

Data Visualizations That POP

A Best Practices Guide To Data Visualization Design

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Why Data Visualization Design Is Important

“Data is the new oil. Data is a ubiquitous resource that we can shape to provide new innovations and new insights.”

David McCandless, Data Journalist

We live in an exciting and unprecedented time for data lovers.

In the last three years, we have created 90% of all data that exists today. In 2018, we were generating 2.5 quintillion bytes of data daily around the world.

According to Domo, humans send over 15 million texts, watch 4 million YouTube videos, and tweet nearly half a million messages every minute!

Our ability to capture data has also evolved significantly. Thanks to advances in cloud computing, we can now store massive datasets using sophisticated online platforms. We have more information than ever before at our fingertips and countless ways to analyze what we collect.

Now, the challenge lies in sharing our findings with others in a way that is easy to understand. Our efforts to gather, store, and analyze data are useless if we cannot explain why information is meaningful.

Enter data visualization.

Data visualization is the practice of representing data in a visually engaging manner. It is a form of storytelling that relies on compelling graphics to describe quantitative and qualitative findings.

With data visualization, we help others synthesize information that would otherwise be too overwhelming to consume. Today, there are numerous platforms available that enable users to create stunning graphics for customers, stakeholders, and everyday consumers.

Effective data visualizations are attractive and intuitive. They enhance the quality of data and help people understand why they should care about the information. Companies like Hubspot, Spotify, and Facebook have mastered data visualization and understand how to deliver visuals that create significant value for end users.

Designing great data visualizations is both an **art** and a **science**.

You must create graphics that consumers love by blending creativity with clarity. You need to select the right type of graphics, as well as choose the right colors and fonts. Your choices on these two dimensions can make or break your data visualizations.

Here, we offer guidance on how to think about colors and fonts for data visualizations to help you tell better stories with your data. With this resource, you will be able to create striking data visualizations that your customers and users truly appreciate.

Let's dive in.

Choosing the Right Colors for Data Visualizations

Effective data visualization design includes choosing the right colors to represent your data. Keep the following considerations in mind as you build color palettes for your graphics.

Aligning Color with Purpose

Your colors should align with the type of data you are representing. Whether you are showing sequential, divergent, or categorical data, it is important to be strategic about your color choices.

Sequential data should be represented by smooth palettes with seamless color transitions.

Annual rainfall (inches)

	0-10	[#d9e9f7]
	11-20	[#97caed]
	21-30	[#0094d4]

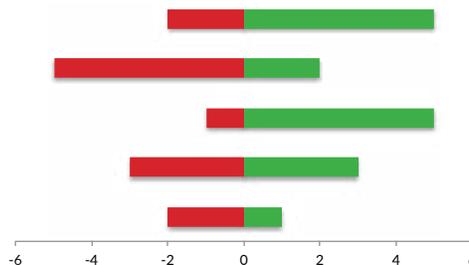


*Example: using different shades of blue to represent average rainfall by area
Note: graphic does not represent real data*

Divergent data should be represented by colors that indicate a quality change across a spectrum or threshold.

Poll answer choices

	Agree	[#41ad49]
	Disagree	[#d3242a]



*Example: using two different colors for poll data
Note: graphic does not represent real data*

Choosing the Right Colors for Data Visualizations

Categorical data should be represented by colors that distinguish unique values or groups.

Olympians by country

	USA	#81c77f
	GER	#beaed5
	UK	#fcc086
	RUS	#ec008c
	AUS	#fff200



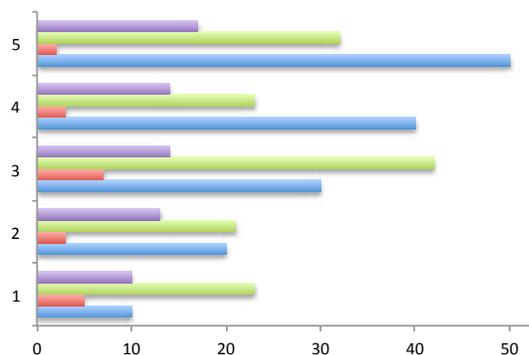
*Example: using different colors to represent various countries
Note: graphic does not represent real data*

Color Range & Brightness

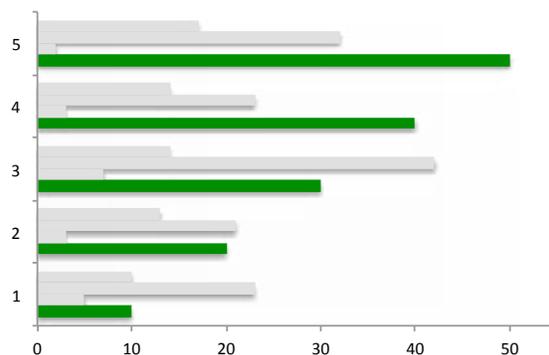
It is crucial for color palettes to have the right number of colors for the data being represented. Different hues can represent unique values or data series that you want to distinguish for your consumers. Those who want to display many different categories of data must have a wide variety of hues at their disposal.

However, using too many colors can confuse and distract from the primary takeaways of your visualization. We recommend consolidating data when appropriate into groupings or hierarchies based on their relative importance.

Nonconsolidated

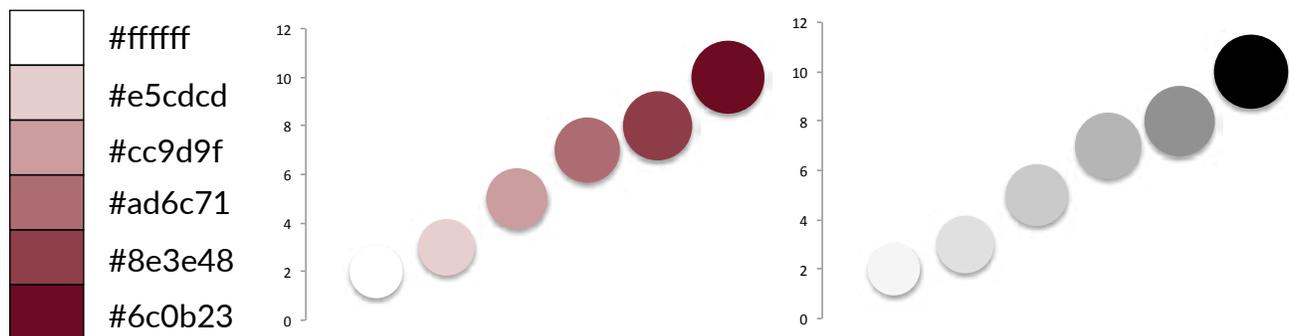


Consolidated



Choosing the Right Colors for Data Visualizations

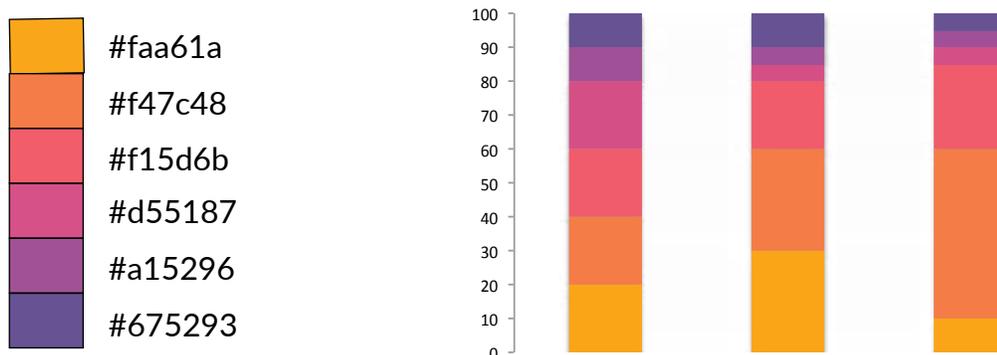
Color palettes should also contain different levels of brightness to help consumers who are color blind. Variations in brightness can help differentiate elements when hues cannot.



Remember that white space and the absence of color can also be used to communicate meaning. If you have many different data series, of which only a few are valuable, apply grays and whites to non-important data to help highlight the few that are meaningful.

Color Combinations & Progressions

Create color palettes that reflect color gradients found in our natural world. Consumers enjoy data visualizations that use color combinations that are familiar to them. For example, using reds and yellows together can be effective as these colors are often associated with the fall season. Gradients that transition from orange to purple are also popular because they remind people of sunset scenes.



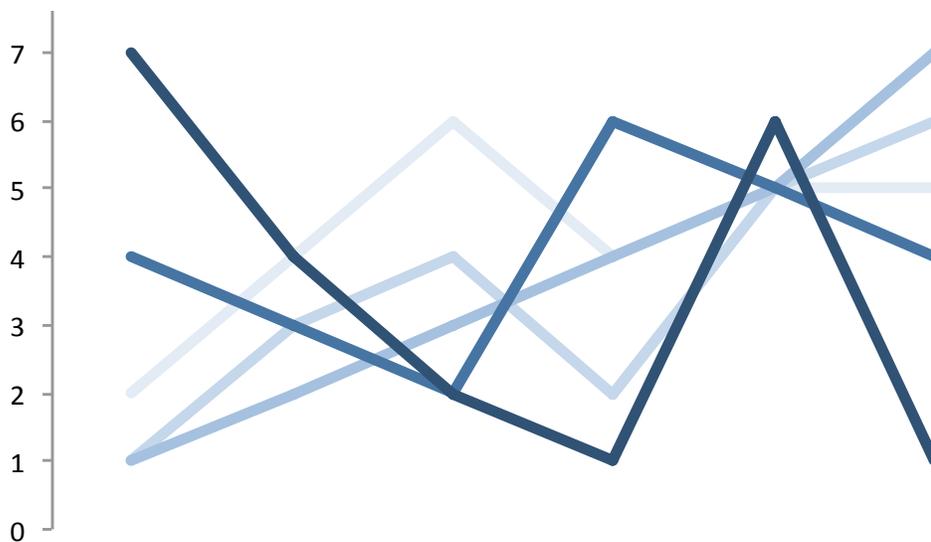
Choosing the Right Colors for Data Visualizations

Pay attention to your surroundings and see what other color combinations exist around you. You can find inspiration for your data visualizations in everyday life!

Using Color to Enhance Data Consumption

Your color choices should enhance your data in whichever way you choose to present it. Those who build data visualizations for big meetings may make very different color choices than those who are creating reports for individual readers.

For example, in a large group setting, it would be challenging to hold a good discussion about a line chart with five different shades of blue. Meeting participants would have a hard time making observations about specific data lines that others would easily understand.



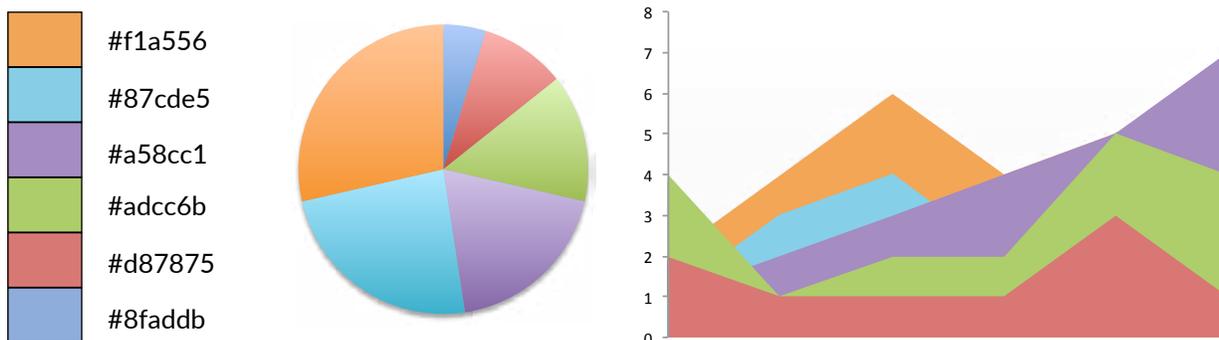
“The light blue line does not make sense to me based on my first-hand experience.”

“Which light blue line? The darker light blue line or the lighter dark blue line?”

Choosing the Right Colors for Data Visualizations

You must also be aware of how different colors interact within your visuals. Even if you create a visually appealing color palette, it may be difficult for consumers to understand nuances in the data if areas or borders bleed together.

Consider this design principle when deploying area charts and pie charts in which one category of data sits directly next to another. You want enough distinction between colors in your visualizations so that consumers can see the size of the area being highlighted.



Accounting for Cultural Biases

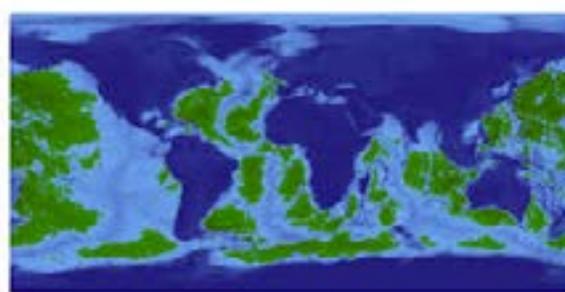
Keep in mind that cultural biases exist around some colors or combinations of colors. Forgetting certain associations may result in users misinterpreting your data visualizations.

For example, people are used to seeing land as green and water as blue on atlases. Using any other colors for this particular type of data visualization could confuse your customers.

Traditional color usage



Non-traditional color usage



Choosing the Right Colors for Data Visualizations

Getting Started

There are many free online tools available that help developers create beautiful color palettes for data visualizations.

We recommend starting with the two options below:

[Learn UI's Data Color Picker](https://bit.ly/2EpSoDI) (<https://bit.ly/2EpSoDI>) tool is incredibly intuitive and easy to use. The interface allows you to experiment with different color combinations for sequential, divergent, and categorical data. You can also change the background color of your screen to test hues against a darker background.

[Color Brewer](https://bit.ly/1vhzr7Q) (<https://bit.ly/1vhzr7Q>) is another powerful resource that allows users to test various palettes using simple dropdown menus and selection bubbles. The tool launches with a data visualization already so that you can test color schemes on an actual graphic. Color Brewer also has an option to evaluate whether a specific color scheme would work for those who are color blind.

Selecting the Right Fonts for Data Visualizations

Data visualizations must have the right fonts for text and numbers to go along with carefully curated color palettes. Selecting a bad font or family of fonts only makes it harder for your consumers to understand key takeaways from your visualizations.

Follow the design principles below to find the perfect fonts for your visuals.

Using Lining Figures for Numbers

When designing data visualizations, you want all of your numbers to be uniform in height -- **lining figures**. Although old-style appears more elegant, lining figures are much easier to read as all digits are aligned top to bottom.

Lining figures

0123456789

Font: Lato

Old-style

0123456789

Font: Raleway

You also want to use **tabular** fonts for numbers, which means that every character takes up the same width. This is especially important for visualizations that include columns of numbers or data points. Selecting a tabular font also ensures that numbers all maintain the same width despite any changes in character weight.

Tabular

11.04.5
70.29.1

Font: Palatino

Non-tabular

11.05.5
70.29.1

Font: Skia

Selecting the Right Fonts for Data Visualizations

Checking Relevant Symbology

Before picking a font, you should evaluate all of the symbols that you anticipate using in your data visualizations for clarity. The most important symbols to check are the dollar sign, percentage symbol, pound sign, and comma, as these are all frequently used.

You do not want a font that makes commas look like periods or dollar signs look like strange S's. Make it easy on your customers by selecting fonts with standard, familiar symbols.

\$ % # ,

Font: Arial

Ŷ % # ,

Font: Marker Felt

Legibility & Readability of Text

As a data visualization designer, you should aim for legibility and readability.

Legibility refers to how easy it is to distinguish between different characters in a given typeface.

Highly Legible

Font: Georgia

Highly Legible

Font: Brush Script

Selecting the Right Fonts for Data Visualizations

Readability refers to how easy it is for consumers to absorb words and sentences. Readability is often related to text size and spacing.

Easy to Read

Font: Helvetica

Harder to Read

Font: Avenir Next Condensed

You should aim for both of these characteristics, regardless of how your data visualizations are deployed. Sans-serif fonts tend to be better for data that is presented on screens while Serif fonts are preferred for printed content.

Always remember to check different style types with any fonts you consider. Often, data visualizations contain normal, bolded, and italicized text, which is why all three styles should pass the legibility and readability tests.

Aligning Font Choice with Branding

Your font choice should also match the “voice” of your brand. For example, if your company has a casual, friendly, and approachable brand, you have more flexibility to choose fonts that are more “playful” in nature.

Selecting the Right Fonts for Data Visualizations

On the other hand, organizations that have a more formal brand voice should stick to fonts that are more “professional” and conservative. For instance, a bubble font is likely not well suited for graphics that represent scientific information.

Use simpler fonts to represent subject matter
this is more professional.

Font: Baskerville

Choosing a font that does not align with your company’s broader image may confuse consumers and, again, distract them from what is important in the visualizations you are presenting.

Selecting the Right Fonts for Data Visualizations

Getting Started

There are tens of thousands of fonts available for download today. It can be overwhelming to find the right one to use in your data visualizations.

We recommend starting with [Google Fonts](http://bit.ly/2Zk0W9V) (<http://bit.ly/2Zk0W9V>).

Google Fonts enables users to explore many fonts and quickly assess how they look with sample text. You can toggle between weights, styles, and sizes for individual fonts or filter by category to see all fonts of a specific type.

You can also click on a specific font and see how every character appears in that style. Additionally, Google Fonts displays popular pairings for your selected font, as well as its utilization around the world.

Data Visualization Made Easy With Keen

“Keen made it easy to create custom dashboards in our application. Through these, we can show our customers the value they are getting out of our platform. They can see sales and orders in near real-time to help them make decisions on which carriers they should focus on.”

Sinan Sari, Co-Founder and CTO, Cuboh

More and more, customers expect to see valuable, data-driven insights directly in their front-end digital experiences. They want real-time feedback and affirmation on how the products they use impact their lives.

At Keen, our expertise is in helping organizations deploy beautiful in-product (“customer-facing”) metrics for their clients and end users. With high-quality customer-facing metrics, platforms can enhance the value of their offerings and monetize new revenue opportunities. App designers can also keep users engaged and increase customer loyalty, all with minimal development effort.

Deploying effective in-product metrics requires excellent data visualization design. We will work with your developers to create stunning visuals that help you tell the story of your data to customers. With the right colors and fonts, you can offer differentiated customer-facing metrics for end users that are both visually attractive and meaningful.

Contact sales@keen.io to speak with us about your data visualization project to ensure you are designing the best possible graphics for your customers. Leverage Keen’s intelligence APIs and expert team to accelerate your customer-facing metrics deployments. Already, more than 3,500 customers and 50,000 developers use Keen to deploy stunning data visualizations in real-time to enterprise clients and consumers.

Design Checklist

Choosing the Right Colors

- Color palette aligns with data type
- Color palette includes appropriate variations in hue
- Color palette includes appropriate variations in brightness
- Color palette includes natural gradients and combinations
- Color palette aligns with presentation method
- Color palette enhances chart type
- Color palette accounts for cultural biases

Selecting the Right Fonts

- Font is lining figure style for numbers
- Font is tabular for numbers
- Font symbology is clear
- Font is legible
- Font is readable
- Font aligns with company branding

Sources

[American Writers & Artists Inc. - \(https://bit.ly/2Th6Ctj\)](https://bit.ly/2Th6Ctj)

[Color Brewer - \(https://bit.ly/1vhzr7Q\)](https://bit.ly/1vhzr7Q)

[Data + Design - \(https://bit.ly/2KRG15p\)](https://bit.ly/2KRG15p)

[Domo - \(https://bit.ly/2ywRgM6\)](https://bit.ly/2ywRgM6)

[Earth Observatory - \(https://go.nasa.gov/2ZmQTMk\)](https://go.nasa.gov/2ZmQTMk)

[Fonts.com - \(https://bit.ly/2L5Pzbl\)](https://bit.ly/2L5Pzbl)

[Fonts by H&Co. - \(https://bit.ly/2HoczSh\)](https://bit.ly/2HoczSh)

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[GraphIQ Color Palettes - \(https://bit.ly/2ZnCvHZ\)](https://bit.ly/2ZnCvHZ)

[GraphIQ Fonts - \(https://bit.ly/2ZcD2NM\)](https://bit.ly/2ZcD2NM)

[Learn UI Design - \(https://bit.ly/2U18sR9\)](https://bit.ly/2U18sR9)

[Medium - \(https://bit.ly/2KPbJA0\)](https://bit.ly/2KPbJA0)

[TED - \(https://bit.ly/2ZnJz34\)](https://bit.ly/2ZnJz34)