Writing about Diagrams, Figures, Tables, and Images

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1. Motivation: Why this topic is important

Political scientists, public policy scholars, and policy analysts are increasingly relying on visual tools in their writing support their arguments and proposals. These tools can appear in many forms. Sometimes they are logic diagrams that map out an idea. Other times they are renderings of data in figures or tables. Still additional techniques might incorporate images, such as photographs or maps. Effectively incorporating such elements into your writing can help you bolster your arguments while simultaneously allowing readers to grasp valuable information that words alone are difficult to convey.

Probably the biggest mistake that novice writers make when they incorporate these elements into their work is that they put heavy burdens on the reader rather than walking the reader through the information in order to highlight the key elements that the author wants to convey. Think about it. Any given image, figure, or table, for example, might contain dozens of bits of information. It won't be immediately obvious to the reader what is most important or what the reader should grasp. That's why good writing and effective "hand holding" by the author is so important.

2. Overall technique: Follow these steps when writing about a diagram, figure, table, or image.

- **Step 1. Proper identification.** Know what you are writing about and identify it properly. People lacking experience in this sort of writing commonly confuse the terms "figure" and "table," for example. Here's how to know the difference: "figures" are data visualizations such as scatterplots, bar graphs, and other images that convey quantitative amounts; "tables" present columns or rows (or both) of numbers. When you discuss data in your writing be sure to use the proper term. Other labels such as "map" or "photo" will be useful when using those sorts of visuals.

- **Step 2. Introduction.** Introduce the diagram, figure, table, or image in the text of your paper. Refer to it by name (e.g., Figure 1 or Table 1) and then use a clear verb to say what the figure or table is designed to do (e.g., "Figure 1 compares…" or "Table 1 lists…").

- **Step 3. Argument.** State an argument or key point that the diagram, figure, table, or image helps to establish.

- **Step 4. Tour of key elements.** Talk the reader through a key part or parts of the diagram, figure, table, or image to show how it reveals the argument you stated in Step 3. This part might take multiple sentences to accomplish. Do not assume that the meaning of the diagram, figure, table, or image is self-evident. You do not want the reader to be puzzled about what you are presenting. You want to avoid putting a heavy cognitive load on the reader. Ideally, the reader's attention is focused on the substance of your ideas not trying to make sense of confusing visuals.

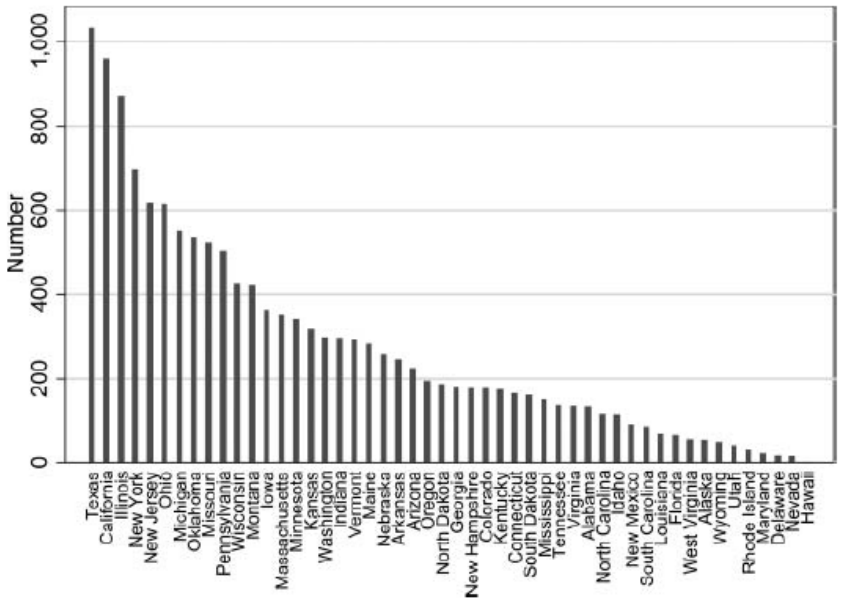
- **Step 5. Circle back or transition.** Return to Step 3 to make an additional point if necessary, or transition to a new idea. This will be useful if you are using a diagram, figure, table, or image to help the reader understand several distinct points. An example would be if you have presented a map and you are discussing different regions of it. Another example would be if you have a table of statistical results and you are working your way through it to explain key findings.

3. Good practices: Follow these practices to facilitate your use of a diagram, figure, table, or image in your writing.

- **Location:** Locate the diagram, figure, table, or image in your writing after you have introduced it. In other words, if you begin discussing a figure on page 2, don't have the figure appear on page 1.
- **Order:** Discuss the diagram, figure, table, or image in the order it appears in the paper. You may refer back to one mentioned earlier as long as you are clear (e.g., see the steps described above).
- **Numbers in the text:** Use numbers, not words, when describing numeric quantities that appear in a diagram, figure, table, or image (e.g., "75 percent" not "seventy-five percent"; or "7 states," not "seven states").
- **Starting sentences:** Construct sentences so you do not begin them with a number from a diagram, figure, table, or image; sentences should begin with words.

4. Examples: Here are some examples that demonstrate these techniques using a data figure and a data table. You could also employ the techniques for other sorts of visuals.

Example 1: A figure. Full article is at http://pmanna.people.wm.edu/research/Manna2012PeabodyJournal.pdf.

Figure 1 plots the number of school districts in each state from 2008–09. Interestingly, the number of districts is imperfectly correlated with state population, revealing different approaches to school governance across the country. As one might expect, there are few high-population states to the left with the most school districts, such as Texas, California, and Illinois, and smaller states to the right, including Delaware, Nevada, and Hawaii, that do not have very many. Still, some relatively smaller states (e.g., Iowa and Kansas) are in the left side of the distribution with lots of districts, whereas other somewhat larger states (e.g., Florida and North Carolina) are towards the right with relatively few. Overall, then, population does not appear to be only factor influencing how states organize their education governance systems at the local level.	Figure 1. Number of School Districts in the United States, 2008-09 school year  Source: Manna (2013, p. 635)

Example 2: A table. Full article is at https://www.jstor.org/stable/3542566.

Next consider Table 1, which presents an ordinary least squares regression predicting the percent of students in Texas school districts passing state standardized tests from 1995 to 1999. The results show that school districts with superintendents who engage in more active networking tend to have higher pass rates on state tests. The key result is in the first row and shows that a 1-unit increase in the scale of managerial networking, indicating superintendents making more active efforts to form networks, is associated with school district pass rates increasing by .7035 percentage points, while controlling for other factors known to be related to student achievement. The result is statistically significant ($p<.01$) and substantively significant, too, given that pass rates increasing by that amount could mean several thousand more students passing their exams.

Table 1. Impact of managerial networking on organizational performance

Dependent variable = Student exam pass rates

Independent variables	**Slope**	***t***	***p***
Managerial networking	.7035	(4.60)	.0001
Control variables			
Teacher's salaries (000s)	.4665	(4.31)	.0001
Class size	-.3117	(4.72)	.0001
Teacher experience	.1943	(1.90)	.0575
Noncertified teachers	-.1873	(5.30)	.0001
Percent state aid	-.0173	(2.09)	.0366
Percent black students	-.2167	(13.49)	.0001
Percent Latino students	-.1091	(10.39)	.0001
Low income students	-.1670	(11.16)	.0001

R^2 .59
Standard error 7.62
F 276.07
N of Cases 2,534
Dummy variables for individual years not reported.

Source: O'Toole & Meier (2004, p. 688)