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Wrksht CH1: Basic Terms and Variable Measurement

Answer the following questions **in your own words**:

1. How is statistics both a science and data?

2. What is univariate descriptive statistics?

3. What is bivariate descriptive statistics?

4. Define inferential statistics.

5. What is a variable?

6. What is the difference between parameter and statistics?

7. Distinguish between population and sample.

Identify the sample, the population, the sample statistic, and the population parameter in the following research situation. (from Practice Basic Terms from *Statistical Reasoning for Everyday Life*, 4th Edition by Bennett, Briggs, and Triola, #11)

8.) In a Gallup poll of 1,018 adults in the US, it was found that 22% smoked in the past week.

For the next two questions, do the following:

a) state what you think was the goal of the study,
b) identify a possible population parameter of interest, and
c) briefly describe the sample, raw data, and sample statistic for the study.

(from Practice Basic Terms from *Statistical Reasoning for Everyday Life*, 4th Edition by Bennett, Briggs, and Triola, #23, #24)

9.) Death Penalty. A Gallup Poll asked 511 randomly selected adults if they favor the death penalty for a person convicted of murder, with 64% saying yes.

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10.) Prescription Drugs. A study of 3,005 adults ages 57 to 85 showed that 82% of them use at least one prescription drug.

Practice Variable Measurement from Healey, *Statistics A Tool for Social Research* #1.4, #1.5, #1.7, #1.8).

11.) Below are some items from a public-opinion survey. For each item, indicate the variable, its level of measurement, its unit of measurement, and whether it is discrete or continuous.

A. What is your occupation?
B. How many years of schooling have you completed?
C. If you were asked to use one of these four names for your social class, which would you say you belonged in?
   _____ Upper _____ Middle _____ Working _____ Lower
D. What is your age?
E. In what country were you born?
F. What is your grade point average?
G. What is your major?
H. The only way to deal with the drug problem is to legalize all drugs.
   _____ Strongly agree _____ Agree _____ Undecided _____ Strongly disagree
I. What is your astrological sign? j. How many brothers or sisters do you have?

12.) Below are brief descriptions of how researchers measured a variable. For each situation, determine the level of measurement of the variable and whether the unit of measurement is discreet or continuous.

A. [Race] Respondents were asked to select a category from the following list:
   _____ Black _____White _____ Other
B. [Honesty] Subjects were observed as they passed by a spot on campus where an apparently lost wallet was lying. The wallet contained money and complete identification. Subjects were classified into one of the following categories.
   _____ Returned wallet with money;
   _____ Returned the wallet but kept the money;
   _____ Did not return wallet
C. [Social Class] Subjects were asked about their family situation when they were 16 years old. Was their family
   _____ very well off compared to other families?
   _____ about average?
   _____ not so well off?
D. [Education] Subjects were asked how many years of schooling they and each parent had completed.
E. [Racial integration on campus] Students were observed during lunchtime at the cafeteria for a month. The number of students sitting with students of other races were counted for each meal period.

F. [Number of children] Subjects were asked: “How many children have you ever had? Please include any that may have passed away.”
G. [Student seating patterns in classrooms] On the first day of class, instructors noted where each student sat. Seating patterns were remeasured every two weeks until the end of the semester. Each student was classified as
    _____ same seat as last measurement
    _____ adjacent seat
    _____ different seat, not adjacent
    _____ absent
H. [Physicians per capita] The number of practicing physicians were counted in each of 50 cities, and the researchers used population data to compute the number of physicians per capita.
I. [Physical attractiveness] A panel of 10 judges rated each 50 photos of a mixed-race sample of males and females for physical attractiveness on a scale of 0 to 20 with 20 being the highest score.
J. [Number of accidents] The number of traffic accidents for each of 20 busy intersections in a city were recorded. Also, each accident was rated as
    _____ minor damage, no injuries
    _____ moderate damage, personal injury requiring hospitalization
    _____ severe damage and injury

13.) For each research situation summarized below, identify all variables, their level of measurement, and indicate whether they are discrete or continuous. Also, decide which statistical applications are used: descriptive statistics (single variable), descriptive statistics (two or more variables), or inferential statistics. Remember that it is quite common for a given situation to require more than one type of application.

A. The administration of your university is proposing a change in parking policy. You select a random sample of students and ask each one if he or she favors or opposes the change.
B. You ask everyone in your social research class to tell you the highest grade he or she ever received in a math course and the grade on a recent statistics test. You then compare the two sets of scores to see if there is any relationship.
C. Your aunt is running for mayor and hires you (for a huge fee, incidentally) to question a sample of voters about their concerns in local politics. Specifically, she wants a profile of the voters that will her tell what percent belong to each party; what percent are male or female; and what percent favor or oppose the widening of the main street in town.
D. Several years ago, a state reinstituted the death penalty for first degree homicide. Supporters of capital punishment argued that this change would reduce the homicide rate. To investigate this claim, a researcher gathered information on number of homicides in the state for the two-year periods before and after the change.

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E. A local automobile dealer is concerned about customer satisfaction. He wants to mail a survey form to all customers for the past year and ask them if they are satisfied, very satisfied, or not satisfied with their purchases.

14.) For each research situation below, identify the independent and dependent variables. Classify each in terms of level of measurement and whether the variable is discrete or continuous.

A. A graduate student is studying sexual harassment on college campuses and asks 500 female students if they personally have experienced any such incidents. Each student is asked to estimate the frequency of these incidents as either “often, sometimes, rarely, or never.” The researcher also gathers data on age and major to see if there is any connection between these variables and frequency of sexual harassment.
B. A supervisor in the Solid Waste Management Division of a city government is attempting to assess two different methods of crash collection. One area of the city is served by trucks with two-men crews who do “backyard” pickups, and the rest of the city is served by trucks who “hi-tech” single-person trucks with curb-side pick-up. The assessment measures include number of complaints received from the two different areas over a six-month period, the amount of time per day required to service each area, and the cost per ton of trash collected.
C. The adult bookstore near campus has been raided and closed by the police. Your social research class has decided to poll the student body and get their reactions and opinions. The class decides to ask each student if he or she opposes or supports the closing of the store, how many times each one has visited the store, and if he or she agrees that “pornography is a direct cause of sexual assaults on women.” The class also collects information on the sex, age, religious and political philosophy, and major of each student to see if opinions are related to these characteristics.
D. For a research project in a political science course, a student has collected information about the quality of life and the degree of political democracy in 50 nations. Specifically, she used infant mortality rates to measure quality of life, and the percentage of all adults who are permitted to vote in national elections as a measure of democratization. Her hypothesis is that quality of life is higher in more democratic nations.
E. A highway engineer wonders if a planned increase in speed limit on a heavily traveled local avenue will result in any change in number of accidents. He plans to collect information on traffic volume, number of accidents, and number of fatalities for the six-month periods before and after the change.
F. Students are planning a program to promote “safe sex” and awareness of a variety of other health concerns for college students. To measure the effectiveness of the program, they plan to give a survey measuring knowledge about these matters to random sample of the student body before and after the program.
G. Several states have drastically cut their budgets for mental health care. Will this increase the number of homeless people in these states? A researcher contacts a number of agencies serving the homeless in each state and develops an estimate of the size of the population before and after the cuts.

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H. Does tolerance for diversity vary by race, ethnicity, or gender? A sample of white, Asian, Hispanic, and Native Americans have been given a survey that measures their interest in and appreciation of cultures and groups other than their own.