Beckham Carver

Jan 20, 2022

STAT 4025

Prof. Robinson

Homework Assignment 1

**a. Is this an interventional or observational study? Explain.**

In the fish hatchery study it is an interventional study because those conducting the study are assigning different types of feed to the tanks, as well as assigning the fish to the tanks. A theoretical observational study of the same goals could be researchers visiting multiple hatcheries that use different feeds and collecting the same information. However, because the researchers are assigning the feed and tanks themselves, they are intervening, making this an interventional study, specifically a randomized trial.

**b. What are the experimental units in this design?**

In this design the experimental units are the individual tanks that are given different feeds. This is because it is the tanks that are assigned different feeds, not the fish that are assigned different feeds. The assignment of treatment decides the experimental unit.

**c. What is your sample size if you want to compare the growth lengths of fish exposed to Diet A to Diet C?**

In this case the sample size for comparing Diet A to Diet C would be 10, this is because there are 5 tanks assigned to diet A and 5 tanks assigned to diet C.

**d. At the beginning of the study, the fry differ from each other in terms of length, weight, and hatch date. Do you expect there to be any substantial differences in length and weights of the fry across the diet groups at the beginning of the study? Explain.**

It is expected that the initial data collected from the fish will be varied- that is to say that there will be substantial differences in the weights and lengths of the fish at the beginning of the study.

However, the goal of the experiment is to observe the differences between the feeds over time. By analyzing the total average change from start to finish, and randomly assigning feeds and fish to tanks, the initial variance will have little to no effect on our conclusions.

**e. Regarding the air pollutant study, which type of study design is this? Is it interventional or observational?**

This study is clearly an observational study because no treatment- which in this case would be exposure to different levels of fine particulate matter- was administered by the researchers. Children without asthma were identified, and measurements of fine particulate matter were measured near their residency, at no point was any intervention or treatment made, the risk factor was only observed. This is an observational cohort study.

**f. Tell me why you are taking this course. What is your major and what statistics courses have you taken in the past? Rate your R programming on a scale of 1 to 5 (5 being a rock star)**

I originally chose this course because it was the only stats class that would fit in my theoretical schedule, and I planned on deciding to keep the course once I met the professor. I do plan on staying in, as the exposure to graduate students and your genuine care for teaching makes me excited for the semester. I am a major in computer science and statistics and am studying under the Trustees scholarship- I sincerely need to get very good grades this semester as my scholarship is on the line. My R programming experience is a 2, but I am very comfortable with programming overall. I have taken intro to stats and stats methods; however, I would like to think my intro class was especially extensive as Michelle Bird did a wonderful and vigorous job introducing the study of statistics.