

WTADJUST Example #4

SUDAAN Statements and Results Illustrated

- VPAIRWISE
- CLASS
- PREDSTAT
- NEST
- MODEL

Input Data Set(s):

Example

Using the data and final solution found in WTADJUST Example #1 to compute R-Indicator, Response Rate, Standard Deviation of Response Propensities, Population Variance of Responses Propensities, Mean of Response Propensities, Relative Standard Deviation of Response Propensities, Standard Deviation of Weight Adjustments, Population Variance of Weight Adjustments, Mean of Weight Adjustments, Relative Standard Deviation of Weight Adjustments and each estimate's sample variance, standard error, and upper and lower 95% confidence limit. These statistics are new in Release 11. Also new in Release 11 is that standard errors for all estimates properly account for the sample design as well as the sample weight adjustments.

Solution

Exhibit 1. SUDAAN Code

```
PROC WTADJUST DATA=one DESIGN=WR ADJUST=NONRESPONSE;  
WEIGHT weight;  
NEST strata psu;  
CLASS region race gender;  
MODEL resp=region race gender race*gender;  
SETENV COLWIDTH=15;  
PREDSTAT RIND RESPRATE PSTD PVAR PMEAN PRSTD ASTD AVAR AMEAN ARSTD;  
PRINT ESTIM VAR_ESTIM SE_ESTIM LOW_ESTIM UP_ESTIM ;  
RUN;
```

In the SUDAAN code above, the PREDSTAT option lists all the desired estimates and the PRINT statement requests the estimate, sample variance, standard error and upper and lower 95% confidence limits. Each estimate is output by all the variables listed in the CLASS statement. For this specific example the results are given by region, race and gender.

The results for gender are:

Propensity and Weight Adjustment Statistics		Gender			
		Total	Male	Female	

R-Indicator	Estimate	0.62	0.65	0.57
	Sample Variance	0.01	0.01	0.02
	Standard Error	0.11	0.09	0.15
	Lower 95% Limit	0.39	0.44	0.28
	Upper 95% Limit	0.81	0.81	0.83

Response Rate	Estimate	0.75	0.77	0.71
	Sample Variance	0.00	0.00	0.01
	Standard Error	0.05	0.05	0.12
	Lower 95% Limit	0.63	0.64	0.42
	Upper 95% Limit	0.84	0.86	0.90

Population Standard Deviation of Response Propensities	Estimate	0.19	0.18	0.21
	Sample Variance	0.00	0.00	0.01
	Standard Error	0.05	0.05	0.07
	Lower 95% Limit	0.08	0.08	0.06
	Upper 95% Limit	0.30	0.27	0.37

Population Variance of Response Propensities	Estimate	0.04	0.03	0.05
	Sample Variance	0.00	0.00	0.00
	Standard Error	0.02	0.02	0.03
	Lower 95% Limit	-0.01	-0.00	-0.02
	Upper 95% Limit	0.08	0.06	0.11

Mean of Response Propensities	Estimate	0.75	0.77	0.70
	Sample Variance	0.00	0.00	0.02
	Standard Error	0.05	0.06	0.14
	Lower 95% Limit	0.65	0.65	0.41
	Upper 95% Limit	0.85	0.89	1.00

Relative Standard Deviation of Response Propensities	Estimate	0.26	0.23	0.30
	Sample Variance	0.01	0.00	0.02
	Standard Error	0.08	0.07	0.13
	Lower 95% Limit	0.08	0.09	0.04
	Upper 95% Limit	0.43	0.37	0.57

Population	Estimate	0.43	0.32	0.57
Standard	Sample Variance	0.08	0.02	0.24
Deviation of	Standard Error	0.28	0.12	0.49
Weight	Lower 95% Limit	-0.16	0.06	-0.47
Adjustments	Upper 95% Limit	1.03	0.58	1.61
Population	Estimate	0.19	0.10	0.32
Variance of	Sample Variance	0.06	0.01	0.31
Weight	Standard Error	0.24	0.08	0.56
Adjustments	Lower 95% Limit	-0.33	-0.06	-0.86
	Upper 95% Limit	0.70	0.27	1.50
Mean of Weight	Estimate	1.44	1.37	1.58
Adjustments	Sample Variance	0.03	0.02	0.18
	Standard Error	0.16	0.13	0.43
	Lower 95% Limit	1.10	1.09	0.68
	Upper 95% Limit	1.78	1.65	2.48
Relative	Estimate	0.30	0.23	0.36
Standard	Sample Variance	0.03	0.01	0.06
Deviation of	Standard Error	0.17	0.07	0.24
Weight	Lower 95% Limit	-0.06	0.08	-0.14
Adjustments	Upper 95% Limit	0.66	0.39	0.86

In addition to the requested statistics a contrast statement can be included allowing for contrast estimates and their corresponding significance test results. The contrast estimates along with the precision of the contrast can be obtained using the VCONTRAST, VDIFFVAR, VPAIRWISE, and VPOLYNOMIAL statements. The precision of the contrast (e.g. standard error of the contrast) and the associated t-values and p-values, will also account for the sample design. In the SUDAAN code below we request response rates and test for significant differences in the response rates between males and females by all the variables listed in the CLASS statement (region and race) by using the VPAIRWISE statement.

The VPAIRWISE statement specifies linear contrasts that are simple differences between all possible pairs of levels of a SUBGROUP or CLASS variable. Specifying the VPAIRWISE statement is equivalent to specifying multiple VDIFFVAR or VCONTRAST statements, one for each possible pairwise difference in the levels. Note that unlike the VCONTRAST and VDIFFVAR statements, only one variable may appear on the VPAIRWISE statement.

In the SUDAAN code below the results are output to a SAS dataset using the OUTPUT statement.

Exhibit 1. SUDAAN Code

```
PROC WTADJUST DATA=one DESIGN=WR ADJUST=NONRESPONSE;
WEIGHT weight;
NEST strata psu;
CLASS region race gender;
MODEL resp=region race gender race*gender;
SETENV COLWIDTH=15;
VPAIRWISE gender;
```

```

PREDSTAT RESPRATE ;
OUTPUT ESTIM T_ESTIM P_ESTIM /filename = estimates1b replace;
RUN;

```

Using a proc print statement in SAS we can see what was output from the SUDAAN code to the output SAS dataset.

Obs	PROCNUM	TABLENO	REGION	RACE	PREDSTATX	CONTRAST	_C1	_C2	ESTIM	T_ESTIM	P_ESTIM	
1	17	1		0	-2	1	1	0	-2	0.05	0.39	0.70
2	17	1	Northeast		-2	1	1	1	-2	0.31	1.08	0.29
3	17	1	South		-2	1	1	1	-2	-0.11	-0.48	0.64
4	17	1	Midwest		-2	1	1	1	-2	-0.19	-2.26	0.04
5	17	1	West		-2	1	1	1	-2	0.14	0.64	0.53
6	17	2		-2	0	1	1	-2	0	0.05	0.39	0.70
7	17	2		-2	White	1	1	-2	1	-0.18	-1.03	0.31
8	17	2		-2	Black	1	1	-2	1	0.13	0.68	0.51
9	17	2		-2	Other	1	1	-2	1	0.45	1.93	0.07

The column titled “ESTIM” is the difference in response rates for males versus females, “T_ESTIM” is the t-value and “P_ESTIM” is the corresponding p-value for the significance test testing for difference between males and females. In the first row the overall difference in response rates between males and females is listed (0.05), the t-value for the significance test (0.39) and the p-value (0.70). In the next four rows the difference in response rates between males and females and the corresponding t-values and p-values for each region are listed and in the last three rows the same is listed for each race category. Row 6 is just a repeat of row 1.