

DESIGN EFFECT AND EFFECTIVE SAMPLE SIZE

History

WinCross is designed to perform significance testing between means (and proportions), including those based on weighted data. When the data are weighted, some other programs do not perform these tests correctly. WinCross implements the correct test. Noting that the correct test replaces the sample size in the denominator of the usual formula for the standard error with another number, calculated from the weights, WinCross refers to this number as the "effective sample size."

Design effect

The "design effect" in sampling is defined as the ratio of the variance of the appropriate estimator for that design to the variance of the estimator based on a simple random sample. As an example, in cluster sampling with randomized trials, the "design effect" is given by

$$1+(m-1)\rho$$

Where m is the number of observations per cluster and ρ is the intraclass correlation. In his book, Survey Sampling, Leslie Kish noted that in many computations of estimates of population means based on sampling other than simple random sample (e.g., stratified random sampling) the estimator can be expressed as a weighted average of the observations. He then derived exactly the same factor as we did and referred to it as the "design effect," even though it is such only in the circumstance where the estimator is a weighted average of the observations.

If you are interested in calculating the "design effect/effective sample size" for a survey (as opposed to the design effect on a subset of the surveys, e.g., the design effect on the mean of the data from males), set up a total sample column in a table and calculate the "effective sample size" as one of the table statistics.