13. **a)** This is an observational study. The researchers are simply studying traits that already exist in the subjects, not imposing new treatments.
   **b)** This is a prospective study. The subjects were identified first, then traits were observed.
   **c)** The subjects were disabled women aged 65 and older, with and without a vitamin B-12 deficiency. The selection process is not stated.
   **d)** The parameter of interest is the percentage of women in each group who suffered severe depression.
   **e)** There is no random assignment, so a cause-and-effect relationship between B-12 deficiency and depression cannot be established. The most that can be determined is an association, if this is supported by the data.

14. **a)** This is an observational study. The researchers are simply studying traits that already exist in the subjects, not imposing new treatments.
   **b)** This is a prospective study. The subjects were identified first, then traits were observed.
   **c)** The subjects are roughly 200 men and women with moderately high blood pressure and normal blood pressure. There is no information about the selection method.
   **d)** The parameters of interest are difference in memory and reaction time scores between those with normal blood pressure and moderately high blood pressure.
   **e)** An observational study has no random assignment, so there is no way to know that high blood pressure caused subjects to do worse on memory and reaction time tests. A lurking variable, such as age or overall health, might have been the cause. The most we can say is that there was an association between blood pressure and scores on memory and reaction time tests in this group, and recommend a controlled experiment to attempt to determine whether or not there is a cause-and-effect relationship.

17. a) This is an experiment, since treatments were imposed on randomly assigned groups.
    b) The subjects were volunteers exposed to a cold virus.
    c) There is 1 factor (herbal compound), at 2 levels (herbal compound and sugar solution).
    d) 1 factor, at 2 levels, results in 2 treatments.
    e) The response variable is the severity of cold symptoms.
    f) There is no mention of any randomness is the design. Hopefully, subjects were randomly assigned to treatment groups.
    g) The experiment uses blinding. The use of a sugar solution as a placebo kept the subjects from knowing whether or not they had received the herbal compound. If the doctors responsible for assessing the severity of the patients' colds were also unaware of the treatment group assignments, then the experiment incorporates double blinding.
    h) There is no evidence to suggest that the herbal treatment is effective.

19. a) This is an experiment.
    b) The subjects were racing greyhounds.
    c) There is 1 factor (level of vitamin C in diet). The 3 levels of diet were not specified.
    d) One factor, at 3 levels, results in 3 treatments.
    e) The response variable is speed or time to complete a race.
    f) The experiment uses a matched design. Each greyhound was given each of the 3 levels of diet, in random order. The matched design reduces variation due to the racing ability of each greyhound.
    g) There is no mention of blinding.
    h) Greyhounds that eat diets high in vitamin C run more slowly than greyhounds with diets lower in vitamin C.

# EXERCISES

Pg.29

1. It has been suggested that women and men differ in their political preferences. Women may be more likely than men to prefer Democratic candidates. A political scientist selects a large sample of registered voters, both men and women, and asks them whether they voted for the Democratic or Republican candidate in the last Congressional election. Is this study an experiment? Why or why not?

*Not an experiment b/c No treatment.*

2. Before a new variety of frozen muffins is put on the market, it is subjected to extensive taste testing. People are asked to taste the new muffin and a competing brand, and to say which they prefer. (The muffins are not identified in the test.) Is this an experiment? Why or why not?

*Yes. Subject are asked to taste and rate both muffins.*

3. You are testing a new medication for relief of migraine headache pain. You intend to give the drug to migraine sufferers and ask them one hour later to estimate what percent of their pain has been relieved. You have 40 patients available to serve as subjects.

a. Outline an appropriate design for the experiment, taking the placebo effect into account.
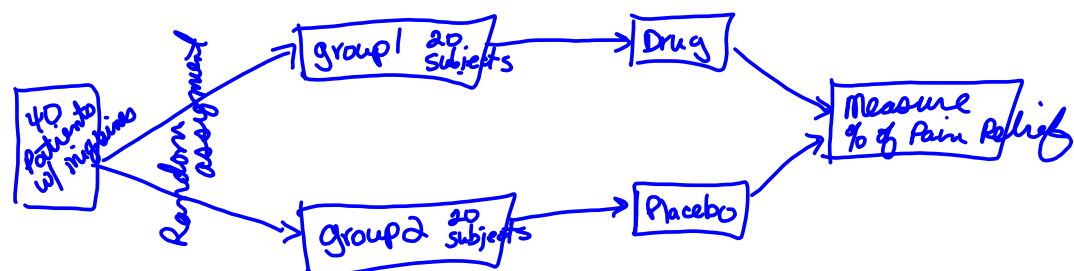
4. Determine which of the experiments below are single-blind, double-blind, or neither. Justify your answer.

*Double Blind*

    a. Dr. Colman has a home remedy that he thinks will help his patients recover from colds. He arranges for a colleague to have two sets of identical looking pills made up and bottled – pill A contains his remedy and pill B is a placebo. He recruits some of his patients to take part in the experiment. They are told that they will be randomly assigned to his remedy or a placebo. Dr. Colman does not know which bottles of pills, A or B, contain his remedy. After six months, Dr. Colman interviews his patients to check on the number of colds they contracted and the duration. He then summarizes his results in a report before learning from his colleague which group of participants got his remedy.

*Neither*

    b. Pam decides that she wants to know what type of diet cola tastes best – Diet Coke, Caffeine Free Diet Coke, or Coca Cola Zero. So she invites a group of friends over for a taste test. She sets an unopened bottle of each type of soda on a table with some paper cups. Each of the participants pours some cola from each bottle into paper cups, marking the cups with the type of soda. Then they taste each type of diet soda and give Pam their rating – 1 (tastes awful) to 5 (tastes great).

*Single*

    c. Janet wants to know whether her secret recipe for chocolate cake will taste better if she uses cocoa or baking chocolate. She bakes two cakes that appear identical and asks a group of her friends to take part in a taste test. She labels the cake with cocoa as A and the cake with baking chocolate as B. Then she randomly assigns half her friends to taste cake A and the other half to taste cake B. Her friends are then asked to rate each cake from 1 to 10.

Homework:

Review Questions

Packet Pg. 31-32

Collected as a quiz grade.