ACTIVITY 7b: Memory Study – Did Random Assignment do its job?

Science News *from research organizations*

Dog ownership associated with longer life, especially among heart attack and stroke survivors

Date: October 8, 2019

Source: American Heart Association

Summary: Dog ownership was associated with a 33% lower risk of early death for heart attack survivors living alone and 27% reduced risk of early death for stroke survivors living alone, compared to people who did not own a dog. Dog ownership was associated with a 24% reduced risk of all-cause mortality and a 31% lower risk of death by heart attack or stroke compared to non-owners.

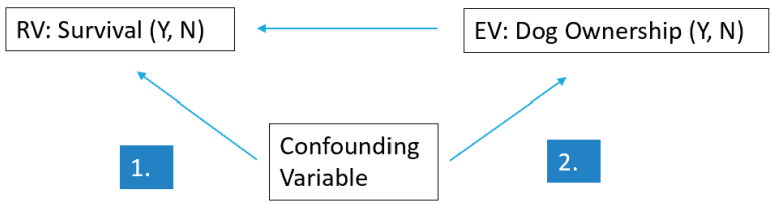
1. What type of study is this? Observational or a designed experiment?

2. What is a response variable in this study?

3. What is the explanatory variable in this study?

A **confounding variable** is a variable that provides an alternative explanation for the study result. In this study, a confounding variable would need to provide an explanation for the higher survival rate in the dog owner group compared to the non-owner group.

4. What is a possible confounding variable in this study?



5. Use your variable in #4 to provide an alternative explanation for the higher survival rates in the dog ownership group compared to the non-owner group.

Confounding variables are an issue in **observational studies**. That is why we do **not** draw cause-and-effect conclusions in observational studies.

Designed Experiments

If a study is a well-designed experiment with a control group, replication and has used random assignment potential to draw cause-and-effect conclusions

Returning to the Memory Study:

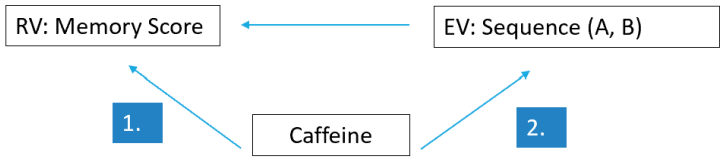
6. What would it take for caffeine to be a confounding variable in the relationship between memory score and sequence?

The purpose of **random assignment** is to create to sequence groups that are similar in terms of the distribution of caffeine. This will hopefully ensure that neither sequence has an advantage in terms of having a greater proportion of people who consumed caffeine.

Follow the link to Load the data into the Multiple Variables applet. Then drag and drop caffeine into the response box and sequence into the subset by box.

7. Use the results to explain whether caffeine is acting as a confounding variable in this study.

8. In the diagram below, which relationship will random assignment try to eliminate? Relationship 1, 2 or both 1 and 2? Explain.



Return to the Multiple Variables applet. Drag sleep into the response box and sequence into the subset by box.

9. Did random assignment do its job with the variable sleep? Explain.

Random sampling vs. Random assignment

- Random sampling: Obtain a representative sample from the population so that results may be generalized back to this entire population

- Random assignment: Create treatment groups that are similar with respect to the extraneous sources of variation so that cause-and-effect conclusions may be drawn (if the results are statistically significant)