DATA VISUALIZATION CHECKLIST

This checklist guides the development of high-quality data visualizations. Rate each aspect of the data visualization by circling the most appropriate number, where 2 points means the guideline was fully met, 1 means it was partially met, and 0 means it was not met at all.

n/a should not be used frequently, but reserved for when the guideline truly does not apply. For example, a pie chart has no axes lines or tick marks to rate. If the guideline has been broken intentionally to make a point, rate it n/a and deduct those points from the total possible. Guidelines particularly helpful for accessibility are marked with 

Refer to the Data Visualization Anatomy Chart on the last page for guidance on vocabulary and the Resources at the end for more assistance.

TEXT

Graphs don't contain much text, so existing text must encapsulate your message clearly and concisely.

Guideline	Description	Rating
8-20 word descriptive title is a full sentence, left-justified, in upper left	Rather than a generic phrase, use a full, descriptive sentence that encapsulates a takeaway message about the graph's finding or "so what?" When communicating to Western cultures put the title in the upper left. Not centered. 	2 1 0 n/a
Subtitle and/or annotations provide additional information	Subtitles and annotations can add explanatory and interpretive power to a graph. Use them to answer potential viewer questions or to highlight specific data points. Annotations only count if they're within the graph, not in a paragraph around it.	2 1 0 n/a
Text size is hierarchical and readable	Titles are a larger font size than subtitles or annotations, which are larger than labels, which are larger than source information. The smallest text is at least 9-point font size for arm's length reading, at least 20 for large room reading. 	2 1 0 n/a
Text is horizontal	Titles, subtitles, annotations, data labels, and even axis titles are horizontal (not vertical or diagonal). Consider switching graph orientation (e.g., from column to bar chart) to make text horizontal.	2 1 0 n/a
Data are labeled directly	Delete the legend and position category labels near the data whenever possible. Embedded legends reduce eye movement between legend and data, which eases the brain's attempt to interpret the graph. 	2 1 0 n/a
Labels are used sparingly	Focus attention by removing redundancy. For example, label every other year on an axis. Don't add value labels *and* use a y-axis scale, since this is redundant. Avoid axis titles – put this content in your title or subtitle.	2 1 0 n/a

ARRANGEMENT

Improper arrangement of graph elements can confuse readers at best and mislead viewers at worst. Thoughtful arrangement makes a data visualization easier for a viewer to interpret.

Proportions are accurate	A viewer should be able measure the length or area of the graph with a ruler and find it matches the relationship in the underlying data. Y-axis scales should be appropriate for the dataset (e.g., the stock market ticker should not start at 0 or we won't see a meaningful pattern). Bar charts axes at 0.	2	1	0	n/a
Data are intentionally ordered	Display data in an order that makes logical sense to the viewer – by frequency counts (greatest to least for nominal categories), by groupings or bins (e.g., histograms), by time period (e.g., line charts), alphabetically, etc.	2	1	0	n/a
Axis intervals are equidistant	The space between axis intervals should be the same unit, even if every axis interval isn't labeled. (Graphing software *should* do this automatically.) Irregular data collection can be noted with markers on a line, for example.	2	1	0	n/a
Graph is two-dimensional	Avoid three-dimensional displays, bevels, shadows, and other distortions.	2	1	0	n/a
Display is free from decoration	Graph is free from clipart or other illustrations used solely for decoration. Some graphics, like icons, can support interpretation.	2	1	0	n/a

LINES

Excessive lines—borders, tick marks, and axes—can add clutter or noise to a graph, so eliminate them whenever they aren't useful for interpreting the data.

Gridlines, if present, are muted	If the graph has a value axis, use faint gray gridlines. If using data labels, remove the value axis and the gridlines and give full points. No gridlines on categorical axes.	2	1	0	n/a
Graph does not have border line	Graph should blend into the surrounding page or slide rather than being contained by a border.	2	1	0	n/a
Axes do not have tick marks or axis lines	Tick marks are unnecessary in almost all graph types. Remove axes lines whenever possible.	2	1	0	n/a
Graph has one horizontal and one vertical axis	Viewers can best interpret one x- and one y-axis. Don't add a second y-axis. Try a connected scatter plot or two graphs, side by side, instead. (A secondary axis used to hack new graph types is ok, so long as viewers aren't being asked to interpret a second y-axis.)	2	1	0	n/a

COLOR

Color is a preattentive attribute that your audience will notice. Use it wisely, attending to vision deficiencies and cultural associations.

Color scheme is intentional	Colors should not be your software's default color schemes. Use your organization's colors, your client's colors or some other intentional choices.	2	1	0	n/a
Color is used to highlight key patterns	Use color to guide viewer attention to key parts of the data display. Less important, supporting, or comparison data points should be a muted or neutral color, like gray.	2	1	0	n/a
Color is legible when printed in black and white	When printed or photocopied in black and white, the viewer should still be able to distinguish each data series and draw correction interpretations.	2	1	0	n/a
Color is legible for people with colorblindness	Avoid red-green and yellow-blue combinations. Avoid using red to mean bad and green to mean good in the same chart.	2	1	0	n/a
Text sufficiently contrasts background	Black/very dark text against a white/transparent background is easiest to read. Use a color contrast checker.	2	1	0	n/a

OVERALL

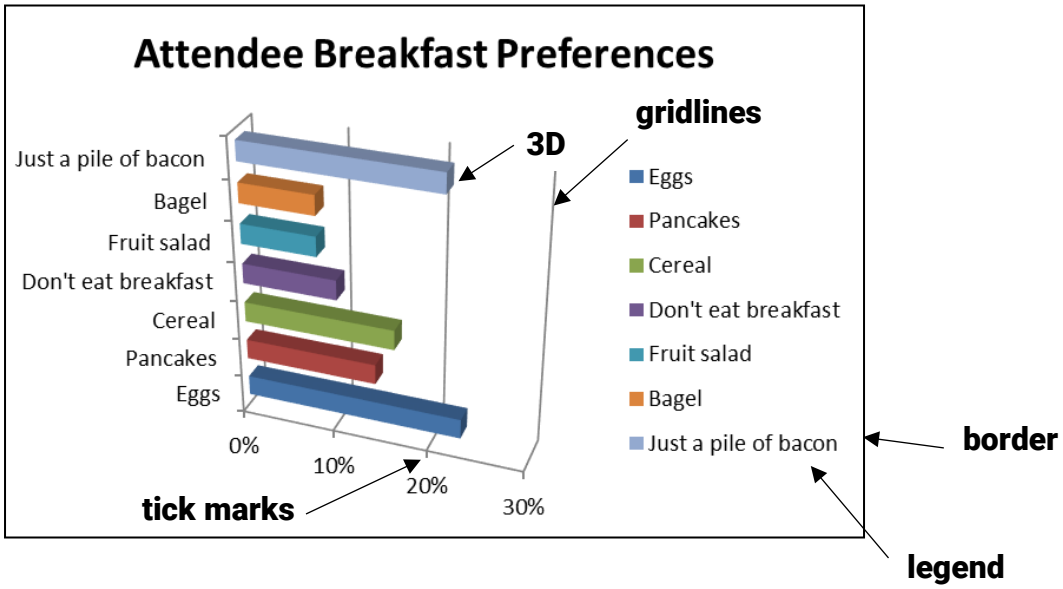
Graphs will catch a viewer's attention so only visualize the data that needs attention. Too many graphics of unimportant information dilute the power of visualization.

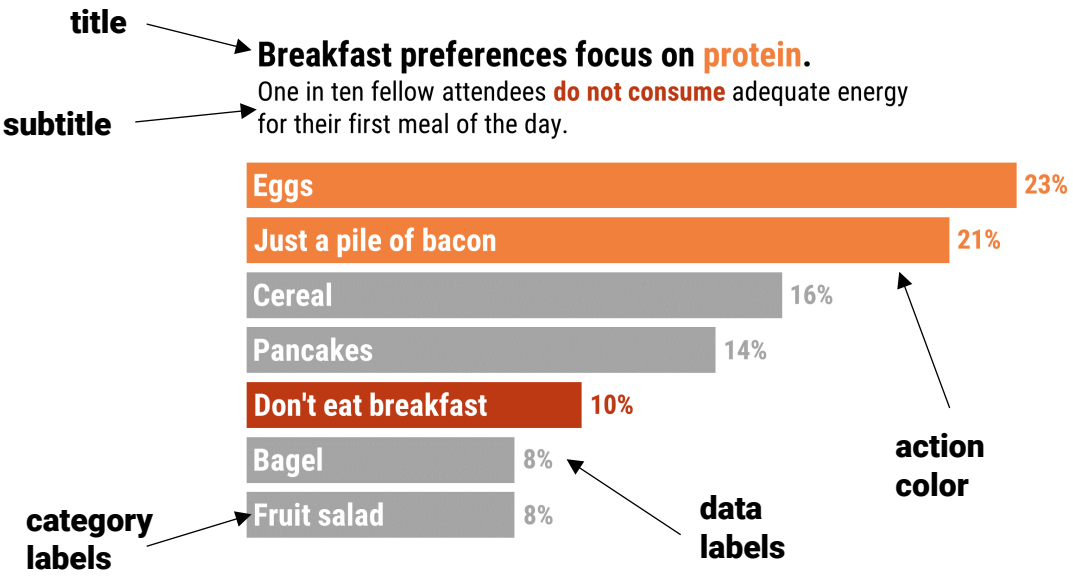
Graph highlights significant finding or conclusion	Graphs should have an evident, meaningful story, easily interpretable for your intended audience. For example, comparison data help viewers understand the significance of the data and give the graph more interpretive power.	2	1	0	n/a
The type of graph is appropriate for data	Data are displayed in a graph type matching the relationship within the data. For example, trend over time could be a line graph, area chart, slope graph, stacked column, waterfall, deviation bar, Sankey, radial chart, or dot plot.	2	1	0	n/a
Graph has appropriate level of precision	Use a level of precision that meets your audiences' needs. Most numeric labels don't need decimal places. Charts intended for public consumption rarely need p values.	2	1	0	n/a
	Well-formatted data visualizations score between 90-100% of available points. At this level, viewers are better able to read, interpret, and retain content.	Score: ___ / ___ = _____ %			

Earlier iterations of this Checklist were made in partnership with Ann K. Emery.
Dr. Sena Sanjines contributed to refinement through validity and reliability tests.

DATA VISUALIZATION ANATOMY

Confused by the terminology? Review the anatomy charts below for illustration of what's what. Try for less of what's on the top and more for what's on the bottom.





RESOURCES

The interactive Data Visualization Checklist site will link you to free resources to support you on any guidelines where you didn't score full points.

Stephanie's blog has heaps of help.

Stephanie's books, *Presenting Data Effectively* and *Effective Data Visualization*, go more in detail.

The Data Visualization Academy shows you how to do all of this in Excel, Tableau, R, and Power BI.