Moore SCC 8e

Chapter 5

1. In the following situation, which is the response variable and which is the explanatory variable: the amount of sunlight and height of a plant.

a. Response variable: amount of sunlight; explanatory variable: height of plant

*b. Response variable: height of plant; explanatory variable: amount of sunlight

c. Response variable: the type of plant; explanatory variable: the amount of shade

d. Response variable: the amount of shade; explanatory variable: the type of plant.

A. Incorrect. The amount of sunlight (explanatory) determines the plant height (response)
B. Correct. The amount of sunlight (explanatory) determines the plant height (response)
C. Incorrect. The amount of sunlight (explanatory) determines the plant height (response).
D. Incorrect. The amount of sunlight (explanatory) determines the plant height (response)

Text Reference: Section 5.1: Talking about experiments

2. Does drinking orange juice alleviate back pain? 50 volunteers were asked to drink 3 glasses of orange juice every morning for two weeks. As a result, most volunteers said that pain was lessened enough for them to ask their doctors to reduce their medication.

What is the explanatory variable?

*a. Drinking orange juice

b. Amount of back pain

c. The fifty volunteers

d. The medication

A. Correct. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response)
B. Incorrect. This is the response variable. The explanatory variable is the orange juice.

C. Incorrect. This is the sample of individuals chosen to participate in the experiment. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response).
D. Incorrect. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response).

Text Reference: Section 5.1: Talking about experiments

3. Does drinking orange juice alleviate back pain? 50 volunteers were asked to drink 3 glasses of orange juice every morning for two weeks. As a result, most volunteers said that pain was lessened enough for them to ask their doctors to reduce their medication.

What is the response variable?

a. Drinking orange juice

*b. Amount of back pain

c. The fifty volunteers

d. The medication

A. Incorrect. This is the explanatory variable. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response).
B. Correct. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response).
C. Incorrect. This is the sample of individuals chosen to participate in the experiment. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response).
D. Incorrect. This experiment is trying to determine the effects of orange juice (explanatory) on back pain (response).

Text Reference: Section 5.1: Talking about experiments

4. Does drinking orange juice alleviate back pain? 50 volunteers were asked to drink 3 glasses of orange juice every morning for two weeks. As a result, most volunteers said that pain was lessened enough for them to ask their doctors to reduce their medication.

What is the lurking variable?

a. Drinking orange juice

b. Amount of back pain

c. The fifty volunteers

*d. The medication

A. Incorrect. This is the explanatory variable.
B. Incorrect. This is the response variable.
C. Incorrect. This is the sample that is undergoing the experiment.
D. Correct. We do not know what effects the medication is having on the experiment. We can say that the medication is confounding the results of the experiment.

Text Reference: Section 5.2: How to experiment badly

5. An experiment is being done to test whether a new drug will reduce eye puffiness. Two groups of 50 are randomly chosen: one group is given the new drug treatment; the second is given a simple cream with no active ingredients. The group who was given the new drug treatment reported that 45% had reduced eye puffiness. In the second group with the simple cream, 20% had reduced puffiness. This second group is an example of:

*a. A control

b. Randomization

c. Confounding

d. Treatments

A. Correct. Without a control group, we can't compare the treatment group against anything.
B. Incorrect. Although randomization is part of good experimental design, the second group is not an example of this.
C. Incorrect. Confounding occurs when the effects on a response variable cannot be distinguished from each other. The second group is not an example of this.
D. Incorrect. A treatment is a specific experimental condition. Both groups received treatments.

Text Reference: Section 5.3: Randomized comparative experiments

6. Randomly assigning individuals into treatment groups to control the effects of lurking variables is known as:

a. Simple Random Samples

*b. Randomized Comparative Experiments

c. Statistical Significance

d. Compare matched groupings

A. Incorrect. Although Randomized Comparative Experiments have some of the same characteristics as an SRS, SRS is a method of surveying, not experimentation.
B. Correct. Randomized Comparative Experiments attempt to control the effects of lurking variables by having them operate equally in both groups.
C. Incorrect. Statistical significance refers to when an observed effect of a size would rarely occur by chance.
D. Incorrect. Randomized Comparative Experiments attempt to control the effects of lurking variables by having them operate equally in both groups.

Text Reference: Section 5.3: Randomized comparative experiments, p. 97

7. Randomization is important in experimental design because it:

a. Reduces bias

b. Creates groups that are similar in all variables

c. Mitigates the effects of lurking variables

*d. All of the choices are correct.

A. Incorrect. Although randomization does reduce bias, it also creates groups that are similar in all variables and helps to reduce the effects of confounding and lurking variables.
B. Incorrect. Although randomization does create groups that are similar in all variables, it also reduces bias as well as the effects of confounding and lurking variables.
C. Incorrect. Although randomization helps to reduce the effects of confounding and lurking variables, it also helps to reduce bias and create groups that are similar in all variables.
D. Correct. Randomization is important in the logic of experimental design for all these reasons.

Text Reference: Section 5.3: Randomized comparative experiments

8. Differences between the effects of treatments that are so large that they would rarely happen by chance are called:

a. Explanatory variables

b. Compare matched groupings

*c. Statistically significant

d. Placebo effect

A. Incorrect. Statistically significant is the correct terminology.
B. Incorrect. Statistically significant is the correct terminology.
C. Correct.
D. Incorrect. Statistically significant is the correct terminology.

Text Reference: Section 5.5: Statistical significance

9. The primary problem with observational studies is:

a. We cannot directly observe the results.

b. We cannot determine associations between variables.

*c. We cannot determine cause and effect relationships between variables.

d. None. Observational studies are flawless.

A. Incorrect. We are either figuratively or literally watching from afar.
B. Incorrect. Observational studies are quite useful for finding associations between variables.
C. Correct. Observational studies can find associations but they cannot determine cause and effect relationships.
D. Incorrect. Without randomization into treatment groups, we cannot determine whether or not one variable causes the other.

Text Reference: Section 5.6: How to live with observational studies

10. The best method for testing causation would be:

a. Sample Surveys

b. Observational Studies

*c. Experimentation

d. Census

A. Incorrect. A sample survey is a good method for gathering data, but experimentation would be the best method for testing causation.
B. Incorrect. Although observational studies are useful for testing causation, a randomized comparative experiment is best for testing causation.
C. Correct. Experiments are the best method for testing causation.
D. Incorrect. Census is a good method for gathering data, but experimentation would be the best method for testing causation.

Text Reference: Section 5.6: How to live with observational studies