

AMDM
Statistics Terms Review

Name Key
Date _____ Period _____

1. Identify which of the following methods: Simple Random Sample, stratified, cluster, convenience, systematic, voluntary response, is used in the following sampling scenarios.

- a) Every fifth person boarding a plane is searched thoroughly. *systematic*
- b) At a local community College, five math classes are randomly selected out of 20 and all of the students from each class are interviewed. *cluster*
- c) A researcher randomly selects and interviews fifty male and fifty female teachers. *stratified*
- d) A researcher for an airline interviews all of the passengers on five randomly selected flights. *cluster*
- e) Based on 12,500 responses from 42,000 surveys sent to its alumni, a major university estimated that the annual salary of its alumni was 92,500. *voluntary response*
- f) A community college student interviews everyone in a biology class to determine the percentage of students that own a car. *convenience*
- g) A market researcher randomly selects 200 drivers under 35 years of age and 100 drivers over 35 years of age. *stratified*
- h) All of the teachers from 85 randomly selected nation's middle schools were interviewed. *cluster*
- i) To avoid working late, the quality control manager inspects the last 10 items produced that day. *convenience*
- j) The names of 70 contestants are written on 70 cards. The cards are placed in a bag, and three names are picked from the bag. *simple random sample*

2. Explain what bias there is in a study done entirely online.

- people might not have access to the internet
- is it a voluntary response? if so, only people that feel strongly will answer

3. A local newspaper ran a survey by asking, "Do you support the development of a weapon that could kill millions of innocent people?" Determine whether the survey questions is biased and why.

The way the question is worded (in particular the "innocent people" part) may lead people to answer a certain way.

4. Identify in context the type of bias (if there is any) present in the following sampling situations:

- a. Horizon Wireless is thinking of entering the satellite TV business. Their planning department decides to survey their existing cell phone customers regarding their interest in satellite TV.

undercoverage

b. The Houston Police Department is concerned about its public image so they develop a survey to be administered by uniformed police officers to a randomly chosen sample of households.

response bias (influenced by questioner)

c. Prior to graduation each member of the senior class is required to participate in a survey about their school experiences. In order to walk at graduation they need to complete the survey online.

response bias (underrepresented pop - those who don't grad.)

d. A car dealer wants to estimate the mean number of cars per household in a medium sized city. He obtains detailed aerial photographs of the city and randomly selects 250 locations on the map.

The house nearest each selected location is identified and an employee is sent to that home to ask the owner how many cars they own. The employee follows up until each home responds.

none

e. A medical researcher is interested in the view smokers have on the health risks of cigarettes.

They position themselves at local convenience store and ask people they see buying cigarettes if they believe the smoking causes cancer.

Sampling bias

5. For each sampling method below, tell which groups in the population are likely to be underrepresented.

a. To obtain a sample of households, a television rating service dials numbers taken at random from telephone directories.

people w/out telephones

b. In 1984, Ann Landers conducted a poll on the marital happiness of women by asking women to write to her.

women that don't read her column and husbands!

c. To determine the percentage of teenage girls with long hair, Teen magazine published a mail-in questionnaire. Of the 500 respondents, 85% had hair shoulder length or longer (USA Today, July 1, 1985).

d. To evaluate the reliability of cars owned by its subscribers, Consumer Reports magazine publishes a yearly list of automobiles and their frequency-of-repair records. The magazine collects the information by mailing a questionnaire to subscribers and tabulating the results from those who return it.

non-subscribers

6. Determine whether the data are qualitative or quantitative (discrete or continuous):

a) the colors of automobiles on a used car lot Qualitative / Categorical

b) the numbers on the shirts of a girl's soccer team Quantitative (Discrete)

c) the ratings of a movie ranging from "poor" to "good" to "excellent" Qualitative / Categorical

d) number of milligrams of tar in 28 cigarettes Quantitative (Continuous)

e) the ages of a sample of 350 employees of a large hospital Quantitative

f) marriage status of the faculty at the local community college Qualitative / Categorical

7. Determine if the below situations are observational studies or experiments—and why.

a) Over a 4-month period, among 30 people with bipolar disorder, patients who were given a high dose (10g/day) of omega-3 fats from fish oil improved more than those given a placebo. (Archives of General Psychiatry 56 [1999]: 407)

EXP

b) The leg muscles of men aged 60 to 75 were 50% to 80% stronger after they participated in a 16-week, high-intensity resistance-training program twice a week. (Journal of Gerontology 55A [2000]: B336)

EXP

c) Among a group of disabled women aged 65 and older who were tracked for several years, those who had a vitamin B12 deficiency were twice as likely to suffer severe depression as those who did not. (American Journal of Psychology 157 [2000]: 715)

Obs

d) In 2001 a report in the Journal of the American Cancer Institute indicated that women who work at nights have a 60% greater risk of developing breast cancer. Researchers based these findings on the work histories of 763 women with breast cancer and 741 women without the disease.

Obs

e) In 2002, the journal Science reported that a study of women in Finland indicated that having sons shortened the lifespan of mothers by about 34 weeks per son, but that daughters helped to lengthen the mothers' lives. The data came from church records from the period 1640 to 1870.

Obs

f) Some gardeners prefer to use nonchemical methods to control insect pests in their gardens. Researchers have designed two kinds of traps, and want to know which design will be more effective. They randomly choose 10 locations in a large garden and place one of each kind of trap at each location. After a week, they count the number of bugs in each trap.

EXP

8. A study was conducted in which neither the participants nor the research assistants knew who was assigned to the experimental and control groups. This is an example of a

Double
Blind study.

9. Identify the population and the variable of interest:

a) A survey of 1353 American households found that 18% of the households own a computer.

Population: American Households

Variable of Interest: whether or not you own a computer

b) A recent survey of 2625 elementary school children found that 28% of the children could be classified obese.

Population: Elem. School children

Variable of Interest: obese or not

c) The average weight of every sixth person entering the mall within 3 hour period was 146 lb.

Population: mall shoppers

Variable of Interest: weight

d) In a USA Today Internet poll, readers responded voluntarily to the question "Do you consume at least one caffeinated beverage every day?"

Population: USA today readers

Variable of Interest: caffeinated beverage intake

e) Astronomers typically determine the distance to galaxy (a galaxy is a huge collection of billions of stars) by measuring the distances to just a few stars within it and taking the mean (average) of these distance measurements.

Population: all stars

Variable of Interest: distances

10. Researchers wanted a representative sample of Japanese-Americans living in San Francisco. "The procedure was as follows. After consultation with representative figures in the Japanese community, the four most representative blocks in the Japanese area of the city were chosen; all persons resident in those four blocks were taken for the sample. However, a comparison with Census data shows that the sample did not include a high-enough proportion of Japanese with college degrees".

a. What kind of sampling did this study use?

convenience

b. Why do you suppose the sample did not have enough college graduates?

B/c they might live in different areas

11. The headline on page 11 of an Illinois newspaper stated, "More people using drugs at work, survey reports." The article gave the following information: "The survey questioned 227 people who called the national [cocaine] helpline, chosen at random, during a six-week period in February and March...Ninety-two percent of the callers said they sometimes worked while under the influence of drugs" (Rockford Register Star, March 25, 1985).

a. What kind of sampling was used?

simple random

b. What population would you say this sample was drawn from?

cocaine users

c. Describe why this survey does not justify the claim made in the headline.

B/c everyone that was surveyed was a drug user