Chapter One: Introduction to Statistical Analysis

1. If we utilize even the most sophisticated statistical tests, can we ever be 100% certain that our results reflect reality?
   Yes or no? Why or why not?

2. What two factors influence the degree of error?
   a. _____
   b. _____

3. What is the difference between a population and a sample?

4. What are we referring to if we ask, "Are we measuring what we intend to measure?"
   a. Validity.
   b. Reliability.

5. What do we call a variable that has an impact on the outcome of another variable?
   a. Independent variable.
   b. Dependent variable.

6. We are interested in the relationship between "number of hours watching TV" and "criminal behavior." Indicate which variable is independent and which variable is dependent. Explain.

7. We want to examine whether one's "gender" (male/female/transgender) is somehow related to "attitudes toward the criminal justice system." Indicate which variable is independent and which variable is dependent. Explain.

8. We are also eager to find whether there is a relationship between a "problematic drug habit" and "incarceration." Indicate which variable is independent and which variable is dependent. Explain.

9. Finally, you want to examine whether there is a relationship between "traffic stops" and "race/ethnicity." Indicate which variable is independent and which variable is dependent. Explain.

10. Why is it important, even crucial, to know what the levels of measurement for each of the variables in any study are?

11. What is the difference between nominal- and ordinal-level variables? Provide an example for both.

12. What is the difference between interval- and ratio-level variables? Provide an example for both.

13. Indicate the level of measurement for the following:
    a. Gender.
    b. IQ score.
    c. Level of education (some high school, high school graduate, some college/university, Bachelor's degree, Master's Degree, PhD).
    d. Temperature.
    e. Country of origin.
    f. Age (1, 2, 3, . . . , 99, . . .).
    g. Age (0–18; 19–28; 29–38; 39–48).
    h. Eye color.
    i. Number of times arrested.
    j. Income.

14. You conducted a survey on citizen's satisfaction with the local police utilizing a random sample of residents. To measure citizen's satisfaction you utilized a scale between 1 and 15 (15 indicating the highest level of satisfaction). Indicate the level of measurement and explain.

Key:

1. No. Some degree of error is inevitable.

2.
    a. Accuracy of our statistical instruments used.
    b. Sample size (the larger the sample the smaller the error).

3. A population includes everyone with the characteristics of interest (e.g., if you want to study attitudes of students of your school, the population includes every single student enrolled in your school). A sample, on the other hand, is a subset of your population (e.g., 200 of the entire universe of students at your school).

4. a. Validity.

5. a. Independent variable.

6. The IV is "number of hours watching TV" and the DV is "criminal behavior." We assume that the hours an individual is watching TV is somehow impacting one's decision to engage in criminal behavior. We do not expect that criminal behavior has a direct influence on the amount of TV watched by an individual in this example.

7. The IV is “gender” and the DV is “attitudes toward the criminal justice system.” In this case the distinction is rather easy because we can be rather certain that “attitudes toward the criminal justice system” has no influence on one’s gender. Thus, we want to find whether gender has an impact on the DV.

8. In this case, both variables could be IV or DV as long as your explanation justifies your decision. You could argue that a “problematic drug habit” promotes “incarceration” because the offender is in constant need of means that support his/her habit and therefore at risk to be convicted and incarcerated; also, the majority of drug use is illegal, which by itself can lead to conviction and incarceration. On the other hand, you could argue that “incarceration” is likely to foster a problematic drug habit. Justification is key.

9. Because traffic stops are unable to change one’s race/ethnicity, it is obvious that “traffic stops” is the DV and “race/ethnicity” is the IV.

10. It is important because you can only decide what statistical test to use if you know the level of measurements of your variables. As you will learn in the following chapters, statistical tests all have assumptions that must be met for the results to be accurate (e.g., DV must be continuous; IV must be categorical).

11. Both levels of measurement are categorical. However, unlike nominal level variables (e.g. gender—there is no such thing as more or less gender), ordinal level variables can be rank ordered (e.g., low-risk offender, medium-risk offender, high-risk offender).

12. Both levels of measurement are continuous. However, unlike interval-level variables, ratio-level variables have a real zero point (the absence of something). A textbook example for interval-level data is temperature (0 degrees Fahrenheit does not mean the absence of temperature). An example for a ratio-level variable is “number of times arrested,” where 0 means that a person has never been arrested (= true zero point—indicating the absence of something).

13.
    a. Nominal.
    b. Interval (a score of 0 does not indicate the absence of intelligence but the lowest score of the IQ test).
    c. Ordinal.
    d. Interval.
    e. Nominal.
    f. Ratio.
    g. Ordinal.
    h. Nominal.
    i. Ratio.
    j. Ratio.

14. The level of measurement for an alienation scale lies somewhere between ordinal and interval data and can therefore be treated as both.