

Research Skills, Graphs

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November 28, 2011

1 USA Population Increase

Considering problems with the given graph. The horizontal axis is not uniformly spaced, which makes the population increase appear linear. Minor problems are missing axis labels, using an unnecessary legend, and not using an appropriate scale for the y-axis (there are lots of redundant zeros). Figure 1 shows a revised version, we can see that the data has a significantly different character than it appeared originally.

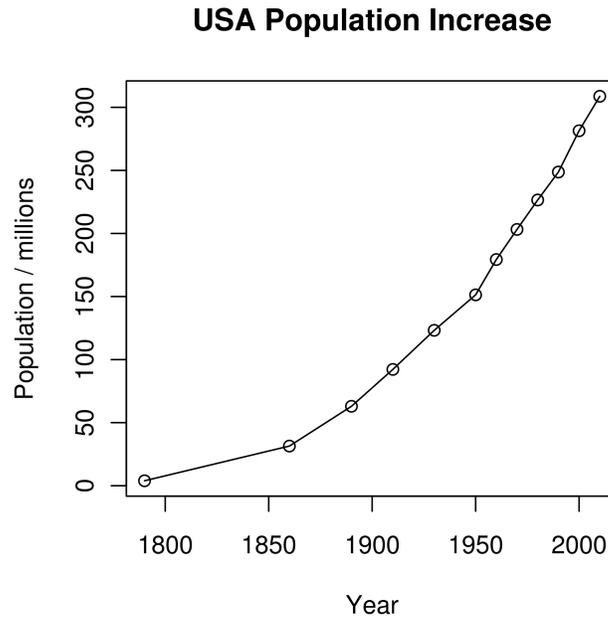


Figure 1: Population of the USA from 1790 to 2010

2 Cambridge Student Population, 1990

It is the height only of the 2-Dimensional figures that represents the data in this graph, but it falls naturally on the viewer to compare the sizes by area, which gives a false impression. Replacing the figures with lines would be an improvement, but since the four categories combined represent the total student population, we can capture the sense of proportions by using a pie chart, as in figure 2. Note however, pie charts are not often used in scientific papers because such data could be even more succinctly illustrated in a table.

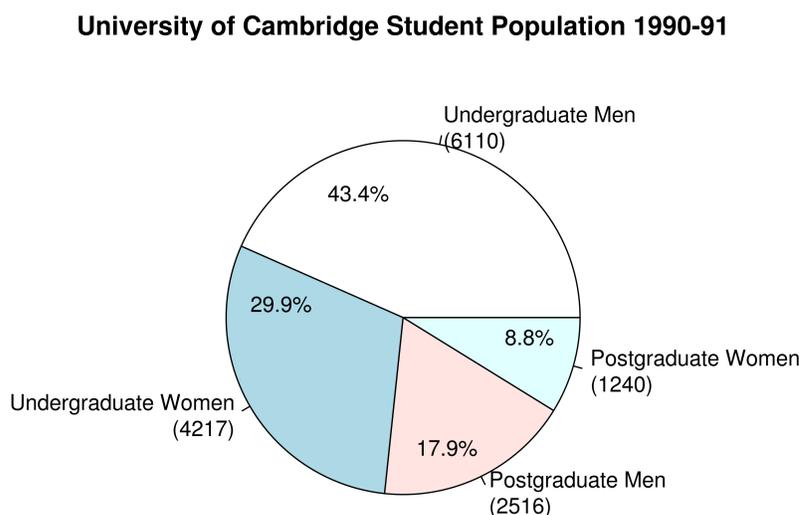


Figure 2: Male and female population of students at Cambridge

3 Influence of Framing

The data shown are proportions related to six discrete experiments. One major problem is that they are plotted in 2D space: (i) lines are drawn between points, (ii) points that discretely relate to each other are separated horizontally, and (iii) the x-axis is spatially segmented. Another significant issue is that there exists two different experimental variables; default setting, and framing. These two variables are shown incongruently, by horizontal axis and by legend. There are also several minor problems. The language is unhelpful, and the positioning of labels is confusing (just to name a few!).

To make the data more understandable we can use a table, and group together the important categories by rows and columns. In table 1 we can see how changing the experimental variables along each

dimension affects the outcome.

	Default		
	<i>Opt-Out</i>	<i>No Default</i>	<i>Opt-In</i>
<i>Positively Framed</i>	59.9%	88.5%	89.2%
<i>Negatively Framed</i>	44.2%	70.8%	76.9%

Table 1: Influence of framing and default setting on participation

4 Papers & Citations

Figure 3 shows for each paper the number of reported citations given by ISI and Google Scholar. They are sorted from left to right by the total number of citations given by both websites. We can see that Google Scholar usually reports about twice as many citations as ISI.

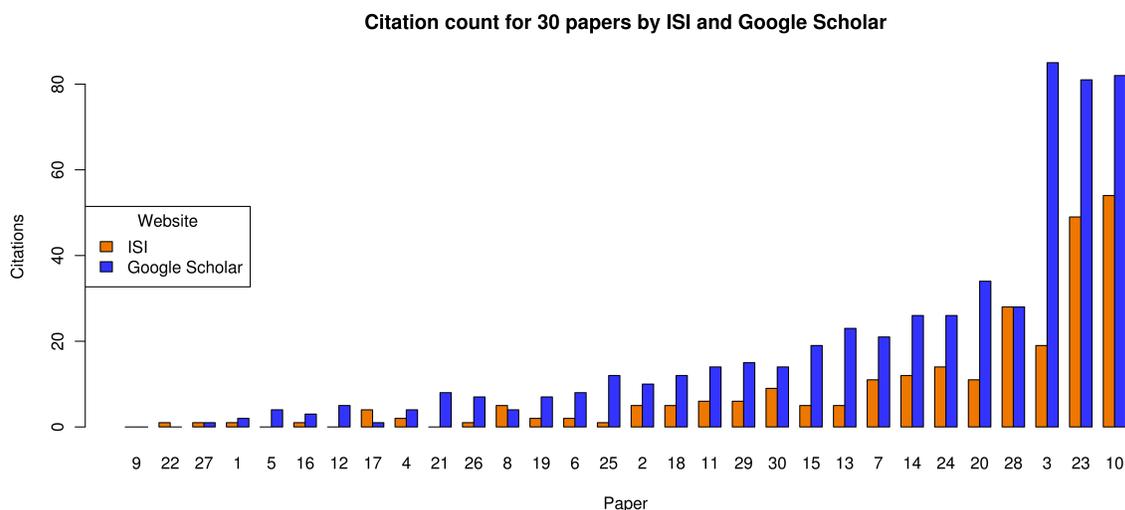


Figure 3: Papers are listed from least to most influential

5 Student Population at the University

Figure 4 shows the populations (combined undergraduate and graduate) of the total number of male, and total number of female students since 1968. We can see that only a small proportion of students were females in 1968, about 10%. This proportion has increased steadily until the late 90s, and settled at a proportion of around 47% since the last ten years.

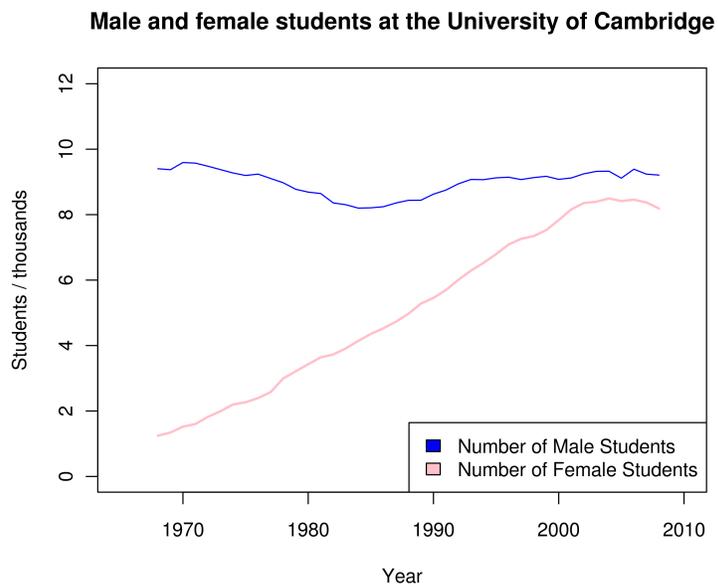


Figure 4: Proportion of female students have increased significantly since the late 60s