

Procedures for Estimating Post-Stratification NZAVS Sample Weights

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Overview

This technical report outlines how the post-stratification weights provided in each NZAVS data file were calculated. Details on how to apply post-stratification sample weighting procedures are provided in Groves, Fowler, Couper, Lepkowski, and Tourangeau (2004). These post-stratification weights are provided as standard in the data files for each wave of the NZAVS. Research papers using NZAVS data that have applied these or other more specific post-stratification weighting procedures explicitly state that they have done so.

Time 1 (2009)

To estimate representative population proportions, the NZAVS provides a post-stratification weight that adjusted for sample bias in gender (male versus female), ethnic identification as Māori (yes, no), identification as Pacific (yes, no), identification as Asian (yes, no), and identification as European or another ethnic group (yes, no). The combined weighting factor adjusting for gender and ethnic group sampling bias is expressed in Equation (1.0):

$$\text{Sample Weight}_i = W_{i(\text{Gender})} * W_{i(\text{European \& Other})} * W_{i(\text{Māori})} * W_{i(\text{Pacific})} * W_{i(\text{Asian})} + c \quad (1.0)$$

where c was a constant value added to the weight for each participant so that the average weight across participants was 1.00. The weighting value for a given demographic factor, W_i , was defined as a ratio of the known proportion of that demographic group in the population, $P_{i(pop)}$, relative to the sampled proportion, $P_{i(sample)}$ as in Equation (2.0). Population estimates used to calculate these weights were based on 2006 New Zealand Census data for people 15 years of age and over.

$$W_i = P_{i(pop)} / P_{i(sample)} \quad (2.0)$$

Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 1. The weighting values for each demographic variable are also reported.

Table 1. Weighting values provided for the Time 1 (2009) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Gender			
Male	.488	.407	1.199
Female	.512	.593	.864
Māori			
Yes	.140	.179	.784
No	.860	.821	1.047
Pacific			
Yes	.066	.043	1.536
No	.934	.957	.976
Asian			
Yes	.088	.049	1.796
No	.912	.951	.959
European/Other			
Yes	.754	.849	.888
No	.256	.151	1.632

Time 2 (2010)

Comparable post-stratification weights that adjusted for sample bias in gender (male versus female), ethnic identification as Māori (yes, no), identification as Pacific (yes, no), identification as Asian (yes, no), and identification as European or another ethnic group (yes, no) are also provided for the Time 2 (2010) NZAVS. Estimation of the post-stratification weights using in the Time 2 sample also employed Equations 1.0 and 2.0. Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 2. The weighting values for each demographic variable are also reported in Table 2.

Table 2. Weighting values provided the Time 2 (2010) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Gender			
Male	.488	.387	1.260
Female	.512	.613	.836
Māori			
Yes	.140	.155	.906
No	.860	.845	1.017
Pacific			
Yes	.066	.036	1.834
No	.934	.964	.969
Asian			
Yes	.088	.040	2.201
No	.912	.960	.950
European/Other			
Yes	.754	.889	.848
No	.256	.111	2.220

Time 3 (2011)

Comparable post-stratification weights that adjusted for sample bias in gender (male versus female), ethnic identification as Māori (yes, no), identification as Pacific (yes, no), identification as Asian (yes, no), and identification as European or another ethnic group (yes,

no) are also provided for the Time 3 (2011) NZAVS. Estimation of the post-stratification weights using in the Time 3 sample also employed Equations 1.0 and 2.0. Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 3. The weighting values for each demographic variable are also reported in Table 3.

Table 3. Weighting values provided for the Time 3 (2011) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Gender			
Male	.488	.375	1.301
Female	.512	.624	.821
Māori			
Yes	.140	.108	1.230
No	.860	.892	.964
Pacific			
Yes	.066	.026	2.539
No	.934	.974	.959
Asian			
Yes	.088	.037	2.379
No	.912	.963	.947
European/Other			
Yes	.754	.909	.829
No	.256	.091	2.708

Time 4 (2012)

The NZAVS post-stratification weighting procedure was changed from Time 4 onwards.

The Time 4 NZAVS sample included various regional booster samples. Because of this, the Time 4 NZAVS post-stratification weighting included regional information. Regions of residence were coded by identifying which of the 16 mutually exclusive and non-overlapping council zones of New Zealand each participant listed as their primary residential

address. The post-stratification weighting procedure was also revised to weight men and women from each of the four primary ethnic groups separately.

The combined weighting factor adjusting for gender and ethnic group sampling bias and region is expressed in Equation (3.0):

$$\begin{aligned} \text{Sample Weight}_i = & W_{i(\text{Male European \& Other})} * W_{i(\text{Female European \& Other})} * W_{i(\text{Male Māori})} * W_{i(\text{Female Māori})} * W_{i(\text{Male Pacific})} * W_{i(\text{Female Pacific})} * W_{i(\text{Male Asian})} * W_{i(\text{Female Asian})} + W_{i(\text{Council} \\ & \text{Region})} + c \end{aligned} \quad (3.0)$$

where c was a constant value added to the weight for each participant so that the average weight across participants was 1.00. The weighting value for a given demographic factor, W_i , was defined as a ratio of the known proportion of that demographic group in the population, $P_{i(\text{pop})}$, relative to the sampled proportion, $P_{i(\text{sample})}$ as in Equation (4.0).

$$W_i = P_{i(\text{pop})} / P_{i(\text{sample})} \quad (4.0)$$

Population estimates used to calculate these weights were based on 2013 New Zealand Census data for people 15 years of age and over. The census provided information in the age bracket from 15-19. Because our sample included those aged 18 and older, to adjust for this bias, we estimated census proportions for those over 18 by down-weighting the frequencies for this age bracket by a factor of 2/5. Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 4. The weighting values for each demographic variable and residential location are also reported.

Table 4. Weighting values provided for the Time 4 (2012) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Māori Male			
Yes	0.0515	0.0583	0.8844
No	0.9485	0.9417	1.0072
Māori Female			
Yes	0.0598	0.1079	0.5544
No	0.9402	0.8921	1.0539
Pacific Male			
Yes	0.0253	0.0159	1.5892
No	0.9747	0.9841	0.9905
Pacific Female			
Yes	0.0277	0.0341	0.8131
No	0.9723	0.9659	1.0066
Asian Male			
Yes	0.0511	0.0184	2.7799
No	0.9489	0.9816	0.9667
Asian Female			
Yes	0.0576	0.0324	1.7751
No	0.9424	0.9676	0.9740
European/Other Male			
Yes	0.3470	0.3237	1.0722
No	0.6530	0.6763	0.9655
European/Other Female			
Yes	0.3799	0.5420	0.7009
No	0.6201	0.4580	1.3540
Council Region			
Auckland Region	0.3337	0.3652	0.9140
Bay of Plenty Region	0.0631	0.0562	1.1226
Canterbury Region	0.1272	0.1338	0.9506
Gisbourne Region	0.0103	0.0084	1.2300
Hawke's Bay Region	0.0356	0.0338	1.0544
Manawatu-Wanganui Region	0.0525	0.0491	1.0688
Marlborough Region	0.0102	0.0100	1.0194
Nelson Region	0.0109	0.0134	0.8178
Northland Region	0.0358	0.0304	1.1774
Otago Region	0.0477	0.0443	1.0764
Southland Region	0.0220	0.0151	1.4530
Taranaki Region	0.0258	0.0208	1.2453
Tasman Region	0.0111	0.0096	1.1554
Waikato Region	0.0952	0.0746	1.2765
Wellington Region	0.1111	0.1289	0.8618
West Coast Region	0.0076	0.0064	1.1919

Time 5 (2013)

The NZAVS post-stratification weighting procedure followed that implemented at Time 4, and weighted men and women from each of the four primary ethnic groups separately as well as region of residence. Regions were coded by identifying which of the 16 mutually exclusive and non-overlapping council zones of New Zealand each participant listed as their primary residential address.

The combined weighting factor adjusting for gender and ethnic group sampling bias and region is expressed in Equation (5.0):

$$\begin{aligned} \text{Sample Weight}_i = & W_{i(\text{Male European \& Other})} * W_{i(\text{Female European \& Other})} * W_{i(\text{Male Māori})} * W_{i(\text{Female Māori})} * W_{i(\text{Male Pacific})} * W_{i(\text{Female Pacific})} * W_{i(\text{Male Asian})} * W_{i(\text{Female Asian})} + W_{i(\text{Council} \\ & \text{Region})} + c \end{aligned} \quad (5.0)$$

where c was a constant value added to the weight for each participant so that the average weight across participants was 1.00. The weighting value for a given demographic factor, W_i , was defined as a ratio of the known proportion of that demographic group in the population, $P_{i(\text{pop})}$, relative to the sampled proportion, $P_{i(\text{sample})}$ as in Equation (6.0).

$$W_i = P_{i(\text{pop})} / P_{i(\text{sample})} \quad (6.0)$$

Population estimates used to calculate these weights were based on 2013 New Zealand Census data for people 15 years of age and over. The census provided information in the age bracket from 15-19. Because our sample included those aged 18 and older, to adjust for this bias, we estimated census proportions for those over 18 by down-weighting the frequencies for this age bracket by a factor of 2/5. Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 5. The weighting values for each demographic variable and residential location are also reported.

Table 5. Weighting values provided for the Time 5 (2013) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Māori Male			
Yes	0.0515	0.0417	1.2354
No	0.9485	0.9583	0.9898
Māori Female			
Yes	0.0598	0.0857	0.6980
No	0.9402	0.9143	1.0283
Pacific Male			
Yes	0.0253	0.0107	2.3583
No	0.9747	0.9893	0.9853
Pacific Female			
Yes	0.0277	0.0235	1.1793
No	0.9723	0.9765	0.9957
Asian Male			
Yes	0.0511	0.0163	3.1328
No	0.9489	0.9837	0.9646
Asian Female			
Yes	0.0576	0.0284	2.0294
No	0.9424	0.9716	0.9700
European/Other Male			
Yes	0.3470	0.3354	1.0346
No	0.6530	0.6646	0.9825
European/Other Female			
Yes	0.3799	0.5646	0.6729
No	0.6201	0.4354	1.4242
Council Region			
Auckland Region	0.3337	0.3169	1.0532
Bay of Plenty Region	0.0631	0.0586	1.0773
Canterbury Region	0.1272	0.1380	0.9215
Gisbourne Region	0.0103	0.0078	1.3161
Hawke's Bay Region	0.0356	0.0338	1.0541
Manawatu-Wanganui Region	0.0525	0.0509	1.0317
Marlborough Region	0.0102	0.0106	0.9630
Nelson Region	0.0109	0.0136	0.8049
Northland Region	0.0358	0.0328	1.0896
Otago Region	0.0477	0.0544	0.8782
Southland Region	0.0220	0.0191	1.1516
Taranaki Region	0.0258	0.0228	1.1334
Tasman Region	0.0111	0.0132	0.8447
Waikato Region	0.0952	0.0815	1.1684
Wellington Region	0.1111	0.1385	0.8026
West Coast Region	0.0076	0.0076	0.9973

Time 6 (2014)

The NZAVS post-stratification weighting procedure followed that implemented at Time 4, and weighted men and women from each of the four primary ethnic groups separately as well as region of residence. Regions were coded by identifying which of the 16 mutually exclusive and non-overlapping council zones of New Zealand each participant listed as their primary residential address.

The combined weighting factor adjusting for gender and ethnic group sampling bias and region is expressed in Equation (5.0):

$$\begin{aligned} \text{Sample Weight}_i = & W_{i(\text{Male European \& Other})} * W_{i(\text{Female European \& Other})} * W_{i(\text{Male Māori})} * W_{i(\text{Female Māori})} * W_{i(\text{Male Pacific})} * W_{i(\text{Female Pacific})} * W_{i(\text{Male Asian})} * W_{i(\text{Female Asian})} + W_{i(\text{Council} \\ & \text{Region})} + c \end{aligned} \quad (5.0)$$

where c was a constant value added to the weight for each participant so that the average weight across participants was 1.00. The weighting value for a given demographic factor, W_i , was defined as a ratio of the known proportion of that demographic group in the population, $P_{i(\text{pop})}$, relative to the sampled proportion, $P_{i(\text{sample})}$ as in Equation (6.0).

$$W_i = P_{i(\text{pop})} / P_{i(\text{sample})} \quad (6.0)$$

Population estimates used to calculate these weights were based on 2013 New Zealand Census data for people 15 years of age and over. The census provided information in the age bracket from 15-19. Because our sample included those aged 18 and older, to adjust for this bias, we estimated census proportions for those over 18 by down-weighting the frequencies for this age bracket by a factor of 2/5. Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 6. The weighting values for each demographic variable and residential location are also reported.

Table 6. Weighting values provided for the Time 6 (2014) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Māori Male			
Yes	0.0515	0.0405	1.2723
No	0.9485	0.9595	0.9885
Māori Female			
Yes	0.0598	0.0842	0.7104
No	0.9402	0.9158	1.0266
Pacific Male			
Yes	0.0253	0.0103	2.4568
No	0.9747	0.9897	0.9848
Pacific Female			
Yes	0.0277	0.0229	1.2075
No	0.9723	0.9771	0.9951
Asian Male			
Yes	0.0511	0.0149	3.4272
No	0.9489	0.9851	0.9633
Asian Female			
Yes	0.0576	0.0284	2.0284
No	0.9424	0.9716	0.9700
European/Other Male			
Yes	0.3470	0.3336	1.0402
No	0.6530	0.6664	0.9799
European/Other Female			
Yes	0.3799	0.5732	0.6627
No	0.6201	0.4268	1.4530
Council Region			
Auckland Region	0.3337	0.3101	1.0761
Bay of Plenty Region	0.0631	0.0585	1.0795
Canterbury Region	0.1272	0.1379	0.9223
Gisbourne Region	0.0103	0.0077	1.3280
Hawke's Bay Region	0.0356	0.0352	1.0137
Manawatu-Wanganui Region	0.0525	0.0502	1.0468
Marlborough Region	0.0102	0.0114	0.8978
Nelson Region	0.0109	0.0145	0.7564
Northland Region	0.0358	0.0323	1.1057
Otago Region	0.0477	0.0546	0.8737
Southland Region	0.0220	0.0184	1.1972
Taranaki Region	0.0258	0.0232	1.1146
Tasman Region	0.0111	0.0133	0.8346
Waikato Region	0.0952	0.0828	1.1500
Wellington Region	0.1111	0.1424	0.7801
West Coast Region	0.0076	0.0075	1.0114

Time 7 (2015)

The NZAVS post-stratification weighting procedure followed that implemented at Time 4, and weighted men and women from each of the four primary ethnic groups separately as well as region of residence. Regions were coded by identifying which of the 16 mutually exclusive and non-overlapping council zones of New Zealand each participant listed as their primary residential address.

The combined weighting factor adjusting for gender and ethnic group sampling bias and region is expressed in Equation (5.0):

$$\begin{aligned} \text{Sample Weight}_i = & W_{i(\text{Male European \& Other})} * W_{i(\text{Female European \& Other})} * W_{i(\text{Male Māori})} * W_{i(\text{Female Māori})} * W_{i(\text{Male Pacific})} * W_{i(\text{Female Pacific})} * W_{i(\text{Male Asian})} * W_{i(\text{Female Asian})} + W_{i(\text{Council} \\ & \text{Region})} + c \end{aligned} \quad (5.0)$$

where c was a constant value added to the weight for each participant so that the average weight across participants was 1.00. The weighting value for a given demographic factor, W_i , was defined as a ratio of the known proportion of that demographic group in the population, $P_{i(\text{pop})}$, relative to the sampled proportion, $P_{i(\text{sample})}$ as in Equation (6.0).

$$W_i = P_{i(\text{pop})} / P_{i(\text{sample})} \quad (6.0)$$

Population estimates used to calculate these weights were based on 2013 New Zealand Census data for people 15 years of age and over. The census provided information in the age bracket from 15-19. Because our sample included those aged 18 and older, to adjust for this bias, we estimated census proportions for those over 18 by down-weighting the frequencies for this age bracket by a factor of 2/5. Sample and population proportions for each demographic variable on which sample weights were based are presented in Table 7. The weighting values for each demographic variable and residential location are also reported.

Table 7. Weighting values provided for the Time 7 (2015) NZAVS.

	$P_{i(pop)}$	$P_{i(sample)}$	W_i
Māori Male			
Yes	0.0515	0.0401	1.2858
No	0.9485	0.9559	0.9881
Māori Female			
Yes	0.0598	0.0795	0.7532
No	0.9402	0.9205	1.0213
Pacific Male			
Yes	0.0253	0.0100	2.5209
No	0.9747	0.9900	0.9846
Pacific Female			
Yes	0.0277	0.0206	1.3459
No	0.9723	0.9794	0.9927
Asian Male			
Yes	0.0511	0.0147	3.4771
No	0.9489	0.9853	0.9630
Asian Female			
Yes	0.0576	0.0244	2.3607
No	0.9424	0.9756	0.9660
European/Other Male			
Yes	0.3470	0.3410	1.0177
No	0.6530	0.6590	0.9908
European/Other Female			
Yes	0.3799	0.5766	0.6588
No	0.6201	0.4234	1.4647
Council Region			
Auckland Region	0.3337	0.2956	1.1291
Bay of Plenty Region	0.0631	0.0606	1.0417
Canterbury Region	0.1272	0.1355	0.9389
Gisbourne Region	0.0103	0.0088	1.1668
Hawke's Bay Region	0.0356	0.0349	1.0227
Manawatu-Wanganui Region	0.0525	0.0504	1.0414
Marlborough Region	0.0102	0.0118	0.8651
Nelson Region	0.0109	0.0139	0.7870
Northland Region	0.0358	0.0338	1.0566
Otago Region	0.0477	0.0529	0.9020
Southland Region	0.0220	0.0184	1.1987
Taranaki Region	0.0258	0.0222	1.1662
Tasman Region	0.0111	0.0138	0.8075
Waikato Region	0.0952	0.0802	1.1859
Wellington Region	0.1111	0.1426	0.7791
West Coast Region	0.0076	0.0073	1.0362

References

Groves, R. M., Fowler, F. J., Couper, M. P., Lepkowski, J. M., Singer, E., & Tourangeau, R. (2004). *Survey methodology*. New Jersey: Wiley.