University of Texas at Austin

Problem Set # 1

Sampling.

Provide your complete solutions for the following problems.

Problem 1.1. A sociologist wants to study the attitudes of American male college students toward marriage and husband-wife relations. She gives a questionnaire to 25 of the men enrolled in Sociology 101 at her college. All 25 complete and return the questionnaire. Identify the sample in this situation!

Solution: The 25 respondents.

Problem 1.2. In order to assess the opinion of students at the University of Montana on campus snow removal, a reporter for the student newspaper interviews the first 12 students he meets who are willing to express their opinion. What is the population in this case?

Solution: All students at the University of Montana.
The group of individuals we want information about is the population. In this case it would have been better to have obtained a simple random sample rather than sampling the first 12 students who are willing to give their opinion, but that doesn't change the population.

Problem 1.3. A researcher is interested in the cholesterol levels of adults in the city in which she lives. A cholesterol screening program is set up in the downtown area during the lunch hour. Individuals can walk in and have their cholesterol determined for free. The service is used by 173 people, and their average cholesterol is 217.8. The sample obtained is an example of what kind of sample? Is it: *simple, stratified, biased*, e.g?

Solution: This is a sample probably containing **bias** and **undercoverage.**
Individuals "volunteered" for the screening. Individuals who knew their cholesterol was fine may not have bothered to have it checked, which would cause the average from the screening to be too high. The downtown area was not equally accessible to all adults in the population. Those who work in the downtown area are more likely to be in the sample, while other groups may not have known about it or may not have been able to reach the screening center, which would lead to undercoverage.

Problem 1.4. (5 points) **French "unfriendliness"**
A study sponsored by American Express Co. and the French government tourist office found that old American stereotypes about French unfriendliness weren't true. The respondents were more than 1000 Americans who have visited France more than once for pleasure over the past two years. The results of this study are probably ...

a. very accurate given the large sample size.
b. very inaccurate since the sample is only a small fraction of all Americans who have visited France.
c. biased, overstating the extent to which the old stereotypes weren't true.

Solution: c.
The sample is not a random sample of Americans. Americans who visited France more than once for pleasure over the past two years may be more likely to find the French friendly than other Americans, and this will overstate the extent to which the old stereotypes are not true. This is because those who had a negative experience on their first visit are less likely to return.

Definition 1.1. A **probability sample** is obtained by a procedure which gives each member of the population a *known chance* of being selected.

Problem 1.5. Disneyland
There are four people in a family: a father, a mother and two children. They have won two tickets to go to Disneyland for a week. They decide to select a sample of two people for the trip as follows: The mother and father flip a coin to see which of the two of them will go, and they then flip a coin to see which of the two children will go. This is ...

a. a *simple random sample* of size two from the family since two coins were flipped.
b. a *probability sample* from the family since each member of the family has a known chance of being selected to go on the trip.
c. not a *probability sample* since the mother and father can't go together.

Solution: b.
A probability sample just gives each member of the population a known chance of being selected, in this case each person has a 50% chance to go (see the explanation for answer choice (b)). The fact that the mother and father can't go together just tells you that not all samples have the same chance, which means that it is not a simple random sample of two people from the family.