

Correlation and causality.

Activity 1. Read the material in the orange boxes on p. 352-355 about correlation and scatterplots. Look at all the scatterplots on p. 352-356. Identify one with a negative correlation, one with no correlation, and one with positive correlation. Discuss this with others in your group. Did everyone find the same ones, or different ones?

Activity 2. Read the orange box on p. 358 about possible explanations of correlation. Then notice that there is an explanation of how to make a scatterplot in Excel on p. 357. On the Calendar for our course, find the spreadsheet for today. At the beginning are three sheets labeled 5E. For each, use Excel to make a scatterplot, identify the type of relationship, and discuss possible explanations for a correlation. Discuss this with the others in your group and help each other.

Activity 3. Establishing causality. How do you suppose scientists established that smoking causes lung cancer? Discuss among yourselves.

Class discussion: P. 352 and 358-359.

Activity 4. A standard comment made about statistics is "To establish causation, we need to conduct an experiment, not just an observational study." Read the case study on p. 358-359 about car seats and children. How does this illustrate the guidelines in the box on p. 359? Discuss with others in your group.

Activity 5. Review the graphs on p. 361 – particularly the last one, Fig. 5.50. What does that graph tell us? Discuss with others in your group.

Activity 6. Clearly, establishing causality is a complicated process, and we do not always have a clear conclusion. How do people communicate results about this. Read the orange box on p. 362. Discuss with each other where you have heard each of these phrases. Do you understand the differences?

Sidelight: It is possible to obtain a numerical measure of correlation. You can easily do this in Excel. I chose not to do that in today's lesson because it is most important that you plot the data to see how strongly related the variables appear to be and then to really "think" about possible causation. I don't see that computing a numerical measure is helpful in the one day we have available to learn about this topic.

Homework and Quiz 14: Due Wed. May 1

5E: 1-6, 13, 15, 17, 19, 25, 29, 31, 33, 35, 39

6D: 1, 9, 10, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 45, 49

Quiz 14:

5E 10, 12, 18, 20, 30(spreadsheet)

6D: 12, 14, 16, 18, 20, 22, 24, 26, 28, 30