

2.4: Graphing Qualitative Variables- Bar Graphs

Graphing Qualitative Variables

The first types of charts that will be covered are bar charts and pie charts. Both types of charts should be used on qualitative variables only. There's another whole mess of chart types to use on quantitative variables! Review the [section on quantitative and qualitative variables](#) in the first chapter to refresh yourself on qualitative variables and the nominal scale of measurement. describes.

Bar Charts

Bar charts are meant to display the frequencies of qualitative variables. Figure 2.4.1 shows the same data as the frequency table in Table 2.2.3, but with bars.

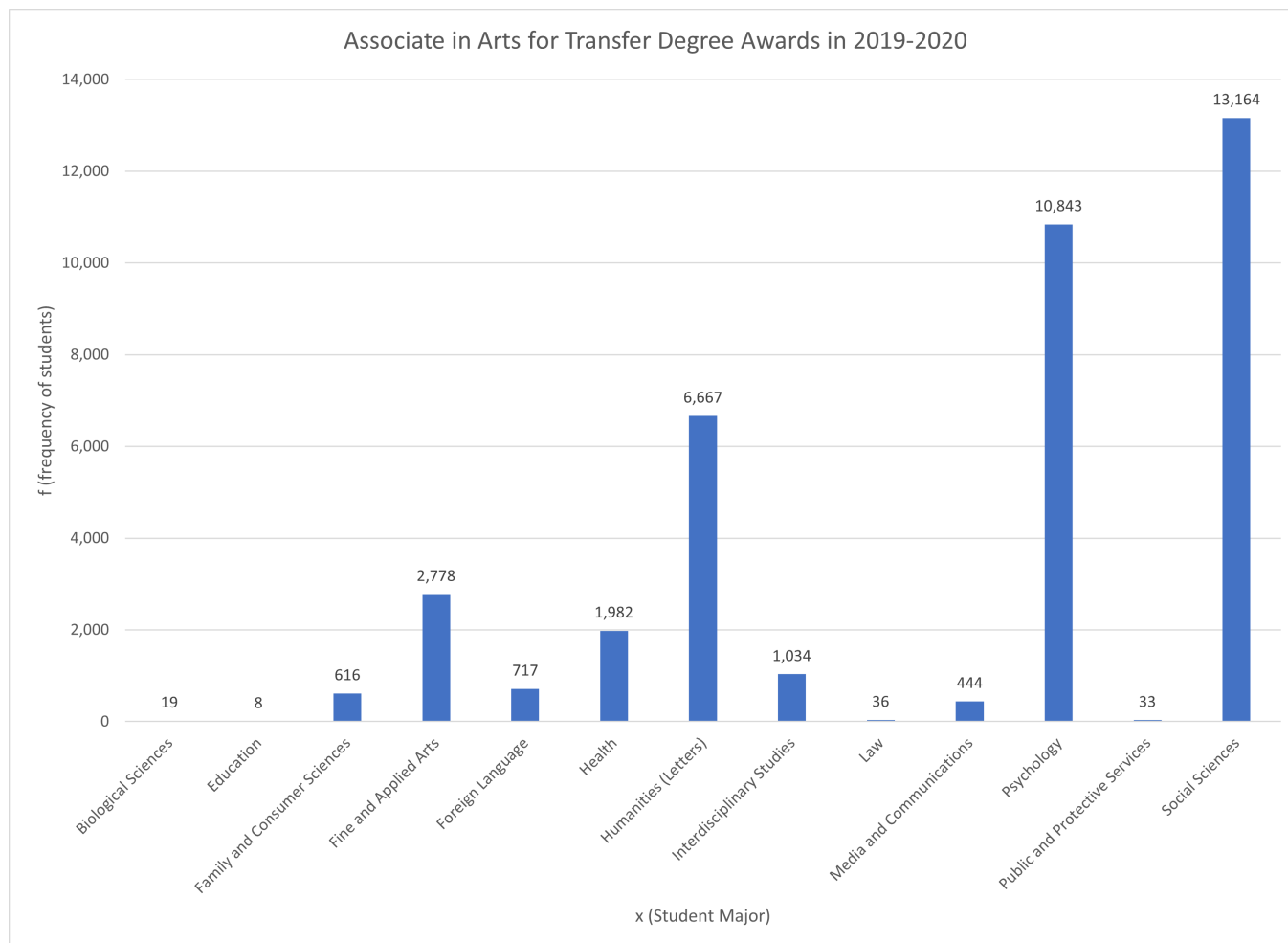


Figure 2.4.1: AA-T Graduates by Major (Copyright CC0; chart created by Michelle Oja via California Community Colleges Chancellor's Office [DataMart](#))

Let's unpack Figure 2.4.1 a bit.

First, the x-axis has the same information as the "x" column in Table 2.2.3, the major that the graduating student earned the degree in. The x-axis is always the one on the bottom going from left to right. Because we are talking about a variable that has categories (nominal scale of measurement; qualitative variable), the information on the x-axis is the category names. They can be in any order on the chart because qualitative variables don't have a natural order. As you can see, they are ordered alphabetically. This makes no sense to me, so I usually order from lowest frequency to highest frequency but wanted to let you see what is looks like when not ordered numerically. You can choose any order that you'd like since qualitative variables have no natural order.

Second, the y-axis in Figure 2.4.1 shows the same information as the “f” column in Table 2.2.3, the number of students who earned that degree. The y-axis is always going up and down. Stand with your hands touching above your head to show that this is the axis that is going up and down, then move your hands out to a “Y” (like in the song YMCA) to remember that the y-axis is the one that goes up and down.

Third, notice that the bars do not touch; this is what makes it a bar chart and not a histogram (which will be covered later in this chapter). This chart was created with common commercial spreadsheet software (Excel), but note that this type of chart is called a “column bar chart” in the software. There are fancier types of bar charts, but often the fancier a chart looks, the more difficult it is to easily and quickly understand what the chart is showing.

Interpreting Bar Charts

The following questions will be asked for each type of graph in this chapter. In most cases, the questions will also be answered so that you can get an idea of what you should be looking for in graphs. Some of these questions won't make sense for specific types of graphs, but I want you to get in the habit of answering them to yourself when reviewing graphs.

1. What kind of graph is Figure 2.4.1?
 1. This is a bar graph (notice that the bars are not touching) because the variable is a qualitative category (nominal scale of measurement).
2. What does the x-axis measure in Figure 2.4.1?
 1. The x-axis is the one on the bottom, and it was named “Student Major”. This is the major that the student earned an Associate of Arts for Transfer degree from a California community college student during the 2019-2020 academic year.
3. What does the y-axis measure in Figure 2.4.1?
 1. The y-axis is the axis that goes up and down. For most charts discussed in this textbook, the y-axis will be frequencies. In this figure, that means that the y-axis shows how many students earned the Associate of Arts for Transfer degree from each major.
4. What do you notice from Figure 2.4.1? What pops out to you?
 1. What I noticed is that most students are earning the general “Social Science” degree, rather than something more specific like Sociology or Psychology. I also noticed that there were very few students earned an Associate of Arts for Transfer degree with an Education major.
5. What does Figure 2.4.1 make you wonder about?
 1. I wonder what kind of degree future teachers are earning, because it does not look like they are earning an Associate of Arts for Transfer! Maybe a general Associate of Arts? Or is there a different major that they are in?
6. What is a catchy headline for Figure 2.4.1?
 1. Be Like the Ten Thousand Psychology Graduates- Go to a California Community College
7. How could you summarize the info in Figure 2.4.1 into one sentence?
 1. The most common Associate of Arts for Transfer degrees were in the Social Sciences, Psychology, Humanities, and Fine and Applied Arts.
8. Who might want to know the information in Figure 2.4.1?
 1. California community college students? Potential California community college students? Faculty or administrators of California community colleges?

? Exercise 2.4.1

Remember those videos about the best way to learn from Dr. Chew, a cognitive psychologist, first discussed in the first chapter? Well, Dr. Chew's second video has a bar chart ([Part 2: What Students Should Know about How People Learn!](#) I suggest that you watch the whole video to understand the experiment, but the bar chart shows up around 3:10 minutes. Then, answer the same questions as above.

Answer

1. What kind of graph is in the video?
 1. This is a bar graph (notice that the bars are not touching).

2. What does the x-axis measure in the video?
 1. The x-axis is the one on the bottom, named “Level of Processing” and it has three levels (shallow, deep, and the control group). There are different colored bars, and they represent another variable (memory goal?) that has two levels, intentional and incidental.
3. What does the y-axis measure in the video?
 1. The y-axis is the axis that goes up and down. For most charts discussed in this textbook, the y-axis will be frequencies. However, in this video, the y-axis is showing the percentage of words that were successfully recalled (remembered).
4. What do you notice from the graph in the video? What pops out to you?
 1. What I noticed is that shallow processing (looking for the letter “e”) leads to worse recall than not having any processing goal (the control group). I also find it interesting that the intent to learn didn’t affect memory really at all. But you might have noticed other things!
5. What does the graph in the video make you wonder about?
 1. I wonder why deep processing (elaborating) isn’t more well known to help students?! But what does the graph make you wonder?
6. What is a catchy headline for the graph in the video?
 1. "Learning is Deep" seems catchy to me, but I bet you came up with something better!
7. How could you summarize the info in the graph in the video into one sentence?
 1. You could say something like, "Focusing on the meaning of words doesn’t seem to help you remember much more than just trying to remember information, but it is way better than shallow processing."
8. Who might want to know the information from the graph in the video?
 1. I imagine that both students and teachers would find this information very useful. Tutors and other learning professionals should also know about it, too.

Summary

Bar charts effectively portraying qualitative data. Bar charts are a good option when there are more than just a few categories, or for comparing two or more distributions.

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