



Weighting

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SURVEY: DEFINITION

- “A survey is a systematic method for gathering information from (a sample of) entities for the purposes of constructing quantitative descriptors of the attributes of the larger population of which the entities are members.” *Groves et al. Survey Methodology 2009*

DIFFERENCES: SAMPLE & POPULATIONS

- A survey sample may cover segments of the target population in proportions that are different from those of the same segments in the population itself.

Differences:

- Probability of selection
- Non-response
- Coverage issues

WEIGHTS

(Weights are values which measures the number of subjects in the population a particular sample case represents)

- Weights should be positive (cases with negative weights, zero, or missing are not included in analysis)
- When weights are zero, negative, or missing SPSS will issue a warning in the output

WEIGHTS REFLECT

- Probability of selection (*design weights*)
- Adjustment of non-response (*number of cases differ from planned number of completed cases*)
- Post-stratification adjustments (*demographics*)

WEIGHTS – SCALE WEIGHING (ESTIMATING POPULATION TOTAL)

Labels	Population	Sample	Sampling fraction (f)	Scale weight (1/f)
Viewers	80	20	$20/80=.25$	$80/20=4$
Ex.		5 pers		$5*4=20$

Sampling Fraction= (n/N)
Scale weight: $wgt_sc= (N/n)$

WEIGHTS – PROPORTIONAL WEIGHTING

Labels	Population	Sample	weight
Women	50 (50%)	6 (60%)	$(50\%/60\%)=0.83$
Men	50 (50%)	4 (40%)	$(50\%/40\%)=1.25$
Total	100 (100%)	10 (100)	-

Proportional Weighting: $wgt_pr=(Nk/N)/(nk/n)$;
With k representing the stratum

WEIGHTS – PROPORTIONAL WEIGHTING

- $pw=1$ (group is represented in the sample in the same proportion as in the population).
- $pw<1$ (group's proportion is higher in sample than in population i.e. it was oversampled).
- $pw>1$ (group's proportion is lower in sample than in population, i.e. it was under-sampled)

INTEGRATED WEIGHTING

- Combining the scale weight and the proportional weighting
- $wgt = wgt_sc * wgt_pr = (Nk/N) / (nk/n) * (N/n) = (Nk/nk)$
(inverse of the probability of selection)

WEIGHTS – PROPORTIONAL WEIGHTING

Labels	Population	Sample	weight (1/f)
Women	50 (50%)	6 (60%)	$(50/6)=8.3$
Men	50 (50%)	4 (40%)	$(50/4)=12.5$
Total	100 (100%)	10 (100)	-

Proportional Weighting: $wgt_pr=(Nk/N)/(nk/n)$;
With k representing the stratum

NON-RESPONSE ADJUSTMENT

- Non-response can cause bias
- Needed information: status of each interview
 - Complete
 - Partial
 - Refusal
 - Unable to contact
 - Ineligible

WEIGHTS – NON-RESPONSE WEIGHTING/ADJUSTMENT

Labels	Population	Sample	Completed surveys	Response Rate	Non-response weight ($wgt_nr=1/RR$)
Women	50	6	5	$5/6=.83$	$6/5=1.20$
Men	50	4	3	$3/4=.75$	$4/3=1.33$
Total	100	10	8		

Non-response Weighting $wgt_nr=(1/RR)$

POST-STRATIFICATION WEIGHTING

- Adjust the sample to the target population on certain demographics:
 - Age
 - Education
 - Race/ethnicity
 - Gender
 - Place of residence

(need population information)

FINAL WEIGHTS

- $Wgt_final = wgt_sc * wgt_pr * wgt_nr * wgt_po.$

SPSS & WEIGHTS: SETTING UP THE WEIGHTS

- Gender variable (Female=1; Male=2).
- If gender =1 wgt=8.3.
- If gender=2 wgt=12.5.

SPSS & WEIGHTS – SYNTAX

- Data/Weight data/Weight by...
- weight by wgt.
- (conduct analysis on weighted data)
- weight off.
- (conduct analysis on un-weighted data)

SPSS & WEIGHTS – Ex.

emp10 are you paid by the day or by the month?

**Unweighted
data**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Day	10	1.5	1.5	1.5
	2 Month	658	96.5	97.6	99.1
	3 Other	6	.9	.9	100.0
	Total	674	98.8	100.0	
Missing	System	8	1.2		
Total		682	100.0		

emp10 are you paid by the day or by the month?

**Weighted
data**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1 Day	7	1.0	1.0	1.0
	2 Month	666	97.7	98.5	99.5
	3 Other	4	.5	.5	100.0
	Total	677	99.2	100.0	
Missing	System	5	.8		
Total		682	100.0		

WEIGHTS - LEVELS OF ANALYSIS

- Household level
- Individual level

REFERENCES

Groves, R. M., Fowler, F.J., Couper, M. P., Lepkowski, J.M., Singer, E., & Tourangeau, R. (2009). Survey Methodology, Second Edition. New York: John Willey.

www.spsstools.net/Tutorials/WEIGHTING.pdf

THANK YOU!