – 5.60)
Waikato × No	0.60 (0.27 – 1.36)
Bay of Plenty × No	0.24 (0.09 – 0.60)
Hawke's Bay/Gisborne × No	0.56 (0.22 – 1.42)
Taranaki/Wanganui/Manawatu × No	0.78 (0.33 – 1.86)
Wellington × No	0.96 (0.40 – 2.24)
Tasman/Nelson/Marlborough/West Coast × No	0.72 (0.25 – 2.07)
Canterbury × No	0.95 (0.40 – 2.24)
Otago/Southland × No	0.69 (0.27 – 1.71)
NZ Deprivation Index × Māori descent	
Q1 × Yes	Reference
Q2 × No	1.80 (1.04 – 3.12)
Q3 × No	1.31 (0.77 – 2.20)
Q4 × No	1.56 (0.94 – 2.57)
Q5 × No	2.53 (1.56 – 4.10)
Urban/Rural × Māori descent	
Major urban × Yes	Reference
Minor urban × No	0.52 (0.32 – 0.83)
Rural × No	0.69 (0.42 – 1.11)
Region × NZ Deprivation Index	
Northland × Q1	Reference
Auckland × Q2	4.58 (0.73 – 28.62)
Auckland × Q3	1.79 (0.46 – 6.99)
Auckland × Q4	2.16 (0.57 – 8.19)
Auckland × Q5	2.80 (0.75 – 10.43)
Waikato × Q2	2.11 (0.29 – 15.23)
Waikato × Q3	0.88 (0.19 – 4.01)
Waikato × Q4	1.03 (0.24 – 4.47)
Waikato × Q5	0.78 (0.18 – 3.45)
Bay of Plenty × Q2	3.08 (0.40 – 23.85)
Bay of Plenty × Q3	0.58 (0.11 – 3.09)
Bay of Plenty × Q4	0.51 (0.10 – 2.59)
Bay of Plenty × Q5	0.97 (0.21 – 4.52)
Hawke's Bay/Gisborne × Q2	1.39 (0.17 – 11.44)
Hawke's Bay/Gisborne × Q3	0.86 (0.18 – 4.24)
Hawke's Bay/Gisborne × Q4	0.29 (0.05 – 1.57)
Hawke's Bay/Gisborne × Q5	0.74 (0.16 – 3.38)
Taranaki/Wanganui/Manawatu × Q2	4.68 (0.62 – 35.44)
Taranaki/Wanganui/Manawatu × Q3	1.11 (0.22 – 5.65)
Taranaki/Wanganui/Manawatu × Q4	1.74 (0.36 – 8.33)
Taranaki/Wanganui/Manawatu × Q5	1.29 (0.26 – 6.32)
Wellington × Q2	1.29 (0.19 – 8.84)
Wellington × Q3	0.47 (0.10 – 2.13)

Wellington × Q4	0.66 (0.15 – 2.81)
Wellington × Q5	1.98 (0.50 – 7.84)
Tasman/Nelson/Marlborough/West Coast × Q2	2.79 (0.37 – 21.13)
Tasman/Nelson/Marlborough/West Coast × Q3	0.59 (0.11 – 3.14)
Tasman/Nelson/Marlborough/West Coast × Q4	0.69 (0.13 – 3.55)
Tasman/Nelson/Marlborough/West Coast × Q5	0.46 (0.06 – 3.50)
Canterbury × Q2	2.25 (0.34 – 14.68)
Canterbury × Q3	0.59 (0.14 – 2.52)
Canterbury × Q4	0.95 (0.23 – 3.89)
Canterbury × Q5	1.48 (0.36 – 6.08)
Otago/Southland × Q2	2.77 (0.40 – 19.36)
Otago/Southland × Q3	0.63 (0.13 – 3.07)
Otago/Southland × Q4	1.37 (0.31 – 6.06)
Otago/Southland × Q5	0.77 (0.15 – 4.00)
Region × Urban/Rural	
Northland × Major urban	Reference
Auckland × Minor urban	0.39 (0.11 – 1.38)
Auckland × Rural	0.42 (0.16 – 1.08)
Waikato × Minor urban	0.61 (0.18 – 2.07)
Waikato × Rural	0.65 (0.25 – 1.72)
Bay of Plenty × Minor urban	0.89 (0.25 – 3.17)
Bay of Plenty × Rural	0.41 (0.13 – 1.26)
Hawke's Bay/Gisborne × Minor urban	0.68 (0.11 – 4.17)
Hawke's Bay/Gisborne × Rural	0.46 (0.15 – 1.44)
Taranaki/Wanganui/Manawatu × Minor urban	0.50 (0.14 – 1.77)
Taranaki/Wanganui/Manawatu × Rural	0.52 (0.19 – 1.44)
Wellington × Minor urban	0.49 (0.12 – 1.94)
Wellington × Rural	0.31 (0.06 – 1.60)
Tasman/Nelson/Marlborough/West Coast × Minor urban	2.23 (0.60 – 8.28)
Tasman/Nelson/Marlborough/West Coast × Rural	0.55 (0.16 – 1.86)
Canterbury × Minor urban	1.56 (0.48 – 5.05)
Canterbury × Rural	0.66 (0.25 – 1.75)
Otago/Southland × Minor urban	0.87 (0.24 – 3.18)
Otago/Southland × Rural	0.71 (0.25 – 2.00)