

Section 1.5

Bias in Sampling

Definitions

- Bias = where the results of the sample are not representative of the population
- Three sources of Bias in Sampling
 - Sampling bias
 - Nonresponse bias
 - Response bias

Sampling Bias

Means that the technique used to obtain the sample's individuals tends to favor one part of the population over another. Can also occur from undercoverage, which occurs when the proportion of one segment of the population is lower in a sample than it is in the population.

Nonresponse Bias

Exists when individuals selected to be in the sample who do not respond to the survey have different opinions from those who do.

Ways to Avoid: callbacks, rewards

Response Bias

Exists when the answers on a survey do not reflect the true feelings of the respondent.

Ways this happens: Interviewer error, misrepresented answers, wording of the questions, ordering of questions or words, type of question (open or closed), and data-entry error

Definitions

- Nonsampling errors result from undercoverage, nonresponse bias, response bias, or data-entry error.
- Sampling errors results from using a sample to estimate information about a population.

1. Determine the type of bias and suggest a remedy

In 1936, the American Literary Digest magazine collected over two million postal surveys and predicted that the Republican candidate in the U.S. presidential election, Alf Landon, would beat the incumbent president, Franklin Roosevelt by a large margin. The result was the exact opposite. The Literary Digest survey represented a sample collected from readers of the magazine, supplemented by records of registered automobile owners and telephone users. This sample included an over-representation of individuals who were rich, who, as a group, were more likely to vote for the Republican candidate.

Source: Wikipedia

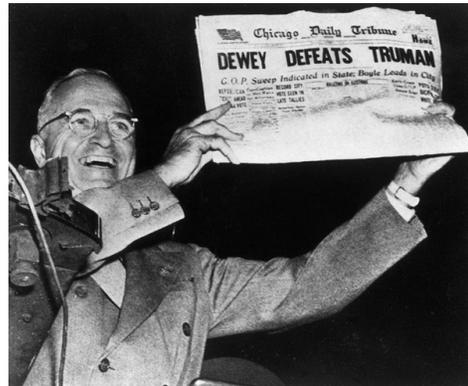
2. Determine the type of bias and suggest a remedy

An email is sent out randomly to 300 managers asking them how many hours they are working per week. The results indicate that the average work week for managers is 40.

3. Determine the type of bias and suggest a remedy

1948 Presidential Election. On Election night, the Chicago Tribune printed the headline DEWEY DEFEATS TRUMAN, which turned out to be mistaken. In the morning the grinning President-Elect, Harry S. Truman, was photographed holding a newspaper bearing this headline. The reason the Tribune was mistaken is that their editor trusted the results of a phone survey. Survey research was then in its infancy, and few academics realized that a sample of telephone users was not representative of the general population. Telephones were not yet widespread, and those who had them tended to be prosperous and have stable addresses.

Source: Wikipedia



4. Determine the type of bias and suggest a remedy

A pollster heads to a particular corner of Ark City and selects 20 houses to find out income levels.



5. Determine the type of bias and suggest a remedy

An instructor decides to use his class as a sample and asks them how many hours they study.

6. Determine the type of bias and suggest a remedy

A doctor's survey asks new patients how many hours they exercise per week.

YOU TOLD HIM ZERO!!



7. Determine the type of bias and suggest a remedy

The instructor received the following survey through email:

Pearson is committed to providing you with the most comprehensive and effective textbooks for the computer aided drawing courses that you teach. To that end, we are trying to determine the courses offered in your program and the challenges and trends that you feel are affecting your courses going forward, etc. Could you please spare a few minutes now and complete our short online questionnaire. In return, your name will be entered into a drawing to win one of THREE \$50 Amazon.com E-gift certificates. The survey is posted at:

8. Determine the type of bias and suggest a remedy

A survey is given to 30 students at random to inquire how many times they have been arrested

