

1. If children are given more choices within a class of products, will they tend to prefer that product to a competing product that offers fewer choices? Marketers want to know. An experiment prepared three sets of beverages. Set 1 contained two milk drinks and two fruit drinks. Set 2 had two fruit drinks and four milk drinks. Set 3 contained four fruit drinks but only two milk drinks. The researchers divided 210 children into 3 groups at random. They offered each group one of the sets. As each child chose a beverage to drink from the set presented, the researchers noted whether the choice was a milk drink or a fruit drink.
 - a.) What are the experimental subjects?
 - b.) What is the factor, and what are its levels?
 - c.) What is the response variable?
 - d.) Use a diagram to outline a completely randomized design for the study.
 - e.) Explain how you would assign the students to the 3 groups. Be specific!

2. Can aspirin help prevent heart attacks? The Physician's Health Study, a large medical experiment involving 22,000 male physicians, attempted to answer this question. One group of about 11,000 physicians took an aspirin every second day, while the rest took a placebo. After several years the study found that subjects in the aspirin group had significantly fewer heart attacks than subjects in the placebo group.
 - a.) Identify the experimental subjects.
 - b.) What is the factor and its levels?
 - c.) What is the response variable?
 - d.) Use a diagram to outline a completely randomized experiment for the Physician's Health Study.

3. Will people spend less on health care if their health insurance requires them to pay some part of the cost themselves? An experiment on this issue asked if the percent of medical costs that are paid by health insurance has an effect either on the amount of medical care that people use or on their health. The treatments were four insurance plans. Each plan paid all medical costs above a ceiling. Below the ceiling, the plans paid 100%, 75%, 50%, or 0% of costs incurred.
 - a.) Outline the design of a randomized comparative experiment suitable for this study.
 - b.) Briefly describe the practical and ethical difficulties that might arise in such an experiment.

4. Once a person has been convicted of drunk driving, one purpose of court-mandated treatment or punishment is to prevent future offenses of the same kind. Suggest three different treatments that a court might require. Then outline the design of an experiment to compare their effectiveness. Be sure to specify the response variable you will measure.

5. Some medical researchers suspect that added calcium in the diet reduces blood pressure. You have available 40 men with high blood pressure who are willing to serve as subjects. Outline an appropriate design for the experiment, taking the placebo effect into account.

6. (Regarding the experiment in the previous problem) Preliminary work suggests that the effect of calcium on blood pressure may be greater for African American men than for other races. Outline an appropriate block design experiment to study this.

7. An expert on worker performance is interested in the effect of room temperature on the performance of tasks requiring manual dexterity. She chooses temperatures of 70 degrees Fahrenheit and 90 degrees Fahrenheit as treatments. The response variable is the number of correct insertions, during a 30-minute period, in a peg-and-hole apparatus that requires the use of both hands simultaneously. Each subject is trained on the apparatus and then asked to make as many insertions as possible in 30 minutes of continuous effort.
 - a.) Outline a completely randomized design to compare dexterity at the two temperature levels.

 - b.) Because individuals differ greatly in dexterity, the wide variation in individual scores may hide the systematic effect of temperature unless there are many subjects in each group. Describe in detail the design of a matched pairs experiment in which each subject serves as his or her control.

8. There are several psychological tests that measure the extent to which Mexican Americans are oriented toward Mexican/Spanish or Anglo/English culture. Two such tests are the Bicultural Inventory (BI) and the Acculturation Rating Scale for Mexican Americans (ARSMA). To study the correlation between the scores on the two tests, researchers will give both tests to a group of 22 Mexican Americans. Outline a matched pairs design for this study.