LAB 5: ANALYSIS OF SEX-DIFFERENCE DATA

As is pretty obvious to everyone, there are differences (beyond genitalia and such) between those who are biologically female and those who are biologically male in human populations. How substantial are those differences? What do the actual patterns of difference look like?

In this lab, you will plot sex-specific data on several characteristics measure in the U.S. In doing so, you will be introduced (or re-introduced, depending on your experience) to several types of data graphs.

Adult Stature (Height)

Males, on average, are somewhat taller than females. You will use data from the Center for Disease Control on height distributions for males and females in the United States at age 20 to create a box and whisker plot. A box and whisker plot is a way of comparing the average and range of variation in two different data sets. In this case, you are looking at the range of heights in males vs. females.

Here’s an example box and whisker plot:

![Example Box and Whisker Plot](image)

Percentiles state how many individuals fall below a particular score or measurement. For example, if an individual is in the 95th percentile for height, then he or she is taller than 95% of the other people in the sample. Now create your own bar and whisker plot on the back of this page, using the data below. You do not need to label the percentiles, like in the example above. I only labeled them to clarify the meaning of the chart.

Using the data provided to you (this will be given out in lab), draw box-and-whisker plots for Male and Female stature on the next page.
Answer the following questions based on the graph you created:

Which group is taller, on average, males or females?

Which group has a wider range of variation, or are they similar?

Are males and females categorically different, or is their significant overlap?

If you were told than an individual was 67 inches tall, could you know their sex from just that information? Why or why not? What if they were 75 inches tall? 55 inches tall? Again, why or why not?
SAT Math Scores

There is a common belief that males and females differ in their math abilities. In fact, there has been a persistent gap in average SAT Math scores between males and females, although females in the United States, on average, have better grades in math classes than males. You will use the data from the 2013 SAT test to create a line graph that visually expresses the differences between males and females in this data set.

Here is an example of a line graph:

Using the data provided, draw a line graph plot for Male and Female SAT Math scores below.
Answer the following questions based on the graph you created:

The average male score is 531. The average female score is 499. Would those two numbers alone give you a good understanding of the differences in math scores? Why or why not?

Are males and females categorically different, or is their significant overlap?

Females are 40% of the individuals who scored 750 or higher on the SAT Math, but they are only 16-20% of engineering graduates at the bachelor’s level. What could account for the differences in those numbers?

Word Count in Conversation

There is a common belief that females talk more than males. In an experiment by Fischer et al. in 2003, males and females were recorded in conversation. Some of these conversations were mixed between the sexes, others were single-sex. You will use the data from that study to create a line graph that illustrates the differences between men and women in the average number of words that they speak during a typical conversation.

Using the data provided, draw a line graph plot for Male and Female word count percentages.
Answer the following questions based on the graph you created:

Which group talks more, on average, males or females?

Which group has a wider range of variation, or are they similar?

Are males and females categorically different, or is their significant overlap?

If you were told that an individual spoke 1600 words during a conversation, could you tell from that information alone whether they were male or female? Why or why not?

**Muscle Mass**

Males, on average, have more muscle mass than females. You will use data from a study by Gallegher et al. (1997) to create a scatterplot that compares muscle mass by sex.

Here is an example of a scatterplot:

![Example Scatterplot](image)

Using the data provided to you, draw a scatterplot for Male and Female Total Appendicular Skeletal Muscle Mass on the next page.
Answer the following questions based on the graph you created:

Which group has more muscle mass, on average, males or females?

Which group has a wider range of variation, or are they similar?

Are males and females categorically different, or is their significant overlap?

If you were told that an individual had 23kg of muscle mass, could you tell from that information alone whether they were male or female? Why or why not? What if they had 40kg? What about 14kg? Again, why or why not?