

1.5.1: Exercises

1. Compare and contrast random sampling and random assignment.
2. When random sampling is used to create a sample, what types of conclusions can reasonably be made?
3. When random assignment is used to create similar groups from a sample, what types of conclusions can reasonably be made?
4. One hundred students were selected at random from those enrolled at a large college. Each of the selected students was asked to participate in a study and all agreed. For each student, a coin was tossed in order to place them into one of two groups. If the coin landed head up, the student was assigned to group 1. If the coin landed tail up, the student was assigned to group 2. Those in group 1 were asked to drink one cup of alkaline water daily for three months. Those in group 2 were asked to drink one cup of tap water daily for three months. At the end of the three months, a skin specialist rated skin health on a scale of 1 to 10 for each of the participants. It was concluded that skin health was significantly better on average for those in group 1 than for those in group 2. In this experiment, what is the explanatory variable, and what are its values (the individual treatments)? What is the response variable in this experiment?

5. With so much advancement in technology, people have been given access to doing many tasks at once. How effectively can people multitask? Imagine researchers want to perform an experiment to answer this question. These researchers divided volunteers into two groups. Each subject was given a literature passage to analyze. One group had to check email and respond to messages while they were analyzing the passage for 30 minutes. The other group analyzed the passage without any distractions for 30 minutes. All subjects were then given a short 10 point assessment directly after. Researchers found that the distracted group's average assessment score was 4 points lower than the average assessment score for the group that was not distracted.
- Identify the explanatory variable and the individual treatments. Then identify the response variable.
 - Explain why it would be good for the researchers to use random assignment to put each volunteer in one of the experimental groups. Why should the researchers do this rather than letting the volunteers decide which group they wanted to be in.
 - Identify the control group in this experiment.
 - Is it possible for the subjects of this study to be blinded? Explain your answer.
6. Compare and contrast voluntary response samples and nonresponse bias.
7. In order to answer a question about a population, what type of study should we conduct?
8. In order to answer a cause-and-effect type question, what type of study should we conduct?