

A MarketSearch Brief

Sample Size and Sampling Error

Among the questions most frequently asked by our clients is “How big does my sample have to be in order to have valid results?” Like most good questions, there is no pat answer. The best answer involves an element of judgment based on known statistical probabilities.

Researchers usually don’t distinguish between samples that are valid or invalid. Instead we speak in terms of degrees of precision. For example, how close are the results of my sample to those of the whole population from which the sample was selected? Sampling error, or margin of error, helps answer this question.

Suppose we surveyed 500 people and found that 65% of them said that vanilla is their favorite flavor of ice cream. For a sample of 500, sampling error is $\pm 4\%$. This means that 95 times out of 100 we could expect the results to be within 4 percentage points – in other words, a result of 65% could be as high as 69% and as low as 61%. Therefore, we have a reasonably high degree of confidence that the result for the entire population would fall somewhere between these two extremes.

As sample size increases, sampling error decreases. Sampling error is 10% for a sample of 100 and 3% for a sample of 1000. The chart below shows the error for samples of 100 to 1500.

| Sample Size | Sampling Error |
|-------------|----------------|
| 100 | 9.8% |
| 200 | 6.9% |
| 300 | 5.7% |
| 400 | 4.9% |
| 500 | 4.4% |
| 600 | 4.0% |
| 700 | 3.7% |
| 800 | 3.5% |
| 900 | 3.3% |
| 1000 | 3.0% |
| 1500 | 2.5% |

It is important to remember that sampling error is only one type of error possible in survey research. As a survey moves through the stages of sample selection, questionnaire design, data collection, and data processing, other errors may occur. The following are some of the possibilities:

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- The sample may be selected with a systematic bias if we draw from one segment or area of the population – for example, only men rather than men and women or residents of the southern part of a city rather than the whole city.
- A survey question may be worded inappropriately.
- An interviewer may misrepresent a question by asking it in the wrong way or with the wrong tone of voice.
- The data may have coding, data entry, or tabulation errors.

While it is important to realize that such errors can occur, most survey research professionals are qualified to recognize and avoid these potential problems for you. Your most effective insurance against these pitfalls is to select a survey research company whose reputation is built on quality and experience.

Choosing a Sample Size

Choosing a sample size is one of the most crucial parts of designing a quantitative survey whether the survey is conducted via telephone, mail, or intercept.

Simply put, the more people you talk to, the more likely you will produce a picture that accurately reflects the opinions of the larger population you are studying.

Balanced against the advantages of a large sample size are the limitations of time and money, and often, whether or not great precision is even necessary. Most often our clients choose to complete studies with a sample of 300 or 500 respondents. These figures usually strike a good balance between moderate cost and usefulness of detail.

Rules of Thumb

The smaller the subgroup within the total sample, the less likely it is that your information about that subgroup is reliable.

The larger your sample size, the more seriously your conclusions will be taken by others.

The simpler and more clear-cut the issues, the fewer respondents it takes to get the answers.