Intro – How Visual Processing Evolved

Jessica LOVE: Let's say you're browsing through a bunch of photos on your phone. Your eyes land on a photo of a basket full of berries. In no time at all, without much effort on your part, you can glean A LOT of information about those berries.

Steve FRANCONERI: So what your visual system was kind of evolved for and typically develops to do is to process images like this, right? You want to look at these berries and count them and know how big they are, and know that there's more red ones than blue ones. And so you're doing actually analytics on the natural world. Congratulations, that helps you be a better berry picker.

Your visual system processes the entire two dimensional rectangle of space in front of your eyes in parallel. In one shot. And it lets you pull out an amazing amount of analysis from a single glance.

LOVE: That's Steve Franconeri, a professor of psychology at Northwestern and a professor of marketing (by courtesy) at Kellogg. He leads a team of scientists at the Visual Thinking Laboratory, which studies how we make sense of visual information.

Franconeri explains that, for survival reasons, our brains' visual systems have evolved to analyze visual information quickly and efficiently. Which means it's not just photos of berries we're good at processing.

FRANCONERI: And now it's going to let you use that same powerful system to be able to do analytics on your data, instead of doing analytics on the natural world. So that's why we use data visualization in general and why it's so powerful. [fade music in during this block of text]

LOVE: Welcome to the Insightful Leader, from the Kellogg School of Management. In today's episode, we'll be hearing from Professor Steve Franconeri on the incredible power of data visualizations. And how to make sure your OWN data visualizations are as compelling as possible.

[music]

What Are Data Visualizations:

LOVE: Chances are, if you read or watched any news, or even looked at social media today, there's a good possibility that you interacted with at least one data visualization. That's because they are everywhere. Graphs, tables, or figures: those are all ways of visualizing data. Those COVID curves? All those color-coded maps at election time? Those are data visualizations too.

And there's a really good reason why these visuals are so PERVASIVE.

FRANCONERI: Giving people data in visual form is more persuasive and more powerful compared to just giving them the raw numbers. Why does this happen? There's a bunch of theories out there for why. Number one is, well, visual system is 40 50% of your brain. It's a huge, powerful system. And when you load information into that system, it's more engaging, and it gets thought about more deeply. That's one main reason. Another reason that's brought up ~~in the research literature~~ is that it's unavoidable. You give people verbal numbers, and it's easy to let them go in one ear and out the other. But show people a visual, it's in front of their face, it's gonna get loaded into that big system. And it's hard to deny. Last, there's a sense of ownership that people have, when they see a pattern in data. And they connect the dots themselves. You're not telling them. You're showing them. People feel that that that conclusion was generated more by their own brain, which they trust, and not by someone else's brain, which they may not trust as much.

The visual alone is going to beat the verbal alone.

LOVE: Because visual processing is so powerful, learning how to make your own data visualizations can be an incredibly useful skill to develop.

Wanna show how your company's move to Zoom boosted product sales across state lines—and make the case for continuing to invest in digital infrastructure? You COULD insert the relevant numbers into a paragraph or a bullet point on your Powerpoint deck.

Or you could come up with a data visualization, present it to your senior leadership team, and let them come to that conclusion themselves.

If you're looking for ideas on how to communicate your data, even really complicated data, Professor Franconeri has a few recommendations.

FRANCONERI: New York Times Upshot, Washington Post, FiveThirtyEight, Economist is really good. Financial Times is really good as well. They have to take data-based arguments and convey them to smart non-experts really quickly and engagingly.

I bet that sounds like a lot of what you do in your job, right, you have to do an analysis and come up with a solution and then argue for it in 15 minutes, or half an hour. These are the world's experts at doing that. So I would highly recommend looking to these outlets and seeing how they communicate their data stories, because they're the best.

LOVE: As for software, Franconeri says that standard programs like Excel, Power Point, or Keynote are totally fine. But if you're feeling more ambitious, give Spotfire, Power BI, or Tableau a try.

FRANCONERI: These systems are all built for really powerful exploration of data. So highly recommend, even if you're not someone who, who deals in the data, or builds these dashboards. Doing the two-hour tutorial on one of these and getting to know one of them makes a big difference.
[flow directly into next section]

Curse of Expertise

LOVE: So let's say you've spent some time with your data, you really understand it, and you're starting to put together a visualization, to share your valuable analysis with others. There's just one small problem.

Now that you've seen something in your data, you can't unsee it. Which makes you a uniquely BAD judge of whether your visualization will make sense to someone else.

FRANCONERI: Once you've locked onto a certain pattern, you can't get rid of it. Your visual system is really good at snapping back to it. And it's tough to imagine what the world looks like through those naive eyes. Through the eyes of your audience seeing, in the end, what's going to be your data for the first time.

So your own knowledge of your own data, all that time that you've spent in thinking about your own data and thinking about your own analysis, and what's important, makes the visualization that you show to others actually look different to you. Your eyes go to different places, and you see it in different ways. And it's hard to get around that. This is called the curse of expertise.

LOVE: So what are some ways to make sure viewers actually come away with the conclusions you want them to?

FRANCONERI: Help people see the patterns that you see through your goggles by actually highlighting and annotating and saying – these are the bars that pop for me. These values are bigger than those. And then take the text that describes them, don't put it in a bullet point somewhere off on the side or on the top, actually stick it right next to the data that support it so that people don't have to work to figure out how your data support your argument.

LOVE: Franconeri also recommends using color to help clarify data and conclusions. But be sure to choose colors that can be deciphered by those who are colorblind.

FRANCONERI: Stop using red and green. Use red and blue. So now red is bad, and blue is good. And that'll help our colorblind friends a good amount in your slide decks.

LOVE: Most importantly, test your visualization with colleagues who don't understand the information or data as deeply as you do. Ask them how they understand the data.

FRANCONERI: The answer is critique. Put it in front of people and say, what do you get from this visualization? What is the first pattern that you notice? What is the conclusion that you pull? And that's your way of making sure that they see what you see. The best data visualization designers in the world, these people at these news outlets, still put their designs in front of their colleagues for critique.

[music]

Honesty

LOVE: Once you've developed an understanding of the basics, how to "walk" your audience through the visualization until they see what you see, you'll want to start thinking about some of the design choices that shape the message you're sending. Are these choices true to your argument?

Or they unintentionally misleading?

FRANCONERI: So visuals work because they're so powerful, and they're also persuasive. And sometimes they're a little too persuasive. Visuals will start to defeat more verbal logical reasoning in a way that actually starts to become a bit irrational.

Let me give you a real world example. This is from one of my favorite books that was on my parent's bookshelf, actually, when I was a kid. It's from the 1950s. It's Huff's "How to Lie With Statistics."

LOVE: And in this book, is a simple line graph that shows sales rising from 20 billion to 22 billion dollars over a twelve month time span. If the vertical or y axis, starts on zero, that two billion dollar climb looks respectable, but hardly dramatic: just a 10% rise. But if you chop off the bottom of the graph and start instead at 18, all of a sudden that 2 point jump looks humongous.

FRANCONERI: Verbally, you're getting the same numbers, right? It still goes from 20 to 22, or whatever the numbers are. But that's not the system that's more persuasive in my head. My visual system is now getting the signal that things are rising really quickly. And that tends to overwhelm that weaker verbal system. So I love this example. And this is something that we've known is a trick that humans can use for a long time.

LOVE: There's a famous example of this in a graph published by The National Review on climate change. The graph plotted the average temperature from 1850 to 2015, with the y-axis starting at zero degrees. On this scale, the rise of two to three degrees appears very minimal. But...

FRANCONERI: In this case, a one degree difference is the difference between having and not having a foot of water on your property in Florida or North Carolina somewhere. This makes a big difference to a lot of people in the world. So how I'd plot this, and how most media outlets would plot this is we're definitely not going to use a zero baseline, in this case. We're going to be stretching it out to show the range of variation that actually matters. That's important for this problem.

LOVE: As the Washington Post rather humorously observed, it's a lot like suggesting that a tall NBA player is actually the same height as someone quite short, because they're both tiny compared to the plapnet Jupiter.

In this instance, a more responsible way of depicting this data would be to, well, cut off the bottom of the graph and use a scale that will visually communicate the magnitude of the risk caused by that 2-3 degree increase.

In other words, be thoughtful about how you're presenting the size of your results. Because no matter how accurately you label your axes, or how carefully you annotate your graph, your mind will see what it sees. And it will use that visual to override everything else.

FRANCONERI: Your visual lizard brain still sees a big difference in the ratio. And it tends to overwhelm that more careful verbal brain, at least for folks that are deeply, deeply invested in the problem.

Your visual system can be manipulating to see to seeing bigger or smaller differences.

And so it's really that effective range that's important in showing your honest argument, in this case.

You can make an equivalent visual that is equally honest or dishonest, depending on your perspective or depending on the context of the problem.

LOVE: Which brings us back to Franconeri's earlier point: always consider your audience.

FRANCONERI: Consider what people are going to pull from your visual. You know your audience, and is what they're going to pull gonna match your honest argument or not?

Show people your work and ask them, you know, find out what patterns they see. What do they conclude from the data? If the response matches the honest argument, then you made a great visualization. You have to consider your audience and make sure that they're getting the honest argument, when they look at your visualization.

*
[music & credits]

This episode of The Insightful Leader was produced by Kevin Bailey, Kim Buikema, Jessica Love, Fred Schmalz, Michael Spikes, and Emily Stone. It was written and edited by Kim Buikema and sound designed and mixed by Michael Spikes.

Special thanks to Professor Steve Franconeri.

As a reminder, you can find us on iTunes, Google Play, or our website. If you like this show, please leave us a review or rating. That helps new listeners find us.

And, if you want more leadership tips from real experts, you should sign up for our free weekly email newsletter. It's packed with ideas and research from one of the world's top business schools...the Kellogg School of Management at Northwestern University. To sign up, go to kell.gg/email. Or check out our webinar series, the Insightful Leader Live, At kell.gg/webinar. That's where our conversation with Prof. Franconeri was originally recorded.

We'll be back in a couple weeks with another episode of The Insightful Leader.