

Calculating A Survey's Design Effect Due To Unequal Selection Probabilities

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4/26/2017

The Design Effect

Can be defined:

$$DEFF = \frac{\sum_{i=1}^n w_i^2}{(\sum_{i=1}^n w_i)^2 * n}$$

where w_i is the post-stratification weight for any one individual in the survey and n is the sample size of the unweighted sample.

After weighting for complex sampling, you sum the squared weights and divided it by the sum of the weights squared multiplied by the sample size.

Update Confidence Interval to Include Design Effect

After calculating the MOE:

$$MoE = z * \sqrt{\frac{p(1-p)}{n}}$$

or using an approximation:

$$MoE = \frac{.98}{\sqrt{n}}$$

you update your level of precision (pretty much updating your MoE) by incorporating the $DEFF$ & MoE by taking the square root of the $DEFF$ (otherwise known as the $DEFFT$) and multiplying it with the MoE

The confidence interval (or margin of error) can be expressed as:

$$\sqrt{(DEFF) * MoE}$$