The appropriate sample size

Choosing a sample size for your study

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# SAMPLING SIZE

Sampling is a common data collection method. It involves getting a portion of a population when researching on a population. This is meant to generate data whose purpose is to give information (generate knowledge) or to represent the entire population.

One of the main concerns when conducting sampling; is what an appropriate sample size should be. There are a few terms necessary to understand when considering a sample size.

1. Level of Precision
2. Confidence level
3. Degree of variability

## Level of Precision:

It is a times called sampling error. It is the range in which the true value of the population is estimated to be. It is expressed as a percentage i.e. ± 5%. E.g. if a researcher finds that the mean weight of a population is 70 at a level of precision of 5%, it means that the mean weight of the population is 70 ± 5% (meaning between 65% - 75%.

## Confidence level

It is also called the risk level. It is the degree to which a sample is representative of the population. E.g. For a 95% confidence level, 95% of the sample is representative of the population.

## Degree of variability

This refers to the distribution of attributes in a population i.e. the level of homogeneity or heterogeneity of a population. i.e. the more the homogeneity, the smaller the sample size required and the more the heterogeneity the bigger the sample size required to achieve representativeness of the population.

# THE APPROPRIATE SAMPLE SIZE

The appropriate sample size is determined based on these factors.

1. The purpose of the study
2. The population size
3. The confidence level.
4. The degree of variability
5. The level of precision

Based on the above there are three main ways of finding the appropriate sample size. That is by using already established tables, by using sample size calculating formulas or by using the sample size used in a similar study. Let us look at the two in more detail.

There are published tables that give the appropriate sample size for a given population size for a given combination of precision, level of confidence and degree of variability.

### Using sample size calculating formulas

The other way is by using formulas to calculate sample sizes given a combination of the above factors of determining a sample size

#### FORMULA FOR CALCULATING SAMPLE FOR PROPORTIONS

1. This is about calculating the sample size but the formula used depends on the population size.

For large populations the formula to use is:

Is the sample size, is the desired confidence level which is used in the z tables to get the value of Z (z scores), is the estimated proportion of an attribute present in the population (variability), is one minus p (1 – p) and e is the desired level of precision.

In absence of variability we can use maximum variability which is 0.5

**e.g.**

1. **When the sample size is small the formula to use is:**

n is the sample size, N is the population size

1. **Simplified formula for proportions**

A simplified formula based on population size is given by:

n is the sample size, N is the population size and e is the level of precision.

#### FORMULA FOR CALCULATING SAMPLE FOR THE MEAN

This is for a population with variability. In this case we can categorize the population into groups then find sample size based on proportions or you can use sampling size based on the mean. This would require a good estimate of the population variance. This is not always available thus not the best formula for calculating sample size. It is given by:

σ is the variance of an attribute in the population

# BIBLIOGRAPHY

**Israel, G. D. (2013). Determining Sample Size, (April 2009), 1–5.**