

**Margin of Error:**

1. 200 teenagers were surveyed after screening a movie. Of those surveyed, 72% said they enjoyed the movie. Give an interval that is likely to contain the true proportion of all teenagers that enjoyed the movie.

$$1.96 \sqrt{\frac{.72(.28)}{200}} = .06 \quad [.66, .78] \Rightarrow 66\% \text{ to } 78\%$$

2. In a survey of 225 people, 16% watch soccer live on television. Find the margin of error.

$$1.96 \sqrt{\frac{.16(.84)}{225}} = .0479 \Rightarrow 4.79\%$$

3. In a sample of 400 teachers, 226 preferred to have 4<sup>th</sup> period planning. Determine (a) sample proportion, (b) margin of error, and (c) the interval likely to contain the true population proportion.  $226/400 = .565$

b)  $1.96 \sqrt{\frac{.565(1-.565)}{400}} = .0486$  c)  $[.516, .6135]$

**Sampling:** State the type of sampling each example represents.

4. An interviewer in a mall is told to survey every 5<sup>th</sup> shopper. *systematic RS*

5. A list of students in elementary statistics is obtained in which the individuals are numbered 1 to 540. A professor randomly selects 30 numbers from a pile. *simple random*

6. Mr. Crayton randomly selects 20 classrooms during first period and surveys all students in those classes. *cluster*

7. A researcher segments the population of car owners into four groups: Ford, General Motors, Chrysler, and foreign. She obtains a random sample from each group and conducts a survey. *stratified RS*

8. A manufacturing company would like to determine the approximate market share of a certain product. A representative of the company is asked to stand in front of a certain grocery store and ask the first 100 people who go into the store whether they use their product. *convenience sample*

9. A car company mails a survey to prospective car buyer's asking their opinions about the company's products. *voluntary response sample*

**Observation vs. Experiment:** State whether each scenario is an observational study, or experiment.

10. A parent group randomly examines 25 randomly selected PG-13 movies and 25 randomly selected PG movies and records the number of curse words that occur in each. They then compare the number of curse words between the two movie ratings. *observation*

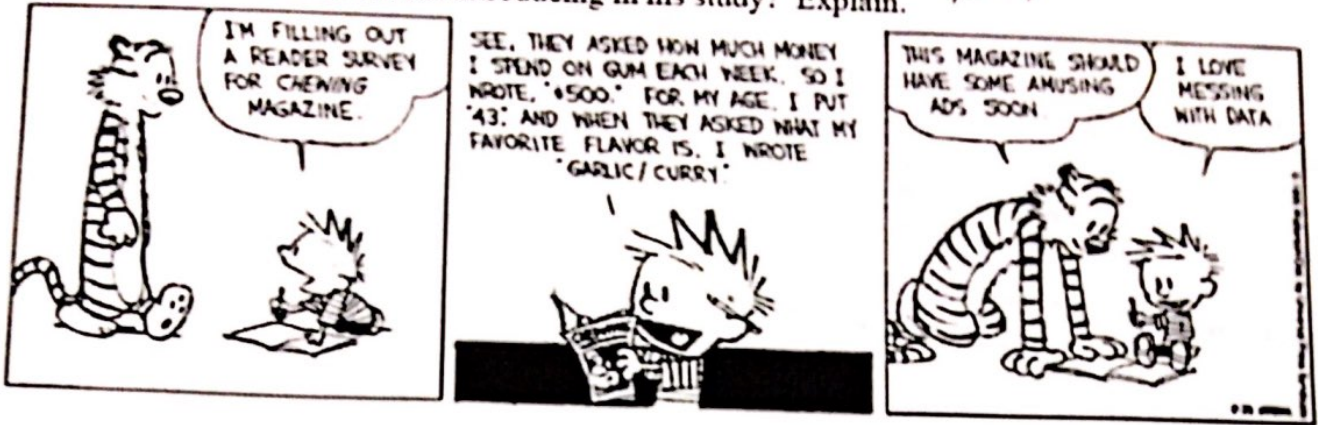
11. Fifty people with clinical depression were divided into two groups. Over a 6 month period, one group was given a traditional treatment for depression while the other group was given a new drug. The people were evaluated at the end of the period to determine whether their depression had improved. *experiment*

12. One hundred people who regularly work out at a gym and one hundred people who do not workout are tested for their cholesterol levels to determine whether exercise helps lower cholesterol. *obs*

13. A sample of 504 patients in early stages of Alzheimer's disease is divided into two groups. One group receives an experimental drug; the other group receives a placebo. The advance of the disease in the patients from the two groups is tracked at 1-month intervals over the next year. *exp.*

16. What kind of bias is Calvin introducing in his study? Explain.

Response bias



**Identify the source of bias:**

a. Before the presidential election of 1936, FDR against Republican ALF Landon, the magazine Literary Digest predicted Landon winning the election in a 3-to-2 victory. The Digest's survey of 2.8 million people came from magazine subscribers, car owners, telephone directories, etc. George Gallup surveyed only 50,000 people and predicted that Roosevelt would win. *undercoverage, non response*

b. Suppose that you want to estimate the total amount of money spent by students on textbooks each semester at UNC. You collect register receipts for students as they leave the bookstore during lunch one day. *convenience, undercoverage, non response*

c. To find the average value of a home in Apex, one averages the price of homes that are listed for sale with a realtor. *undercoverage*

d. A surveyor is conducting a survey outside of a local library. He is asking people to take the survey as they come into the library. *convenience, undercoverage, non response*

e. A magazine includes a questionnaire in one of its issues. The magazine is for guns and ammunition, and the questionnaire is asking about public opinion of gun control. *undercoverage, voluntary response, wording - in gun maga?*

f. A theatre company hands out a questionnaire about the quality of their productions. They are only interested in the people who attend the theatre. *non response*

g. Susan and Walter are getting ready for their big summer barbecue party. Not sure how many hamburgers to buy, Susan sends out a survey to all of the guests. Here is Susan's survey question: *Do you want to have someone kill a defenseless animal, skin it, grab some of it, add preservatives to it, and force me to inhale its death fumes while I cry silently because it reminds me of all my animal farm friends from when I was a child?* *wording of quest.*

h. Walter reads Susan's question and shakes his head and sighs. He writes a new survey question and sends it out to their friends: *Do you want to support local American farmers in these troubled economic times by grilling up a traditional American juicy burger?*

*wording of question - deliberate*