

## Questions on Topic Seven: Planning and Conducting Surveys

### Multiple-Choice Questions

**Directions:** The questions or incomplete statements that follow are each followed by five suggested answers or completions. Choose the response that best answers the question or completes the statement.

1. Ann Landers, who wrote a daily advice column appearing in newspapers across the country, once asked her readers, "If you had it to do over again, would you have children?" Of the more than 10,000 readers who responded, 70% said no. What does this show?
  - (A) The survey is meaningless because of voluntary response bias.
  - (B) No meaningful conclusion is possible without knowing something more about the characteristics of her readers.
  - (C) The survey would have been more meaningful if she had picked a random sample of the 10,000 readers who responded.
  - (D) The survey would have been more meaningful if she had used a control group.
  - (E) This was a legitimate sample, randomly drawn from her readers and of sufficient size to allow the conclusion that most of her readers who are parents would have second thoughts about having children.
2. Which of the following are true statements?
  - I. If bias is present in a sampling procedure, it can be overcome by dramatically increasing the sample size.
  - II. There is no such thing as a "bad sample."
  - III. Sampling techniques that use probability techniques effectively eliminate bias.
  - (A) I only
  - (B) II only
  - (C) III only
  - (D) None of the statements are true.
  - (E) None of the above gives the complete set of true responses.

3. Two possible wordings for a questionnaire on gun control are as follows:

- I. The United States has the highest rate of murder by handguns among all countries. Most of these murders are known to be crimes of passion or crimes provoked by anger between acquaintances. Are you in favor of a 7-day cooling-off period between the filing of an application to purchase a handgun and the resulting sale?
- II. The United States has one of the highest violent crime rates among all countries. Many people want to keep handguns in their homes for self-protection. Fortunately, U.S. citizens are guaranteed the right to bear arms by the Constitution. Are you in favor of a 7-day waiting period between the filing of an application to purchase a needed handgun and the resulting sale?

One of these questions showed that 25% of the population favored a 7-day waiting period between application for purchase of a handgun and the resulting sale, while the other question showed that 70% of the population favored the waiting period. Which produced which result and why?

- (A) The first question probably showed 70% and the second question 25% because of the lack of randomization in the choice of pro-gun and anti-gun subjects as evidenced by the wording of the questions.
- (B) The first question probably showed 25% and the second question 70% because of a placebo effect due to the wording of the questions.
- (C) The first question probably showed 70% and the second question 25% because of the lack of a control group.
- (D) The first question probably showed 25% and the second question 70% because of response bias due to the wording of the questions.
- (E) The first question probably showed 70% and the second question 25% because of response bias due to the wording of the questions.

4. Which of the following are true statements?

- I. Voluntary response samples often underrepresent people with strong opinions.
  - II. Convenience samples often lead to undercoverage bias.
  - III. Questionnaires with nonneutral wording are likely to have response bias.
- (A) I and II
  - (B) I and III
  - (C) II and III
  - (D) I, II, and III
  - (E) None of the above gives the complete set of true responses.

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5. Each of the 29 NBA teams has 12 players. A sample of 58 players is to be chosen as follows. Each team will be asked to place 12 cards with its players' names into a hat and randomly draw out two names. The two names from each team will be combined to make up the sample. Will this method result in a simple random sample of the 348 basketball players?
  - (A) Yes, because each player has the same chance of being selected.
  - (B) Yes, because each team is equally represented.
  - (C) Yes, because this is an example of stratified sampling, which is a special case of simple random sampling.
  - (D) No, because the teams are not chosen randomly.
  - (E) No, because not each group of 58 players has the same chance of being selected.
6. To survey the opinions of bleacher fans at Wrigley Field, a surveyor plans to select every one-hundredth fan entering the bleachers one afternoon. Will this result in a simple random sample of Cub fans who sit in the bleachers?
  - (A) Yes, because each bleacher fan has the same chance of being selected.
  - (B) Yes, but only if there is a single entrance to the bleachers.
  - (C) Yes, because the 99 out of 100 bleacher fans who are not selected will form a control group.
  - (D) Yes, because this is an example of systematic sampling, which is a special case of simple random sampling.
  - (E) No, because not every sample of the intended size has an equal chance of being selected.
7. Which of the following are true statements about sampling error?
  - I. Sampling error can be eliminated only if a survey is both extremely well designed and extremely well conducted.
  - II. Sampling error concerns natural variation between samples, is always present, and can be described using probability.
  - III. Sampling error is generally smaller when the sample size is larger.
  - (A) I and II
  - (B) I and III
  - (C) II and III
  - (D) I, II, and III
  - (E) None of the above gives the complete set of true responses.

8. What fault do all these sampling designs have in common?
- The *Wall Street Journal* plans to make a prediction for a presidential election based on a survey of its readers.
  - A radio talk show asks people to phone in their views on whether the United States should pay off its huge debt to the United Nations.
  - A police detective, interested in determining the extent of drug use by teenagers, randomly picks a sample of high school students and interviews each one about any illegal drug use by the student during the past year.
- (A) All the designs make improper use of stratification.  
(B) All the designs have errors that can lead to strong bias.  
(C) All the designs confuse *association* with *cause and effect*.  
(D) None of the designs satisfactorily controls for sampling error.  
(E) None of the designs makes use of chance in selecting a sample.
9. A state auditor is given an assignment to choose and audit 26 companies. She lists all companies whose name begins with *A*, assigns each a number, and uses a random number table to pick one of these numbers and thus one company. She proceeds to use the same procedure for each letter of the alphabet and then combines the 26 results into a group for auditing. Which of the following are true statements?
- Her procedure makes use of chance.
  - Her procedure results in a simple random sample.
  - Each company has an equal probability of being audited.
- (A) I and II  
(B) I and III  
(C) II and III  
(D) I, II, and III  
(E) None of the above gives the complete set of true responses.
10. A researcher planning a survey of heads of households in a particular state has census lists for each of the 23 counties in that state. The procedure will be to obtain a random sample of heads of households from each of the counties rather than grouping all the census lists together and obtaining a sample from the entire group. Which of the following is a true statement about the resulting stratified sample.
- It is not a simple random sample.
  - It is easier and less costly to obtain than a simple random sample.
  - It gives comparative information that a simple random sample wouldn't give.
- (A) I only  
(B) I and II  
(C) I and III  
(D) I, II, and III  
(E) None of the above gives the complete set of true responses.

11. To find out the average occupancy size of student-rented apartments, a researcher picks a simple random sample of 100 such apartments. Even after one follow-up visit, the interviewer is unable to make contact with anyone in 27 of these apartments. Concerned about nonresponse bias, the researcher chooses another simple random sample and instructs the interviewer to continue this procedure until contact is made with someone in a total of 100 apartments. The average occupancy size in the final 100-apartment sample is 2.78. Is this estimate probably too low or too high?
  - (A) Too low, because of undercoverage bias.
  - (B) Too low, because convenience samples overestimate average results.
  - (C) Too high, because of undercoverage bias.
  - (D) Too high, because convenience samples overestimate average results.
  - (E) Too high, because voluntary response samples overestimate average results.
  
12. To conduct a survey of long-distance calling patterns, a researcher opens a telephone book to a random page, closes his eyes, puts his finger down on the page, and then reads off the next 50 names. Which of the following are true statements?
  - I. The survey design incorporates chance.
  - II. The procedure results in a simple random sample.
  - III. The procedure could easily result in selection bias.
  - (A) I and II
  - (B) I and III
  - (C) II and III
  - (D) I, II, and III
  - (E) None of the above gives the complete set of true responses.
  
13. Which of the following are true statements about sampling?
  - I. Careful analysis of a given sample will indicate whether or not it is random.
  - II. Sampling error implies an error, possibly very small but still an error, on the part of the surveyor.
  - III. Data obtained while conducting a census are always more accurate than data obtained from a sample, no matter how careful the design of the sample.
  - (A) I only
  - (B) II only
  - (C) III only
  - (D) None of these statements are true.
  - (E) None of the above gives the complete set of true responses.



14. Consider the following three events:

- I. Although 18% of the student body are minorities, in a random sample of 20 students, 5 are minorities.
- II. In a survey about sexual habits, an embarrassed student deliberately gives the wrong answers.
- III. A surveyor mistakenly records answers to one question in the wrong space.

Which of the following correctly characterizes the above?

- (A) I, sampling error; II, response bias; III, human mistake
  - (B) I, sampling error; II, nonresponse bias; III, hidden error
  - (C) I, hidden bias; II, voluntary sample bias; III, sampling error
  - (D) I, undercoverage error; II, voluntary error; III, unintentional error
  - (E) I, small sample error; II, deliberate error; III, mistaken error
15. A researcher plans a study to examine the depth of belief in God among the adult population. He obtains a simple random sample of 100 adults as they leave church one Sunday morning. All but one of them agree to participate in the survey. Which of the following are true statements?
- I. Proper use of chance as evidenced by the simple random sample makes this a well-designed survey.
  - II. The high response rate makes this a well-designed survey.
  - III. Selection bias makes this a poorly designed survey.
- (A) I only
  - (B) II only
  - (C) III only
  - (D) I and II
  - (E) None of these statements is true.

### Answer Key

- |      |      |      |       |       |
|------|------|------|-------|-------|
| 1. A | 4. C | 7. C | 10. D | 13. D |
| 2. D | 5. E | 8. B | 11. C | 14. A |
| 3. E | 6. E | 9. E | 12. B | 15. C |

### Answers Explained

1. (A) This survey provides a good example of voluntary response bias, which often overrepresents negative opinions. The people who chose to respond were most likely parents who were very unhappy, and so there is very little chance that the 10,000 respondents were representative of the population. Knowing more about her readers, or taking a sample of the sample would not have helped.
2. (D) If there is bias, taking a larger sample just magnifies the bias on a larger scale. If there is enough bias, the sample can be worthless. Even when the subjects are chosen randomly, there can be bias due, for example, to non-response or to the wording of the questions.