TABLES

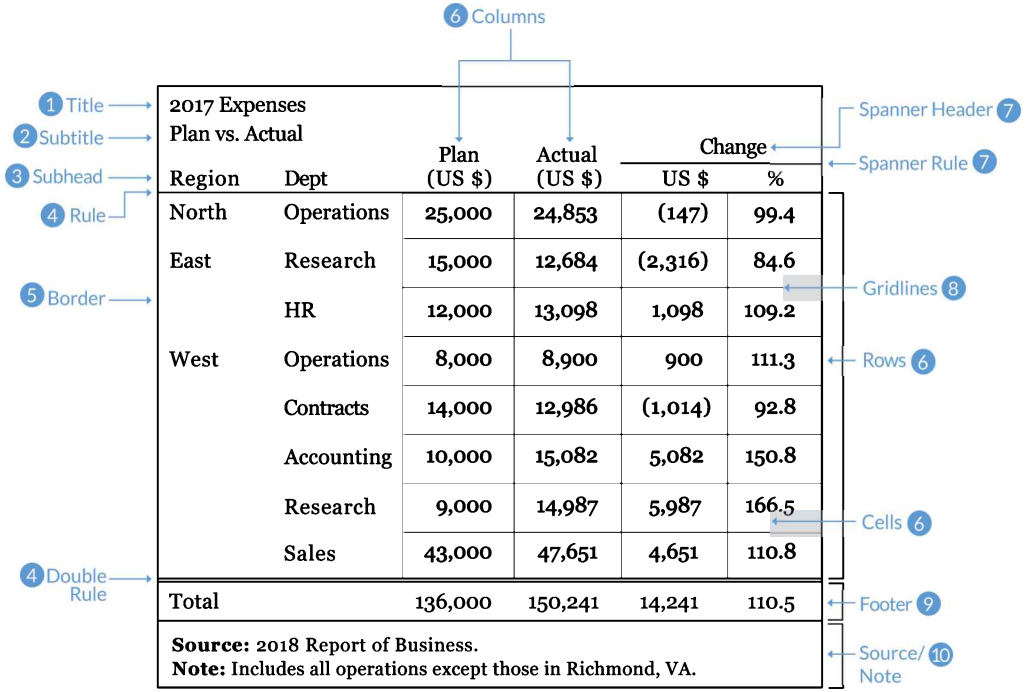
Yes, tables are a form of data visualization. If you want to show the exact amount of every value in your data, a table might be your best solution. They are not the best solution if you want to show a lot of data or if you want to show the data in a compact space—but still, a well-designed table can help your reader find specific numbers and discover patterns and outliers.

As we've seen with other graphs, gridlines, tick marks, and other clutter can crowd a visualization and obscure takeaways. Tables are especially susceptible to clutter. The same guiding principles of creating effective visualizations apply here as well—clearly *show the data* so that our reader can find the most important patterns, trends, or values; *reduce the clutter* of gridlines, extra spacing, and uneven alignment; and *integrate the table and the text* by using concise active titles and subtitles, and including unit labels like percentage signs and dollar signs with care.

In this chapter, we'll cover ten steps for making better tables.

THE PROPER ANATOMY OF A TABLE

We must first understand the components of a table before we can understand how and when to adjust them to improve our data presentation. This diagram shows the ten primary components of a table. Many of these parallel the parts of a chart that you will see in the Style Guides section in Chapter 12. As with chart style, some of the style decisions you choose for



The components of a data table.

your tables will be subjective and depend on nothing more than your preferences for shading colors, font size, and line width.

1. **Title.** Use concise, active titles. "Table 1. Regression Results" is not particularly informative. Instead, guide your reader to the conclusion with a title like "A one year increase in work experience increases annual earnings by 2.8 percent." Left-aligning the title and subtitle will line it flush with the rest of the table, creating a grid, which is easier to navigate.
2. **Subtitle.** This sits below the title, often in a smaller font size or set in a different color to differentiate it. The subtitle should specify the units of the data in the table (like "Percent" or "Thousands of dollars") or make a secondary point (such as "The experience effect is greater for men than for women").
3. **Stubheads or Column Headers.** These are the titles of your columns. Differentiate these from the rest of the table cells with boldface or separate them with a line, also called a "rule."

4. **Rules.** The lines that separate the parts of the table from one another. At minimum, place rules below the stubheads and between the bottom row and any sources or notes.
5. **Border.** The set of lines that surround the table. Including a border around the whole table depends on how the table is arranged in the rest of the document. Sometimes you need to add a visual differentiator to set the table apart, and in those cases a border is useful. If, however, too many lines and borders clutter the document, omit the border altogether.
6. **Columns, Rows, and Cells.** Columns run vertically, and rows run horizontally. The intersecting areas are called cells.
7. **Spanner Header and Spanner Rule.** The text and line that span multiple columns. Text is usually centered over the multiple columns even if the specific column headers are left- or right-aligned.
8. **Gridlines.** The intersecting lines within the table that separate the cells. As with charts, take a light touch with your gridlines—heavy gridlines clutter the table.
9. **Footer.** The bottom area of a table where you might include a row for the total or average. As with the stubhead, we should differentiate this row from the rest of the table. We can do so by bolding the numbers, separating them with a line, or color shading the cells.
10. **Sources and Notes.** The text below a table containing the citation or additional details or notes to the table. Modern Language Association (MLA) style, for example, suggests putting the sources first and the notes second.

THE TEN GUIDELINES OF BETTER TABLES

These guidelines will take us from tables that have too much color, lines, and clutter to ones in which readers can easily see the important numbers and patterns. On the next page, we can see how these guidelines move us from the table on the left to the much more clear and readable table on the right.

RULE 1. OFFSET THE HEADERS FROM BODY

Make your column titles clear. Try using boldface text or lines to offset them from the numbers and text in the body of the table. It should be clear that the headers are not data values

Role	Name	ID	Start Date	Quarterly Profit	Percent Change
Operations	Waylon Dalton	A1873	May-11	5692.88	34.1
Operations	Justine Henderson	B56	Jan-10	4905.02	43.522
Operations	Abdullah Lang	J5867	Jun-14	4919.53	38
Operations	Marcu Cruz	B395	Dec-13	9877.52	37.1
Research	Thalia Cobb	C346	Apr-13	3179.49	-9
Research	Mathias Little	D401	Mar-11	5080.26	3.2
Research	Eddie Randolph	A576	Jul-18	7218.24	43.1
Contracts	Angela Walker	B31	Feb-18	6207.53	-1.788
Contracts	Lia Shelton	C840	Jan-16	1070.61	4.31
Contracts	Hadassah Hartman	D411	Nov-15	3735.96	3.01

Role	Name	ID	Start Date	Quarterly Profit	Percent Change
Operations	Waylon Dalton	A1873	May-11	$5,693	34.1
	Justine Henderson	B56	Jan-10	4,905	43.5
	Abdullah Lang	J5867	Jun-14	4,920	38.0
	Marcu Cruz	B395	Dec-13	9,878	37.1
Research	Thalia Cobb	C346	Apr-13	3,179	-9.0
	Mathias Little	D401	Mar-11	5,080	3.2
	Eddie Randolph	A576	Jul-18	7,218	43.1
Contracts	Angela Walker	B31	Feb-18	6,208	-1.8
	Lia Shelton	C840	Jan-16	1,071	4.3
	Hadassah Hartman	D411	Nov-15	3,736	3.0

Inspired by DarkHorse Analytics

but categories or headers. In this example, which uses growth in per capita GDP, the column labels are boldface and separated from the data with a single line.

Country	2013	2014	2015	2016
China	7.23	6.76	6.36	6.12
India	5.10	6.14	6.90	5.89
United States	0.96	1.80	2.09	0.74
Indonesia	4.24	3.73	3.65	3.85
Mexico	-0.06	1.45	1.90	1.68
Pakistan	2.21	2.51	2.61	3.44

Country	**2013**	**2014**	**2015**	**2016**
China	7.23	6.76	6.36	6.12
India	5.10	6.14	6.90	5.89
United States	0.96	1.80	2.09	0.74
Indonesia	4.24	3.73	3.65	3.85
Mexico	-0.06	1.45	1.90	1.68
Pakistan	2.21	2.51	2.61	3.44

Rule 1. Offset the headers from body.

RULE 2. USE SUBTLE DIVIDERS INSTEAD OF HEAVY GRIDLINES

As with the basic principle to reduce clutter for graphs, you can lighten or even remove much of the heavy borders and dividers in your tables. There is rarely a case when every single cell border is necessary. For series that show the total, use shading, boldface, or subtle line breakers to distinguish these.

Notice in the table on the left how the two columns that show the average (between 2007–2011 and 2012–2016) blend in with the other columns. At a quick glance you don't even

Country	2007	2008	2009	2010	2011	Avg.	2012	2013	2014	2015	2016	Avg.
China	13.64	9.09	8.86	10.10	6.36	10.74	7.33	7.23	6.76	6.36	6.12	6.76
India	8.15	2.38	6.95	8.76	6.90	6.30	4.13	5.10	6.14	6.90	5.89	5.63
United States	0.82	-1.23	-3.62	1.68	2.09	-0.30	1.46	0.96	1.80	2.09	0.74	1.41
Indonesia	4.91	4.59	3.24	4.83	3.65	4.47	4.68	4.24	3.73	3.65	3.85	4.03
Mexico	0.70	-0.48	-6.80	3.49	1.90	-0.19	2.15	-0.06	1.45	1.90	1.68	1.41
Pakistan	2.72	-0.36	0.74	-0.48	2.61	0.64	1.34	2.21	2.51	2.61	3.44	2.42
Average	5.15	2.33	1.56	4.73	3.92	3.51	3.52	3.28	3.73	3.92	3.60	3.61

Country	2007	2008	2009	2010	2011	Avg.	2012	2013	2014	2015	2016	Avg.
China	13.64	9.09	8.86	10.10	6.36	10.74	7.33	7.23	6.76	6.36	6.12	6.76
India	8.15	2.38	6.95	8.76	6.90	6.30	4.13	5.10	6.14	6.90	5.89	5.63
United States	0.82	-1.23	-3.62	1.68	2.09	-0.30	1.46	0.96	1.80	2.09	0.74	1.41
Indonesia	4.91	4.59	3.24	4.83	3.65	4.47	4.68	4.24	3.73	3.65	3.85	4.03
Mexico	0.70	-0.48	-6.80	3.49	1.90	-0.19	2.15	-0.06	1.45	1.90	1.68	1.41
Pakistan	2.72	-0.36	0.74	-0.48	2.61	0.64	1.34	2.21	2.51	2.61	3.44	2.42
Average	5.15	2.33	1.56	4.73	3.92	3.51	3.52	3.28	3.73	3.92	3.60	3.61

Rule 2. Use subtle dividers instead of heavy gridlines.

notice that there is a break in the annual series. In the version on the right, a light shade in those columns sets them apart.

RULE 3. RIGHT-ALIGN NUMBERS AND HEADERS

Right-align numbers along the decimal place or comma. You might need to add zeros to maintain the alignment, but it's worth it so the numbers are easier to read and scan. Here, for example, it is much easier to compare the values in the far-right column where the numbers are right-aligned than in either of the other two columns. To maintain the grid layout, the column header is right-aligned with the numbers as well.

Along these lines, choose the fonts in your tables carefully. Some fonts use what are called "oldstyle figures," in which some numbers drop below the horizontal baseline, the same way the letters *p* or *g* or *q* do. This is fine for cases where numbers are not a matter of data—like the numbering of chapters in a novel. But in data tables, they can be distracting and more difficult to read. Always use fonts that have "lining numbers," where all the numerals hit the baseline, and none drop below it.

Notice how the commas and decimal points in the table on the next page don't line up with custom fonts like Karla and Cabin. When choosing a font, be mindful that the numerals

	2016	2016	2016
China	6,894.40	6,894.40	6,894.40
India	1,862.43	1,862.43	1,862.43
United States	52,319.10	52,319.10	52,319.10
Indonesia	3,974.73	3,974.73	3,974.73
Mexico	9,871.67	9,871.67	9,871.67
Pakistan	1,179.41	1,179.41	1,179.41
Average	**12,683.62**	**12,683.62**	**12,683.62**

Rule 3. Right-align numbers and headers.

	Calibri	Karla	Cabin	Georgia
China	6,894.40	6,894.40	6,894.40	6,894.40
India	1,862.43	1,862.43	1,862.43	1,862.43
United States	52,319.10	52,319.10	52,319.10	52,319.10
Indonesia	3,974.73	3,974.73	3,974.73	3,974.73
Mexico	9,871.67	9,871.67	9,871.67	9,871.67
Pakistan	1,179.41	1,179.41	1,179.41	1,179.41
Average	**12,683.62**	**12,683.62**	**12,683.62**	**12,683.62**

Be aware of how numbers appear in different fonts.

are not always the same size. Also be aware that oldstyle figures of Georgia drop some of the digits below the horizontal baseline (I've added an underline in each cell to make this clear).

RULE 4. LEFT-ALIGN TEXT AND HEADER

Once we've right-aligned the numbers, we should left-align the text. The English language is read from left to right, so lining up the entries in that way generates an even, vertical border and is natural for the reader. Notice how much easier it is to read the country names in the far-right column than in the other two columns.

Right-aligned and hard to read	Centered and even harder to read	Left-aligned and easiest to read
British Virgin Islands	British Virgin Islands	British Virgin Islands
Cayman Islands	Cayman Islands	Cayman Islands
Democratic Republic of Korea	Democratic Republic of Korea	Democratic Republic of Korea
Luxembourg	Luxembourg	Luxembourg
United States	United States	United States
Germany	Germany	Germany
New Zealand	New Zealand	New Zealand
Costa Rica	Costa Rica	Costa Rica
Peru	Peru	Peru

Rule 4. Left-align text and headers.

RULE 5. SELECT THE APPROPRIATE LEVEL OF PRECISION

Precision to the fifth-decimal place is almost never necessary. Strike a balance between necessary precision and a clean, spare table. The per capita GDP growth rate, for example, is never

Country	Too many decimals	Too few decimals	About right
China	6.12380	6	6.1
India	5.88984	6	5.9
United States	0.74279	1	0.7
Indonesia	3.84530	4	3.8
Mexico	1.58236	2	1.6
Pakistan	3.43865	3	3.4
Average	**2.63104**	**3**	**2.6**

Rule 5. Select the appropriate level of precision.

reported to five decimals—that would be unnecessary and suggest a level of precision that is not supported by the data. This can also go the other way: Don't report too few digits. Showing per capita GDP growth as whole numbers masks important variation across countries.

RULE 6. GUIDE YOUR READER WITH SPACE BETWEEN ROWS AND COLUMNS

Your use of space in and around the table can influence the direction in which your reader reads the data. In the table on the left, for example, there is more space between the columns than between the rows, so your eye is drawn to read the table top-to-bottom rather than left-to-right. By comparison, the table on the right has more space between the rows

Country	2014	2015	2016
China	6.76	6.36	6.12
India	6.14	6.90	5.89
United States	1.80	2.09	0.74
Indonesia	3.73	3.65	3.85
Mexico	-0.38	-4.37	-4.25
Pakistan	2.51	2.61	3.44
Average	**3.43**	**2.87**	**2.63**

Country	2014	2015	2016
China	6.76	6.36	6.12
India	6.14	6.90	5.89
United States	1.80	2.09	0.74
Indonesia	3.73	3.65	3.85
Mexico	-0.38	-4.37	-4.25
Pakistan	2.51	2.61	3.44
Average	**3.43**	**2.87**	**2.63**

Rule 6. Guide your reader with space between rows and columns.

than between the columns, so your eye is more likely to track horizontally rather than vertically. Use spacing strategically to match the order in which you want your reader to take in the table.

RULE 7. REMOVE UNIT REPETITION

Your reader knows that the values in your table are dollars because you told them in the title or subtitle. Repeating the symbol throughout the table is overkill and cluttering. Use the title or column title area to define the units, or place them in the first row only (remembering to align the numbers along the decimal). If you are mixing units within the table, be sure to make your labels clear.

Country	2014	2015	2016
China	6.76%	6.36%	6.12%
India	6.14%	6.90%	5.89%
United States	1.80%	2.09%	0.74%
Indonesia	3.73%	3.65%	3.85%
Mexico	-0.38%	-4.37%	-4.25%
Pakistan	2.51%	2.61%	3.44%
Average	**3.43%**	**2.87%**	**2.63%**

Country	2014	2015	2016
China	6.76%	6.36%	6.12%
India	6.14	6.90	5.89
United States	1.80	2.09	0.74
Indonesia	3.73	3.65	3.85
Mexico	-0.38	-4.37	-4.25
Pakistan	2.51	2.61	3.44
Average	**3.43**	**2.87**	**2.63**

Rule 7. Remove unit repetition

RULE 8. HIGHLIGHT OUTLIERS

Instead of showing just six countries and three years as in the previous example, what if we need to show twenty countries and ten years of data? In this case, we might want to highlight outlier values by making the text boldface, shading it with color, or even shading the entire cell. Some readers will wade through all of the numbers in the table because they need specific information, but many readers are more likely to look for only the most important values. Guiding them to those important numbers lets them answer their own questions about the data or better comprehend your argument.

	2010	2011	2012	2013	2014	2015	2016
China	10.10	9.01	7.33	7.23	6.76	6.36	6.12
India	8.76	5.25	4.13	5.10	6.14	6.90	5.89
United States	1.68	0.85	1.46	0.96	1.80	2.09	0.74
Indonesia	4.83	4.79	4.68	4.24	3.73	3.65	3.85
Brazil	6.50	3.00	0.98	2.07	-0.38	-4.37	-4.25
Pakistan	-0.48	0.61	1.34	2.21	2.51	2.61	3.44
Nigeria	5.00	2.12	1.52	2.61	3.52	-0.02	-4.16
Bangladesh	4.40	5.25	5.28	4.77	4.84	5.37	5.96
Russia	4.46	5.20	3.48	1.57	-1.04	-3.04	-0.41
Mexico	3.49	2.12	2.15	-0.06	1.45	1.90	1.58

	2010	2011	2012	2013	2014	2015	2016
China	10.10	9.01	7.33	7.23	6.76	6.36	6.12
India	8.76	5.25	4.13	5.10	6.14	6.90	5.89
United States	1.68	0.85	1.46	0.96	1.80	2.09	0.74
Indonesia	4.83	4.79	4.68	4.24	3.73	3.65	3.85
Brazil	6.50	3.00	0.98	2.07	-0.38	-4.37	-4.25
Pakistan	-0.48	0.61	1.34	2.21	2.51	2.61	3.44
Nigeria	5.00	2.12	1.52	2.61	3.52	-0.02	-4.16
Bangladesh	4.40	5.25	5.28	4.77	4.84	5.37	5.96
Russia	4.46	5.20	3.48	1.57	-1.04	-3.04	-0.41
Mexico	3.49	2.12	2.15	-0.06	1.45	1.90	1.58

Rule 8. Highlight outliers.

RULE 9. GROUP SIMILAR DATA AND INCREASE WHITE SPACE

Reduce repetition by grouping similar data or labels. Similar to eliminating dollars signs on every number value, we can reduce some of the clutter in our tables by grouping like terms or labels. In this next example, grouping the names of the country regions reduces the amount of repetitive information in the first column. You can also use spanner headers and rules to combine the same entry and reduce unnecessary repetition. Here, besides grouping the country names, I've also applied some of the guidelines discussed so far such as left-aligning text, right-aligning numbers, and using boldface headers and footers.

Region	Country	Per Capita GDP 2015	Per Capita GDP 2016	Percent Change
Asia	China	6496.62	6894	6.1238
Asia	India	1758.84	1862	5.8898
North America	United States	51933.40	52319	0.7428
Asia	Indonesia	3827.55	3975	3.8453
North America	Brazil	11351.57	10869	-4.2541
Asia	Pakistan	1140.21	1179	3.4387
Africa	Nigeria	2562.52	2456	-4.1601
Asia	Bangladesh	971.64	1030	5.9627
North America	Mexico	9717.90	9872	1.5824
Asia	Japan	47163.49	47661	1.0546
Africa	Ethiopia	487.29	511	4.9041
Middle East	Egypt	2665.35	2726	2.2633
Europe	Germany	45412.56	45923	1.1240
Middle East	Iran	6007.00	6734	12.1010
Middle East	Turkey	13898.75	14117	1.5734
Europe	France	41642.31	41969	0.7845
Average		15440	15631	2.6860

Region	Country	Per Capita GDP 2015	Per Capita GDP 2016	Percent Change
Africa	Ethiopia	487	511	4.90
	Nigeria	2,563	2,456	-4.16
Asia	Bangladesh	972	1,030	5.96
	China	6,497	6,894	6.12
	India	1,759	1,862	5.89
	Indonesia	3,838	3,975	3.85
	Japan	47,163	47,661	1.05
	Pakistan	1,140	1,179	3.44
Europe	France	41,642	41,969	0.78
	Germany	45,413	45,923	1.12
Middle East	Egypt	2,665	2,726	2.26
	Iran	6,007	6,734	12.10
	Turkey	13,899	14,117	1.57
North America	Mexico	9,718	9,872	1.58
	United States	51,933	52,319	0.74
South America	Brazil	11,352	10,869	-4.25
Average		**15,440**	**15,631**	**2.69**

Rule 9. Group similar data and increase white space.

While grouping like elements does help reduce the amount of clutter on the page, be aware that posting tables to the internet may require some concessions in this regard. If you post tables to websites as images, users will be unable to copy and paste the data from the table to another tool, and screen readers—which literally step through the table and read the values out loud (see Chapter 12)—will be unable to read the data values. Instead, because of current constraints in web programming languages and formats, you might need to forgo spanner headers and other special formatting decisions, depending on the tools you use to post it to the internet.

RULE 10. ADD VISUALIZATIONS WHEN APPROPRIATE

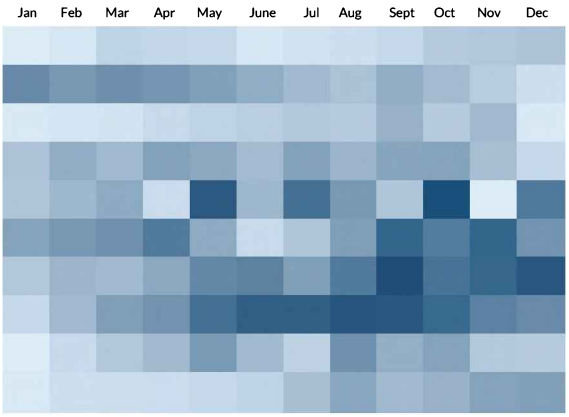
We can make larger changes to our tables by adding small visualizations. Just like highlighting outliers with color or boldface, you might add sparklines (see page 152) to visualize some data rather than showing every number. Or you can use small bar charts to visually illustrate a series of numbers. Or you could use a heatmap (see page 112) and leave the numbers in the table or hide them, which can help the reader focus on the overall patterns and ignore the details.

We can also embed a chart-type structure right into our table. If you want a full chart embedded within the table, a dot plot (see Chapter 4) is succinct and can line up well within the linear structure of a table. You can also use a modification on the standard dot plot to place the numbers in their relative positions directly in a table.

Country	2007	2016	2007-2016
China	13.64	6.12	
India	8.15	5.89	
United States	0.82	0.74	
Indonesia	4.91	3.85	
Mexico	0.70	1.58	
Pakistan	2.72	3.44	
Average	**5.15**	**3.60**	

Country	2016
China	6.12
India	5.89
United States	0.74
Indonesia	3.85
Mexico	1.58
Pakistan	3.44
Average	**3.60**

	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
1	10	13	24	22	21	13	16	17	21	28	30	32
2	65	57	62	58	52	45	38	33	45	37	27	17
3	12	14	15	20	24	26	30	28	42	28	38	12
4	32	45	38	51	47	37	51	41	49	50	35	21
5	31	39	46	19	92	39	80	56	31	97	10	75
6	50	57	61	74	46	20	31	53	86	73	86	59
7	30	40	38	47	66	69	52	74	98	78	85	93
8	21	38	53	60	80	90	90	94	93	83	70	64
9	10	20	30	38	55	38	25	61	44	50	29	28
10	12	17	18	19	21	24	35	48	38	42	50	52



Country	2007	2016
China	13.64	6.12
India	8.15	5.89
United States	0.82	0.74
Indonesia	4.91	3.85
Mexico	0.7	1.58
Pakistan	2.72	3.44
Average	5.86	2.63

Rule 10. Add visualizations when appropriate, for example, sparklines, bar charts, heatmaps or dot plots.

DEMONSTRATION: A BASIC DATA TABLE REDESIGN

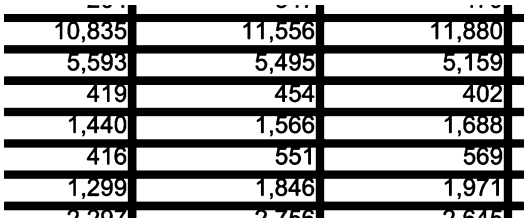
This table from the U.S. Department of Agriculture Food and Nutrition Service shows the number of people who participate in the Food Distribution Programs on Indian Reservations. The table presents participation estimates for twenty-four states over fiscal years 2013 through 2016, plus preliminary estimates for fiscal year 2017. Note the very dark, thick

FOOD DISTRIBUTION PROGRAM ON INDIAN RESERVATIONS: PERSONS PARTICIPATING
(Data as of March 9, 2018)

State	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017
					Preliminary
Alaska	204	347	479	650	724
Arizona	10,835	11,556	11,880	11,887	11,235
California	5,593	5,495	5,159	4,795	4,463
Colorado	419	454	402	442	353
Idaho	1,440	1,566	1,688	1,706	1,530
Kansas	416	551	569	592	613
Michigan	1,299	1,846	1,971	2,061	1,960
Minnesota	2,297	2,756	2,645	2,600	2,487
Mississippi	701	863	958	1,056	1,169
Montana	2,375	3,144	3,149	3,313	3,271
Nebraska	1,010	1,229	1,339	1,396	1,267
Nevada	1,373	1,611	1,508	1,468	1,328
New Mexico	2,533	2,853	2,966	2,890	2,809
New York	380	384	369	452	350
North Carolina	584	736	743	700	671
North Dakota	3,840	4,800	4,976	5,661	5,569
Oklahoma	25,678	29,012	31,042	33,588	32,795
Oregon	678	871	800	785	687
South Dakota	7,457	8,123	8,208	8,505	8,525
Texas	117	131	142	124	114
Utah	117	167	217	421	384
Washington	3,164	3,185	3,284	3,410	3,221
Wisconsin	2,441	2,978	3,240	3,442	3,367
Wyoming	657	742	881	1,096	1,190
TOTAL	**75,608**	**85,397**	**88,615**	**93,038**	**90,083**

FDPIR is an alternative to the Supplemental Nutrition Assistance Program for Indian tribal organizations which prefer food distribution. Participation numbers are 12-month averages. Data are subject to revision.

This table from the U.S. Department of Agriculture Food and Nutrition Service is cluttered and difficult to read.



10,835	11,556	11,880
5,593	5,495	5,159
419	454	402
1,440	1,566	1,688
416	551	569
1,299	1,846	1,971

Notice those heavy gridlines in the USDA table.
Source: US Department of Agriculture

gridlines, which make the table cluttered and difficult to read. As we zoom in, we can see that the numbers are top-aligned in each cell, which cuts them off ever-so-slightly.

There is a better way. Instead of including all of the gridlines—and making them dark and thick—we can remove them and keep only the line below the column header row. The

Number of People Participating in Food Distribution Programs on Indian Reservations
(Data as of March 9, 2018)

State	FY 2013	FY 2014	FY 2015	FY 2016	Preliminary, FY 2017
Alaska	204	347	479	650	724
Arizona	10,835	11,556	11,880	11,887	11,235
California	5,593	5,495	5,159	4,795	4,463
Colorado	419	454	402	442	353
Idaho	1,440	1,566	1,688	1,706	1,530
Kansas	416	551	569	592	613
Michigan	1,299	1,846	1,971	2,061	1,960
Minnesota	2,297	2,756	2,645	2,600	2,487
Mississippi	701	863	958	1,056	1,169
Montana	2,375	3,144	3,149	3,313	3,271
Nebraska	1,010	1,229	1,339	1,396	1,267
Nevada	1,373	1,611	1,508	1,468	1,328
New Mexico	2,533	2,853	2,966	2,890	2,809
New York	380	384	369	452	350
North Carolina	584	736	743	700	671
North Dakota	3,840	4,800	4,976	5,661	5,569
Oklahoma	25,678	29,012	31,042	33,588	32,795
Oregon	678	871	800	785	687
South Dakota	7,457	8,123	8,208	8,505	8,525
Texas	117	131	142	124	114
Utah	117	167	217	421	384
Washington	3,164	3,185	3,284	3,410	3,221
Wisconsin	2,441	2,978	3,240	3,442	3,367
Wyoming	657	742	881	1,096	1,190
Total	**75,608**	**85,397**	**88,615**	**93,038**	**90,083**

Note: FDPIR is an alternative to the Supplemental Nutrition Assistance Program for Indian tribal organizations which prefer food distribution. Participation numbers are 12-month averages. Data are subject to revision.

A simple redesign of the USDA table removes the clutter and lightens the view.

column header text is now bold to distinguish it from the numbers in the table. A line at the bottom of the table separates it from the note, and the *Total* row is bolded to set it apart from the body of the table.

Let's take this a step further by adding some visuals and color to the table.

Number of People Participating in Food Distribution Programs on Indian Reservations
(Data as of March 9, 2018)

State	FY 2013	FY 2014	FY 2015	FY 2016	Preliminary, FY 2017
Alaska	204	347	479	650	724
Arizona	10,835	11,556	11,880	11,887	11,235
California	5,593	5,495	5,159	4,795	4,463
Colorado	419	454	402	442	353
Idaho	1,440	1,566	1,688	1,706	1,530
Kansas	416	551	569	592	613
Michigan	1,299	1,846	1,971	2,061	1,960
Minnesota	2,297	2,756	2,645	2,600	2,487
Mississippi	701	863	958	1,056	1,169
Montana	2,375	3,144	3,149	3,313	3,271
Nebraska	1,010	1,229	1,339	1,396	1,267
Nevada	1,373	1,611	1,508	1,468	1,328
New Mexico	2,533	2,853	2,966	2,890	2,809
New York	380	384	369	452	350
North Carolina	584	736	743	700	671
North Dakota	3,840	4,800	4,976	5,661	5,569
Oklahoma	25,678	29,012	31,042	33,588	32,795
Oregon	678	871	800	785	687
South Dakota	7,457	8,123	8,208	8,505	8,525
Texas	117	131	142	124	114
Utah	117	167	217	421	384
Washington	3,164	3,185	3,284	3,410	3,221
Wisconsin	2,441	2,978	3,240	3,442	3,367
Wyoming	657	742	881	1,096	1,190
Total	**75,608**	**85,397**	**88,615**	**93,038**	**90,083**

Note: FDPIR is an alternative to the Supplemental Nutrition Assistance Program for Indian tribal organizations which prefer food distribution. Participation numbers are 12-month average. Data are subject to revision.

Adding a little color to the USDA table—such as a simple heatmap—makes it easier and faster for our reader to pick out specific values or patterns.

Number of People Participating in Food Distribution Programs on Indian Reservations
(Data as of March 9, 2018)

State	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	Average FY 2013-FY 2017
Alaska	204	347	479	650	724	481
Arizona	10,835	11,556	11,880	11,887	11,235	11,479
California	5,593	5,495	5,159	4,795	4,463	5,101
Colorado	419	454	402	442	353	414
Idaho	1,440	1,566	1,688	1,706	1,530	1,586
Kansas	416	551	569	592	613	548
Michigan	1,299	1,846	1,971	2,061	1,960	1,827
Minnesota	2,297	2,756	2,645	2,600	2,487	2,557
Mississippi	701	863	958	1,056	1,169	949
Montana	2,375	3,144	3,149	3,313	3,271	3,050
Nebraska	1,010	1,229	1,339	1,396	1,267	1,248
Nevada	1,373	1,611	1,508	1,468	1,328	1,458
New Mexico	2,533	2,853	2,966	2,890	2,809	2,810
New York	380	384	369	452	350	387
North Carolina	584	736	743	700	671	687
North Dakota	3,840	4,800	4,976	5,661	5,569	4,969
Oklahoma	25,678	29,012	31,042	33,588	32,795	30,423
Oregon	678	871	800	785	687	764
South Dakota	7,457	8,123	8,208	8,505	8,525	8,164
Texas	117	131	142	124	114	126
Utah	117	167	217	421	384	261
Washington	3,164	3,185	3,284	3,410	3,221	3,253
Wisconsin	2,441	2,978	3,240	3,442	3,367	3,094
Wyoming	657	742	881	1,096	1,190	913
Total	**75,608**	**85,397**	**88,615**	**93,038**	**90,083**	**86,548**

Note: FDPIR is an alternative to the Supplemental Nutrition Assistance Program for Indian tribal organizations which prefer food distribution. Participation numbers are 12-month average. Data are subject to revision.

Number of People Participating in Food Distribution Programs on Indian Reservations
(Data as of March 9, 2018)

State	FY 2013	FY 2014	FY 2015	FY 2016	FY 2017	Percent Change FY 2013-FY 2017
Alaska	204	347	479	650	724	254.9 ▲
Arizona	10,835	11,556	11,880	11,887	11,235	3.7 ▲
California	5,593	5,495	5,159	4,795	4,463	-20.2 ▼
Colorado	419	454	402	442	353	-15.8 ▼
Idaho	1,440	1,566	1,688	1,706	1,530	6.3 ▲
Kansas	416	551	569	592	613	47.4 ▲
Michigan	1,299	1,846	1,971	2,061	1,960	50.9 ▲
Minnesota	2,297	2,756	2,645	2,600	2,487	8.3 ▲
Mississippi	701	863	958	1,056	1,169	66.8 ▲
Montana	2,375	3,144	3,149	3,313	3,271	37.7 ▲
Nebraska	1,010	1,229	1,339	1,396	1,267	25.4 ▲
Nevada	1,373	1,611	1,508	1,468	1,328	-3.3 ▼
New Mexico	2,533	2,853	2,966	2,890	2,809	10.9 ▲
New York	380	384	369	452	350	-7.9 ▼
North Carolina	584	736	743	700	671	14.9 ▲
North Dakota	3,840	4,800	4,976	5,661	5,569	45.0 ▲
Oklahoma	25,678	29,012	31,042	33,588	32,795	27.7 ▲
Oregon	678	871	800	785	687	1.3 ▲
South Dakota	7,457	8,123	8,208	8,505	8,525	14.3 ▲
Texas	117	131	142	124	114	-2.6 ▼
Utah	117	167	217	421	384	228.2 ▲
Washington	3,164	3,185	3,284	3,410	3,221	1.8 ▲
Wisconsin	2,441	2,978	3,240	3,442	3,367	37.9 ▲
Wyoming	657	742	881	1,096	1,190	81.1 ▲
Total	**75,608**	**85,397**	**88,615**	**93,038**	**90,083**	**19.1**

Note: FDPIR is an alternative to the Supplemental Nutrition Assistance Program for Indian tribal organizations which prefer food distribution. Participation numbers are 12-month average. Data are subject to revision.

Adding other visualizations—bar charts or icons denoting change—are other ways to add visual elements to your tables.

The first example is a heatmap. Until I made this, I didn't realize by how much program participation in Oklahoma exceeded the rest of the states. It was only after the row appeared in dark blue that the magnitude became clear.

Another approach is to maintain the core look of the original table but add additional visual elements. In the tables above, the version on the left in the above pair adds a new data point—the average between fiscal year 2013 and 2017—and a bar chart to its right. This small graphic element gives the table a visual anchor and directs the eye to the states with more participation. The chart on the right adds the percentage change between 2013 and 2017 and a small up- or down-arrow to signal the change.

DEMONSTRATION: A REGRESSION TABLE REDESIGN

A typical regression table contains point estimates, standard errors, and some symbol (usually asterisks) to denote the level of statistical significance, such as 1 percent, 5 percent, and 10 percent. Such basic tables are especially useful when readers need the detailed numbers.

	Model 1	Model 2	Model 3
r_age	0.0509***	0.0119***	0.0207***
	(0.0062)	(0.0044)	(0.0026)
gndr	0.0442***	0.0616***	0.0630***
	(0.0057)	(0.0037)	(0.0043)
_educ	0.0027***	0.0052***	0.0157***
	(0.0087)	(0.0050)	(0.0072)
hrswkd	0.0397***	0.0075***	0.0211***
	(0.0053)	(0.0025)	(0.0029)
expr	0.0003***	0.0043***	0.0030***
	(0.0051)	(0.0026)	(0.0024)
marstat	0.0191***	0.0066***	0.0069***
	(0.0053)	(0.0025)	(0.0027)

* p < 0.05, ** p < 0.01, *** p < 0.001

	Model 1	Model 2	Model 3
Age	0.0509***	0.0119***	0.0207***
	(0.0062)	(0.0044)	(0.0026)
Gender	0.0442***	0.0616***	-0.0630***
	(0.0057)	(0.0037)	(0.0043)
Education	0.0027	0.0052	0.0157**
	(0.0087)	(0.0050)	(0.0072)
Hours Worked	0.0397***	0.0075*	0.0211***
	(0.0053)	(0.0044)	(0.0029)
Experience	0.0003	0.0043*	0.0030
	(0.0051)	(0.0026)	(0.0024)
Married	0.0191***	0.0066***	0.0069*
	(0.0053)	(0.0025)	(0.0041)

* p < 0.05, ** p < 0.01, *** p < 0.001

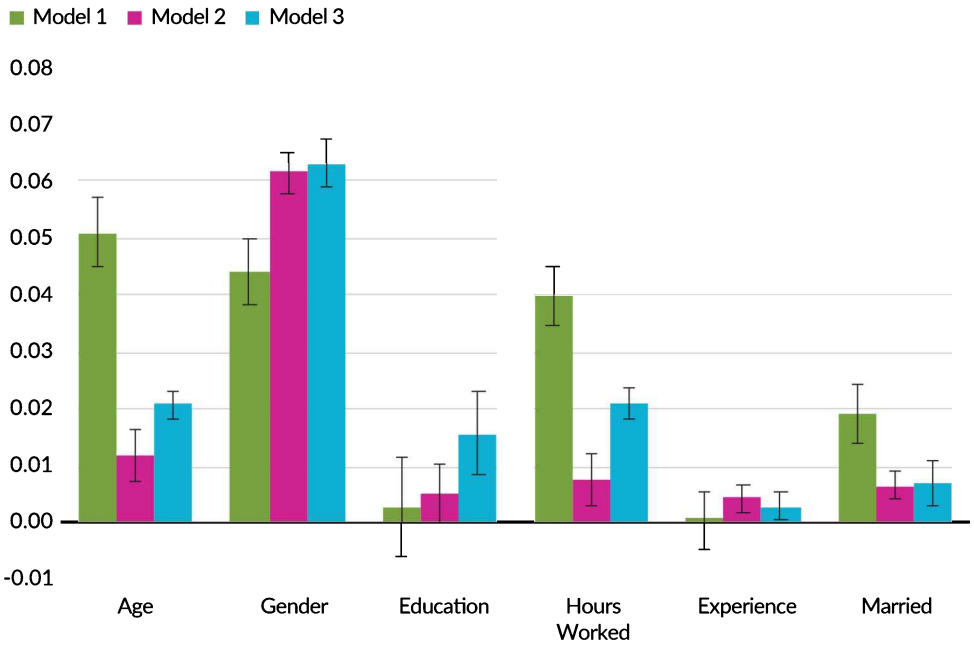
A table of basic regression results can be improved following the ten rules shown earlier.

We can make a table of regression estimates clearer and more visually engaging by following the ten table rules and the visualization strategies from earlier in this chapter. We might also consider putting the dense table in an appendix (in the paper itself or maybe online) and using a graph in the main body of the paper instead.

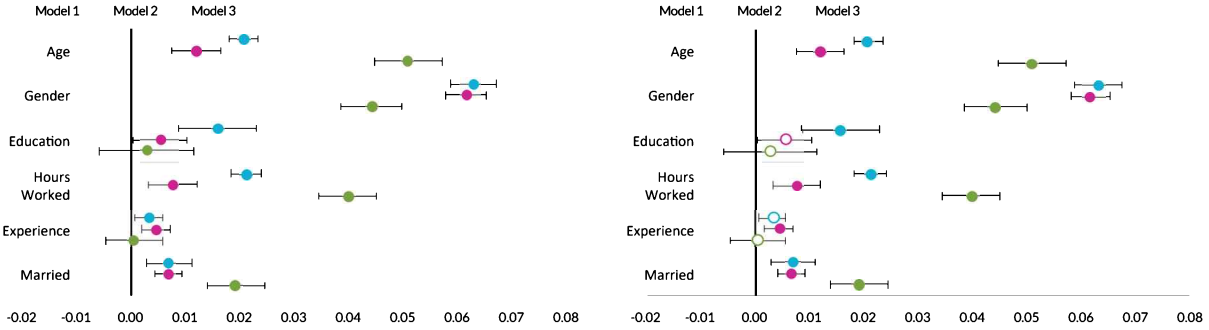
Consider this relatively simple regression table that includes the coefficient estimates with asterisks, standard errors with parentheses, and unreadable variable names in the first column. Don't use variable names to list your results! Your reader—even a reader of an academic journal article—does not know what "_educ" or "expr" means. For our final table, let's use real words like "Education" and "Experience," and use the rules above to make the table cleaner and easier to read.

We can also convert these kinds of tables into data visualizations. A standard way is to use a bar chart with error bars, though, as noted in Chapter 6, some research has shown that we tend to discount the end of the error bar that sits within the bar itself.

Or we could try a dot plot approach (with or without error bars) and maybe use color to further signify statistical significance. In the graph on the right, solid circles contain estimates that are statistically significant and empty circles are estimates that are not statistically significant.



Regression results can be shown as a bar chart instead of a table.



A dot plot is another way to visualize regression results.

Ultimately, if you decide such visual elements are unnecessary or insufficient, stick with the ten rules to make the table clearer and easier to read. Remember, the goal of our tables is to let the reader to more easily find the important numbers and patterns in the data and not ask them to wade through clutter.

CONCLUSION

Tables are themselves a form of data visualization, and the same rules apply. Many researchers and scholars rely heavily on tables, likely because they don't require much creative thinking—filled with text and numbers, columns and rows intersect, and details are left for the reader to navigate and decipher. And while tables are valuable and have their place, we can use these ten strategies to elevate our tables and make them clearer and easier to read.

Rule 1. Offset the headers from body
Rule 2. Use subtle dividers instead of heavy gridlines
Rule 3. Right-align numbers and headers
Rule 4. Left-align text and header
Rule 5. Select the appropriate level of precision
Rule 6. Guide your reader with space between rows and columns
Rule 7. Remove unit repetition
Rule 8. Highlight outliers
Rule 9. Group similar data and increase white space
Rule 10. Add visualizations when appropriate