

Homework 1: Sections 1.1 - 1.2

STA209-04: Applied Statistics

January 25, 2019

From the Book:

Due Date: Friday, February 1

Questions: 1.11, 1.20, 1.36, 1.55, 1.59

1.11 Data 1.1 introduced the dataset **StudentSurvey**, and Example 1.2 identified seven of the variables in that dataset as categorical or quantitative. The remaining variables are:

Year FirstYear, Sophomore, Junior, Senior

Height In inches

Weight In pounds

Siblings Number of siblings the person has

VerbalSAT Score on the Verbal section of the SAT exam

MathSAT Score on the Math section of the SAT exam

SAT Sum of the scores on the Verbal and Math sections of the SAT exam

HigherSAT Which is higher, Math SAT score or Verbal SAT score?

- Indicate whether each variable is quantitative or categorical.
- List at least two questions we might ask about any one of these individual variables.
- List at least two questions we might ask about relationships between any two (or more) of these variables.

1.20 Hookahs are waterpipes used for smoking flavored tobacco. One study of 3770 university students in North Carolina found that 40% had smoked a hookah at least once, with many claiming that the hookah smoke is safer than cigarette smoke. However, a second study observed people at a hookah bar and recorded the length of the session, the frequency of puffing, and the depth of inhalation. An average session lasted one hour and the smoke inhaled from an average session was equal to the smoke in more than 100 cigarettes. Finally, a third study measured the amount of tar, nicotine, and heavy metals in samples of hookah smoke, finding that the water in a hookah filters out only a very small percentage of these chemicals. Based on these studies and others, many states are introducing laws to ban or limit hookah bars. In each of the three studies, identify the individual cases, the variables, and whether each variable is quantitative or categorical.

1.36 To estimate the proportion of Americans who support changing the drinking age from 21 to 18, a random sample of 100 college students are asked the question "Would you support a measure to lower the drinking age from 21 to 18?" Based on this sampling situation, give:

- The sample
- The population of interest
- A population we can generalize to

1.55 In Example 1.10 on page 16, we introduce a study by researchers from Harris Interactive who were interested in determining what percent of people wash their hands after using the washroom. They collected data by standing in public restrooms and pretending to comb their hair or put on make-up as they observed patrons' behavior.

Public restrooms were observed at Turner's Field in Atlanta, Penn Station and Grand Central Station in New York, the Museum of Science and Industry and the Shedd Aquarium in Chicago, and the Ferry Terminal Farmers Market in San Francisco. Of the over 6000 people whose behavior was observed, 85% washed their hands. Women were more likely to wash their hands: 93% of women washed, while only 77% of men did. The Museum of Science and Industry in Chicago had the highest hand-washing rate, while men at Turner's Field in Atlanta had the lowest.

- (a) What are the cases? What are the variables? Classify each variable as quantitative or categorical.
- (b) In a separate telephone survey of more than 1000 adults, more than 96% said they always wash their hands after using a public restroom. Why do you think there is such a discrepancy in the percent from the telephone survey compared to the percent observed?

1.59 As part of an "internet cat videos/photos" study, Dr. Jessica Gall Myrick posted an on-line survey to Facebook and Twitter asking a series of questions regarding how individuals felt before and after the last time they watched a cat video on the Internet. One of the goals of the study was to determine how watching cat videos affects an individual's energy and emotional state. People were asked to share the link, and everyone who clicked the link and completed the survey was included in the sample. More than 6000 individuals completed the survey, and the study found that after watching a cat video people generally reported more energy, fewer negative emotions, and more positive emotions.

- (a) Would this be considered a simple random sample from a target population? Why or why not?
- (b) Ignoring sampling bias, what other ways could bias have been introduced into this study?

Miscellaneous:

Due Date: Sunday, January 27

Questions: Complete [this survey](#).