Methods and procedures for the
2016 International Social Survey Programme (ISSP) for New Zealand

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The aim of the ISSP 2016 sampling was to achieve a final sample of n=1200 (in line with requirements of the ISSP Secretariat), and for the final sample to be representative across key variables – age, gender, Māori descent, region, deprivation, occupation and urbanicity. To this end, groups of individuals hypothesised to respond at lower rates were oversampled and groups of individuals hypothesised to respond at higher rates were under sampled.

The procedure was as follows. Names and addresses were obtained for all those on the electoral roll (aged 18 years and older). n=15000 were randomly selected from this list in order to (i) define strata which differ on likely response rates; and to (ii) assess the representativeness of the final set of respondents. n=15000 was chosen to ensure (i) there were enough numbers in each strata to achieve a representative number of respondents from each strata, given low response rates in some strata – note that n=15000 allows for response rates as low as 8% in strata (i.e., 1200/15000); and (ii) the numbers were not so great that the task of coding factors to test representativeness was 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).

Strata were based on the response rate patterns of the 2015 ISSP survey, where mailed participants were grouped by combinations of four factors – age, Māori descent, gender, and Auckland residence – so that groups show distinct patterns of response rates. Note that urbanicity was not used to define strata as it was not found to be an important factor predicting response. Also, the coded factors – deprivation and occupation – were not used to define strata so that the time taken to code these factors did not delay mailout. Nine strata were chosen, as shown in Figure 1.
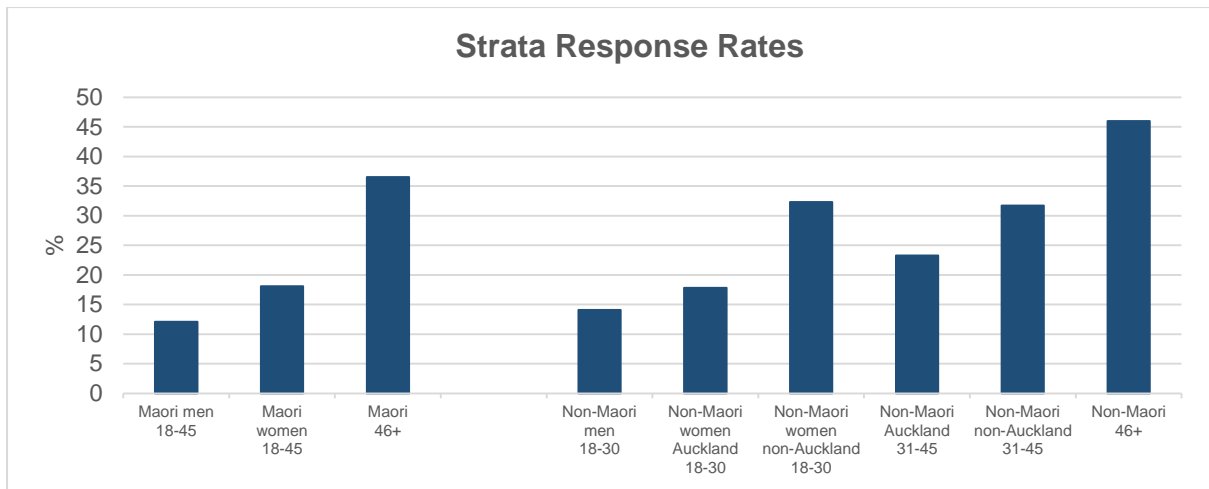
Figure 1. Response rates for ISSP 2015 across nine different strata.

Each of the n=15000 was then categorised into one of the nine strata, and a random sample from each strata was selected to be mailed a survey. The number selected to be mailed from each strata was <u>inversely proportional</u> to the predicted response rates for each strata (taken from Figure 1). That is, groups suspected to have low response rates were mailed in greater numbers and groups suspected to have high response rates were mailed in lower numbers.

The number mailed in each strata is detailed in Table 1 below. The number (%) in each strata (column 1) determines the desired number returned for each strata, given n=1200 are required in total (column 2). The expected response rate from ISSP 2015 (column 3) is used to determine the number required to mail to achieve the desired number of responses (column 4). This in turn determines a selection probability for individuals each strata (column 5) which, when applied stochastically, selects the individuals to mail (the actual number selected to mail is shown in column 6).

Table 1. Process for selecting number to mail in each strata.

Strata	N (%) of 15000 sample	Desired number returned	Response rate (%) ISSP 2015	Number to mail to achieve desired number returned	Proportion of strata to mail	Actual number selected to mail
Maori men 18-45	545 (3.6)	43	12.1	355	0.651 (=355/545)	353
Maori women 18-45	726 (4.8)	58	18.1	320	0.441 (=320/726)	319
Maori 46+	903 (6.0)	72	36.5	197	0.218 (=197/903)	201
Non-Maori men 18-30	1145 (7.6)	91	14.1	645	0.563 (=645/1145)	645
Non-Maori women Auckland 18-30	450 (3.0)	36	17.8	202	0.449 (=202/450)	200
Non-Maori women non Auckland 18-30	699 (4.7)	56	32.3	173	0.247 (=173/699)	173
Non-Maori Auckland 31-45	1196 (8.0)	96	23.3	412	0.344 (=412/1196)	417
Non Maori non-Auckland 31-45	1880 (12.5)	150	31.7	473	0.252 (=473/1880)	468
Non Maori 46+	7456 (49.7)	596	46.0	1296	0.174 (=1296/7456)	1299
	15000	**1198**		**4073**		**4075**

The n=4075 selected individuals were sent the International Social Survey Programme (ISSP) questionnaire, cover sheet and a pen. 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 017445); (ii) explained that all respondents go into a draw to win one of two $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 the University of Auckland Department of Sociology; (v) explained that funding was received

from the University of Auckland; 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 2016 ISSP.

The mail out took place on July 11 2016. Participants were able to complete the survey either on the questionnaire provided or online via SurveyMonkey. For those yet to complete the survey, a reminder postcard was sent on August 4 2016, and a second questionnaire was sent on August 30 2016.

A total of n=1350 participants returned surveys between July 11 2016 and 19 December 2016, giving a raw response rate of 33.1% (i.e., 1350/4075), and a standardised response rate of 38.7% (i.e., the response rate that would have been achieved had each stratum been mailed surveys proportional to their share of the population). As shown in **Figure 2**, there were spikes in returns following the first and second mail-outs, with a smaller spike following the reminder postcard. Most returns were through the post: n=255 (18.9%) completed the survey online.
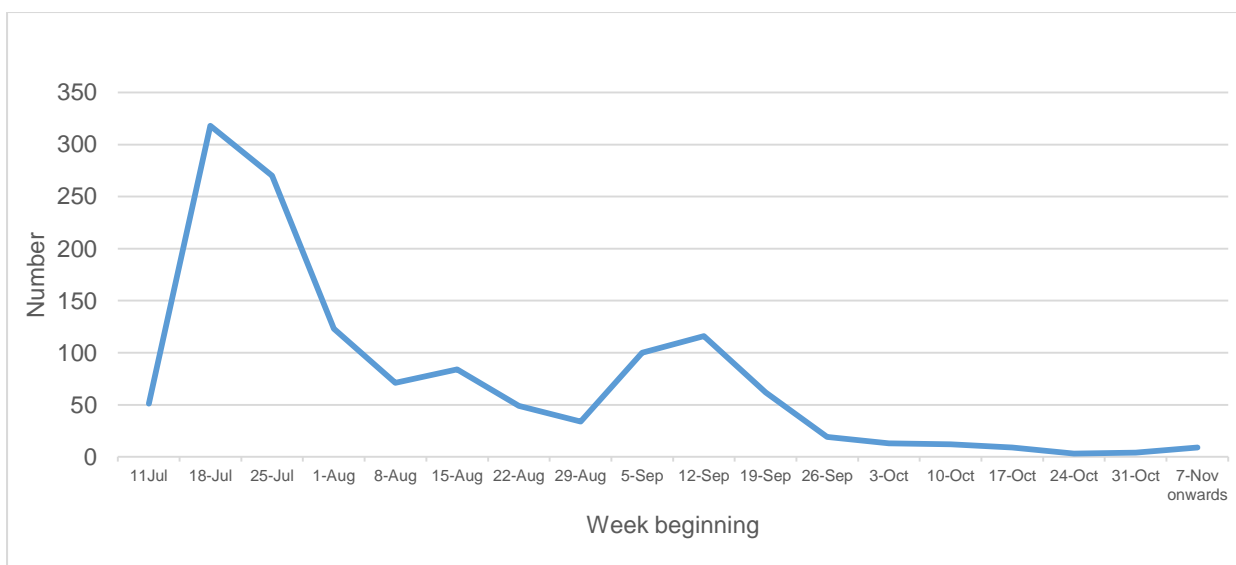

Figure 2. Questionnaires returned by date.

<u>Representativeness</u>

1. Did the sampling strategy produce the correct distribution across strata?

Figure 3 shows the distribution of the strata in the electoral roll and in ISSP respondents. In most cases the proportion of respondents in strata was very similar to that of the electoral roll. The main difference was that greater numbers of young men responded than was expected; e.g., Māori men aged 18-45 comprise 3.6% of the electoral roll but 4.4% of respondents, and non-Māori men aged 18-30 comprise 7.6% of the electoral roll but 10.2% of respondents.
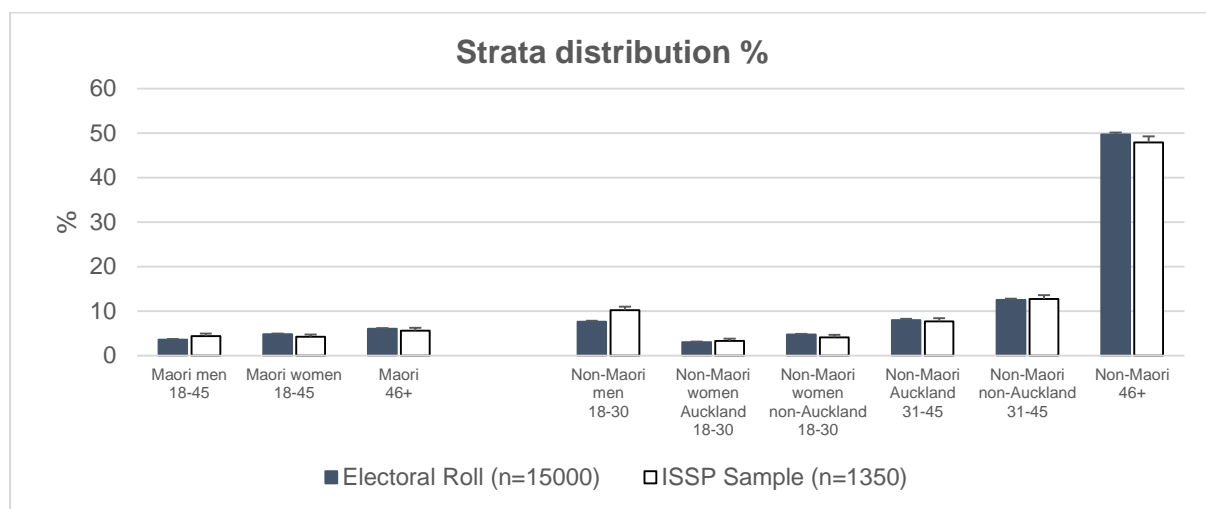
Figure 3. Distribution of the strata in the electoral roll sample and the ISSP sample respondents

This is suggestive of greater response rates than expected among young men. This in borne out by the findings shown in **Figure 4** which shows the response rates in 2016 compared to 2015 (remembering that 2015 response rates were used as a guideline for deciding mailing numbers for each strata). Whereas most response rates were as or slightly higher than expected, those of Māori men aged 18-45 (16.40% in 2016 vs 12.10% in 2015), and non-Māori men aged 18-30 (21.40% in 2016 vs 14.10% in 2015) were substantially higher than expected.
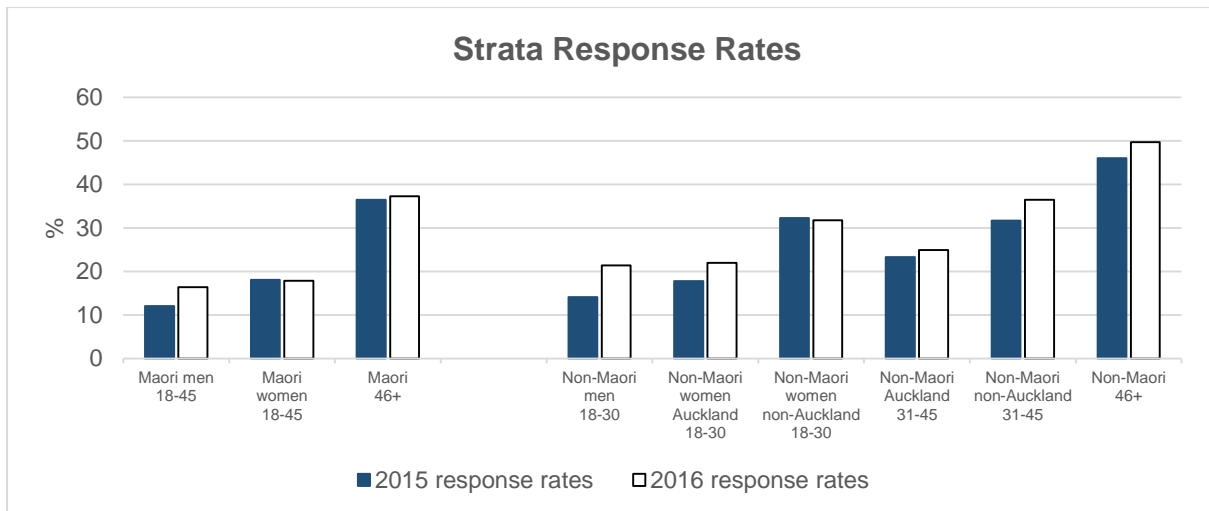
Figure 4. Comparison of response rates between ISSP 2015 and ISSP 2016 across nine different sample groups.

2. Did the sampling strategy produce a sample representative across key demographic variables?

Variables available on the electoral roll that allowed us to compare whether the ISSP respondents were representative included gender, age, Māori descent, region, rurality, New Zealand Deprivation Index quintiles and occupation. Comparisons are shown in **Figure 5.** These revealed that – despite the sampling strategy of oversampling groups less likely to respond – all sample characteristics differed slightly from the electoral roll except gender. Specifically, the sample under-represented those aged 46 - 60, contained fewer individuals living in Auckland, under-represented those living in deprived areas, over-represented those in rural areas and over-represented those from professional occupations.
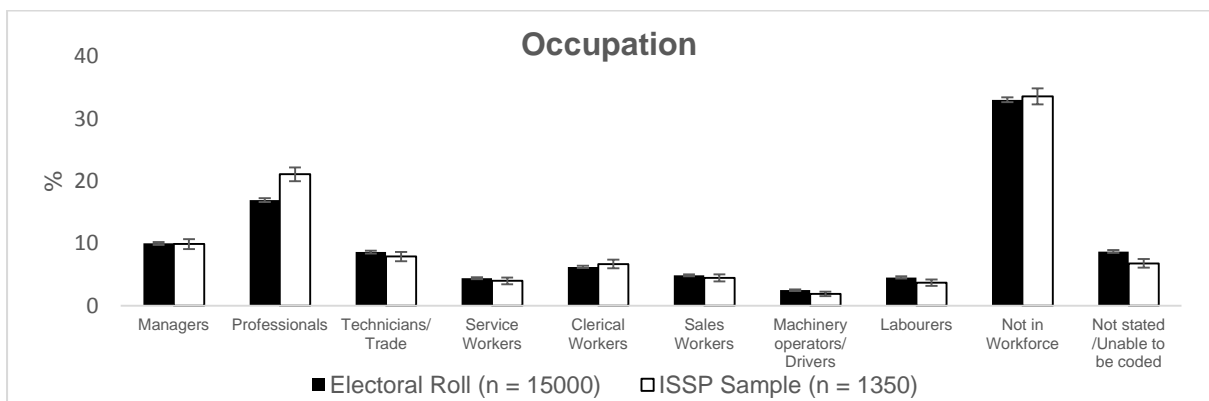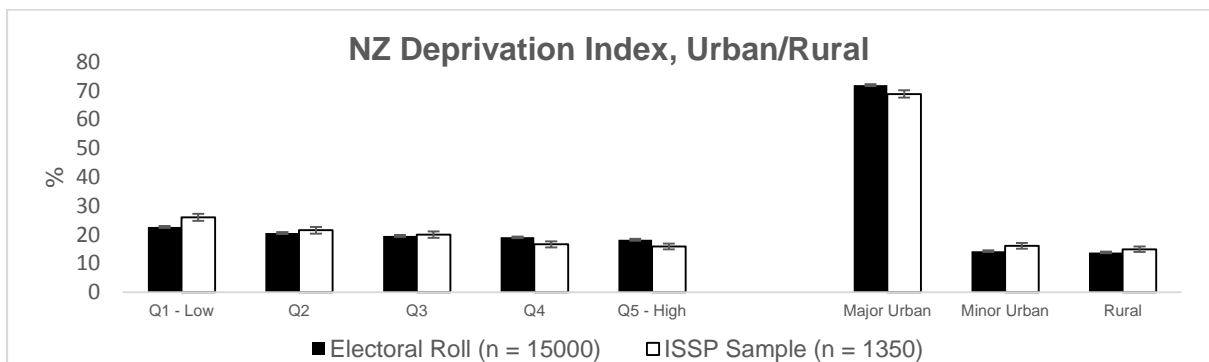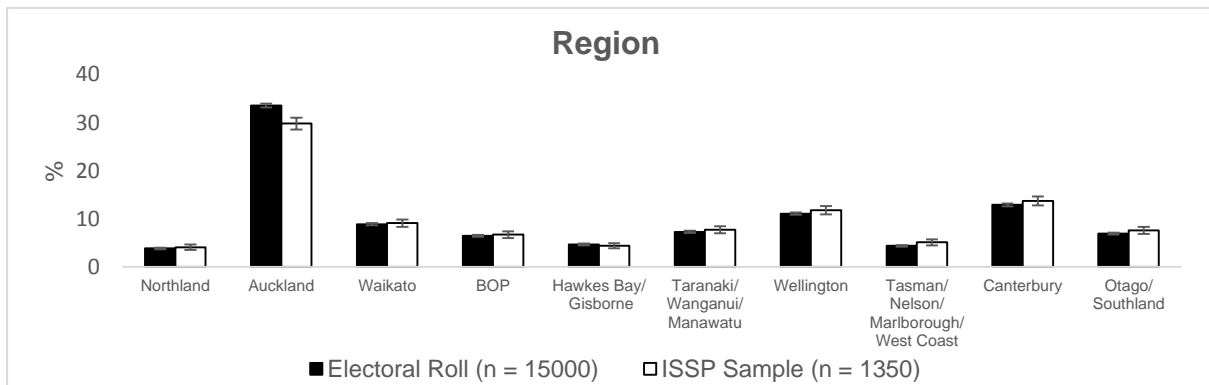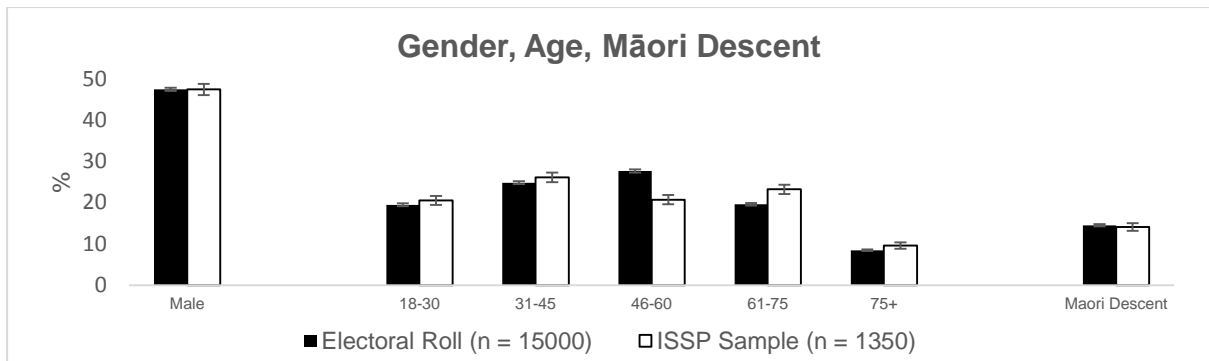
Figure 5. Comparison between Electoral Roll sample (n=15000) and ISSP Sample Respondents (n=1350) on demographic and geographic data available through the electoral roll.

<u>Weighting</u>

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, with each of the above– except region and Māori descent - included as predictors. Region was excluded from the model as the slight deviation from representativeness in this factor could be corrected by the inclusion of an Auckland variable (yes/no) in the model for those who live/do not live in Auckland. Māori-descent was excluded because the proportion of respondents who were of Māori descent was the same as the proportion of the electoral roll who were of Māori descent (see Figure 5). Gender was included in the model to ensure that the weights did not inadvertently over-weight one gender relative to the other, and also to allow for the possibility of gender interactions. A main effects model was computed and then all fifteen two-way interactions were tested in separate models. Four interactions were found to be significant, gender x age, gender x occupation, NZ deprivation index quintiles x urban, age x Auckland. These interactions and all the main effects were included in the final model, as shown in **Table 2**.

From the model in **Table 2**, 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, which ranged from 0.39 – 4.81 across the n=1350 respondents. **Figure 6** 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.

Table 2. Logistic regression model predicting response for those who responded to the ISSP survey (n=1350), of those selected to be mailed (n=15000).

Parameter	Odds Ratio (95% Confidence Interval)
Gender	
Female	Reference
Male	1.487 (0.919 – 2.407)
Age	
Age: 18-30	Reference
Age: 31-45	1.254 (0.953 – 1.649)
Age: 46-60	0.843 (0.633 – 1.123)
Age: 61-75	1.547 (1.177 – 2.032)
Age: 76+	1.260 (0.883 – 1.799)
NZ Deprivation Index	
NZDep – Quartile 1	Reference
NZDep – Quartile 2	0.960 (0.789 – 1.167)
NZDep – Quartile 3	0.783 (0.635 – 0.966)
NZDep – Quartile 4	0.811 (0.658 – 1.000)
NZDep – Quartile 5	0.779 (0.628 – 0.968)
Urbanicity	
Major Urban	Reference
Minor Urban	1.540 (1.068 – 2.222)
Rural	0.957 (0.687 – 1.332)
Occupation	
Not Stated/ Not codable	Reference
Managers	1.409 (0.919 – 2.162)
Professionals	1.728 (1.210 – 2.469)
Technicians/ Trades	1.620 (0.944 – 2.779)
Service workers	0.818 (0.492 – 1.358)
Clerical workers	1.504 (1.010 – 2.239)
Sales workers	1.143 (0.701 – 1.864)
Machinery operators/ Drivers	0.332 (0.045 – 2.470)
Labourers	1.217 (0.674 – 2.197)
Not in workforce	1.140 (0.808 – 1.608)
Auckland	
Not In Auckland Region	Reference
Auckland Region	1.012 (0.779 –1.315)
*Gender * Age interaction*	
Female * Age: 18-30	Reference
Male * Age: 31-45	0.567 (0.399 – 0.805)
Male * Age: 46-60	0.739 (0.511 – 1.068)
Male * Age 61-75	0.613 (0.432 – 0.871)
Male * Age: 76+	0.728 (0.460 – 1.154)
*Gender * Occupation interaction*	
Female * Not Stated/ Not codable	Reference
Male * Managers	0.817 (0.463 – 1.440)
Male * Professionals	0.892 (0.541 – 1.471)

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Male * Technicians/ Trades	0.661 (0.344 – 1.269)
Male * Service workers	2.536 (1.247 – 5.157)
Male * Clerical workers	0.631 (0.298 – 1.336)
Male * Sales workers	1.151 (0.583 – 2.271)
Male * Machinery operators/ Drivers	3.029 (0.381 – 24.098)
Male * Labourers	0.785 (0.372 – 1.659)
Male * Not in workforce	1.083 (0.667 – 1.760)
*Auckland * Age interaction*	
Not in Auckland * Age: 18-30	Reference
Auckland * Age: 31-45	0.963 (0.681 –1.363)
Auckland * Age: 46-60	0.691 (0.474 – 1.008)
Auckland * Age: 61-75	0.632 (0.427 – 0.936)
Auckland * Age: 76+	1.139 (0.696 – 1.863)
*NZ Deprivation Index * Urban interaction*	
NZDep – Quartile 1 * Major Urban	Reference
NZDep – Quartile 2 * Minor Urban	0.691 (0.408 – 1.170)
NZDep – Quartile 2 * Rural	0.946 (0.599 – 1.495)
NZDep – Quartile 3 * Minor Urban	0.836 (0.506 – 1.383)
NZDep – Quartile 3 * Rural	1.880 (1.198 – 2.949)
NZDep – Quartile 4 * Minor Urban	0.635 (0.384 – 1.052)
NZDep – Quartile 4 * Rural	0.790 (0.432 – 1.443)
NZDep – Quartile 5 * Minor Urban	0.786 (0.479 – 1.291)
NZDep – Quartile 5 * Rural	1.301 (0.688 – 2.461)
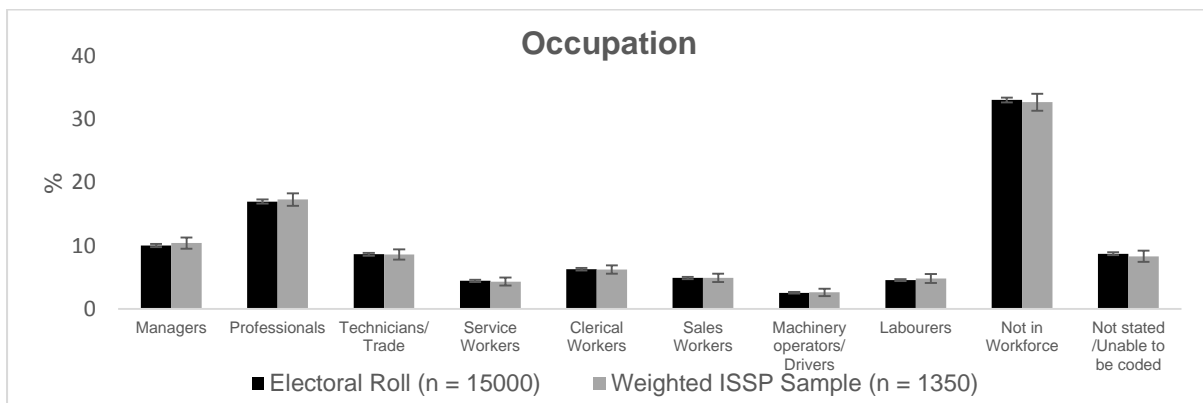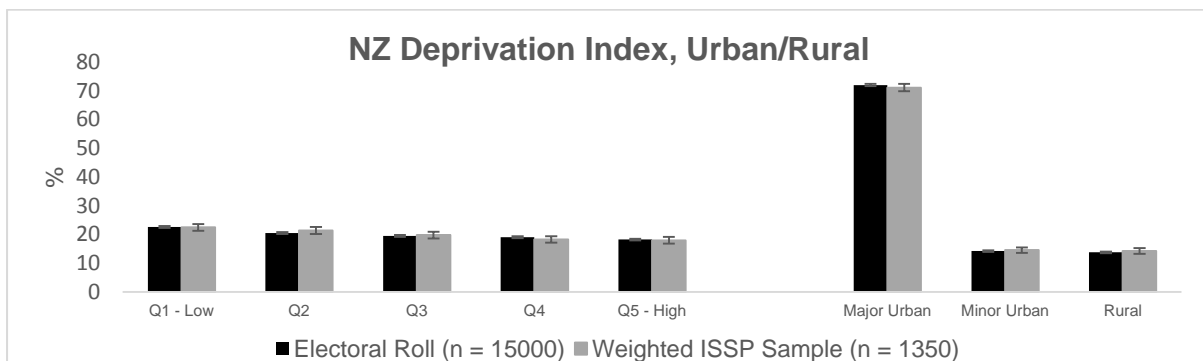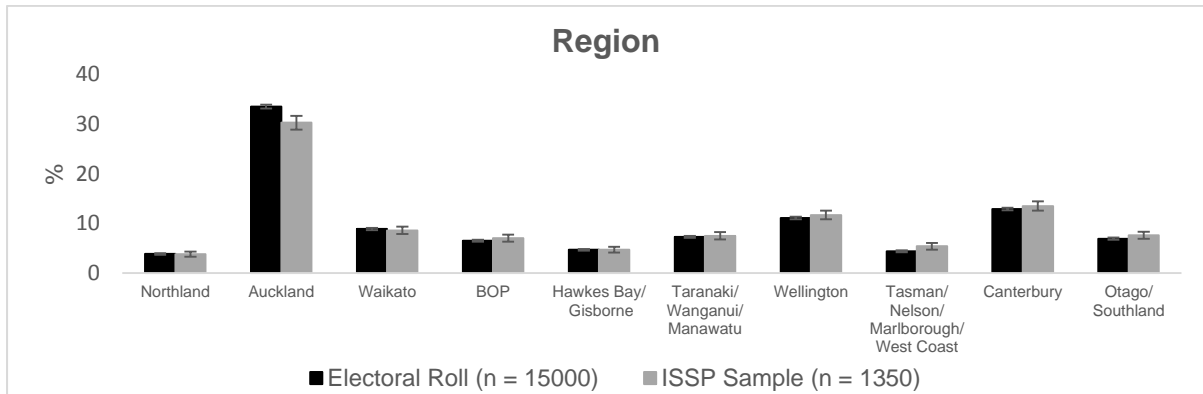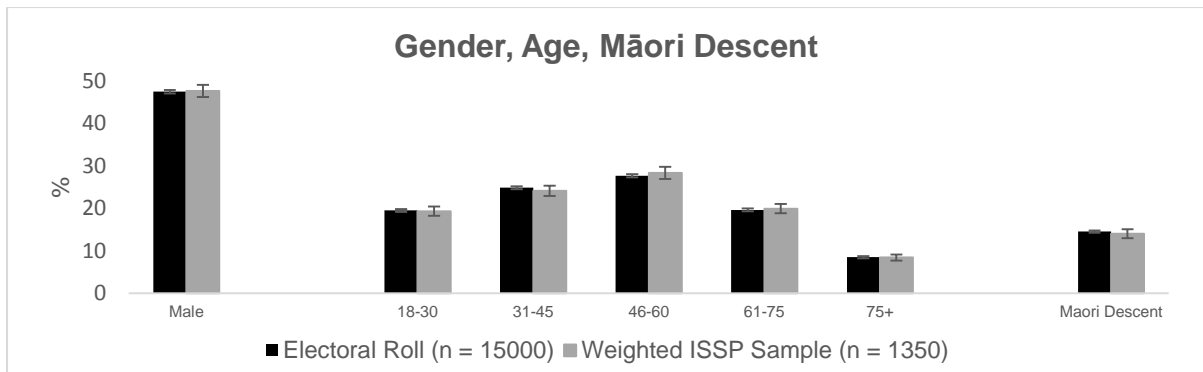
Figure 6. Comparison between Electoral Roll sample (n=15000) and ISSP Sample

Respondents (n=1350), <u>weighted for non-response</u>, on demographic and geographic data

available through the electoral roll.

Further, there were external validation variables in the survey: (i) respondents were asked which party they voted for the 2014 General Election and (ii) ethnicity of respondents. The weighted responses for (i) was compared to the confirmed results from the 2014 General Election in **Figures 7** below. Figure 7 shows that party voting of the weighted ISSP sample closely matched that of the General Election (estimates are within confidence limits for all four major parties). However from the comparison of the weighted responses for (ii) against the 2013 Census shown in **Figure 8** below, there is still an over-representation of Europeans, and under-representation of Pacific peoples and Asians in the weighted ISSP sample.
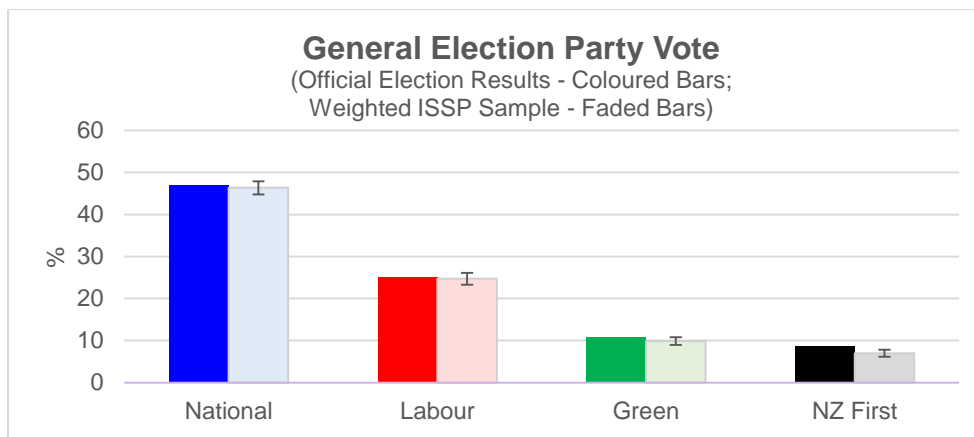

Figure 7. Comparison between 2014 General Election Party Vote Results and ISSP Sample Party Vote (n=1350), weighted for non-response.
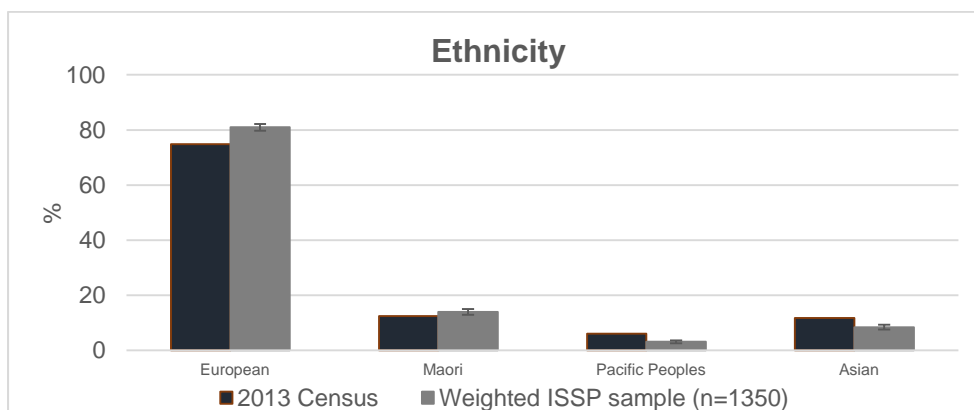

Figure 8. Comparison of ethnicity between 2013 Census and ISSP Sample (n=1350), weighted for non-response.

Conclusions

Weighting the ISSP survey based on the characteristics that predict response was able to achieve a sample that is representative across a number of factors, including gender, age, Māori descent, region, urbanicity, deprivation, occupation, and 2014 General Election voting. However caution is advised, as it is not possible to test whether the weighted sample is representative across other factors. Also, the weighting essentially treats sample respondents from under-represented groups as 'spokespeople' for others like them for all responses in the survey (e.g., the respondent with the lowest weight 'speaks' for 0.39 people who share the same demographic characteristics as them, while the respondent with the highest weight 'speaks' for 4.81 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, insofar as 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.