

2.5: Graphing Qualitative Variables- Pie Charts

In a pie chart, each category is represented by a slice of the pie. The area of the slice is proportional to the percentage of responses in the category. Instead of showing frequencies, a pie chart shows *proportions*. Figure 2.5.1 shows the same information as the frequency table in Table 2.2.3 and the bar chart in Figure 2.4.1, but as a pie chart.

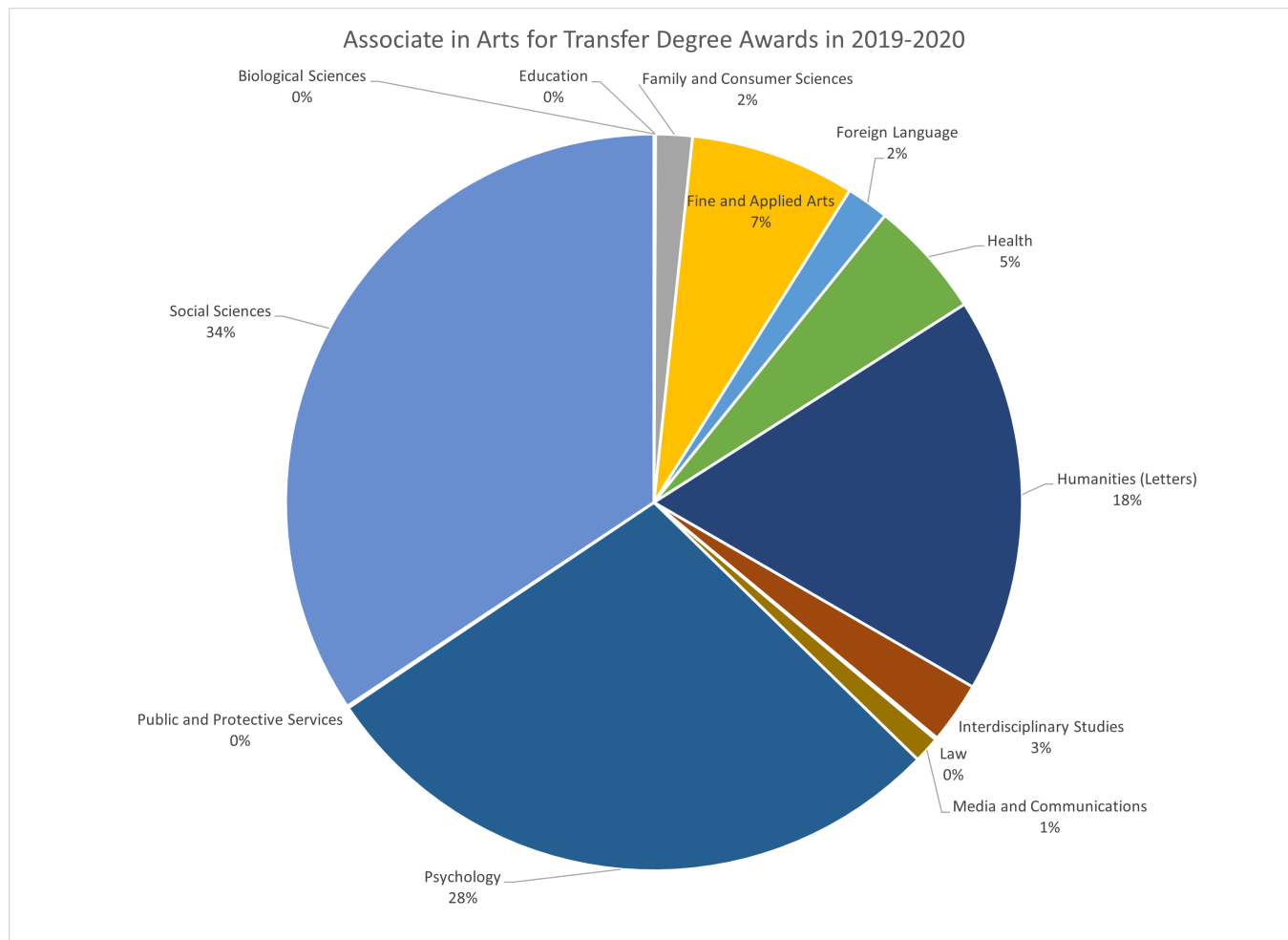


Figure 2.5.1- Pie Chart of Graduate's Majors (Copyright CC0; chart created by Michelle Oja via California Community Colleges Chancellor's Office [DataMart](#))

Both bar charts and pie charts show information about how many people are in each group, but bar charts can show the exam numbers while pie charts show the proportion, or percentage. You can learn different things from each chart, so it's up to you to decide which chart is best for you needs. Remembering that both of these kinds of charts show how many people are in each qualitative variable's group!

Pie Chart Interpretation

The following will have similar answers as the bar chart interpretation because it's the same data. But the answers aren't exactly the same because some things pop out in pie charts but not in bar charts, and vice versa.

- What kind of graph is Figure 2.5.1?
 - This is a pie chart. Pie charts are used with variables that have qualitative categories (nominal scale of measurement) when you are want to compare proportions (percentages).
- What does the x-axis measure in Figure 2.5.1?
 - Trick questions! There's no axes in pie charts! What is normally on the x-axis is the category or each score, and that is what the colors and labels identify.
- What does the y-axis measure in Figure 2.5.1?

1. Another trick question! Again, there are no axes in pie charts! What is normally on the y-axis is the frequency; instead of having the numbers on an axis, the size of the pie slices indicates the size or portion of each category. In this example, I also included the percentage next to the name of the category.
4. What do you notice from Figure 2.5.1? What pops out to you?
 1. The pie chart shows which groups have the most graduates with Associate of Arts for Transfer, and that's Social Sciences, Psychology, Humanities, and Fine and Applied Arts. There are also a bunch of majors that show 0% of the pie. They really don't have 0%, or they wouldn't be in the chart. Instead, those are the ones with really small frequencies, and their percentage is a decimal point (like 0.05% for Biological Sciences).
5. What does Figure 2.5.1 make you wonder about?
 1. Because the general "Social Sciences" is such a large proportion (slice of pie), I wonder what kind of careers they go into?
6. What is a catchy headline for Figure 2.5.1?
 1. Your Rainbow of Choices- Associate of Arts for Transfer from California Community Colleges
7. How could you summarize the info in Figure 2.5.1 into one sentence?
 1. I would still say that the most common Associate of Arts for Transfer degrees were in the Social Sciences, Psychology, Humanities, and Fine and Applied Arts, but the pie chart format shows how small of a proportion many of other majors earn.
8. Who might want to know the information in Figure 2.5.1?
 1. Same as from the bar chart! California community college students? Potential California community college students? Faculty or administrators of California community colleges?

Pie charts can be misleading if they are based on a small number of observations. For example, if just five people had graduated with an Associate of Arts for Transfer, and three earned their transfer degree in Psychology, it would be misleading to display a pie chart with the Psychology major slice showing 60%. Problems like that can happen with small samples. In this case, the slices should be labeled with the actual frequencies observed (e.g., 3) instead of with percentages.

Summary

Pie charts and bar charts can both be effective methods of portraying qualitative data. Let's move on to graphing quantitative data!

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