Data Visualization Techniques:
How to Tell Your Story to Make it Stick

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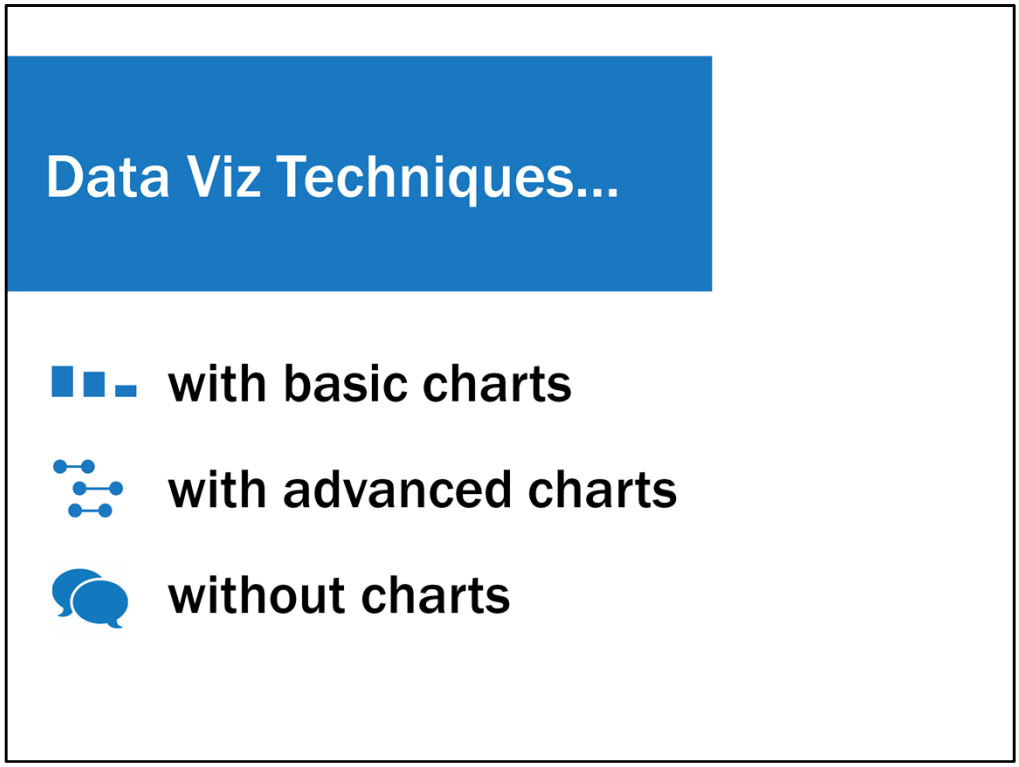
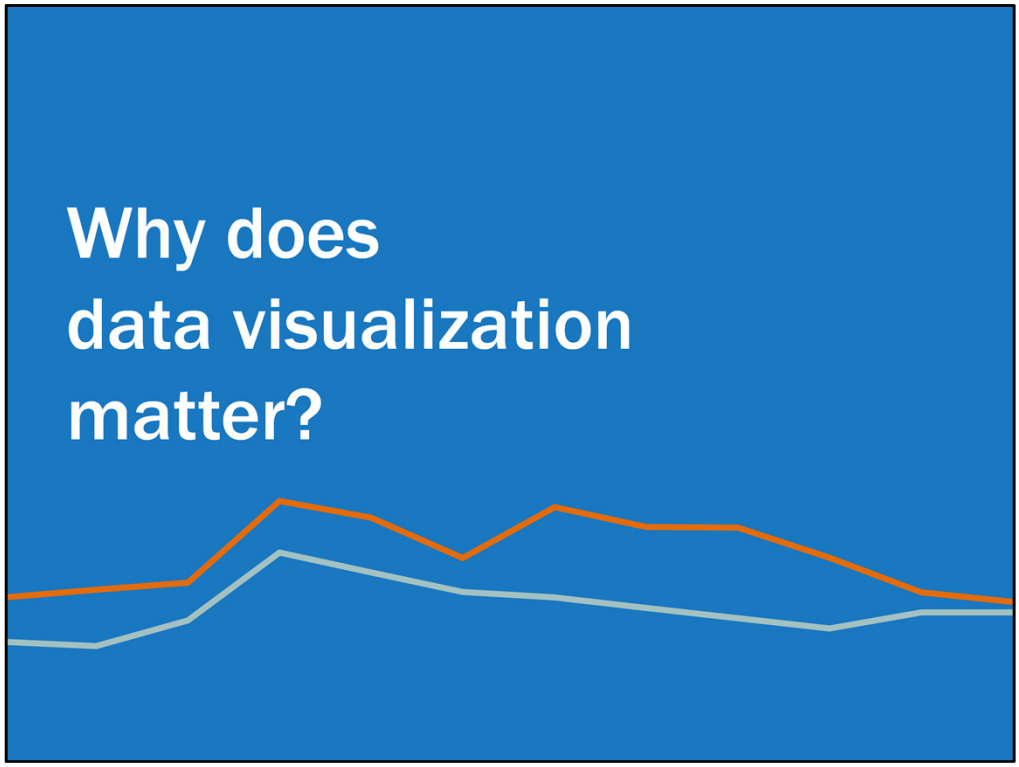
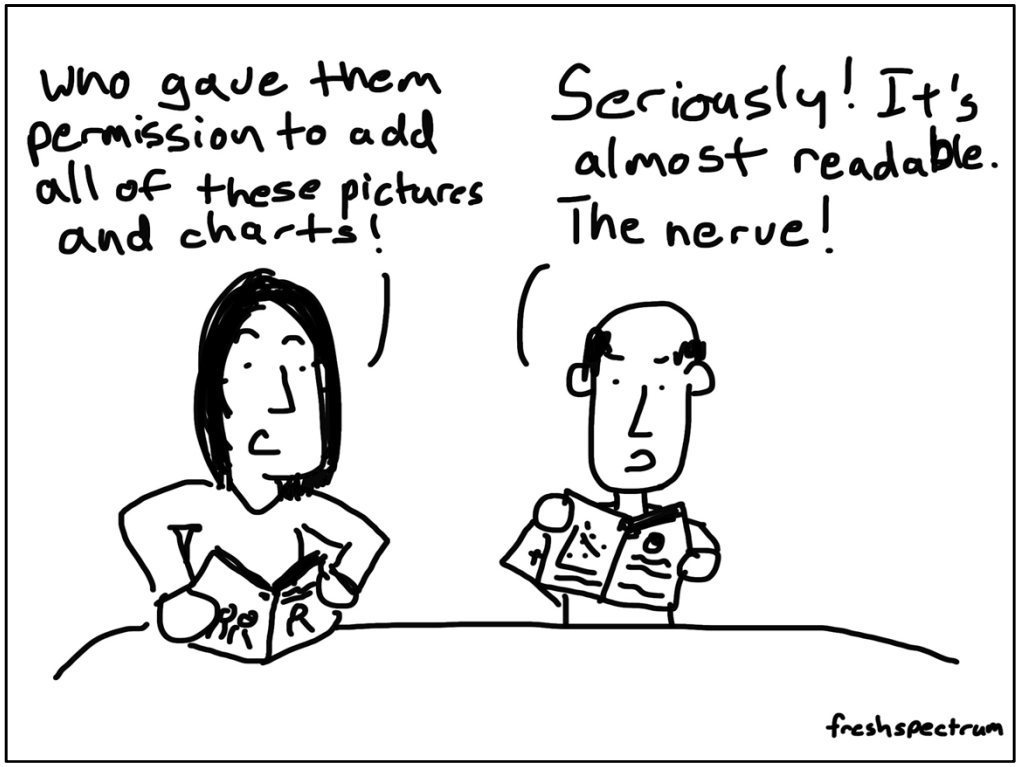


So today I'll be going over data viz techniques using basic charts, like bar and line charts, data viz techniques using advanced charts, which aren't in Excels menu of chart types and require a few more Excel ninja skills, and then finally I'll go over data viz techniques using things other than charts, like tables, diagrams, maps, and icons.



I first want to briefly explain why using effective data visualization techniques even matters. You might think it's all about making things look pretty, but it's so much more than that.

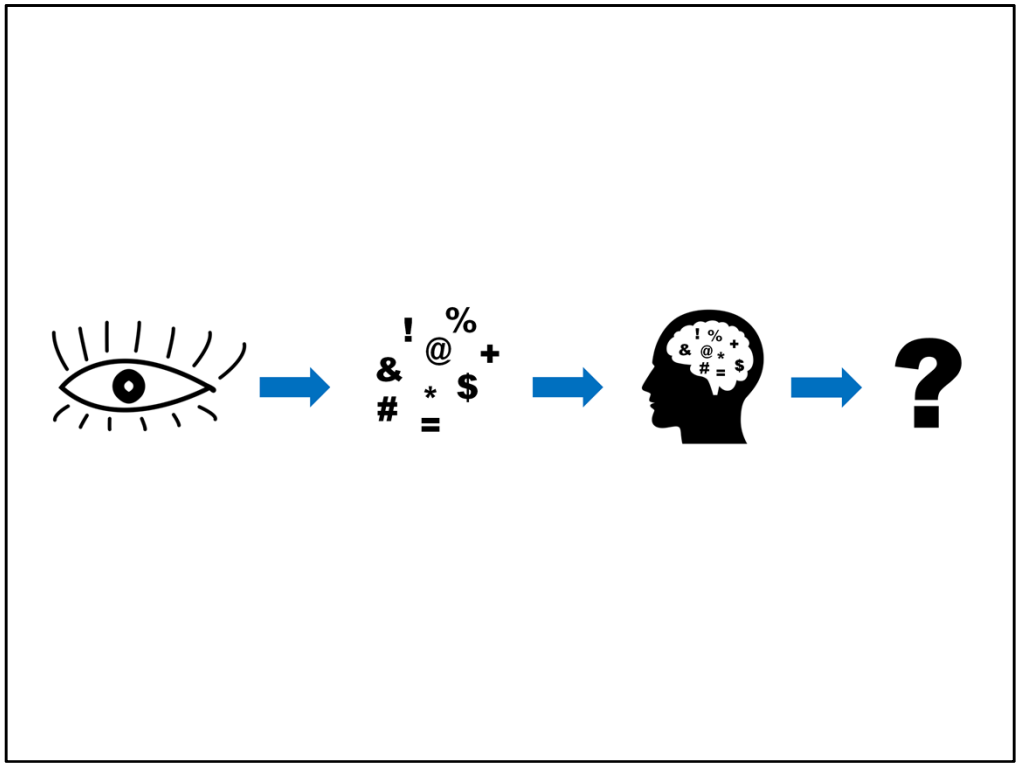


I am guessing that as an evaluator one of your greatest wishes is for your clients, stakeholders, whoever it may be, to read your reports, understand the findings, and take action. Believe it or not, data visualization can help you with this. Data visualization is about cognition. It's about using techniques that will draw attention to important information, help stakeholders comprehend that information, and help them remember that information later on. It's about helping them understand the story you're trying to tell so that they are more likely to take action. It's about making it easier for them to use your evaluation findings. Will it look pretty? I hope so. But its purpose is much greater than that.

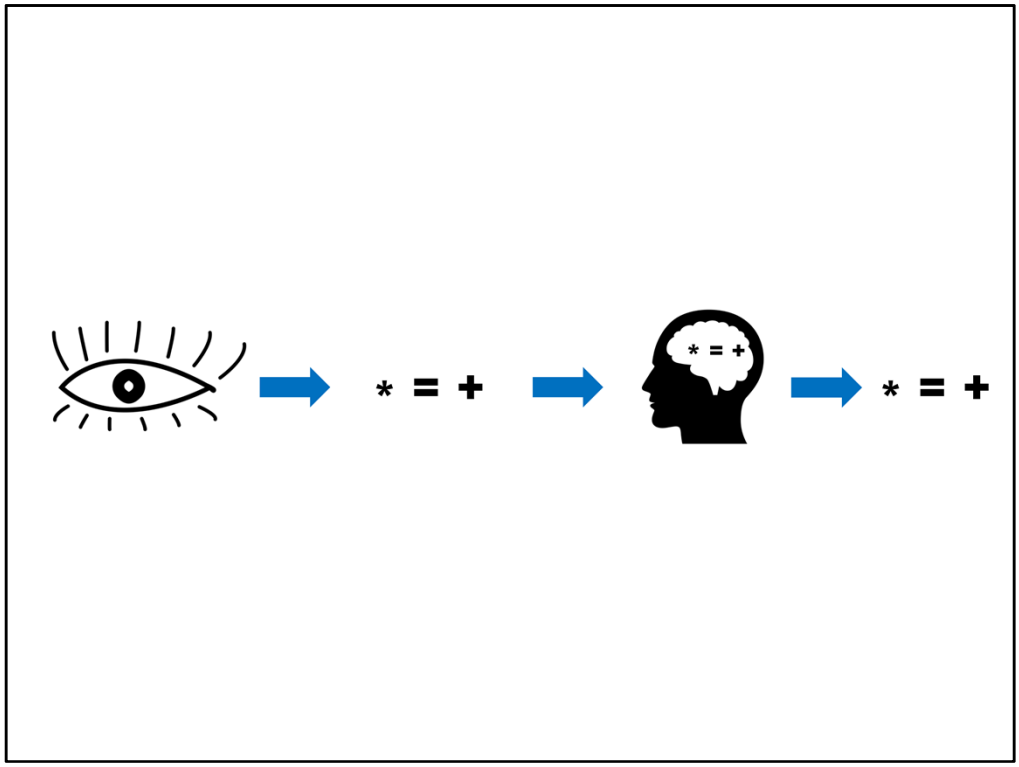
In the smallest nutshell, how is it that data visualization relates to cognition?

Many of us get most of our information about the world through our eyes. We have multiple senses, but our eyes dominate. In our reports, our presentations, we need to speak to the eyes. We need to guide our stakeholders’ eyes to what’s important, what’s the story, what is it that we want them to notice, understand, and remember.

What’s easier on the eyes, is easier on the brain.

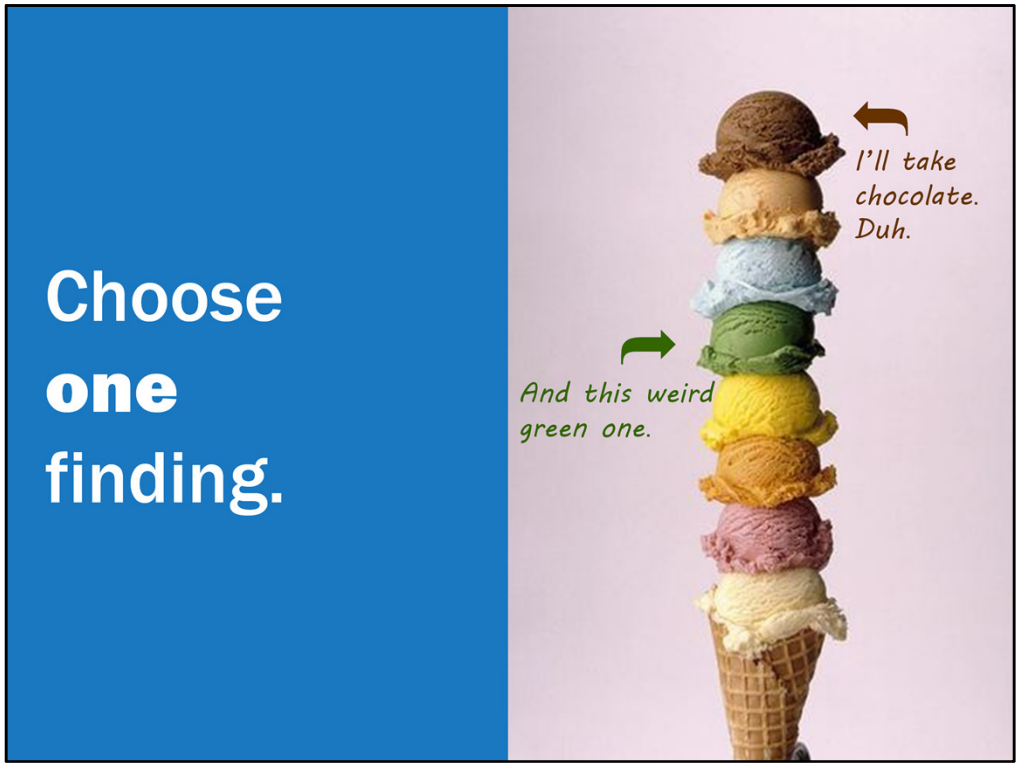


If there's a lot going on in front of us, or a lot for the eyes to process, we might not focus on or remember the important stuff. We might get lost in the noise. We can only handle so much. Research shows that we are only able to hold 3 to 5 chunks of information in our working memory.



Effective data visualization techniques help you avoid overloading the working memory. And so by limiting the amount of information that you have to commit to memory and making that information transparent, it's easier for that information to move into your long-term memory.

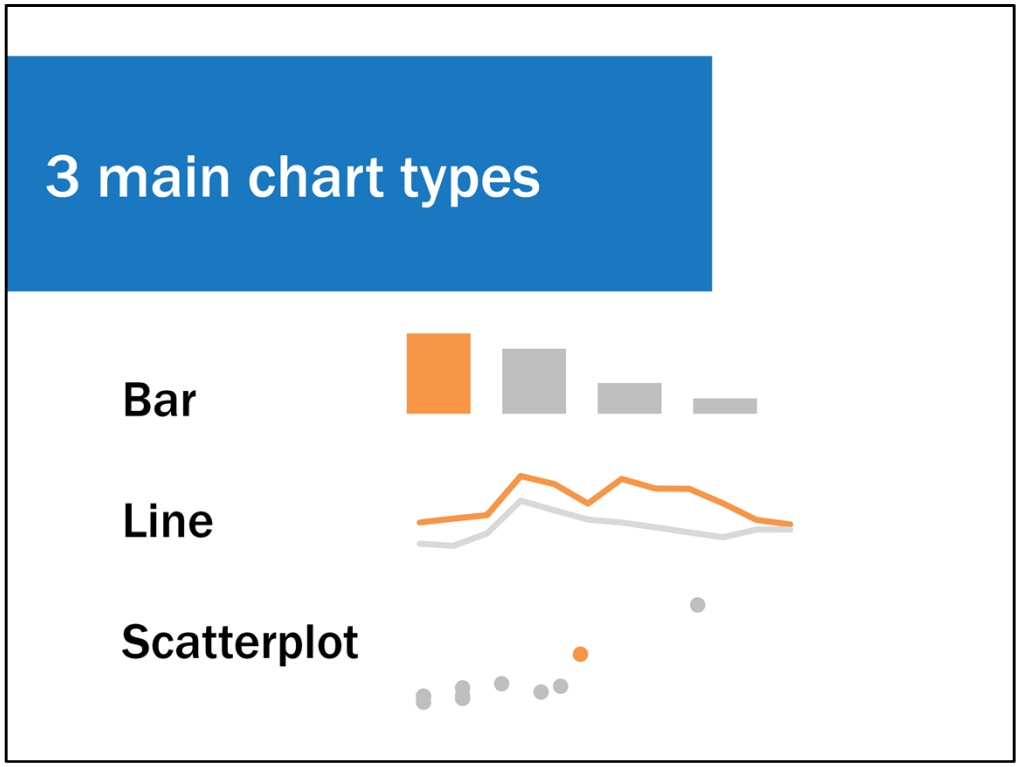
Ok, so you're sold. You're into the data viz thing. You're ready to go. Now we first have to figure out what story you want to tell and what you're going to use to tell it.



The first step is to figure out what your story is. Determine one finding that you want to create a visual for. Much like ice cream, I know you might want throw in more than one flavor or more than one scoop, but stick with one. It will make it easier to tell your story. Maybe it answers an evaluation question. Maybe it's something of interest to your stakeholders. Within the data, think about which specific data point you want to highlight. Maybe it's a success, maybe it's an area for improvement.

And remember that just because you have a piece of data, doesn't mean you have to chart it, or visualize it. You don't always want to try all of the ice cream flavors, right? Maybe you want to, but the ice cream attendant might get a little annoyed. So you just pick several to sample, right?* Again, focus on highlighting evaluation questions or addressing client interests or maybe unexpected findings.* In some of our annual reports we're reporting on demographics of program participants, which are pretty similar from year to year. So we don't create a chart for every single demographic characteristic. That can get a bit long, and it takes away focus from other important areas of the report. So we might just highlight any shifts in demographics, bullet point some of the key characteristics, and then provide a full table of all demographics in the appendix. That's a strategy that works well for us and our client.

So you have your finding, now you have to figure out how to visualize it. Should you use a chart, a table, a diagram, a map, a picture, something else? This is a critical step because you could have the best looking visual on the planet, but if it isn't the best way to tell the story, your point is lost.

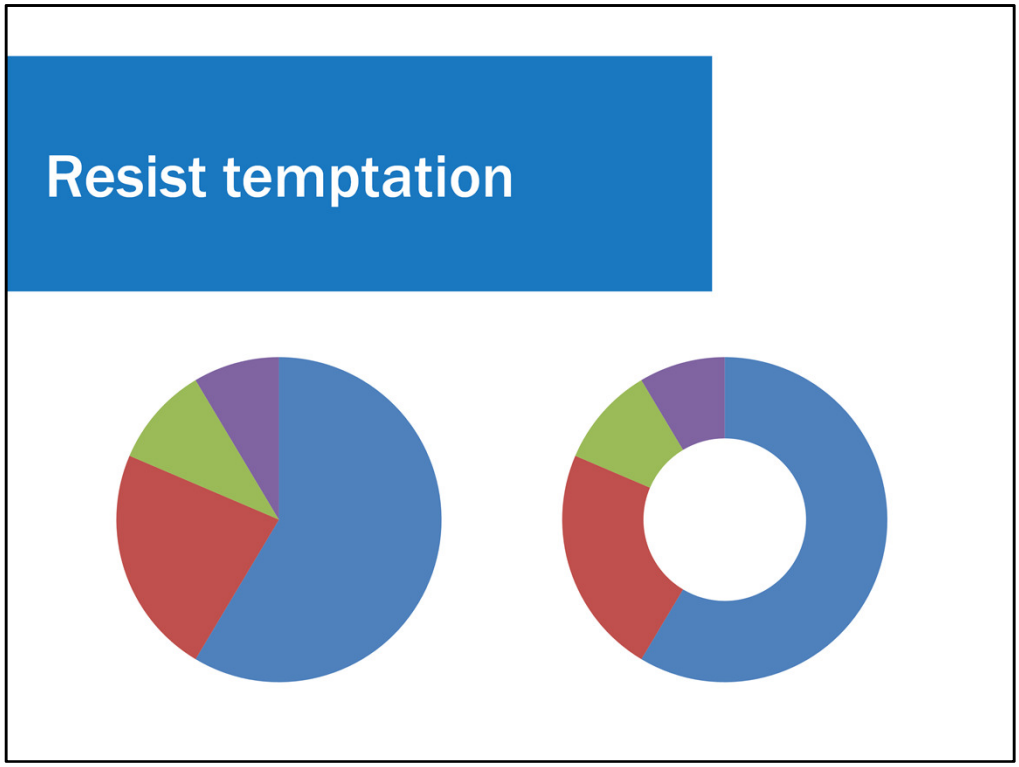


Charts are probably the most common way we visualize data, so I'm going to spend most of my time talking about those today. As you probably know Excel provides quite the array of chart types to choose from. I would say that 98% of the time, I'm using one of three charts – bar, line, or scatterplot. That might sound a little boring but there are some seriously fun things you can do with these charts that take just a few Excel ninja skills, which I will touch on later.

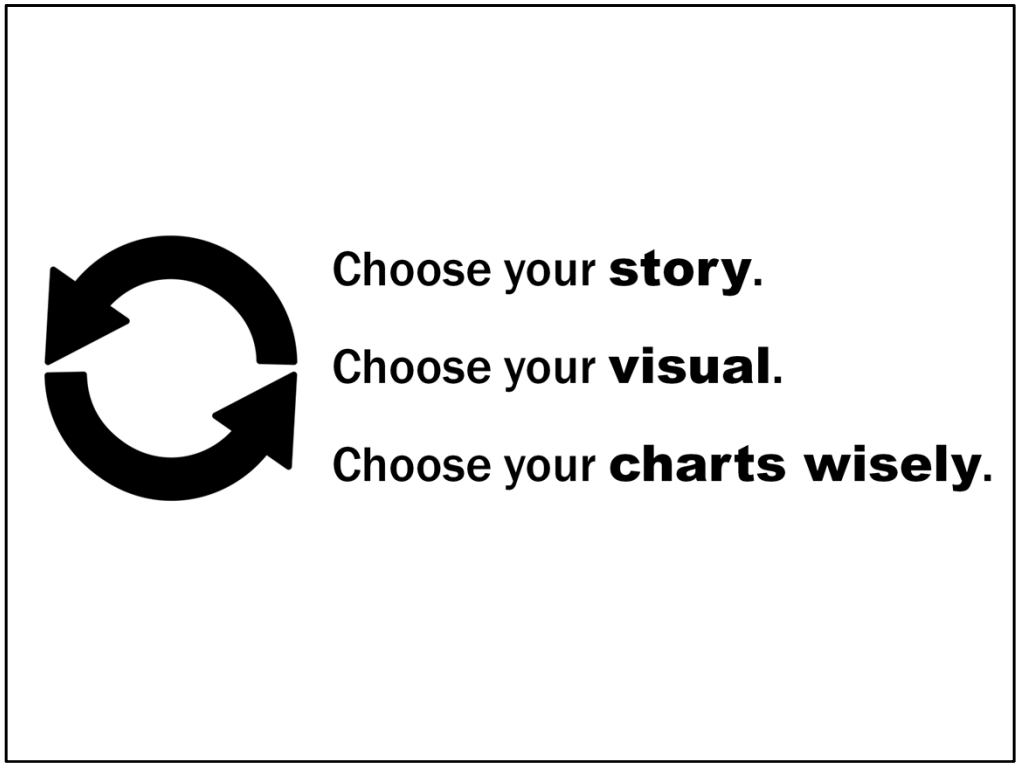
You may notice that two relatively popular charts are not included here.

Resist temptation

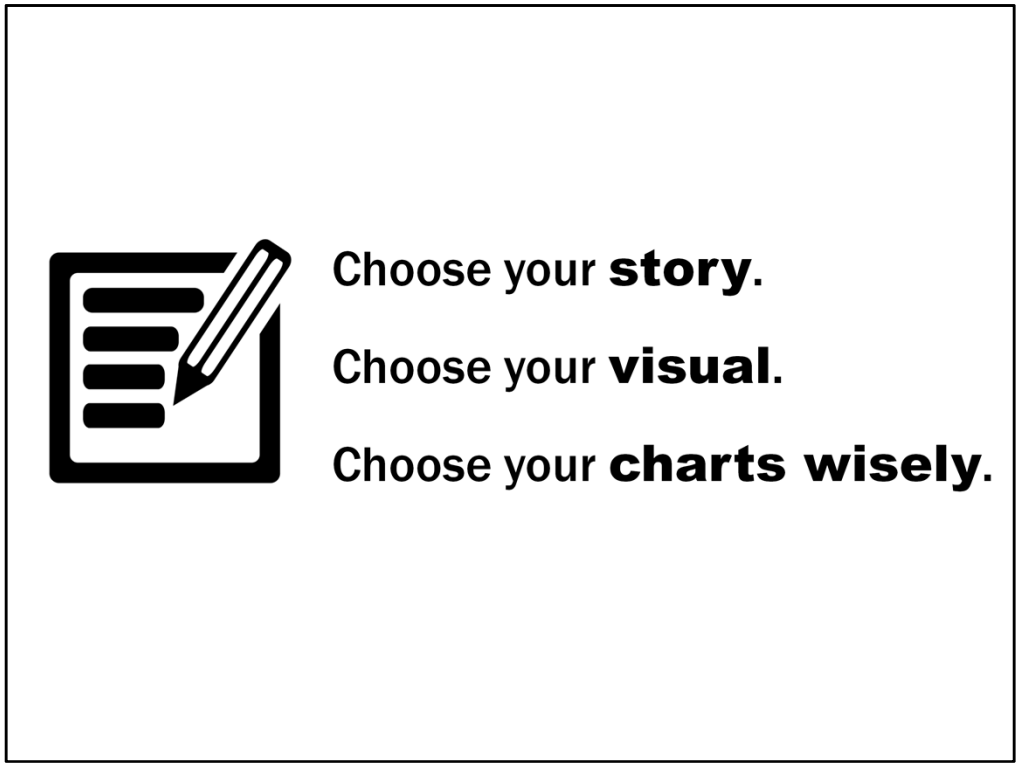
I advise you to resist the temptation to reach for a donut or pie….



…. chart. The circular axis makes it more difficult for the eye to perceive the actual proportion. And I don't understand the utility of the donut chart, which is basically a pie chart with the middle punched out. Maybe someone got bored with pie charts and thought the donut chart would be a fun alternative. I believe that your goal should be to use a visual because it's functional and clearly tells your audience the story, not because it looks fun.



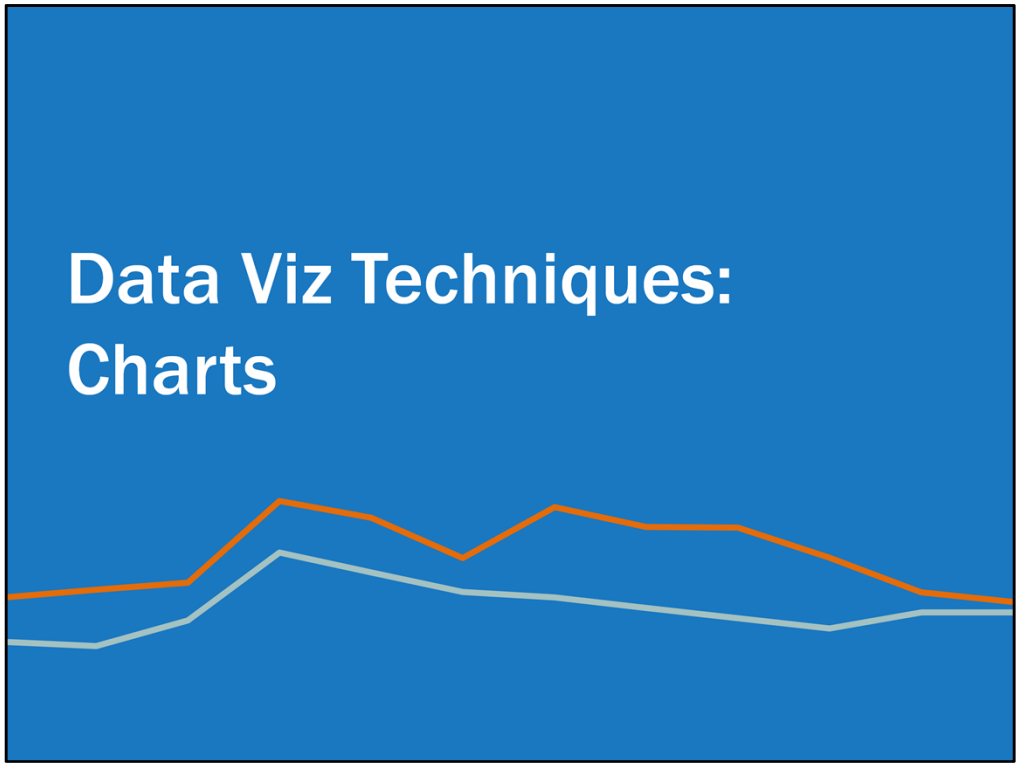
So to recap – choose your story, choose your visual, and choose your charts wisely.



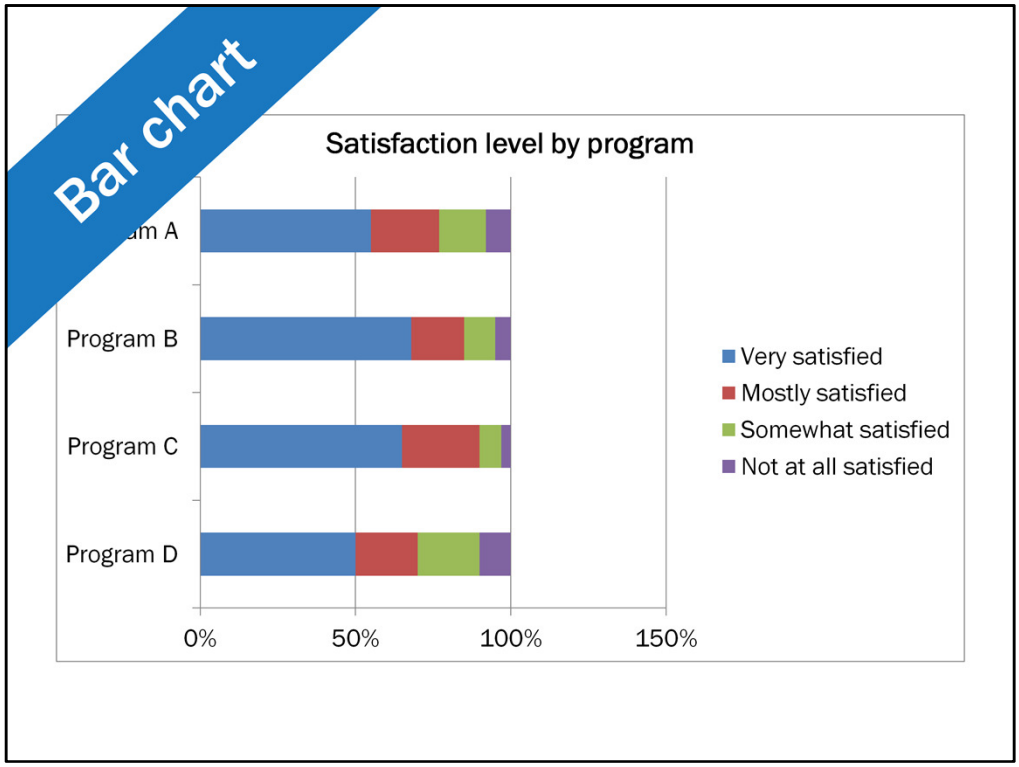
I'd like you to put this into practice. Right now I want you to take a few minutes to think about your own work. Think about an important evaluation question or piece of data or key finding, either past, present, or future. What is the story you want to tell? What visual would work best to tell this story? Since the bulk of this presentation focuses on charts, I encourage you to think of an example you would visualize with a chart versus a map or a table or qualitative data. In the space I provided in your handout on the back page, under letter A, go ahead and write down your key finding and the type of visual that would use to tell the story.

If you're like, yo, it's Friday morning, I work with a ton of data on a daily basis but I'm totally drawing a blank, then imagine what data MESI would collect and use to evaluate the success of this conference. What key finding might emerge out of the conference evaluations – maybe it's related to participant demographics or number of attendees or satisfaction with various conference elements. Make it up.

Throughout this presentation today I'm going to help you work through visualizing your example. I know there are limitations to this because you don't have Excel in front of you and you may not have the exact data points memorized, but just do your best and think big picture.

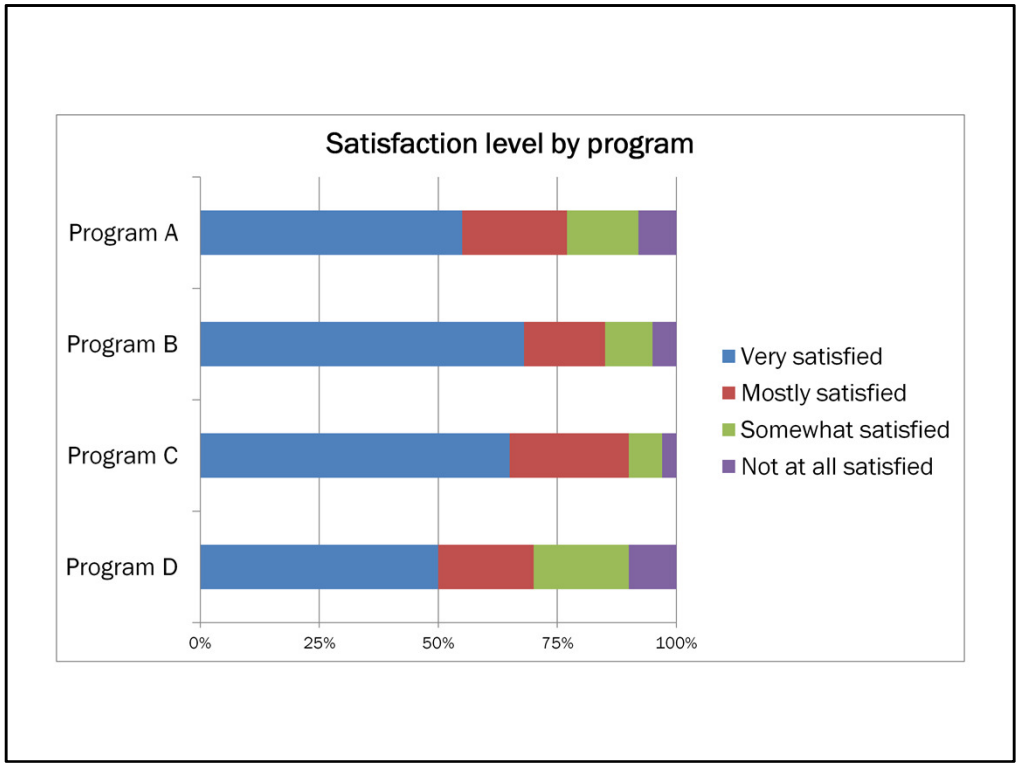


Keep that example of yours in mind. Now I'm going to through some data visualization techniques to apply to charts in Excel.



This is Excel's default bar chart with some made up data I added to it. Excel is showing off all of the bells and whistles you can add to your chart. Unfortunately, all of these bells and whistles distract from your story. So we want to strip the default chart down leaving only the essential elements. This means less stuff for your reader to process so that they focus more on what the bottom line is.

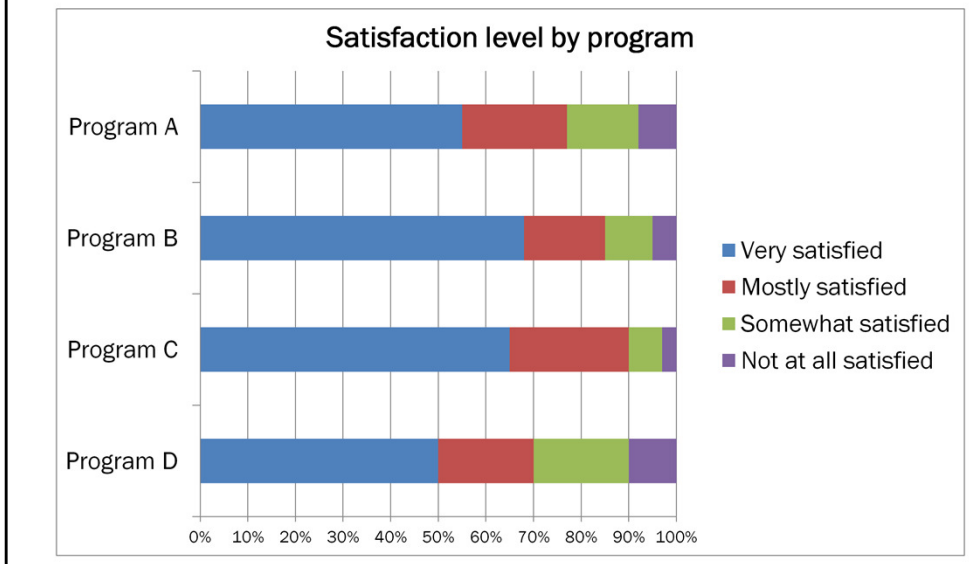
So let's go through an example of stripping down this bar chart. This process is similar for line charts and scatterplots. The bottom line for any chart is to reduce as much clutter as possible and emphasize the most important points.



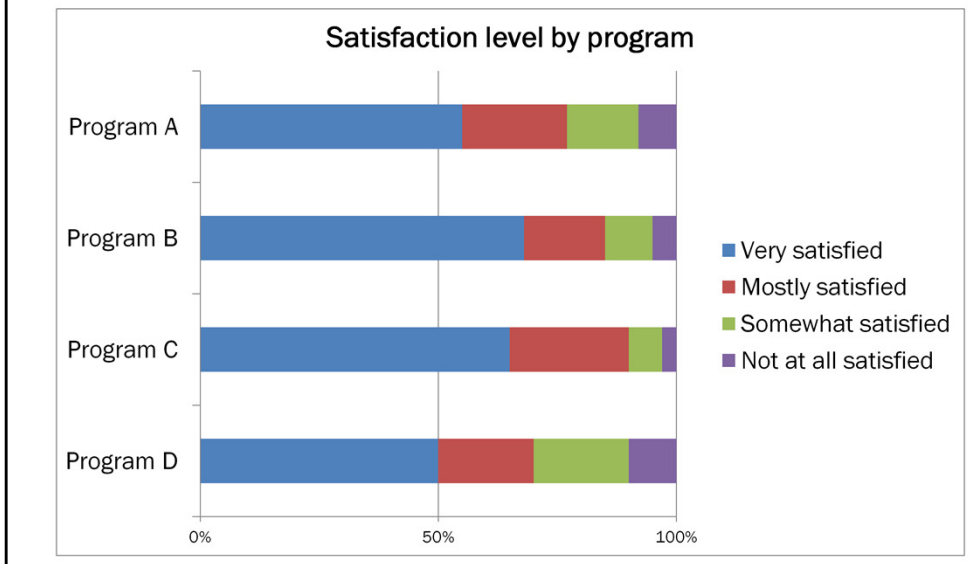
The first thing I did was adjust the axis range. Gotta have it start at zero, which it already was at. It's important for the baseline to start at zero because that ensures that the size of the bar will accurately reflect the proportion of the data it represents.

As for the maximum end of the axis. The default set it at 150%. In this case the maximum possible value is 100% so I set it at that. I often try to set the max at the maximum possible value. There are times where it makes more sense to stop it at 50%, for example, if you're working with smaller values.

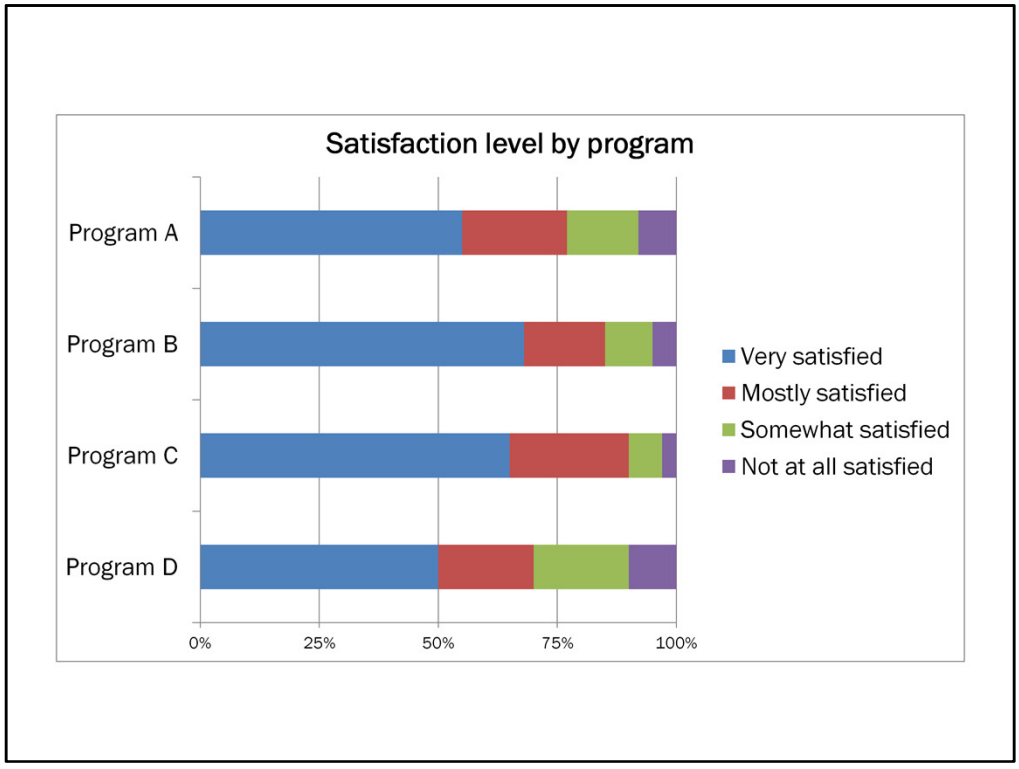
I set the major axis intervals at 25%. 20% would work too. The key is to not have too many or too few categories.



An interval of 10% would have been too many.



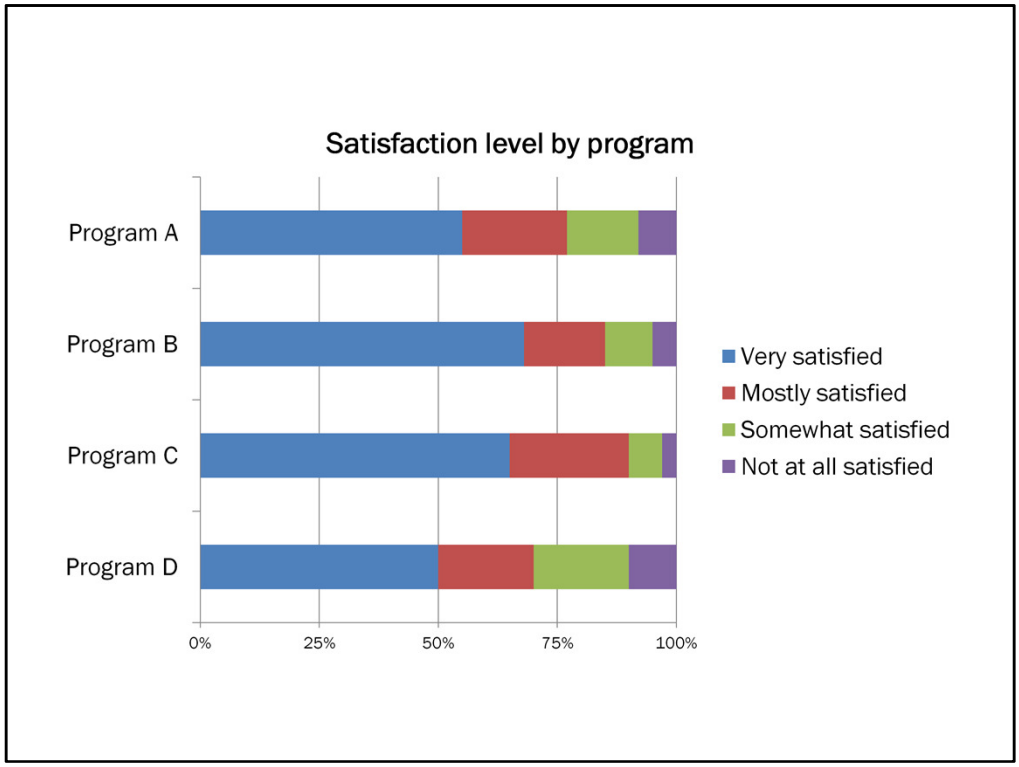
An interval of 50% would be too few.



25% is just right.

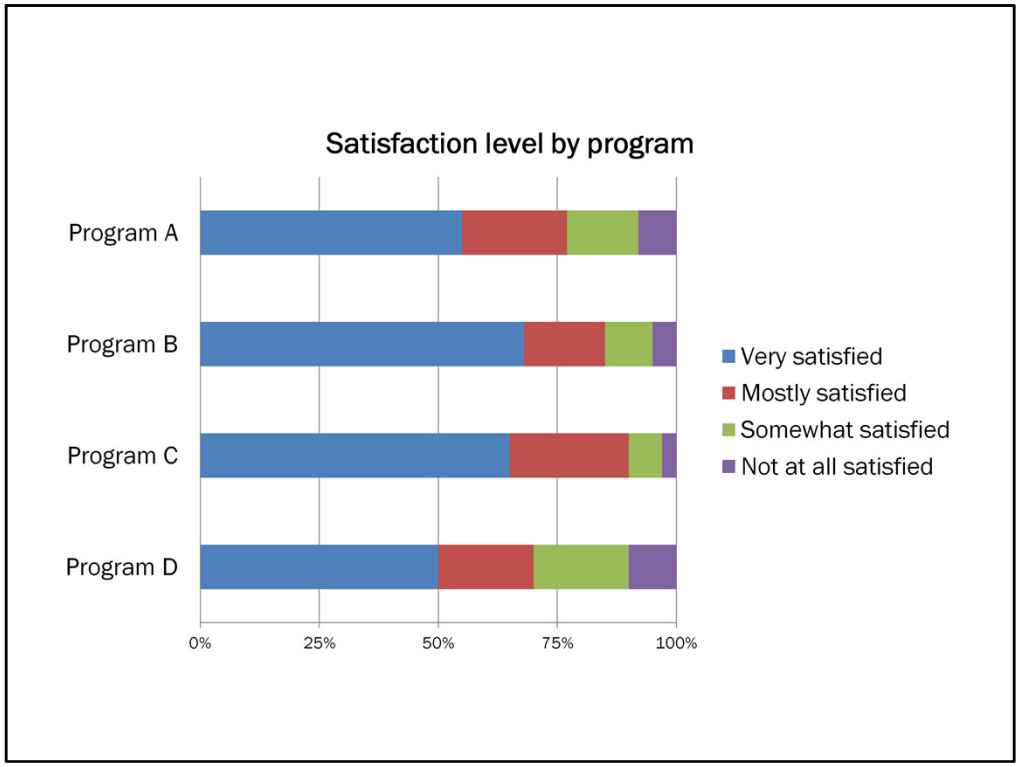
I also made the font size of the axis labels smaller. They are less important compared to say the title and data labels, so I deemphasized them.

Now let's get rid of some unnecessary lines.

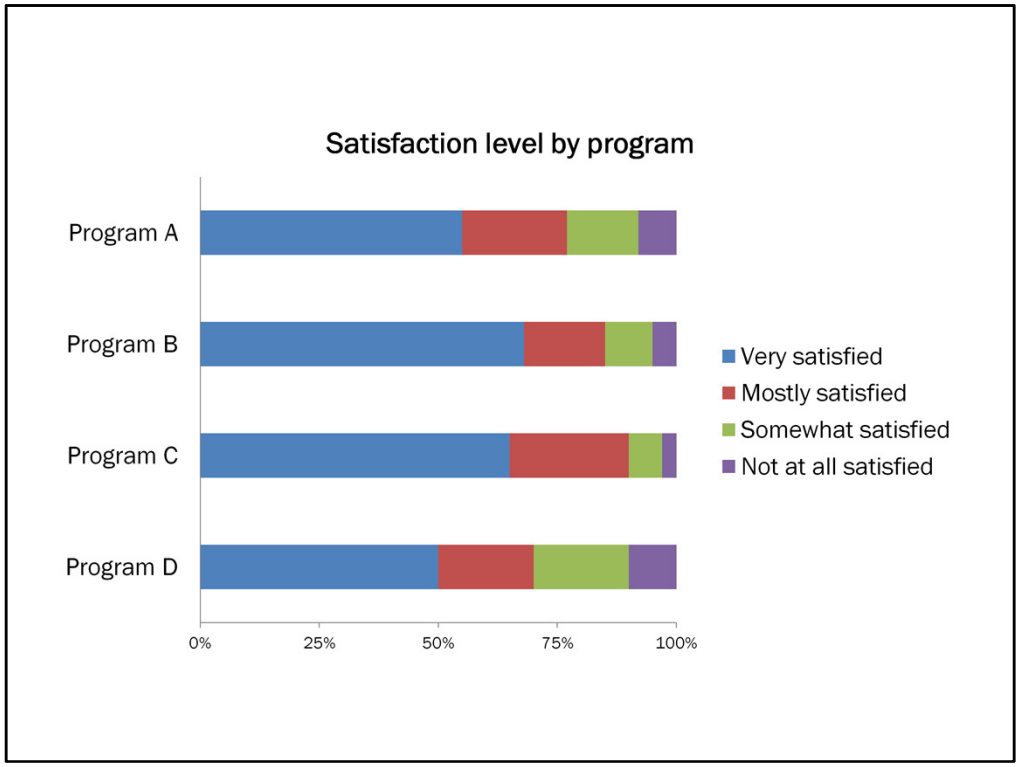


First up is the border, or the shape outline. Don't need it. The space of the chart speaks for itself. Even in a report, it doesn't need a border around it for your audience to understand that it's separate from the surrounding text.

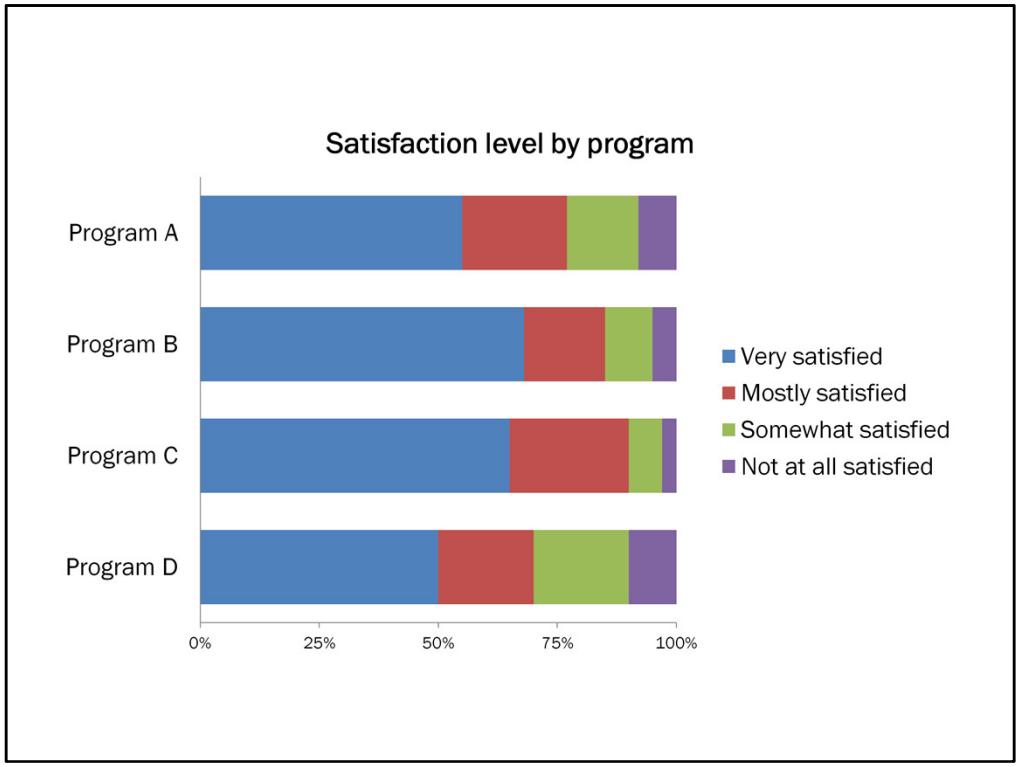
This next step may be hard to see.



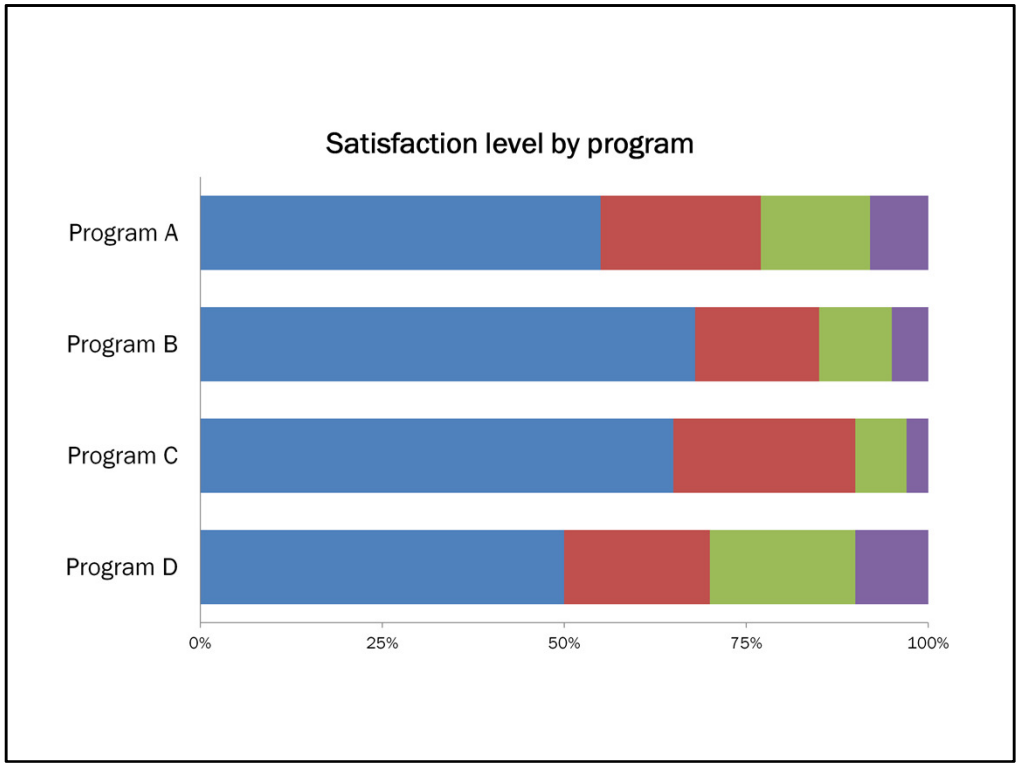
I got rid of the tickmarks along the y-axis, or the verticle axis. Again, they're not necessary. We get that each category is separate. Now I do like to leave the x-axis tickmarks because…



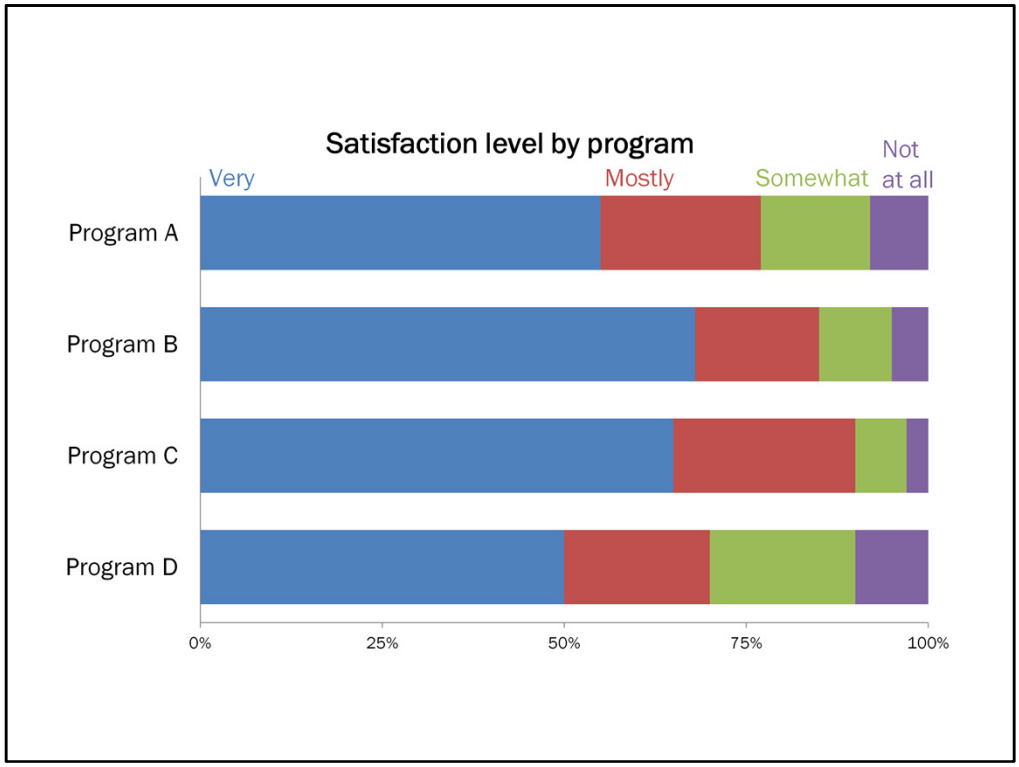
When I get rid of the gridlines, which I often do, I like that they provide a visual cue for the location of the major x-axis labels. For me it's a little too naked without them.



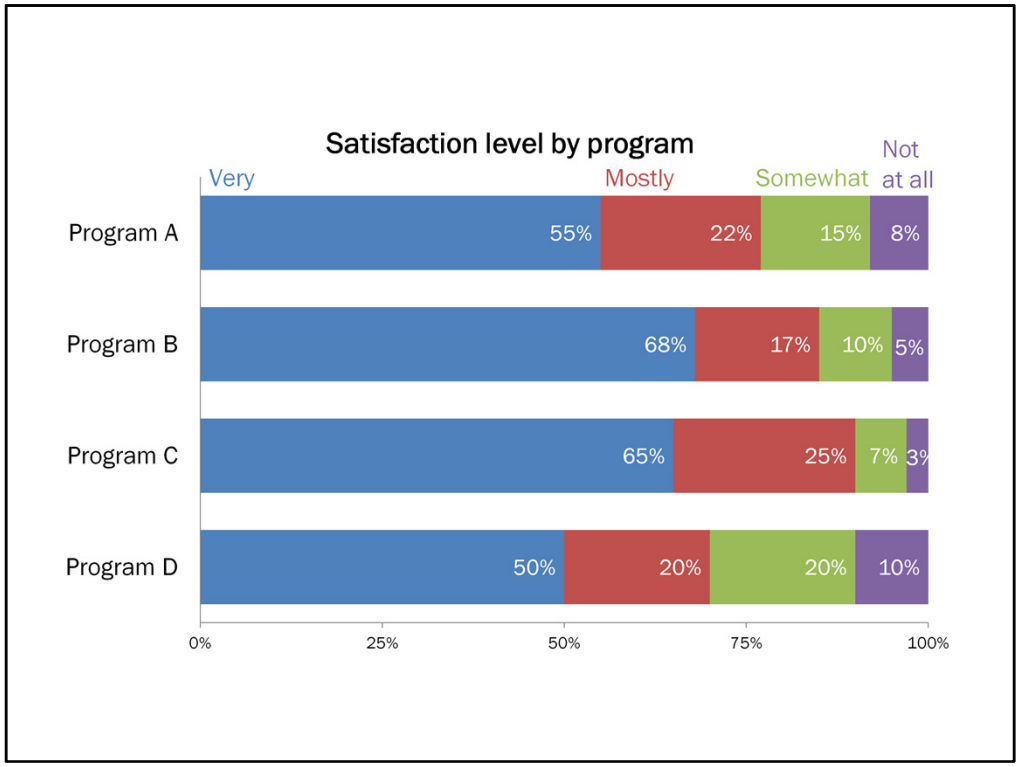
Now I'm going to fatten up the width of the bars. The default is for them to have a gap width of 150%, but it's best for this gap width to be 50-100%. I often go with 50%.



Next up, I got right of the legend.

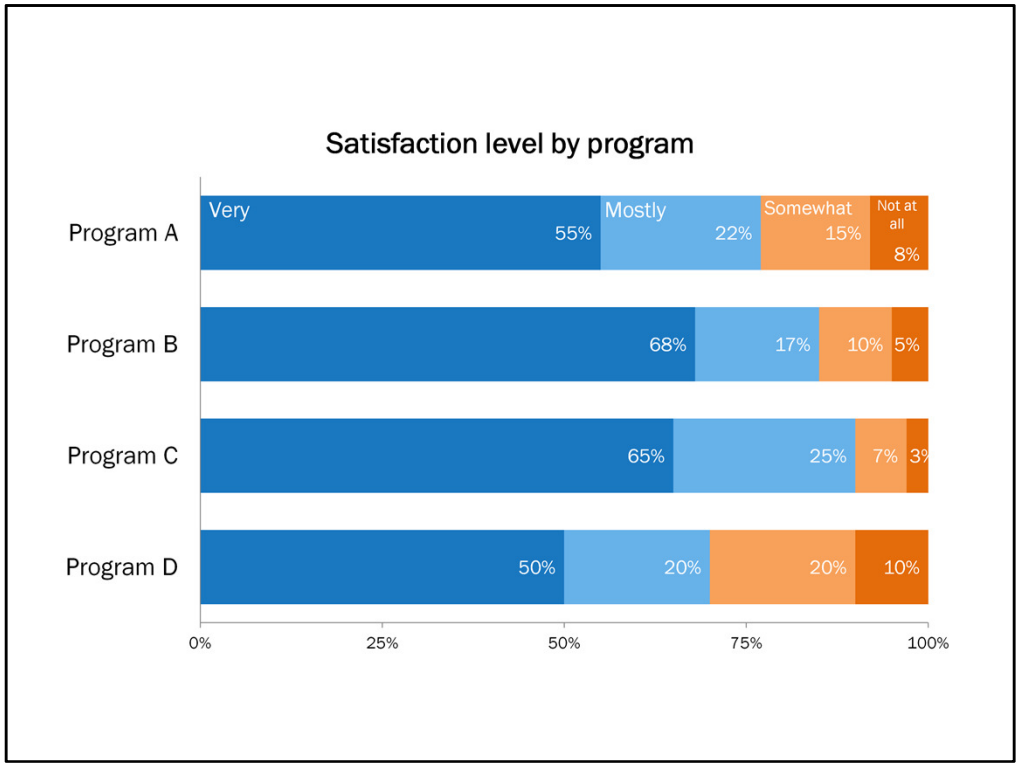


I like to try to directly label as much as I can. This makes it that much easier for your audience to see what each data point refers to. It requires less digging.



Then, if you wish to include data labels, which I often do, go ahead and add those in. I try to add them to the inside of the bars in bar charts vs. the outside. It simply results in less clutter in the chart area.

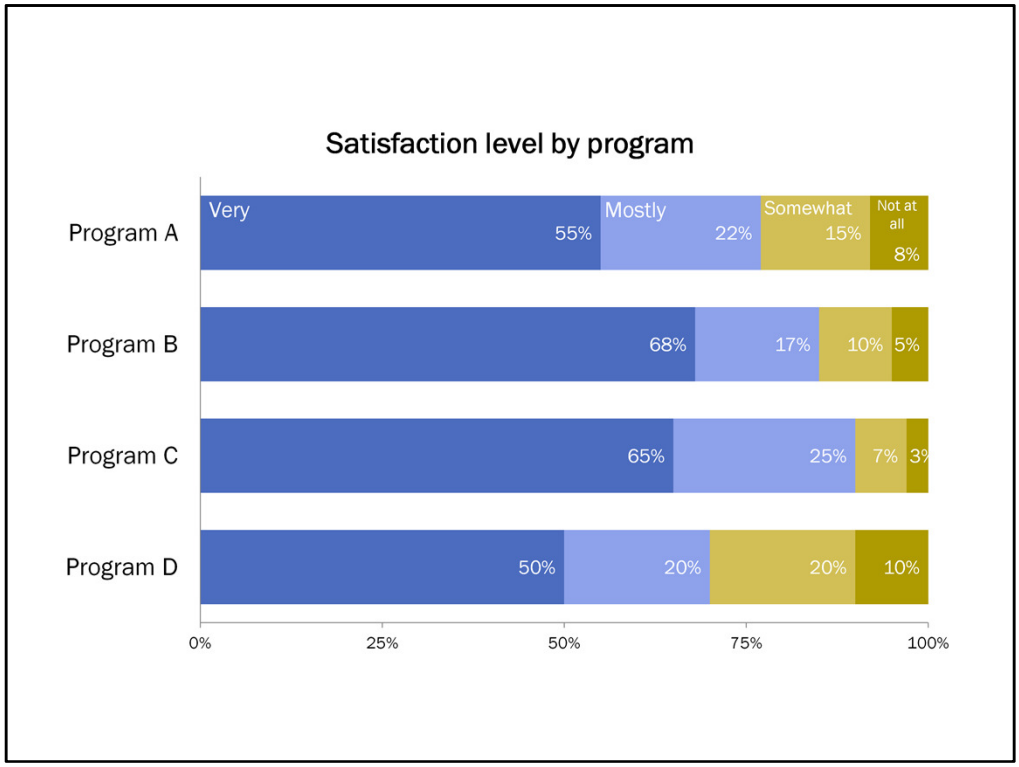
Next is one of my favorite steps.



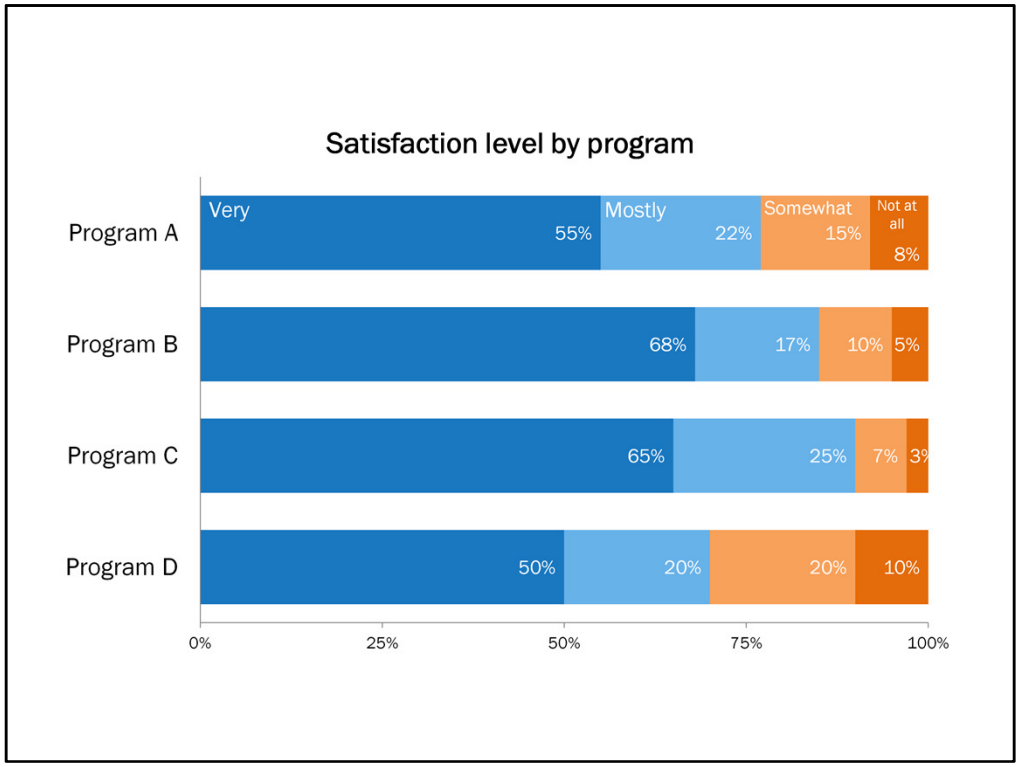
Color. Now we want to be intentional with our color. Maybe you use your own branding colors. Maybe you use your client's colors. Whatever you use, don't stick to the Excel default. It's not that the default is particularly awful, but we want to be intentional with our choices and tailor them to meet our needs.

You'll see in this example I used a diverging color scheme – blues for very and mostly satisfied, and orange for somewhat and not at all satisfied. This same idea could be applied for other scales too, like level of agreement or likelihood. This can be a nice way to visually collapse the data into two camps so that it's easier for the audience to process – ok, these are the positive responses and these are the more negative responses, for example. But you're still maintaining the 4 separate categories, if that's important.

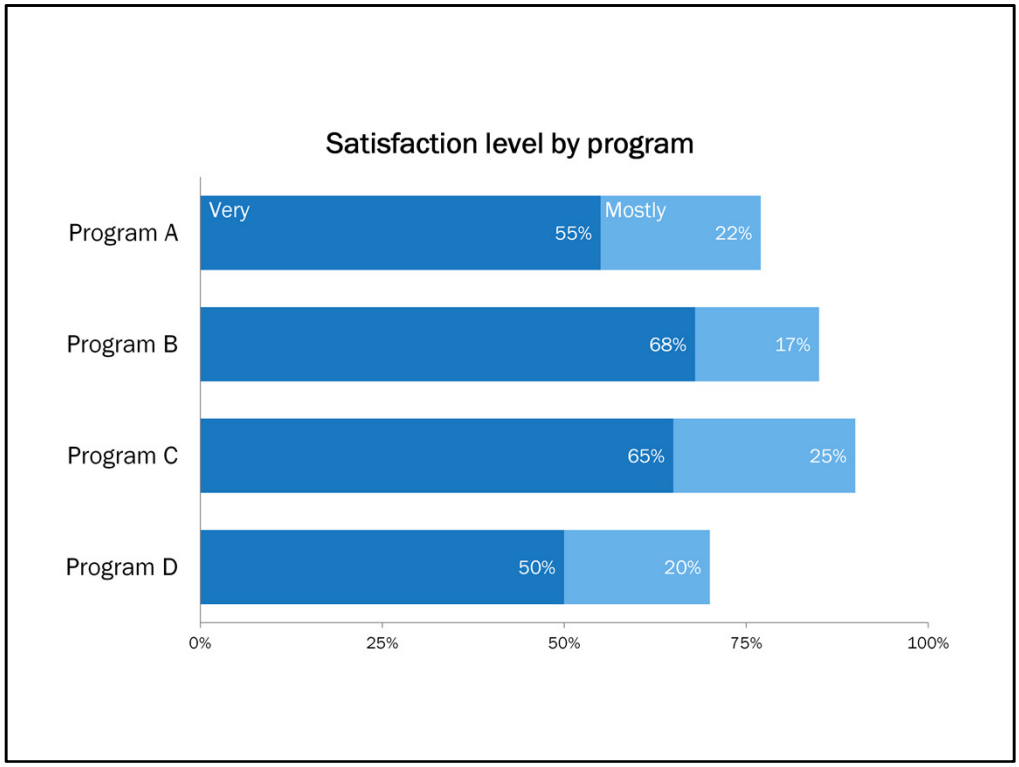
Now if you want to see how this chart looks to someone who's colorblind, there's a website called VisCheck that you can upload an image to and it shows you how that image looks to someone who is colorblind.



In this example, this is what these blue and orange colors look like. I don't see any major issues with this. Since I used the darker and lighter shades of two colors, those are still distinct from one another.

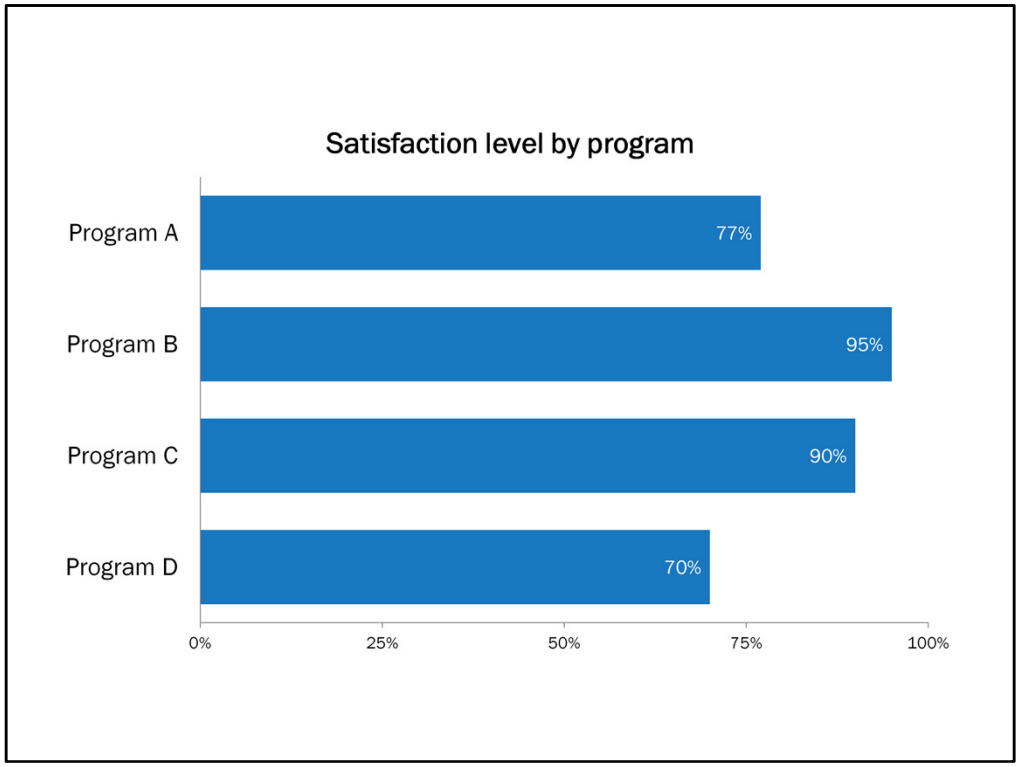


So the original color works, but there's still some work to do for this chart. In this example the client's main interest is knowing the percent of participants who are very or mostly satisfied with the program. Knowing all of the values isn't important. Here you also see that the not at all percentages are small, so low satisfaction isn't really a concern.



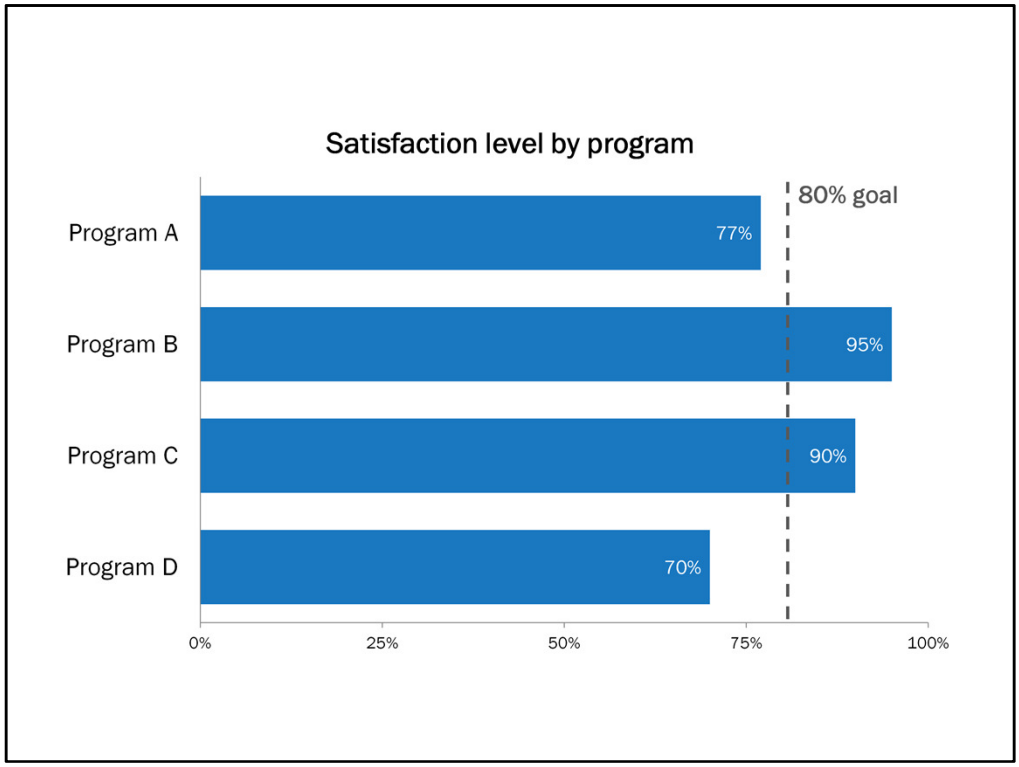
So we can actually get rid of the somewhat and not at all satisfied categories. This might not always be the best option for you. It might be important to keep all categories in the chart. Think about what's important for you to show, but I encourage you to simplify your categories whenever you can.

So I said the client's benchmark relates to the percent who are very or mostly satisfied, so we can actually take this one step further…

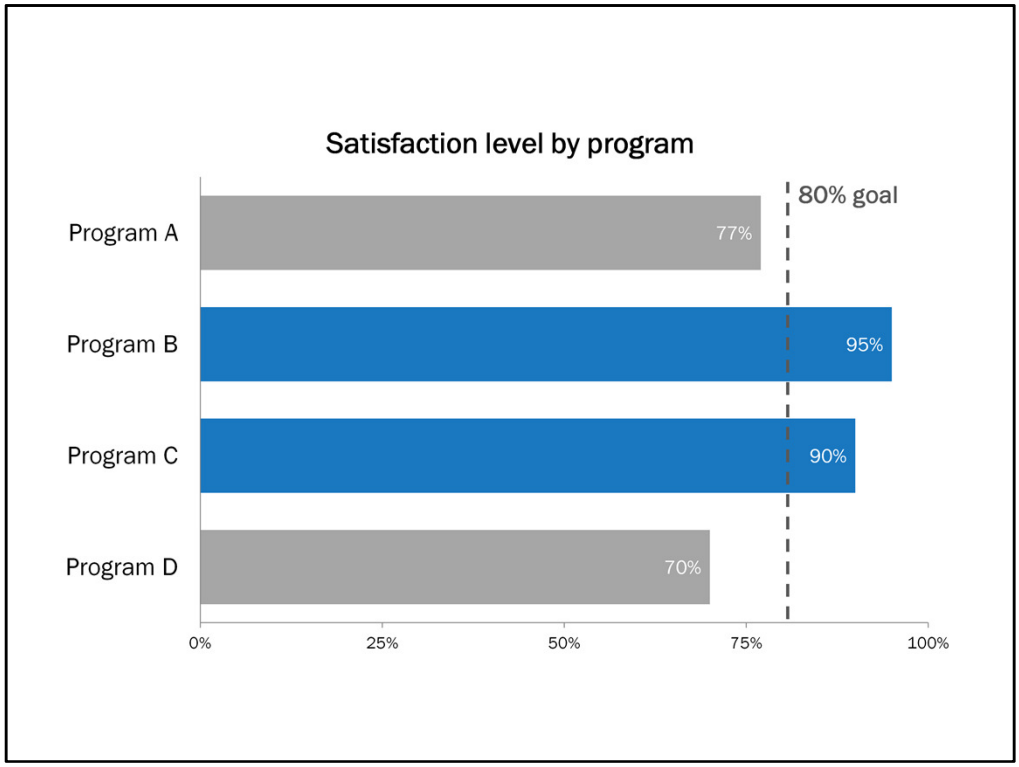


And combine very and mostly satisfied into one category. This simplifies the data but in this case still maintains the needed information.

Now in this example the program actually has a goal for program satisfaction. The goal is for 80% of participants to be very or mostly satisfied with the program.



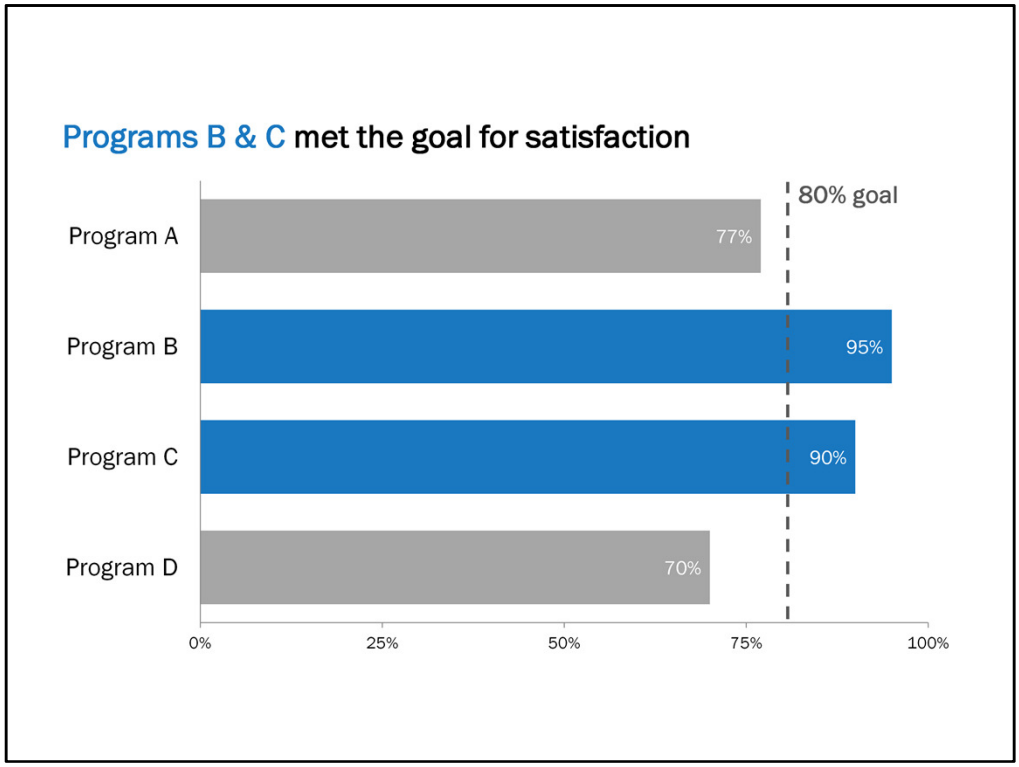
So we can add a line that shows this goal, and that makes it easy for the audience to see which programs met this goal.



We can also take it a step further and emphasize the programs that met the goal by deemphasizing those that didn't. Or if we were focusing on one particular program in this report, maybe that would be the only bar that we highlight in blue.

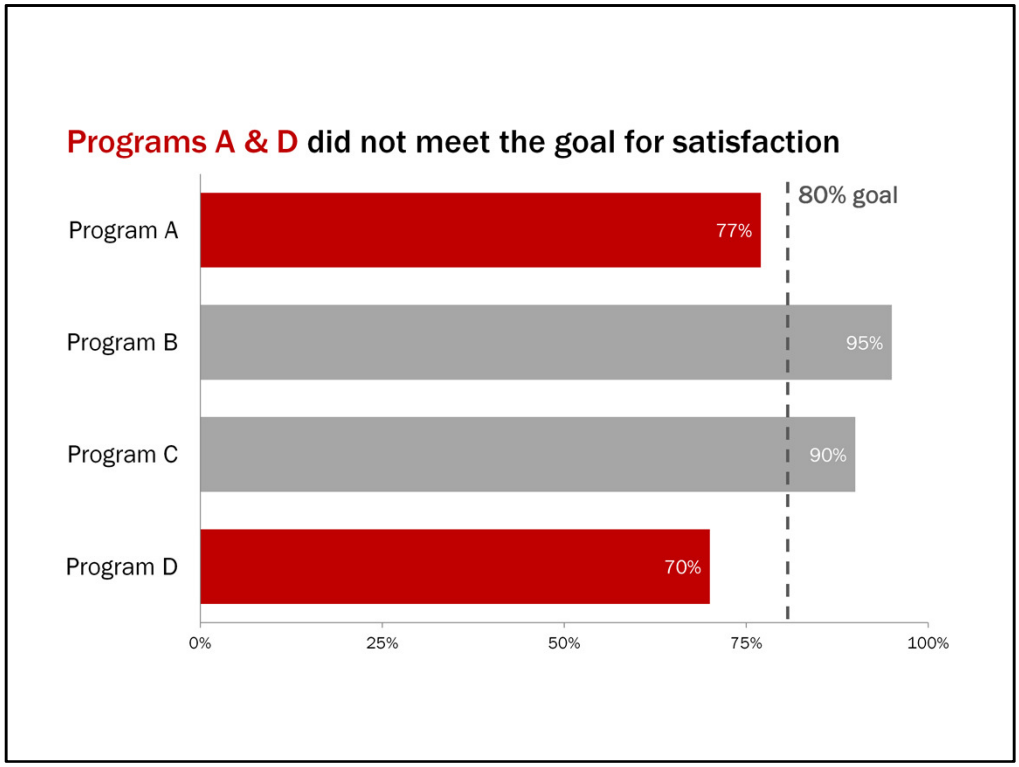
Now I want to briefly talk about the order of categories. So here we're going with the order of program names – A, B, C, D. Maybe the client prefers the program names to always appear in a specific order. But we could also order the data from highest to lowest if that makes more sense. It's important to think about the order of the data. If you're able to sort by values, this can be another way to add interpretation. For this chart though, we're sticking with the order of program name.

Now there's one more thing that this chart needs.

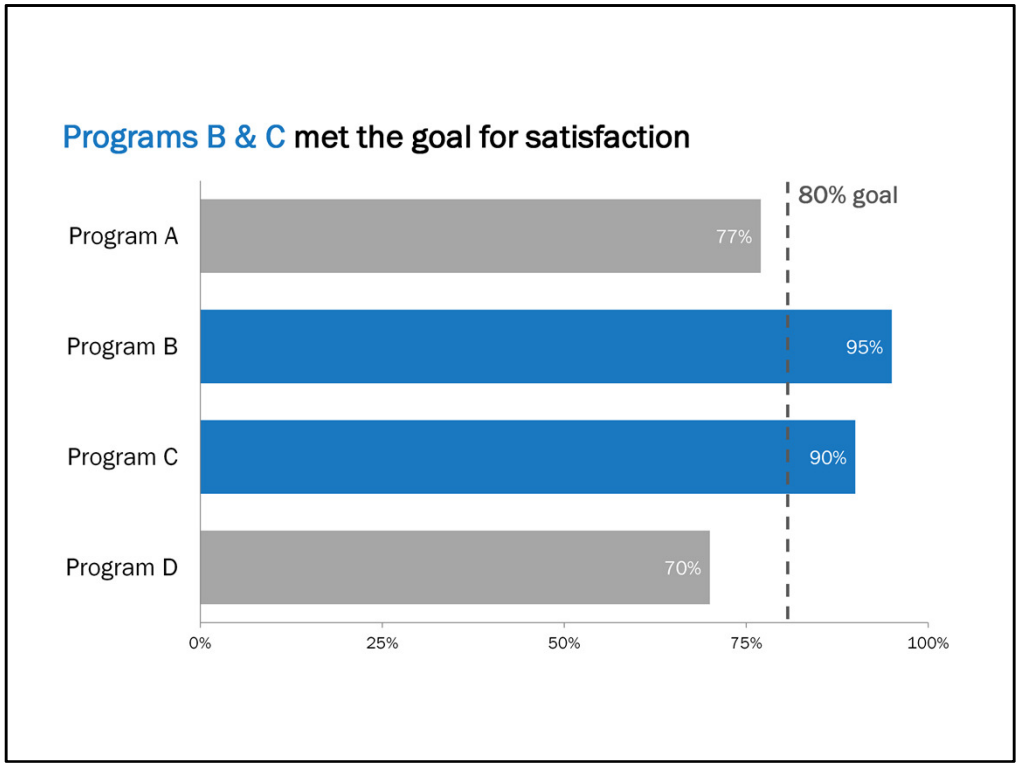


And that's a proper title. A good title can go so far. I will admit that this is my personal area for improvement – using interpretive rather than just descriptive titles. Typically you might see this chart labeled as Satisfaction rates by program, which is fine. But if you provide the interpretation or the story in the title, it makes it that much easier for your audience to interpret.

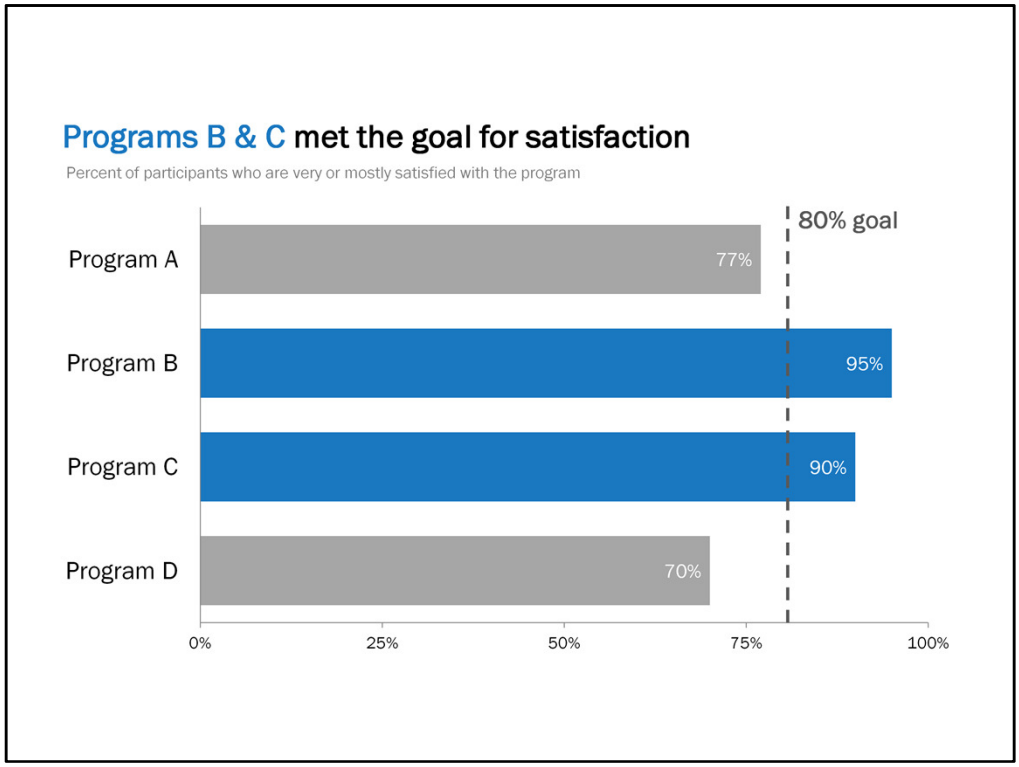
So in this example, the story is that Programs B & C met the goal for satisfaction level. The title should match whatever it is that you're emphasizing in the chart.



So conversely, we could say Programs A & D didn't meet the satisfaction goal, and adjust the title accordingly.

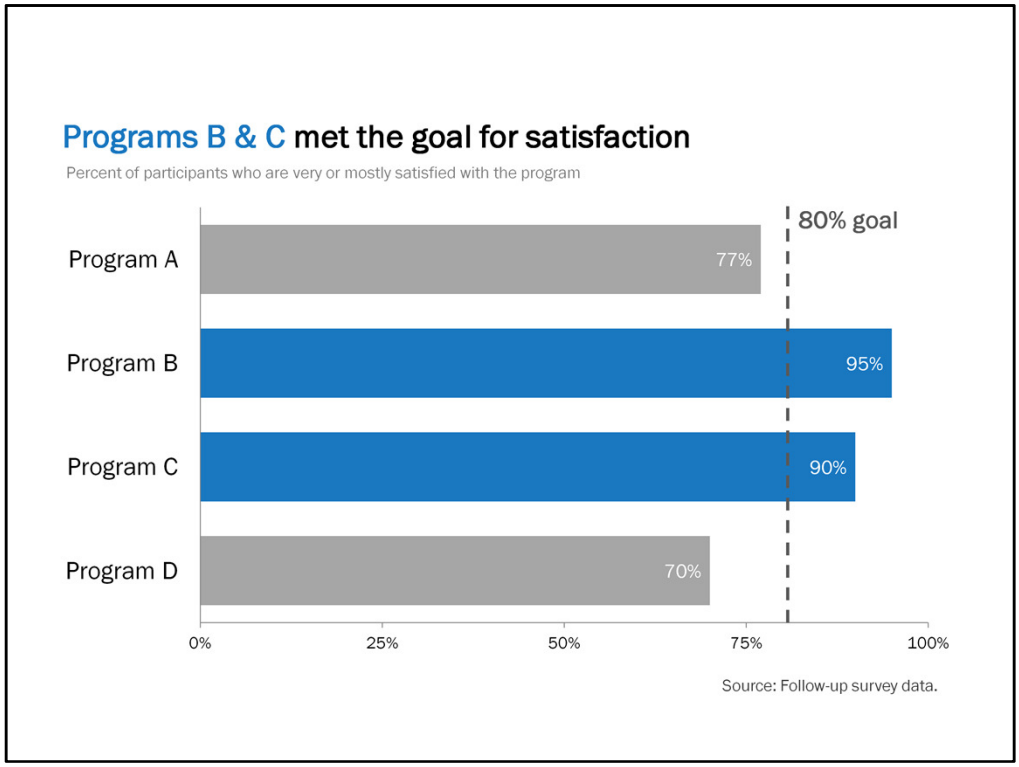


But here, we're focusing on the positive and who met the goals.

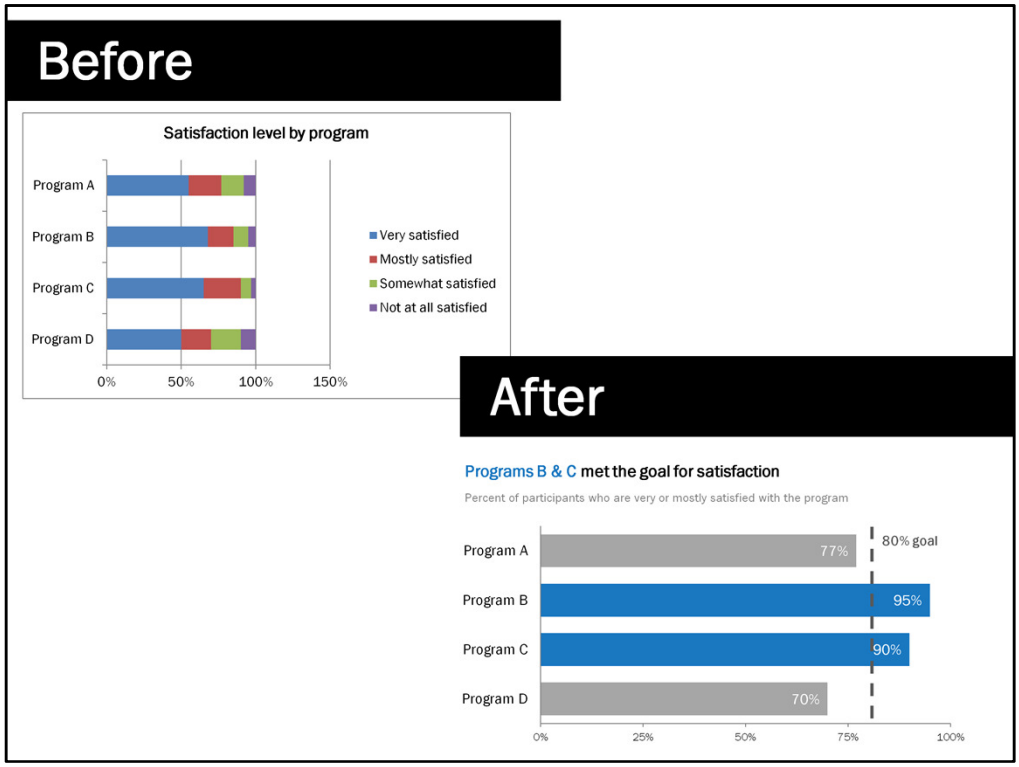


We should also indicate what the horizontal axis is measuring. In this case, the percent of participants who are very or mostly satisfied with the program. I'm giong to put this under the title. Sometimes I will put it under the horizontal access. It just depends what I want or need to write within the title.

I de-emphasized this because it's less important information whereas the main title is bigger and bolder because it's more important.

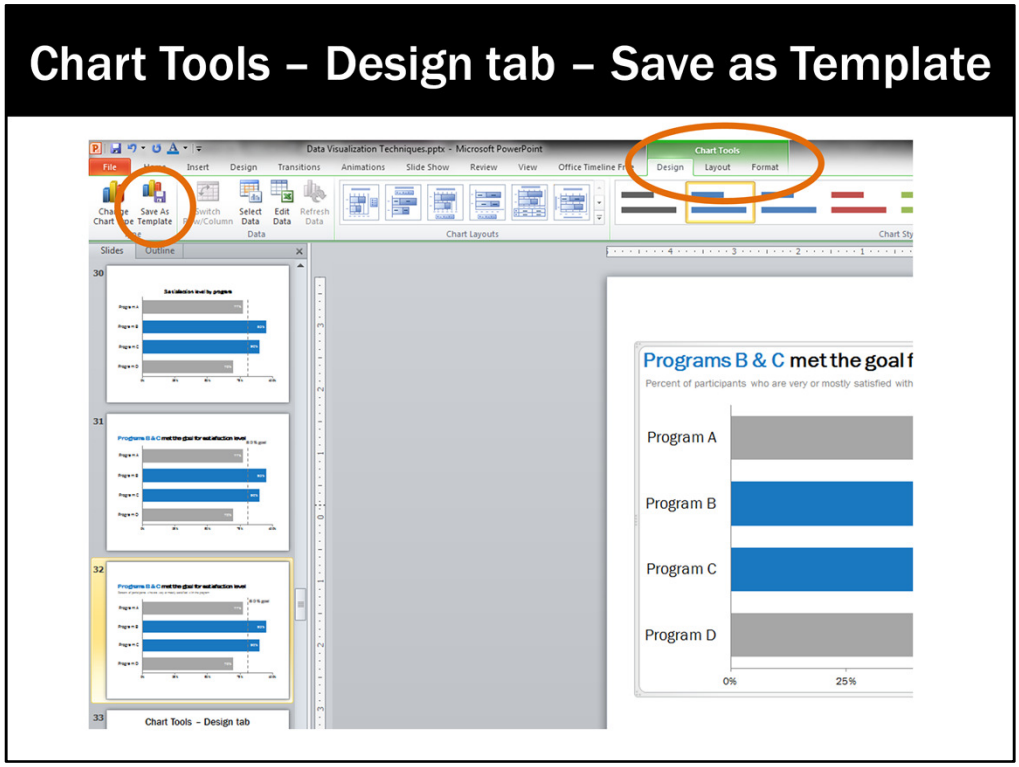


You can also add a caption for further details if needed, like if you need to include your data source. Again, I deemphasize this type of information.



Let's remind ourselves of where we started and where we ended. That's a pretty nice transformation isn't it? Way easier to understand the story in the after.

It took a few steps though to get to the after didn't it? Wouldn't it be nice if the default chart looked a little more like the after? Well guess what – it can be!



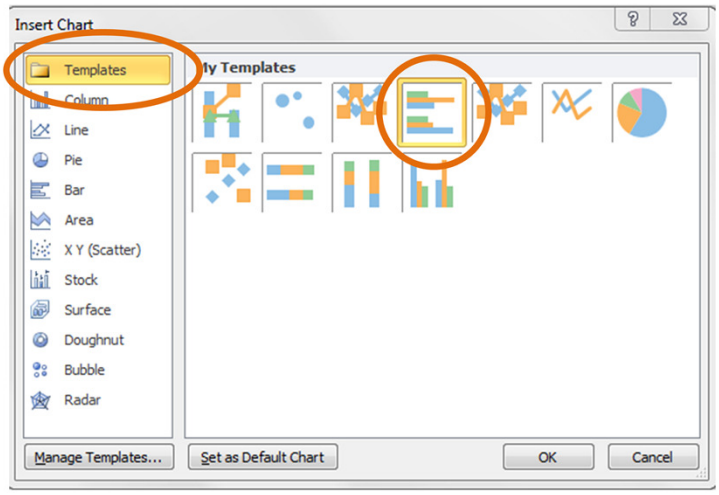
You just have to save it as a template, which is super easy I swear.

So say you have your horizontal bar chart. The chart elements are just the way you want them. The chart is activated (click on it). *Within the Chart Tools menu, go to the Design tab. *On the far left is an icon labeled Save as Template. Simply click that, name the chart whatever you want (for example, I would call this one horizontal bar chart), and then next time want to create a horizontal bar chart, you go to Insert Chart like you normally would, and then select Templates from the Chart Type menu and select your vertical bar chart template. Then, bam, there's your lovely chart that just needs the right data inserted.

You will need to go through that process of saving a template for each TYPE of chart. So do that again for a vertical bar chart, line chart, scatterplot, etc.

I actually created a template for each chart type at PDA that all employees are able to access. They love it because they can easily create charts that they know will meet my standards, and as an organization it's great because it helps create a professional, unified look. Seriously, you gotta try this out when you get back to work.

Insert Chart – Templates– Select template



Then next time want to create a horizontal bar chart, you go to Insert Chart like you normally would, and then select Templates from the Chart Type menu and select your vertical bar chart template. Then, bam, there's your lovely chart that just needs the right data inserted.

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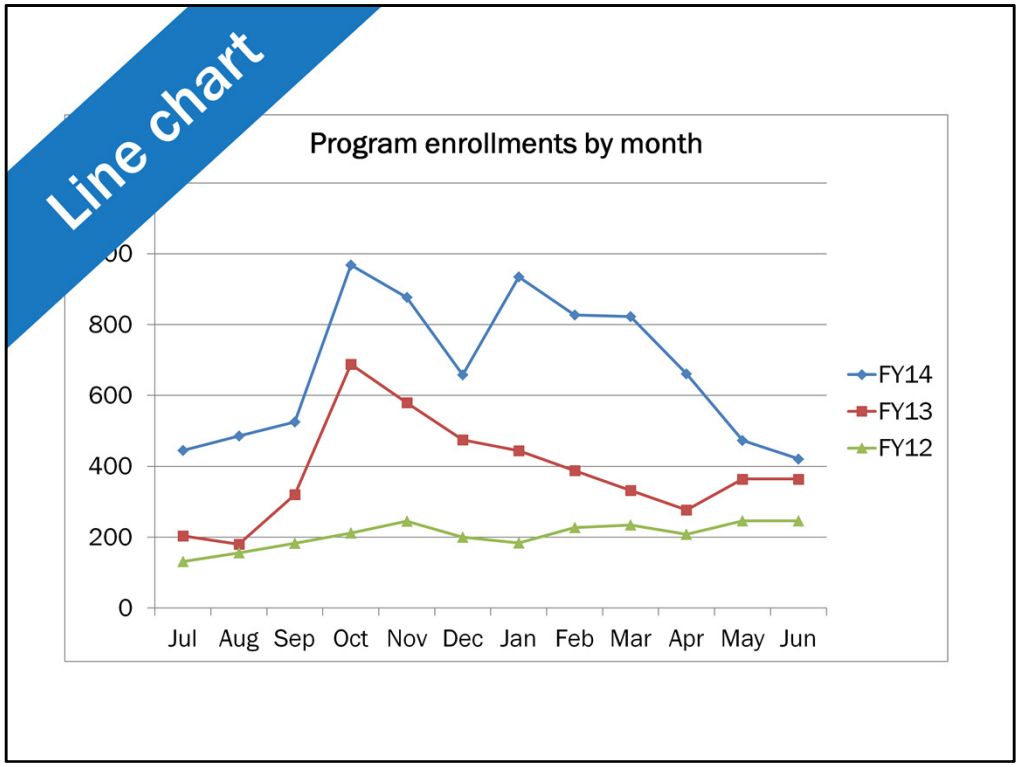
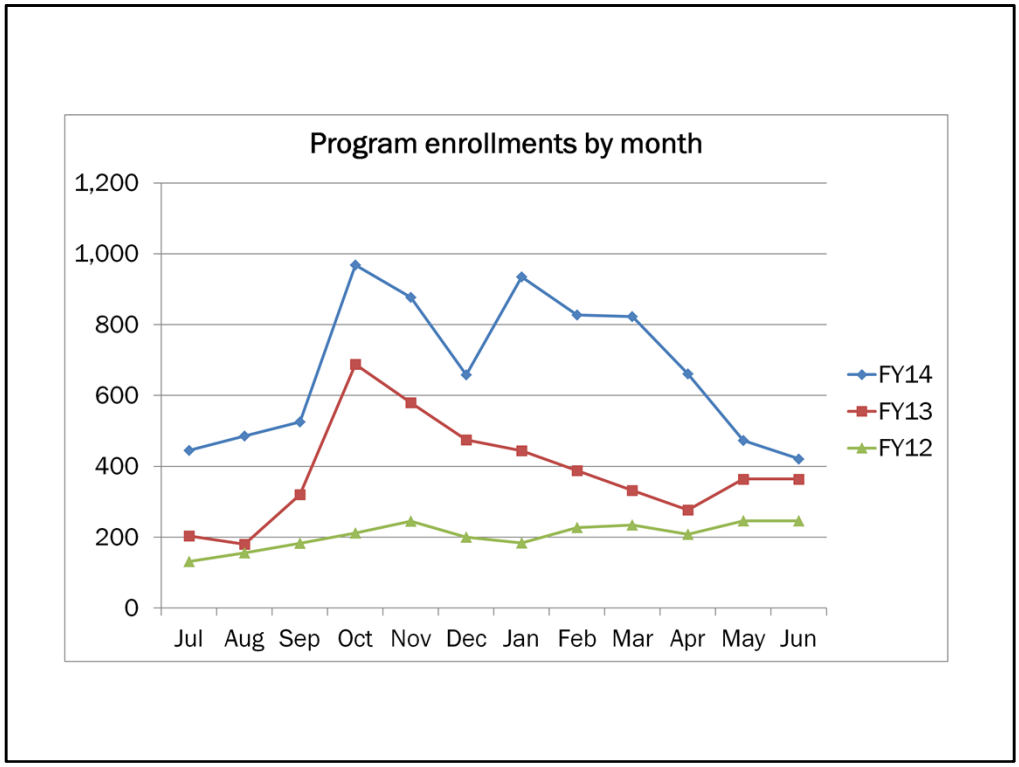
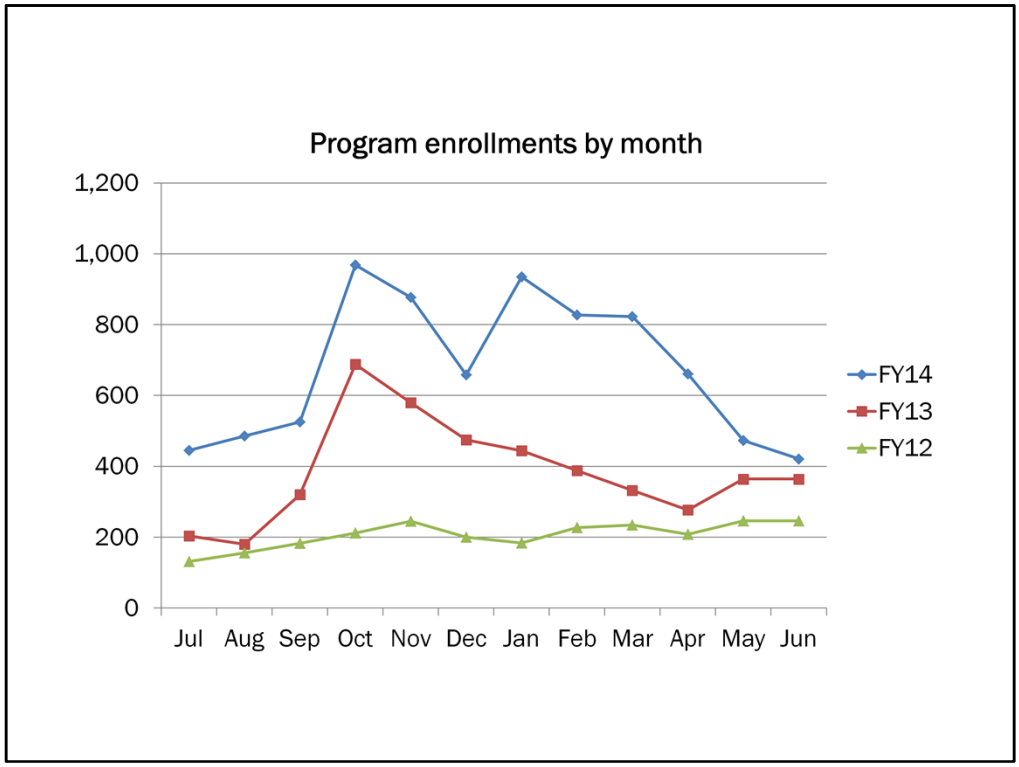


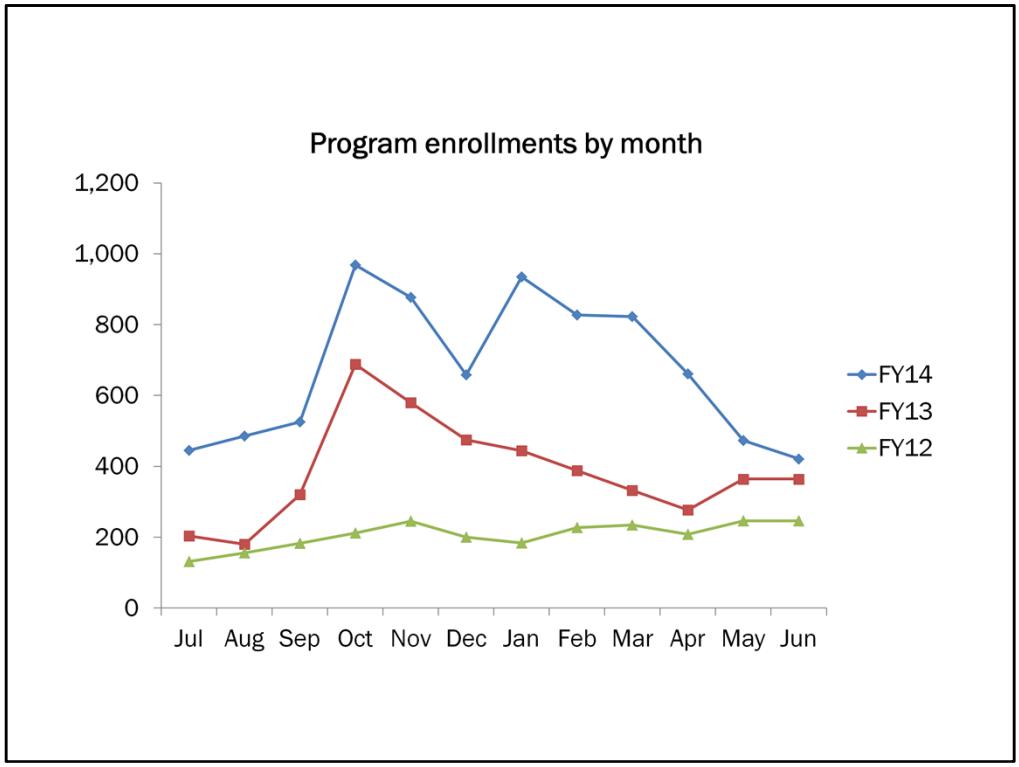
I'd like to run through those steps a little quicker using a line chart.



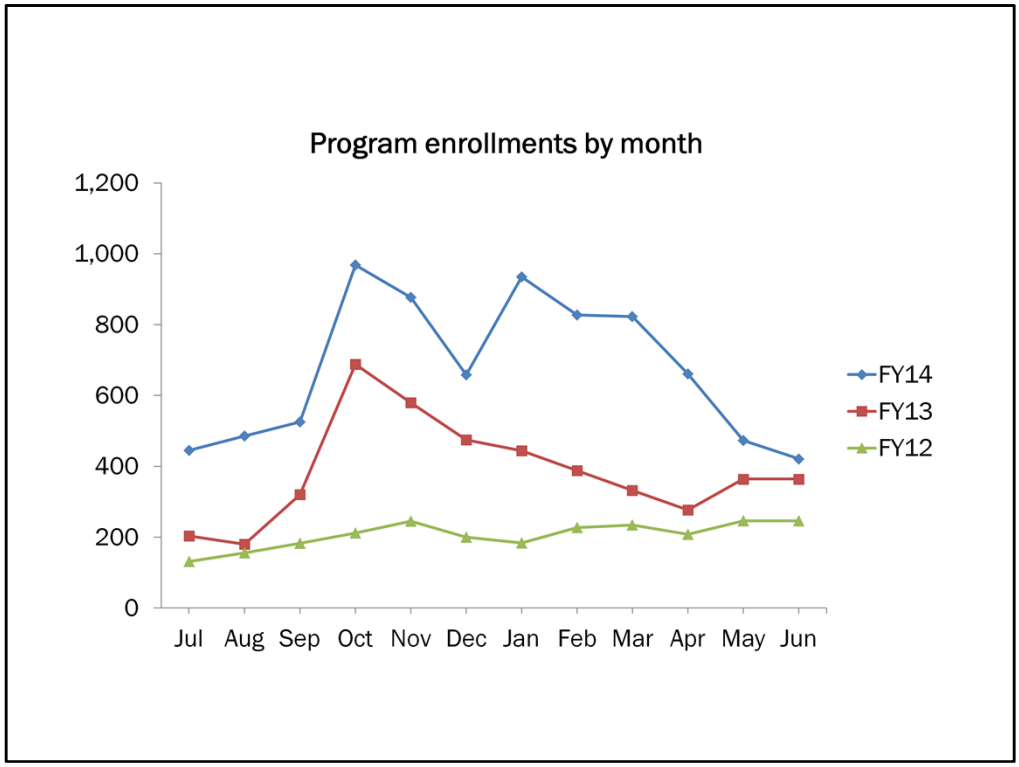
In this case I thought the y-axis min and max was just fine. I personally just like to add in the comma for numbers in the thousands.



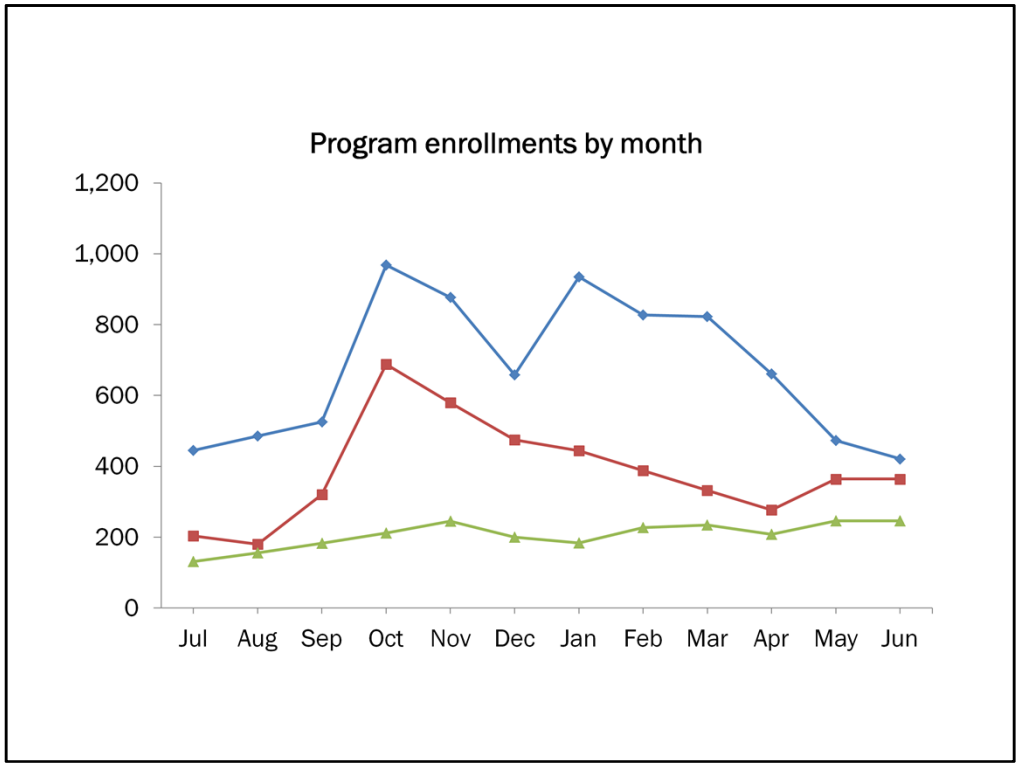
Let's get rid of the border.



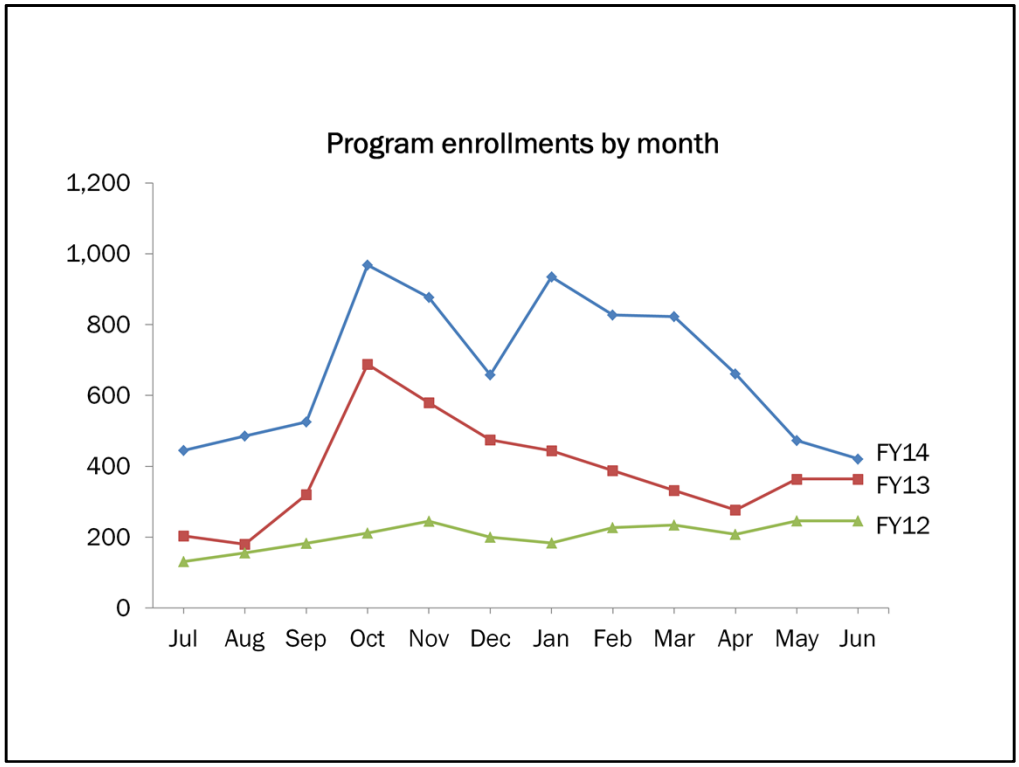
The gridlines



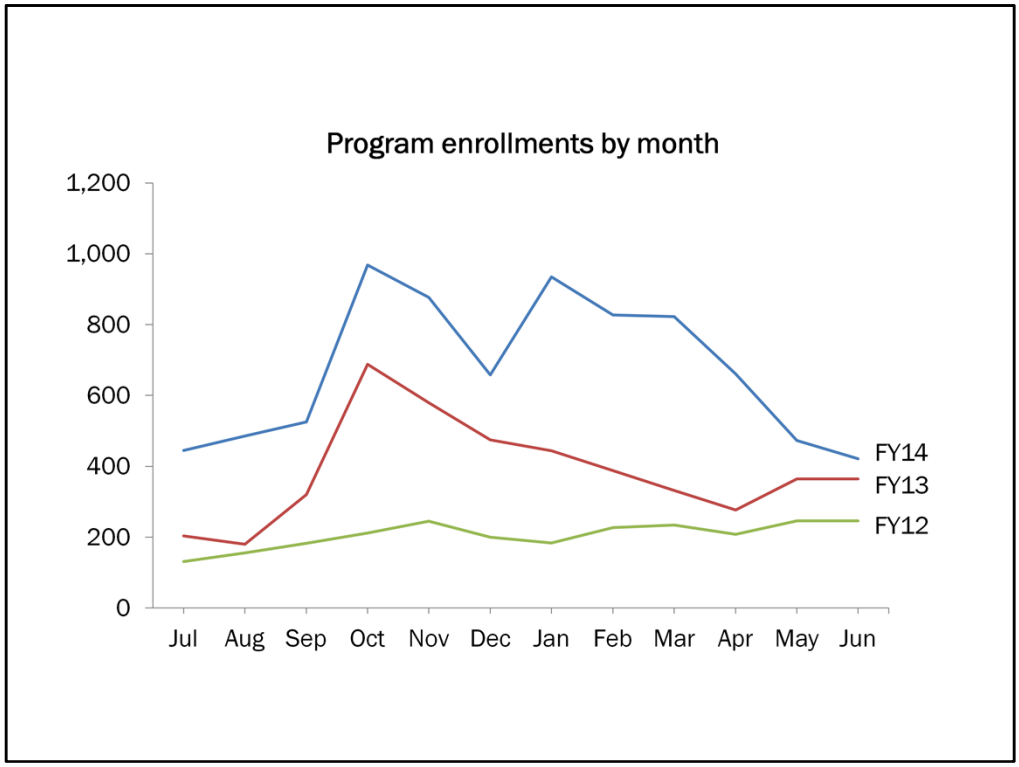
For the tickmarks along the x-axis I would like to actually have them show where the data points are, so I used the minor tickmarks instead of the major tickmarks.



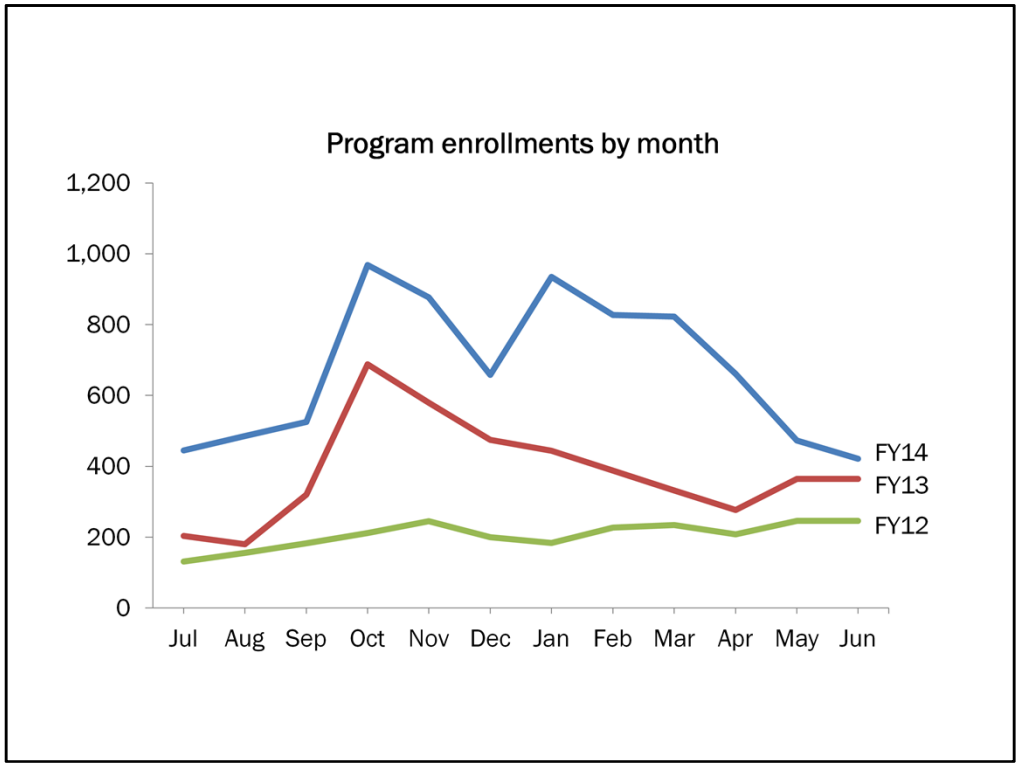
Now let's get rid of that legend.



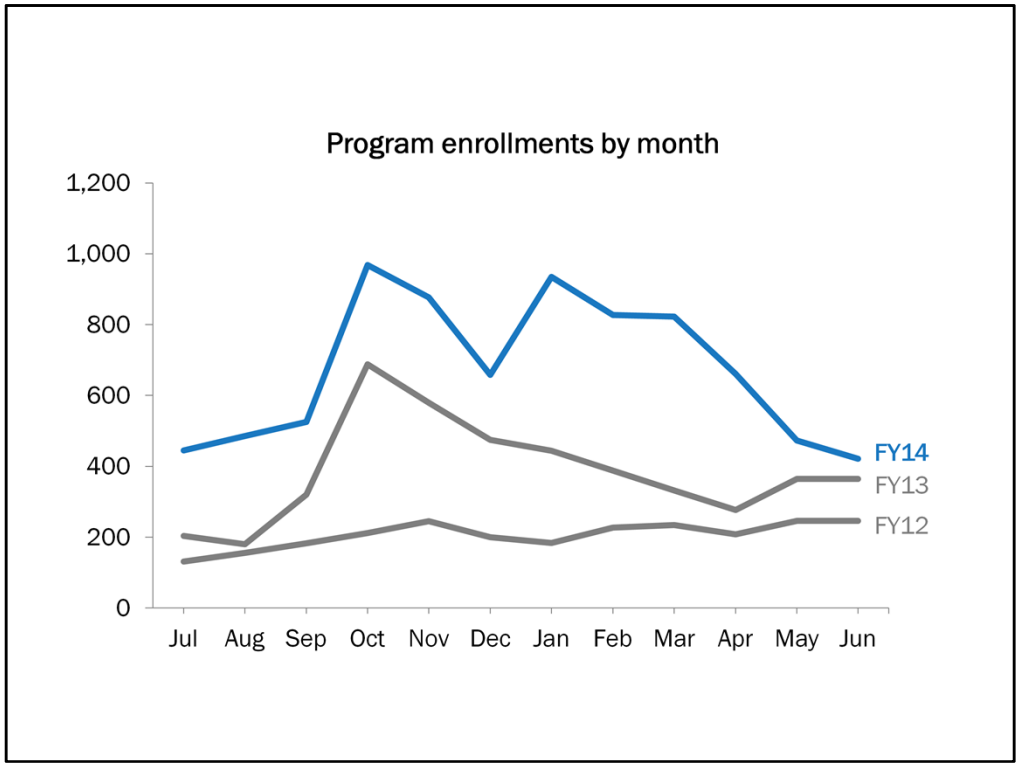
And directly label.



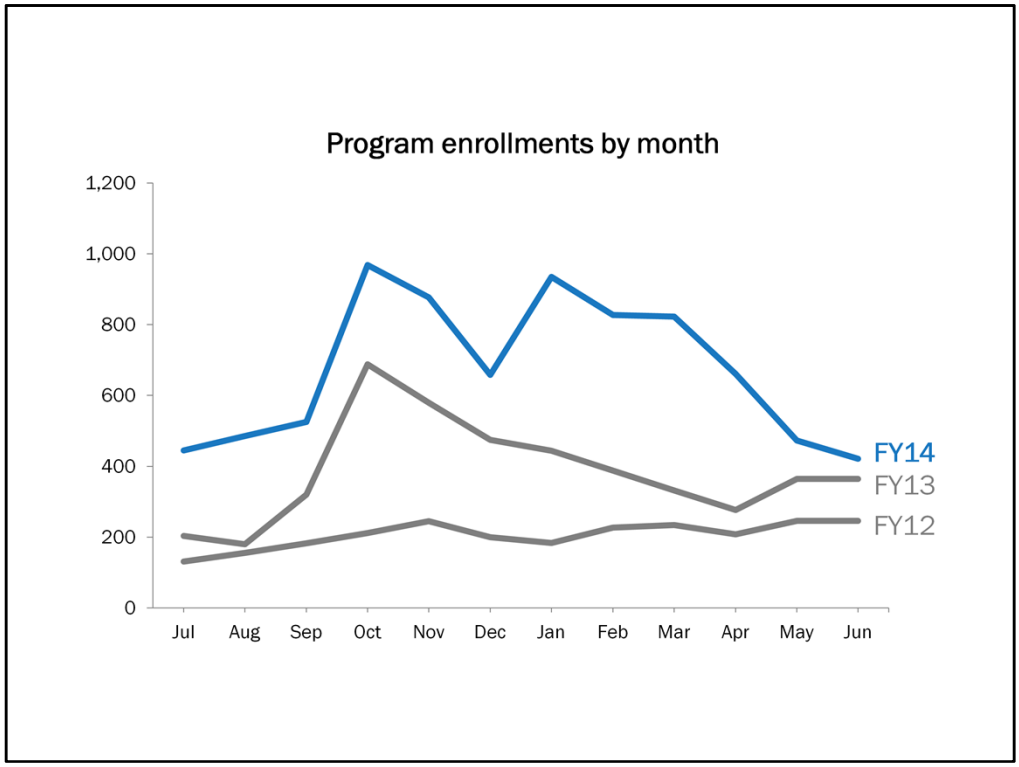
Get rid of the markers.



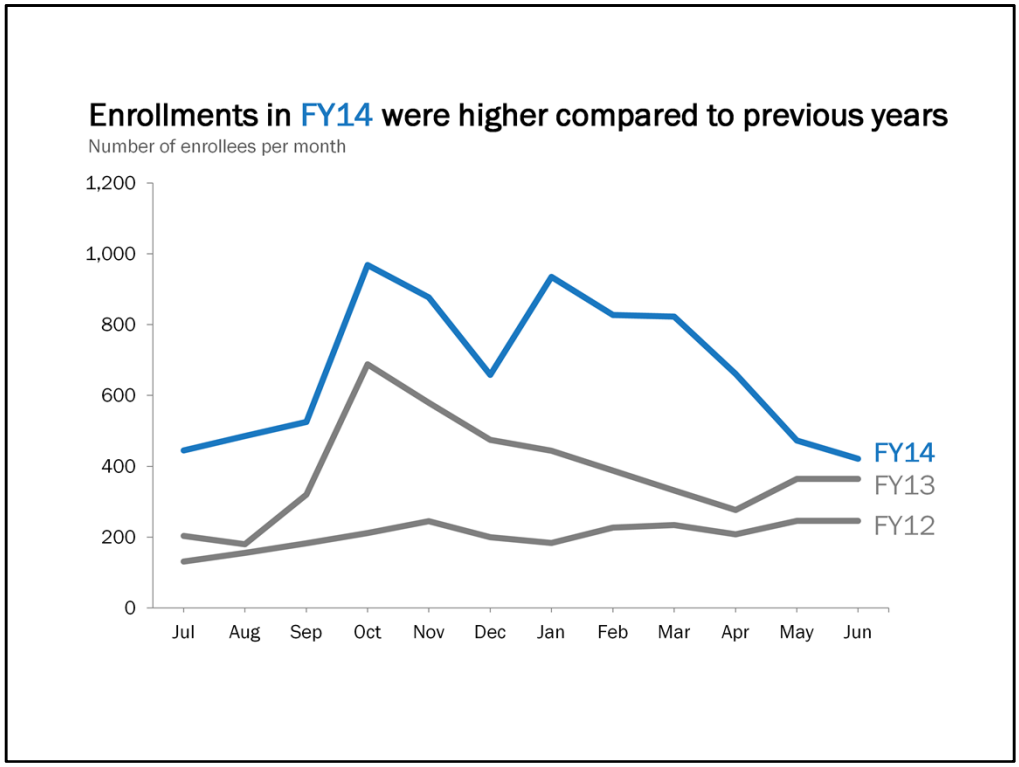
Now we'll thicken the lines a little, mostly for presentation purposes.



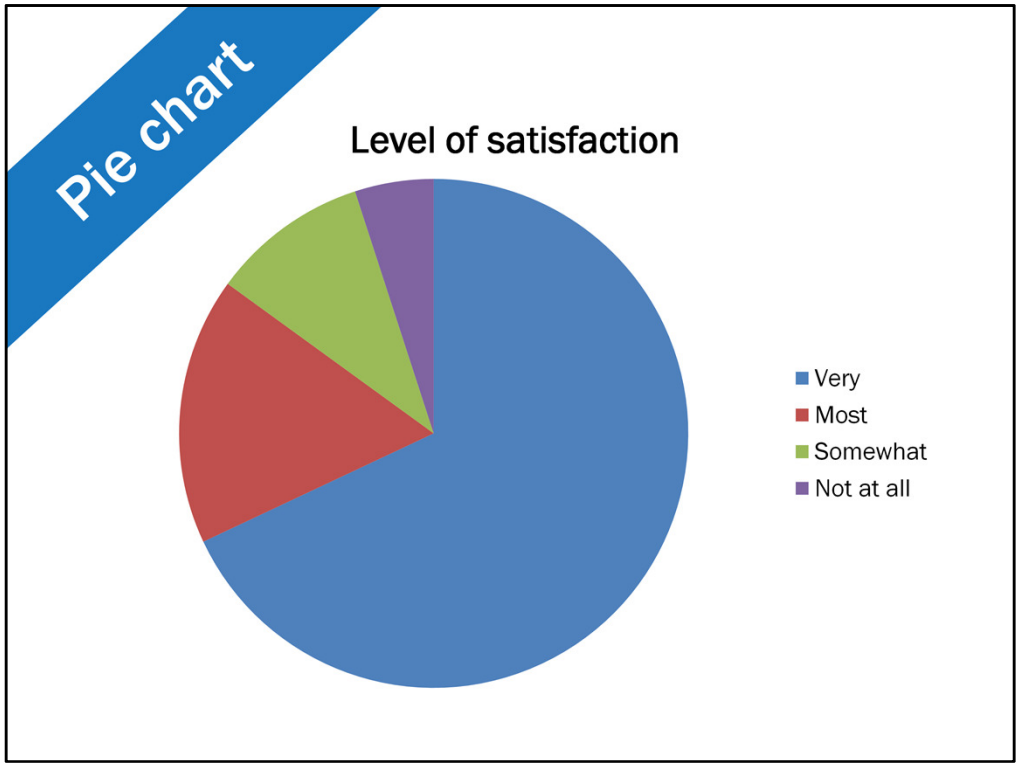
Now say our main focus is FY14. We can emphasize that line that line with color and deemphasize the other two with gray.



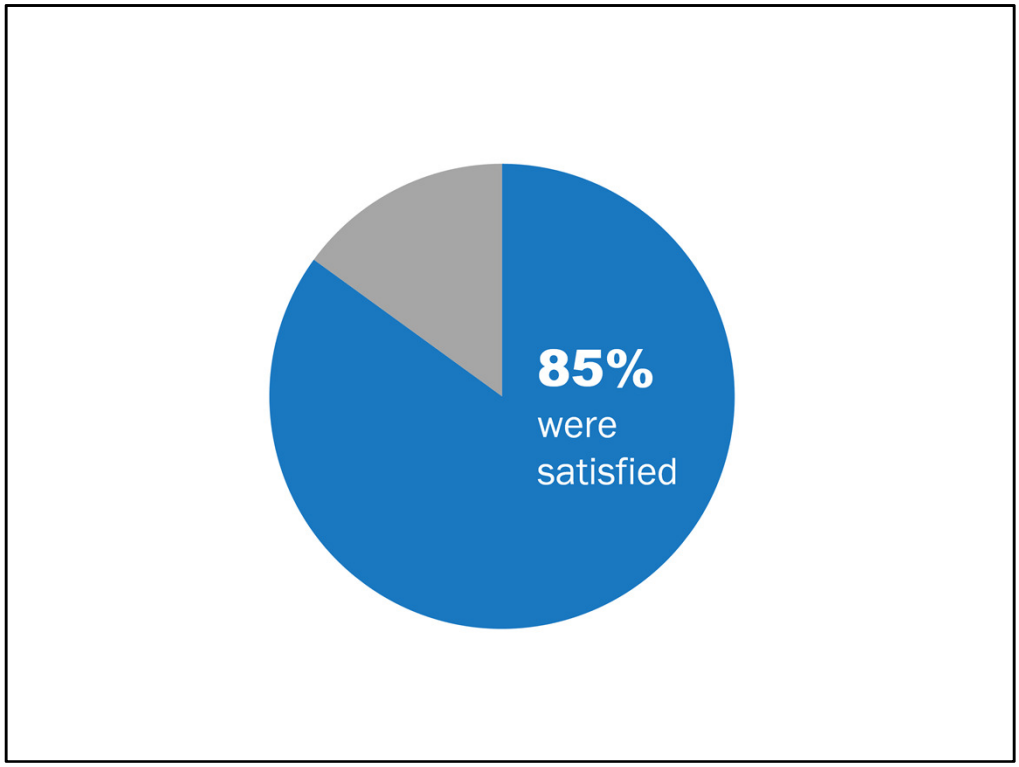
I'm also going to make the data labels a little bigger and the axis labels a little smaller.



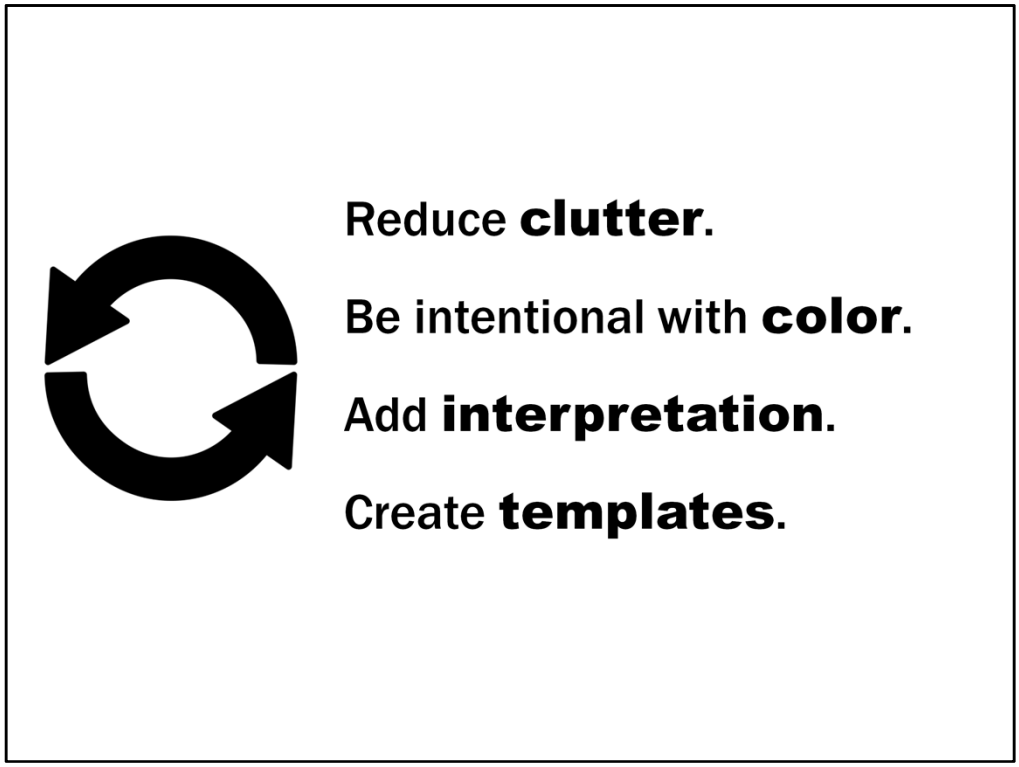
I'm also going to make the data labels a little bigger and the axis labels a little smaller.



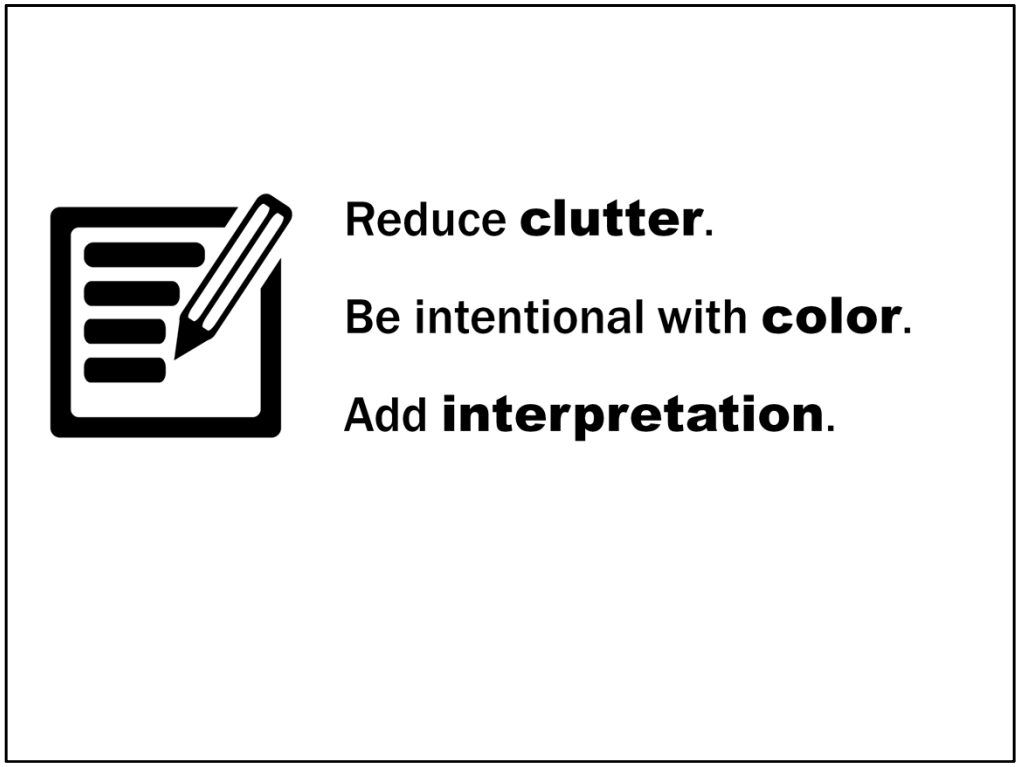
Now I want to show you one quick pie chart makeover. I know you're thinking, but you said to resist the temptation to use a pie chart because of it's circular axis! Some might argue with me on this, but I do think there's an acceptable way of using a pie chart.



And that is like this. I limit it to two categories and I highlight the one of interest in a bright color while deemphasizing the other slice in a lighter gray. Then I'll add a text box with the finding. To me this helps show the general finding when I only have one key piece of data to relay.



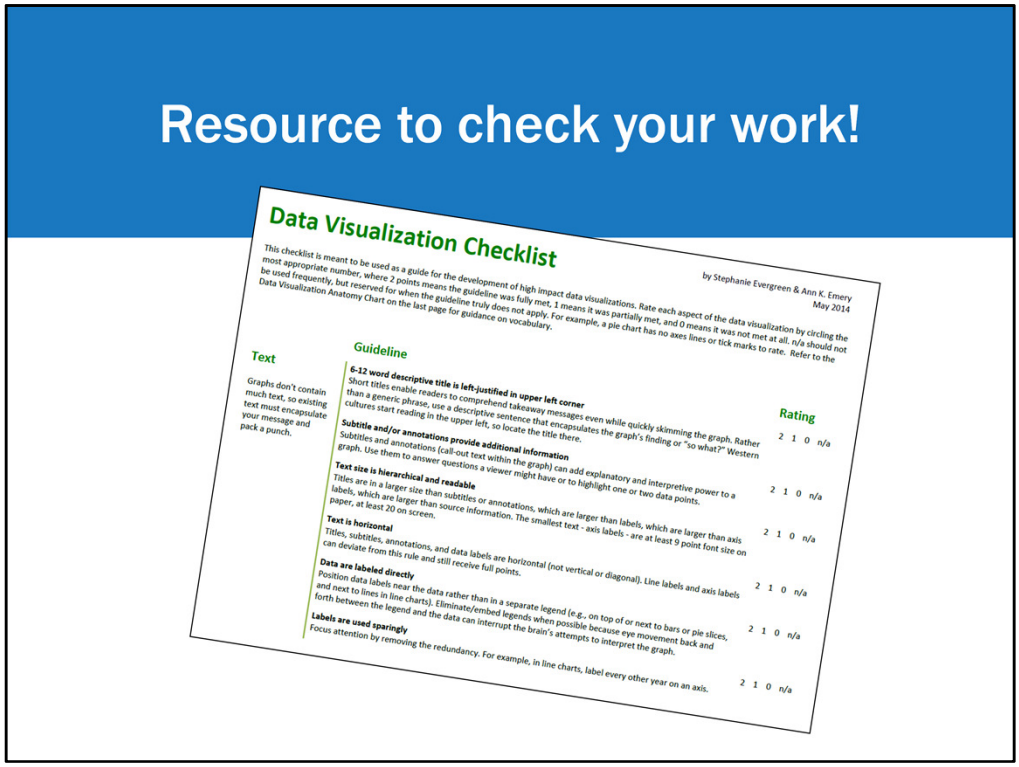
So to recap – choose your story, choose your visual, and choose your charts wisely.



Let’s revisit your own example. Sketch out your visual now under letter B. What are some Excel defaults that you’re going to do away with? If you have the habit of using some of these unnecessary defaults, make a note to yourself about what you can delete. Again, this doesn’t have to be exact. Just think through the essential components of your chart and what you can forgo in order to reduce clutter.

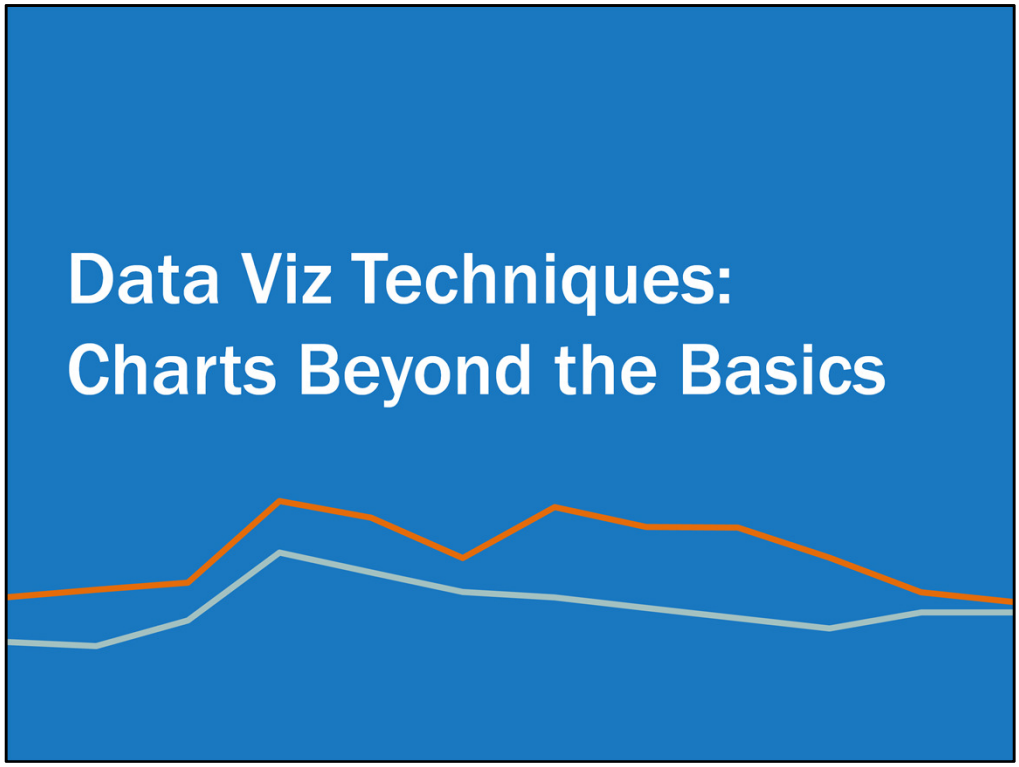
Then I want you to think about ways in which you can emphasize the main takeaway. What can you do with font size, data labels, color?

Finally, add an interpretative title. Tell the reader what the chart is saying. Add a subtitle if needed.

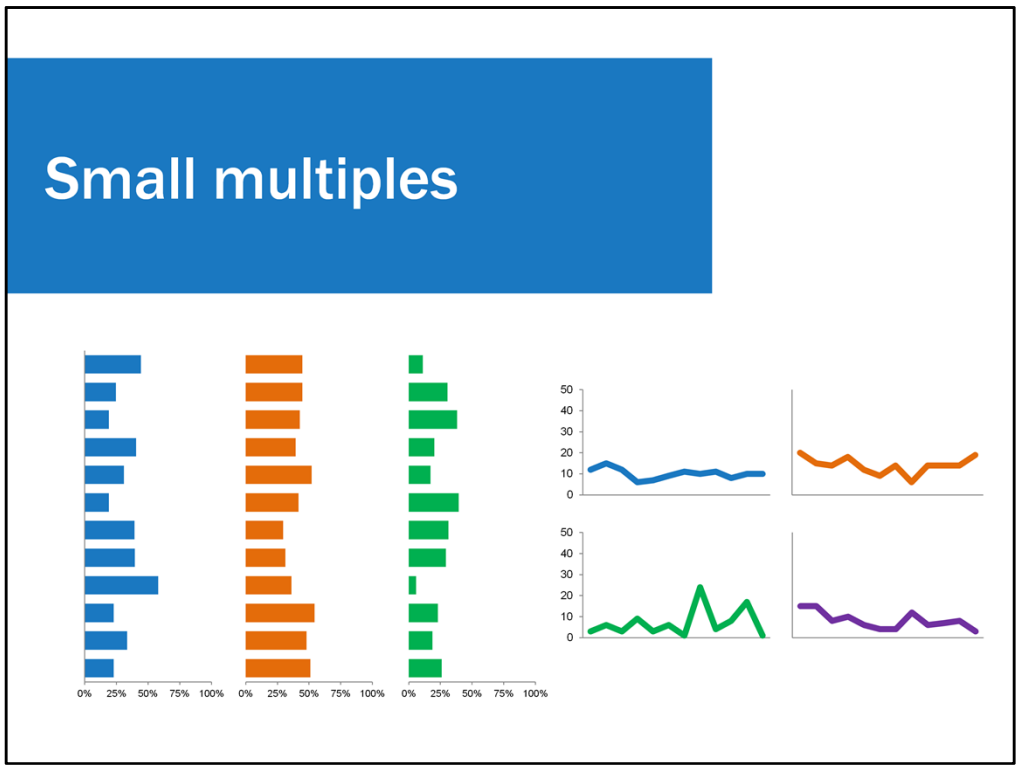


I know that can be a lot to remember and keep straight. One awesome resource that might help you out with this is Stephanie Evergreen and Ann Emery's data visualization checklist. It's free through Stephanie's website and is a really straightforward way to go through a chart and make sure you've developed a high impact data visualization. You basically score yourself on each chart element. This has been really helpful for me in the past. I've even walked through it with a bunch of my co-workers using a chart as an example to figure out areas for improvement, and it was a learning opportunity for them as well.

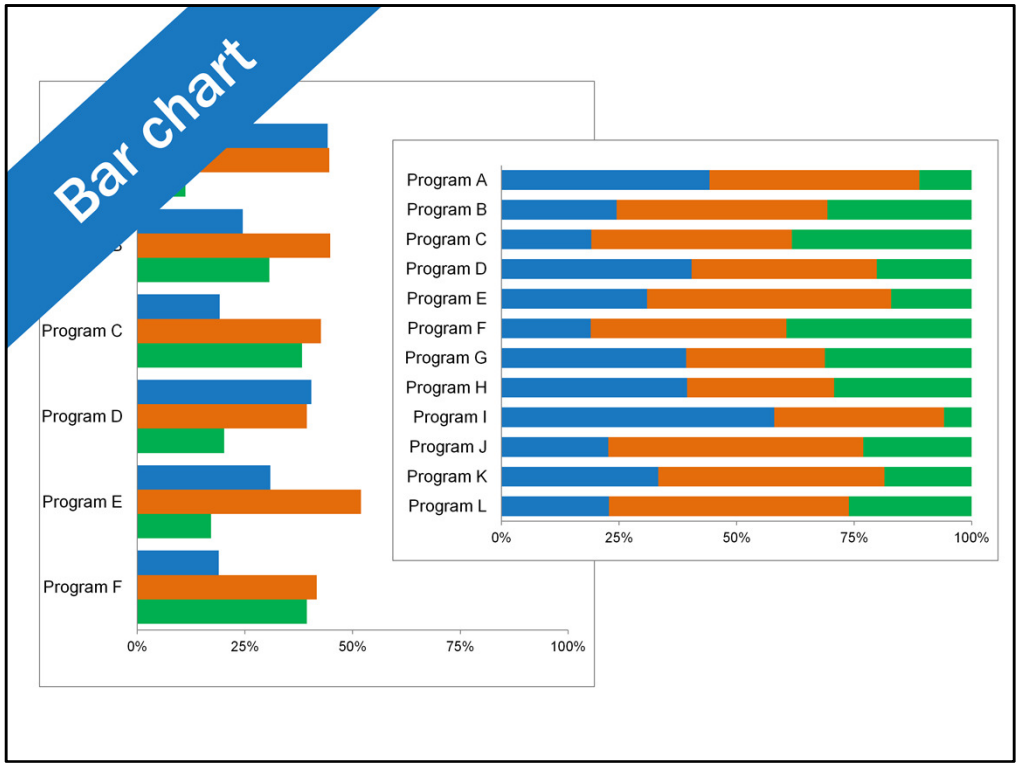
I included a link to access this in the Resources section on the back of my handout.



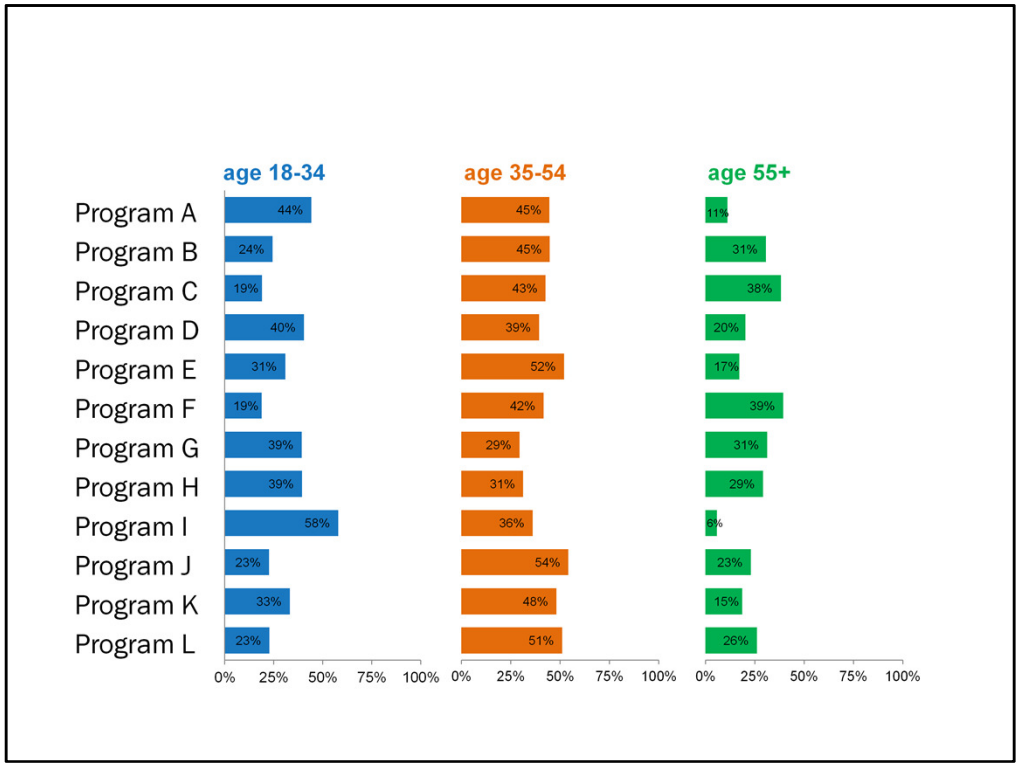
All right. So hopefully this has been helpful so far in terms of thinking how to rethink the basic charts in Excel. Now I'm going to blow your socks off and show you some charts you can create in Excel with a few ninja skills.



The first one is called small multiples.



One problem I used to run into was charts like this. Lots of groups, multiple categories, really hard to understand the takeaway right? I discovered a relatively simple solution to this from a brilliant gal named Ann Emery.

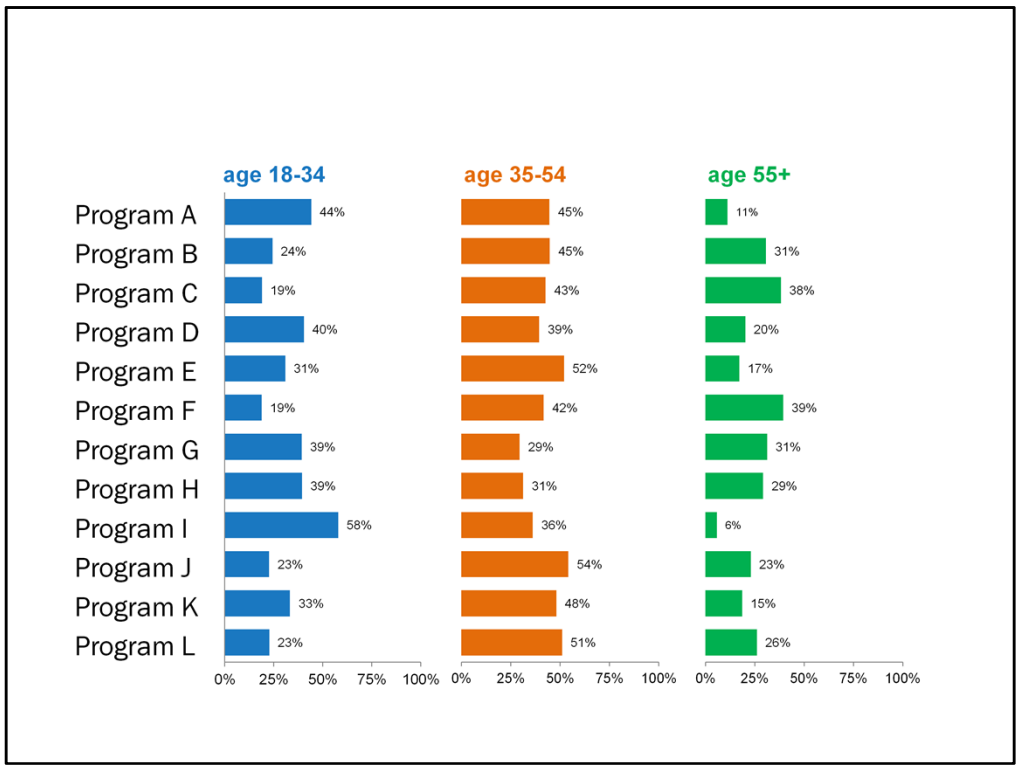


You can break the data up into side by side bar charts, or small multiples. Now it's easier to see which programs serve a high or lower proportion of each age group.

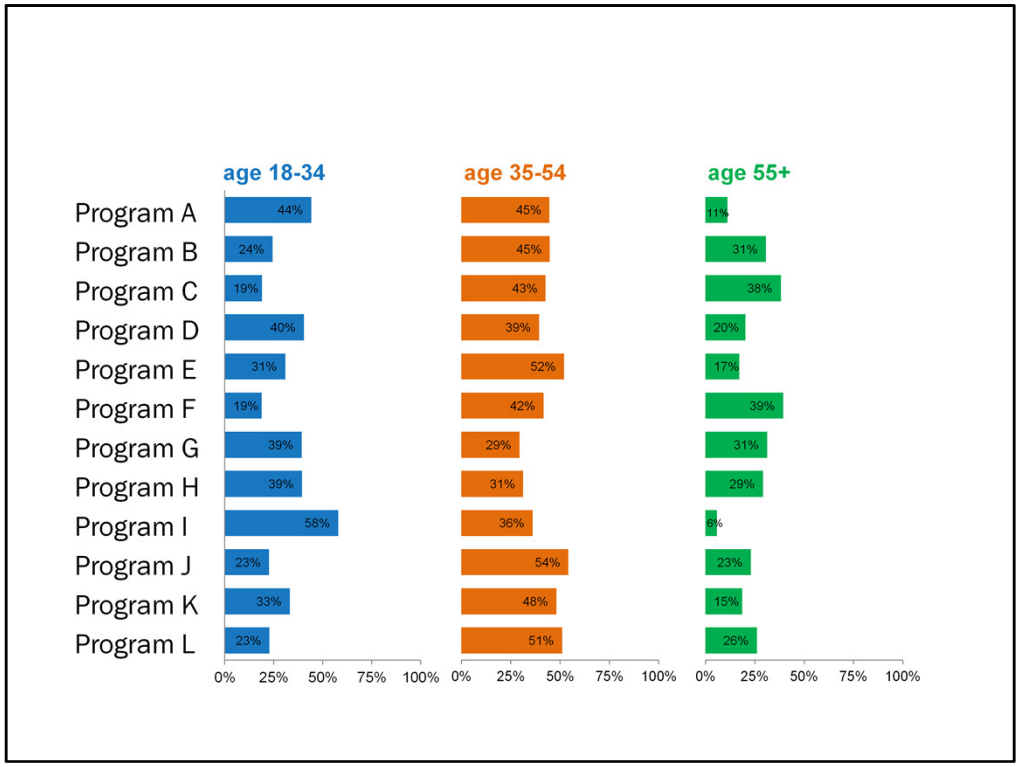
I think of this as one chart, but it's actually three separate charts. I copied the first one to create the second and third one and pasted in the right data for each age category. I deleted the program names from the vertical axis on the second and third chart since it's the same across all charts.

I also want to point out that with this chart we combined 6 age categories into 3. Some of the values were smaller, and this breakdown still provides the needed information.

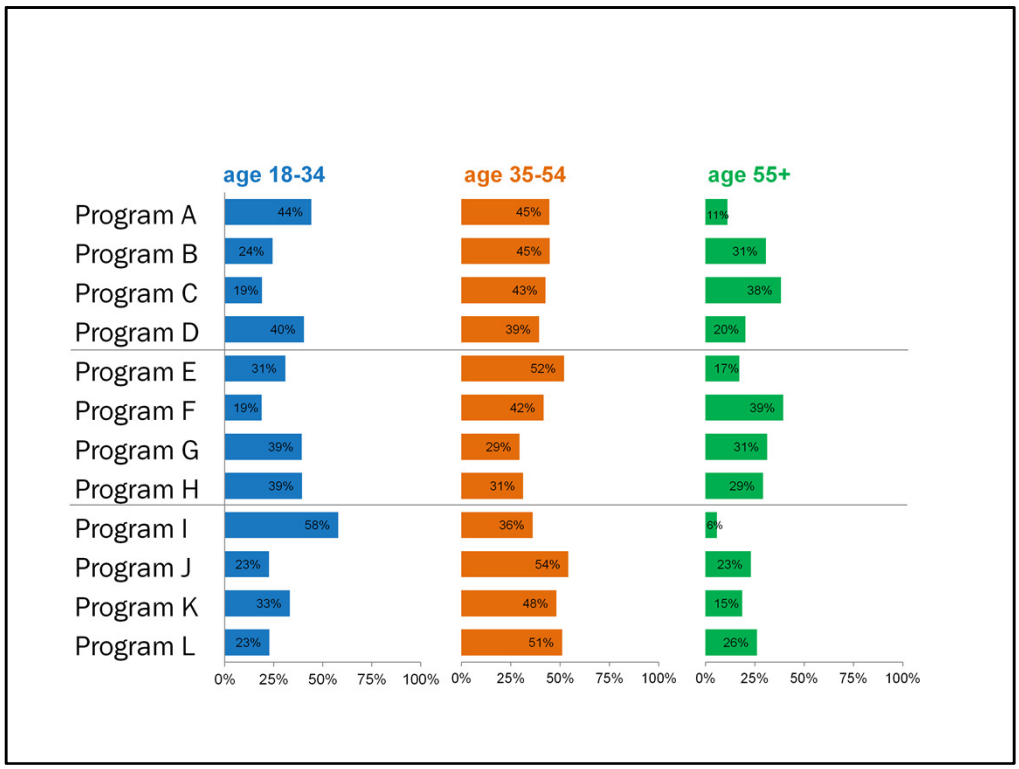
I want to show you here what it looks like when the data labels are outside of the bars instead of inside them.



Not as clean is it?

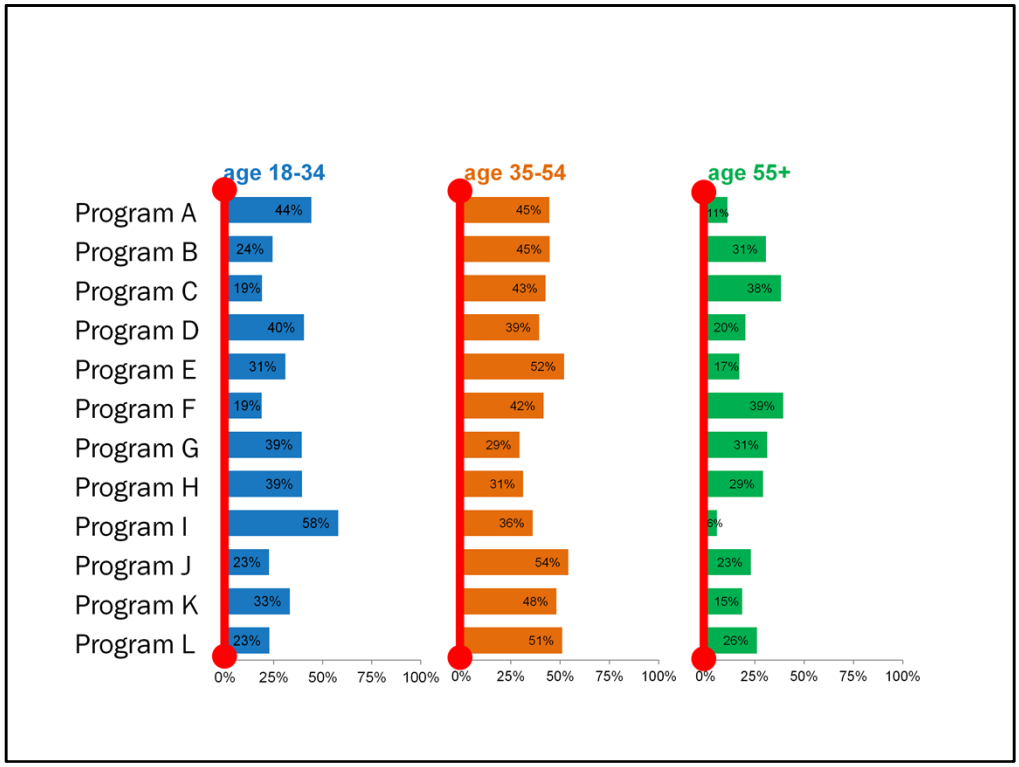


Having them inside the bars really cleans up the chart area.

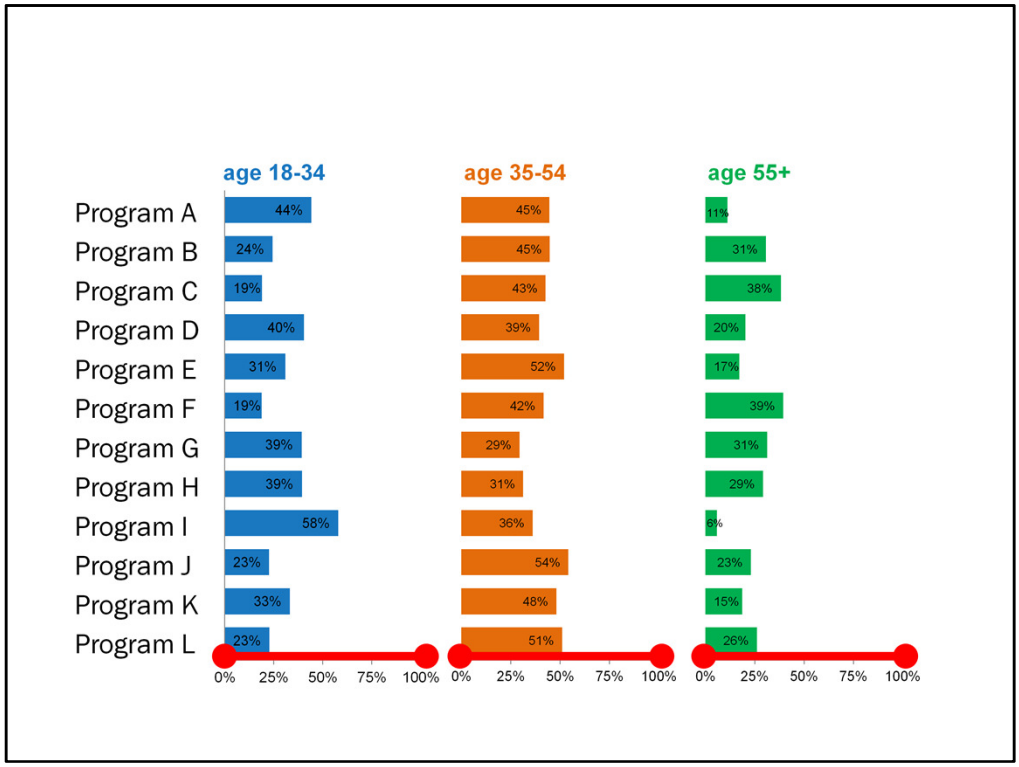


One thing I sometimes do with this type of chart is to add in a line just to break it up a little and make it easier for the eyes to follow the data across one program. You could also use lines like this to separate categories of performance, for example.

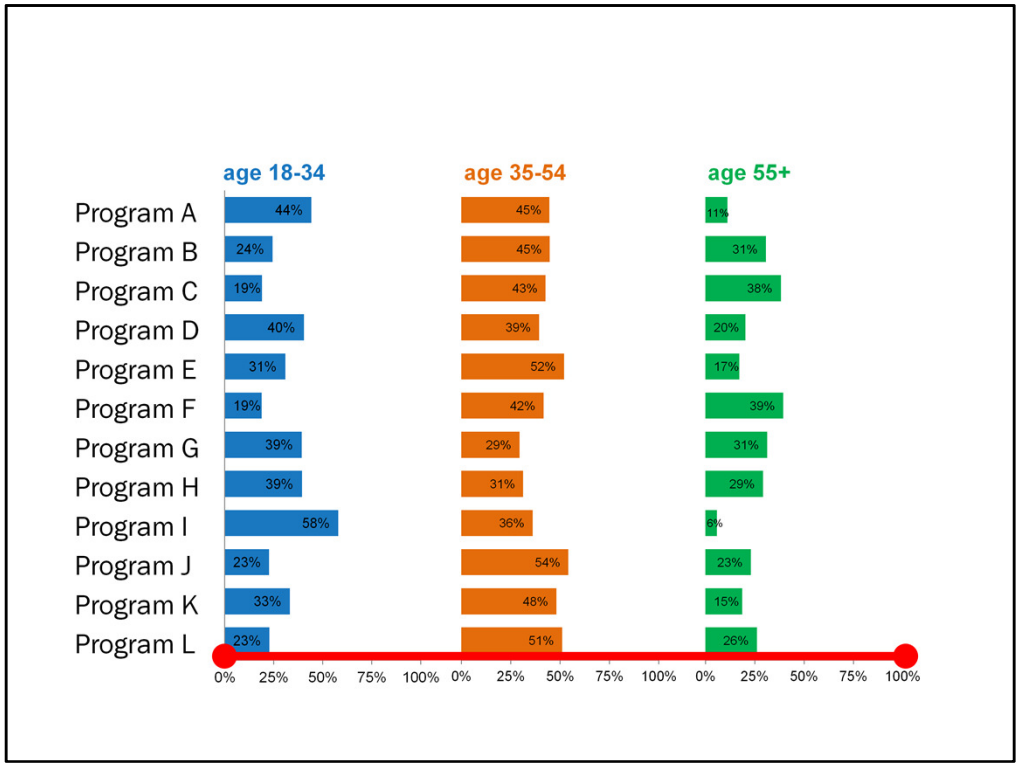
One thing to keep in this with these charts…



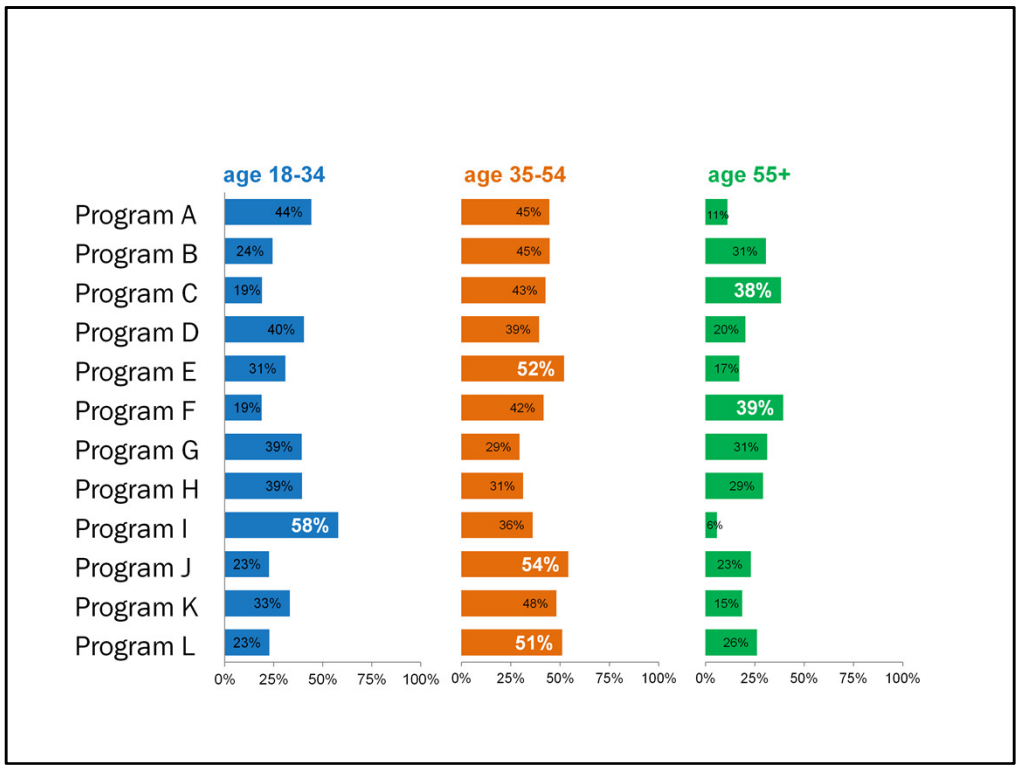
It's super important for the chart areas to be the exact same size – this includes the vertical axis…



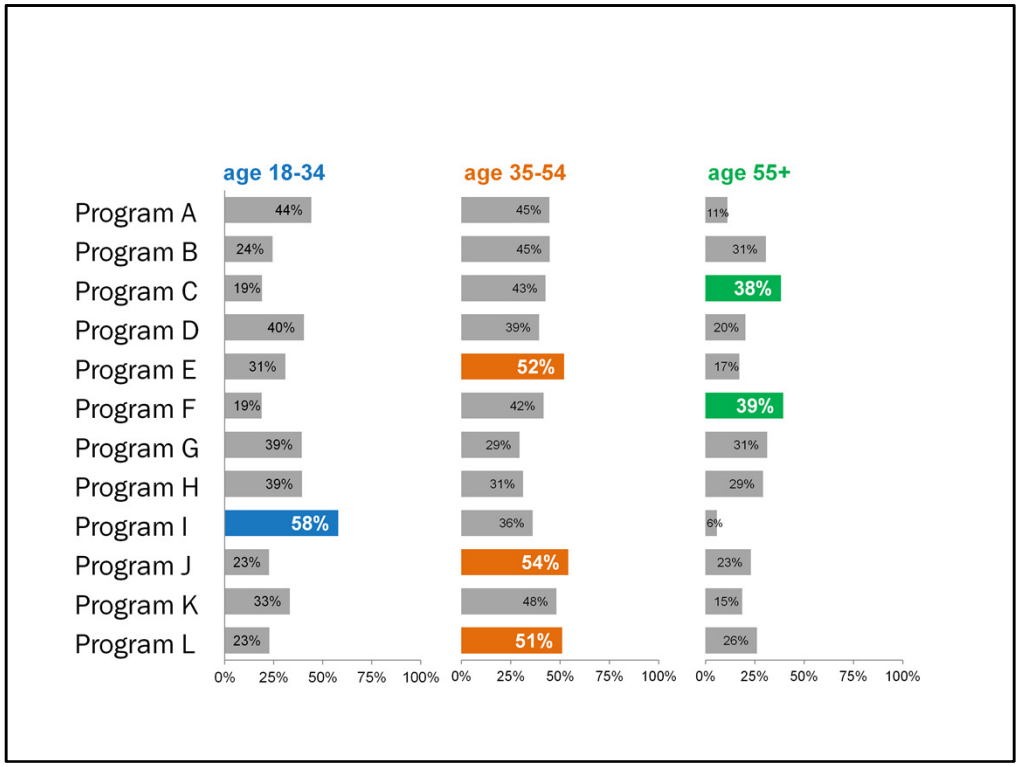
And the horizontal axis. That way you can fairly and accurately compare one program's data to another's. For the same reason, it's important for the axis to be set at the same max.



You also want to be sure they line up perfectly so that the eyes easily follow across one program's row of data.

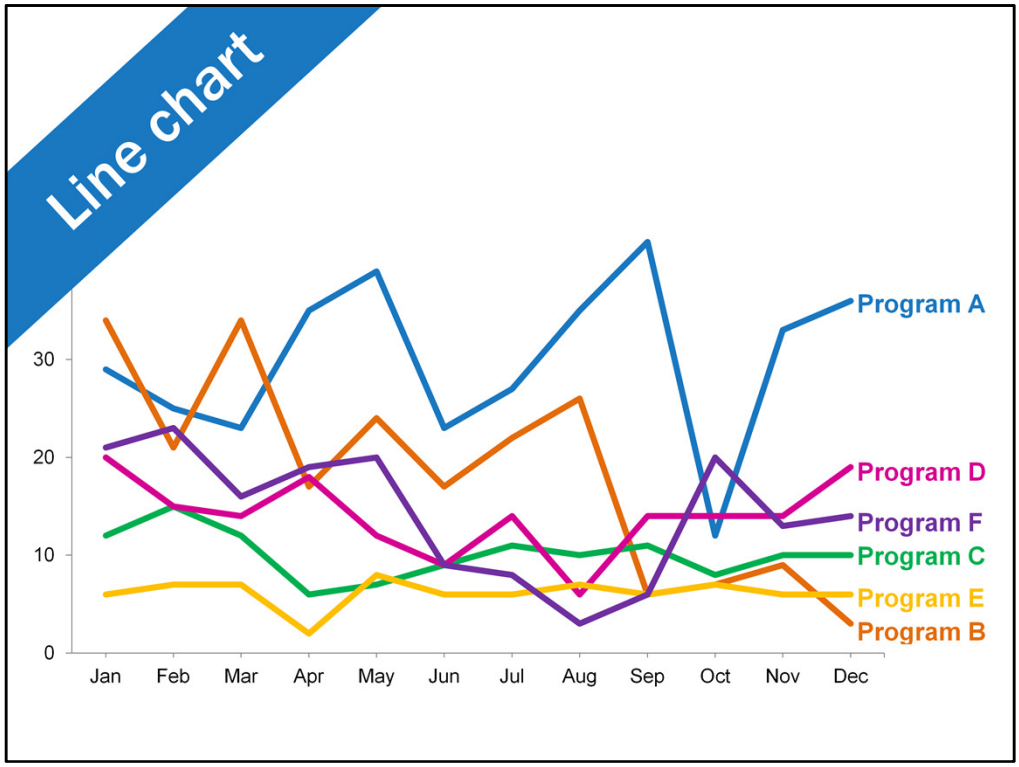


If you wanted to add emphasis to these charts in some way, you could select specific values to highlight, whether it's my emphasizing the font…

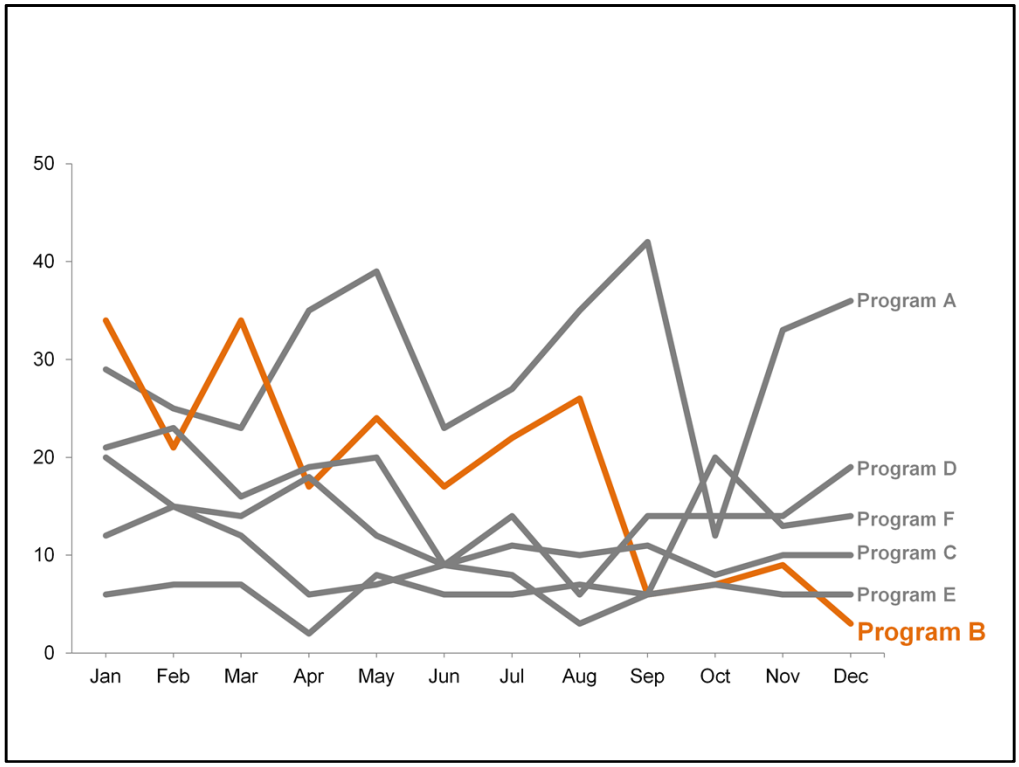


Or the colors of the bars.

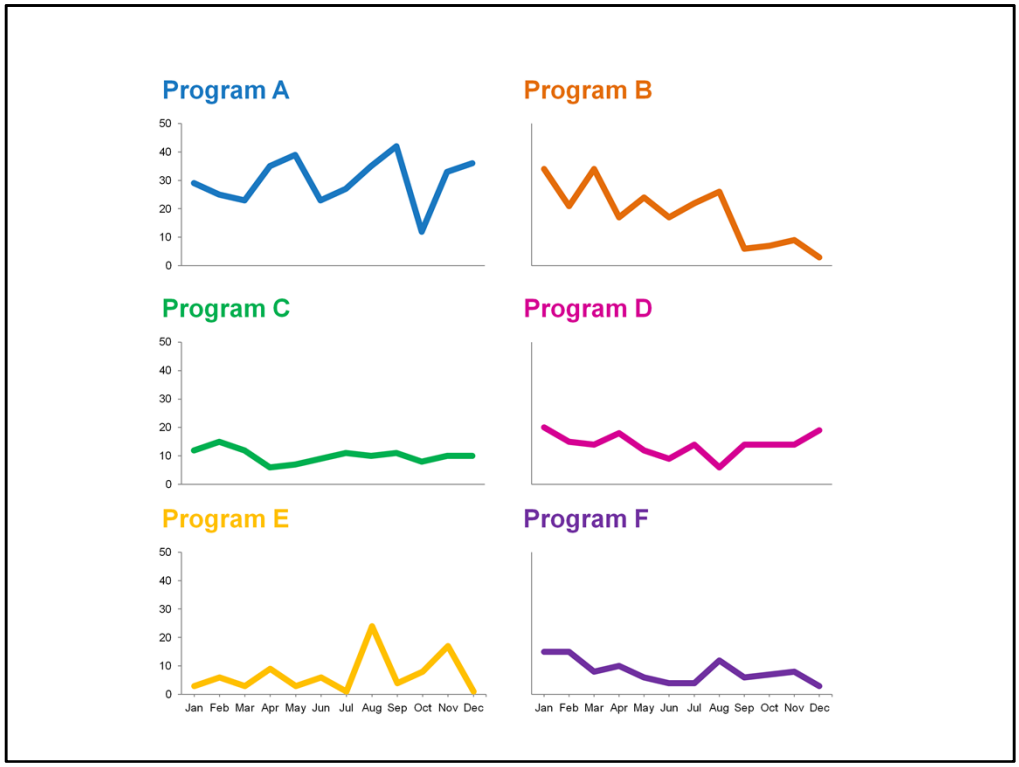
So that's small multiples with bar charts.



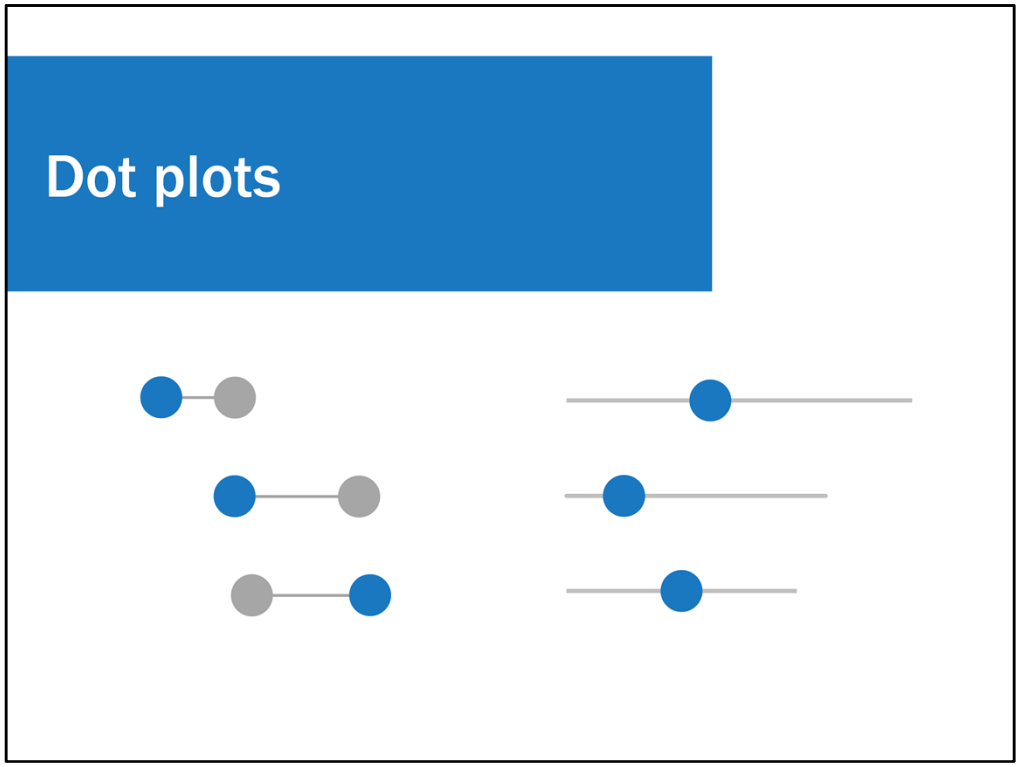
You can do the same thing with line charts. This looks like some pretty cool scribbly art work but it's hard to focus long enough to understand the story of this chart. It takes a lot of effort.



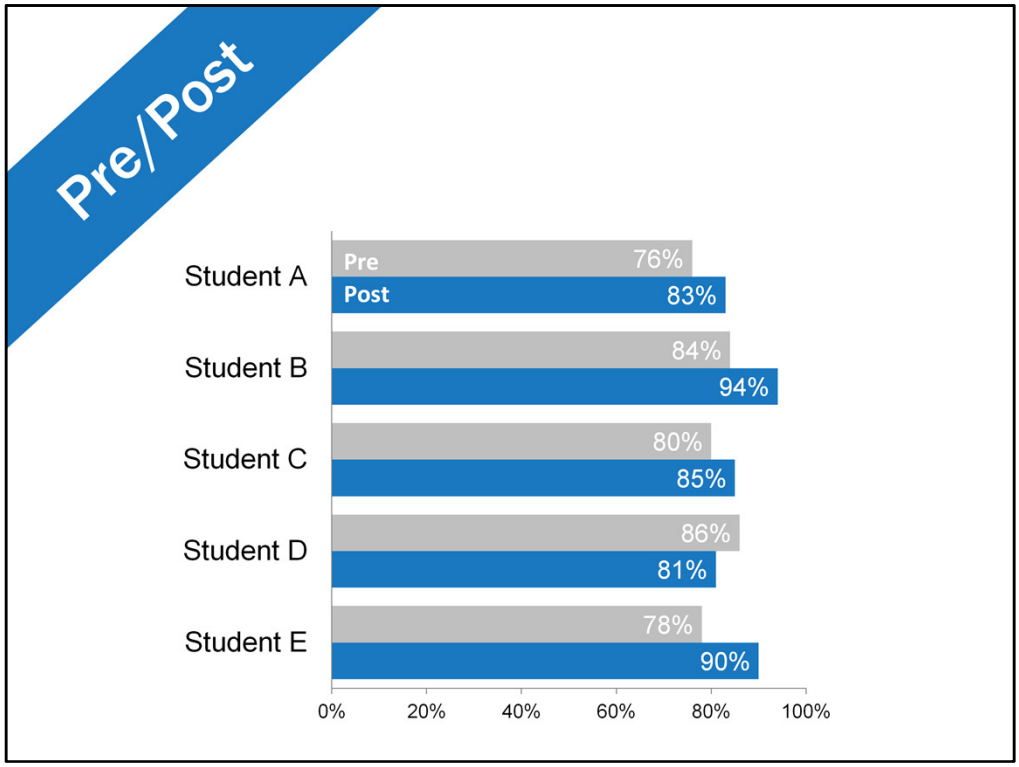
One solution is to gray out everything except the data point you want to draw attention to.



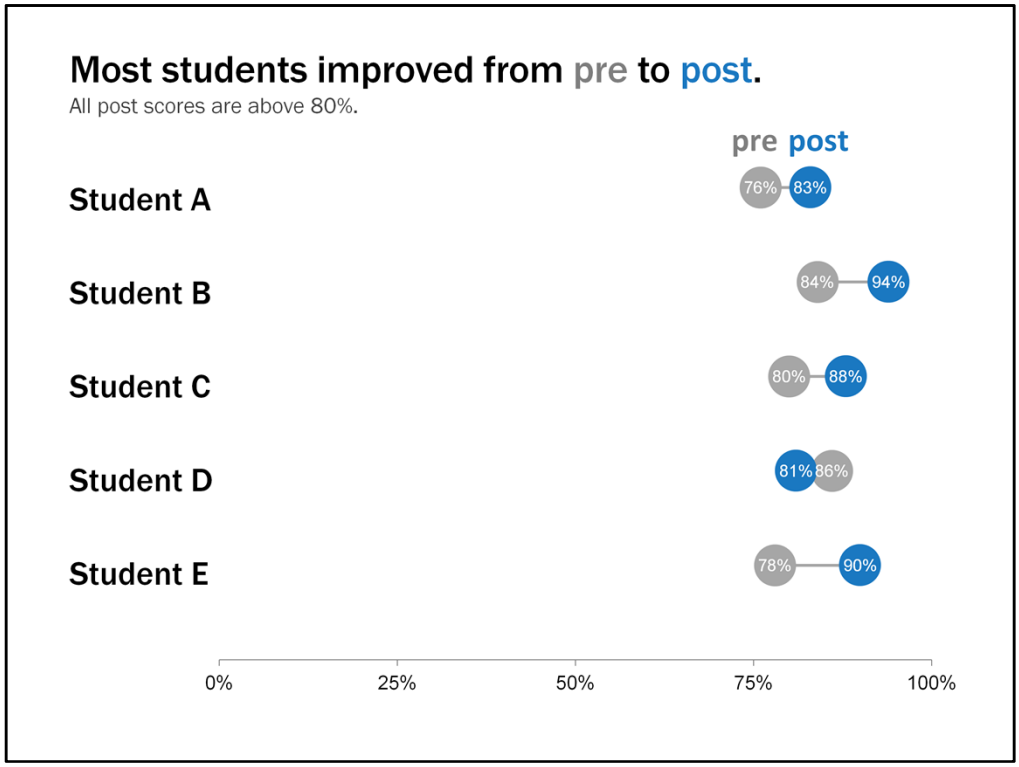
But if they're all important, you can simply break the chart up into 6 separate graphs – one for each program. This makes it a little easier to see the trend for each program. Again, it's very important for the chart area to be the exact same size across all charts. With these small multiples you'll see that I only included the y-axis labels on the bottom two charts and the x-axis labels for the 3 charts on the left. The idea is that the same axis applies and is only needed for the base layer. So you end up hiding all axis labels for Programs B and D in this example.



Another chart I want to talk about are dot plots. From Excel's menu you use scatterplots to create dot plots. This was another trick I learned from Stephanie Evergreen. I've gotten the hang of creating them and am just running wild with it. there are lots of uses for this type of chart.

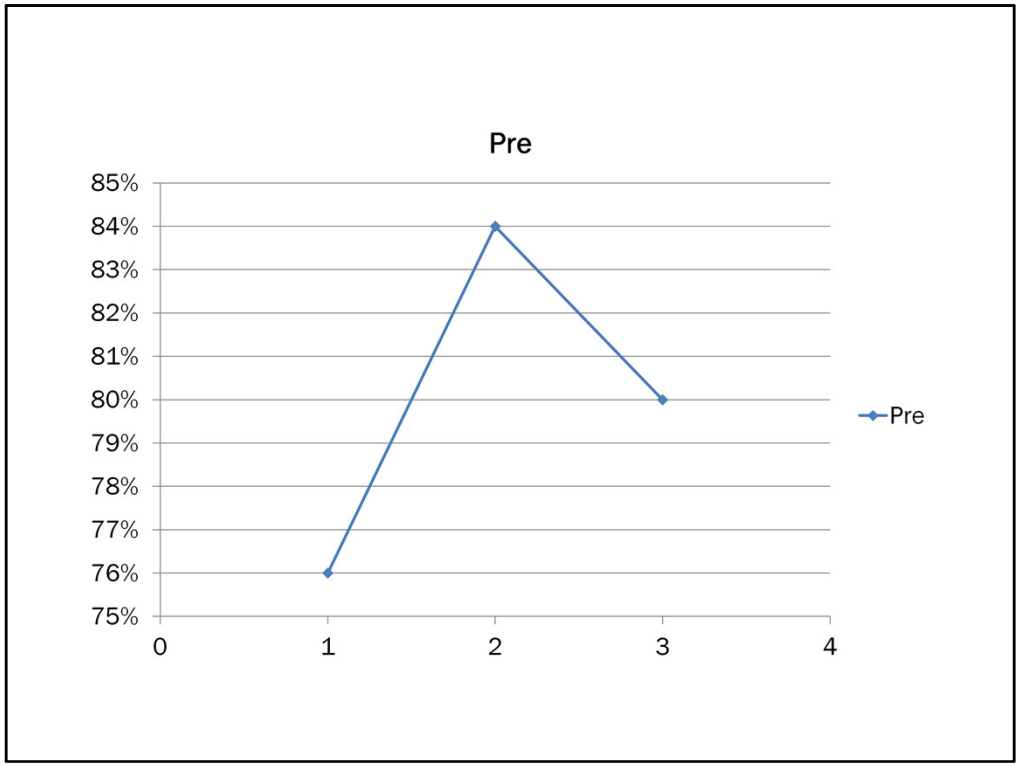


One use for them is showing something like pre-post scores. So maybe typically you use a bar graph to show this.



But I think a dot plot is better because it shows the direction the post score moved and the distance between the pre and post score. How on earth do you create these using a scatterplot?

I'm going to go through the steps today but know that there are tutorials out there online that you can check out after this. Stephanie Evergreen has a blog post on this – I think she calls them dumbbell plots. Super straight forward. Try it out on your own to get the hang of it.



So I inserted a scatterplot and entered my data, but it looks all kinds of wrong. Don't be alarmed if you get back to your desk and end up with the same thing. See Excel doesn't understand what we're trying to do, so we have to talk to it a little more.

Set up the data

	Pre	Post	Pre Y	Post Y
Student A	76%	83%	2.5	2.5
Student B	84%	94%	2	2
Student C	80%	88%	1.5	1.5
Student D	86%	81%	1	1
Student E	78%	90%	0.5	0.5

Let's first take a look at how I set up the data. I have the pre and post scores set up like normal.

Set up the data

	Pre	Post	Pre Y	Post Y
Student A	76%	83%	2.5	2.5
Student B	84%	94%	2	2
Student C	80%	88%	1.5	1.5
Student D	86%	81%	1	1
Student E	78%	90%	0.5	0.5

But then you'll see outside of the chart range I added in the y values for the pre and post scores. Remember this is a scatterplot, so I have to add in y-values to tell Excel where I want each group of student's scores positioned.

Set up the data

	Pre	Post	Pre Y	Post Y
Student A	76%	83%	2.5	2.5
Student B	84%	94%	2	2
Student C	80%	88%	1.5	1.5
Student D	86%	81%	1	1
Student E	78%	90%	0.5	0.5

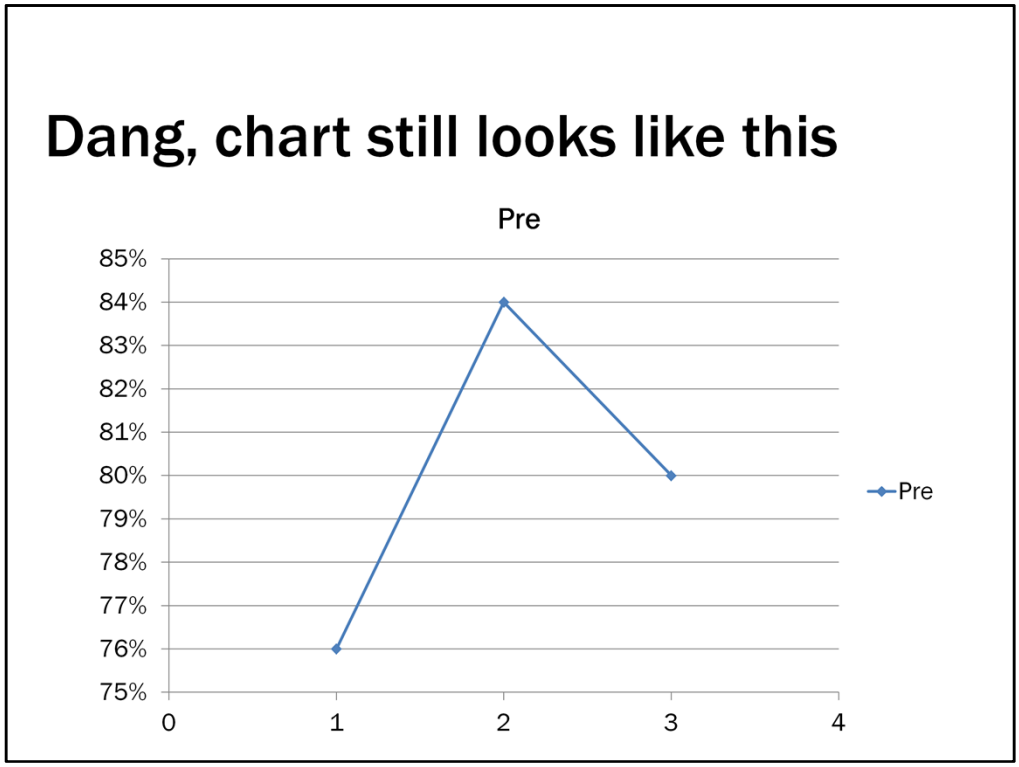
So starting at the bottom with student E, she's going to be closest to the x-axis because I'm putting them in alphabetical order. If I wanted to arrange the students based on their post-test score for example, I would first filter the post test scores from highest to lowest, then add in the y values.

But since we're going alphabetically, student E is on the bottom and I'm going to set her at hitting the y-axis at .5, just above the x-axis. You could certainly go with .25 or 1, or something else. If you start at 0, those values with overlap with the x-axis, and I don't like that. So student E is at .5.

Set up the data

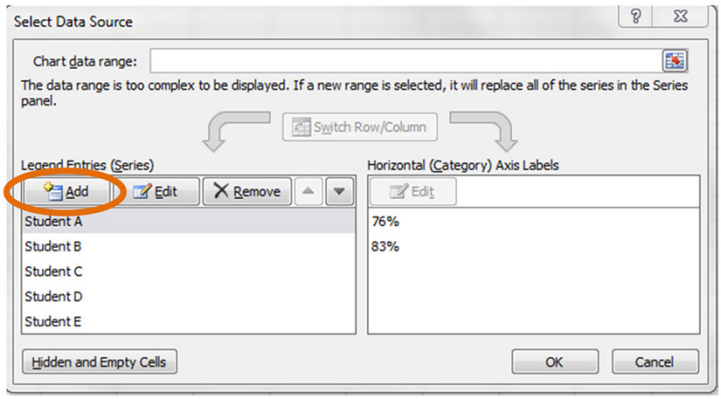
	Pre	Post	Pre Y	Post Y
Student A	76%	83%	2.5	2.5
Student B	84%	94%	2	2
Student C	80%	88%	1.5	1.5
Student D	86%	81%	1	1
Student E	78%	90%	0.5	0.5

I then spaced Student D a half point above E at 1. I used a half point increment for each student, so they will be spaced equally. Again, the exact values you go with isn't important. Think about how far or close you want them together, and make sure they're evenly spaced.



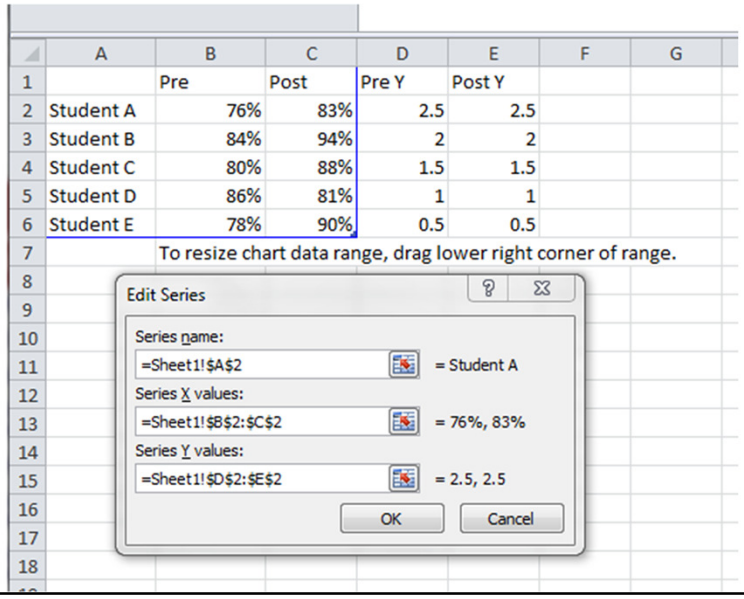
But even after entering these y values, the data still looks funky. Gotta talk to Excel a little more.

Select the data

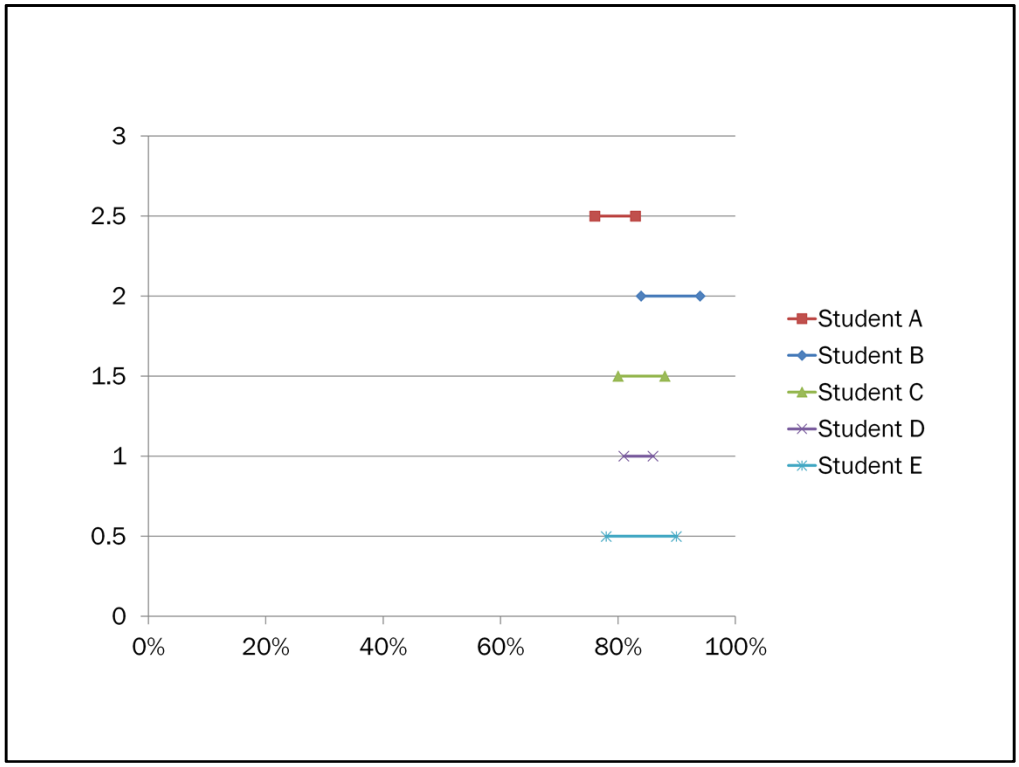


So if you click Select Data, you can now talk more to Excel about how you want the data set up in this chart. You will want to Add a Legend Entry for each student, or each series. So if you click add…

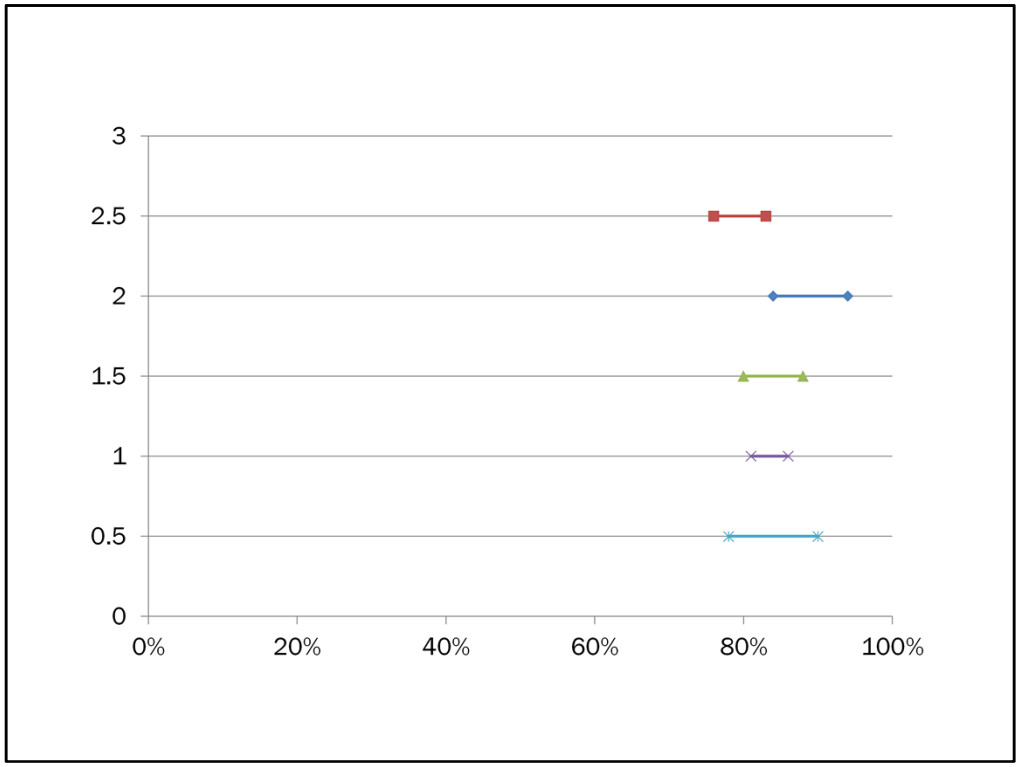
Add each Series



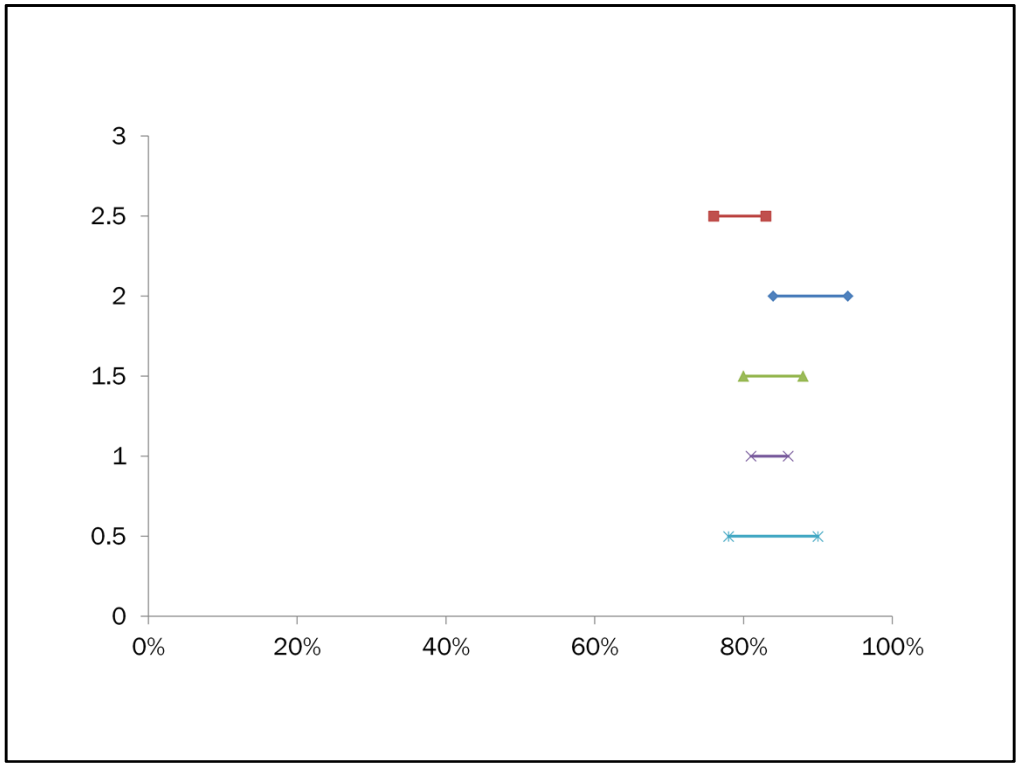
This Edit Series dialog box pops up prompting you to enter the series name, and the x and y values. If we start with student A, the series name will be student a, so you select the cell that says student A. for the x values, those are the pre and post scores, so select those two cells. For the y values, we select the two cells that say 2.5. And click ok. Then you need to add a series for student B. Go through this for each student or each series.



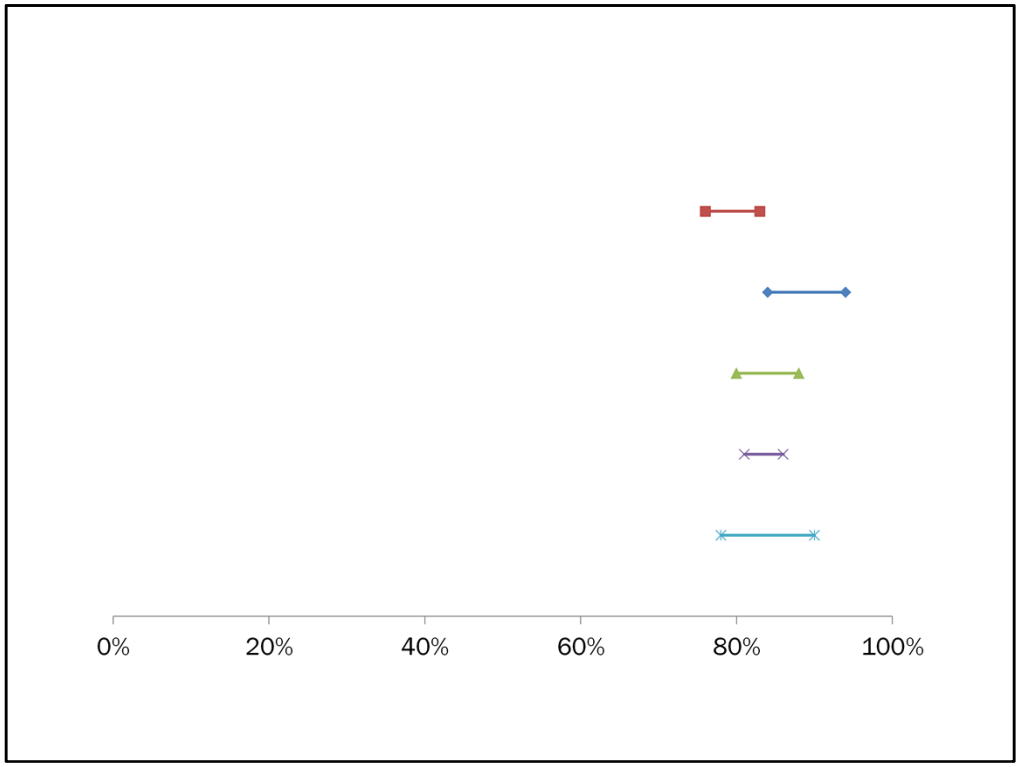
And there we go. that's looking much better. Now a few formatting tweaks.



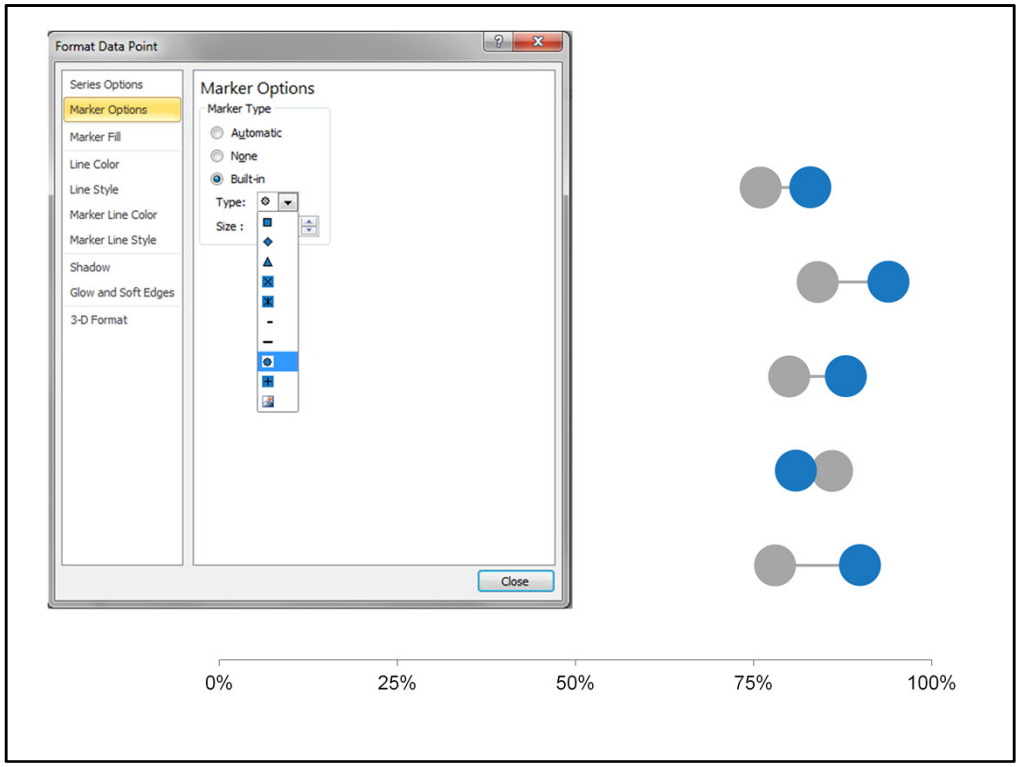
Get rid of the legend



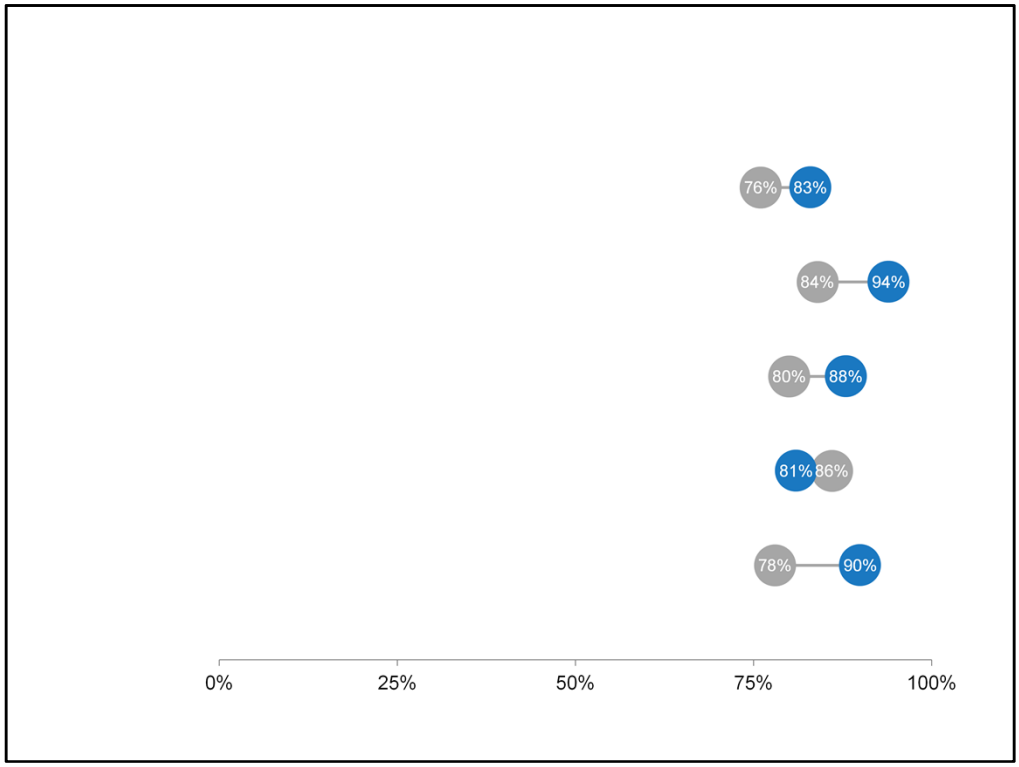
The gridlines



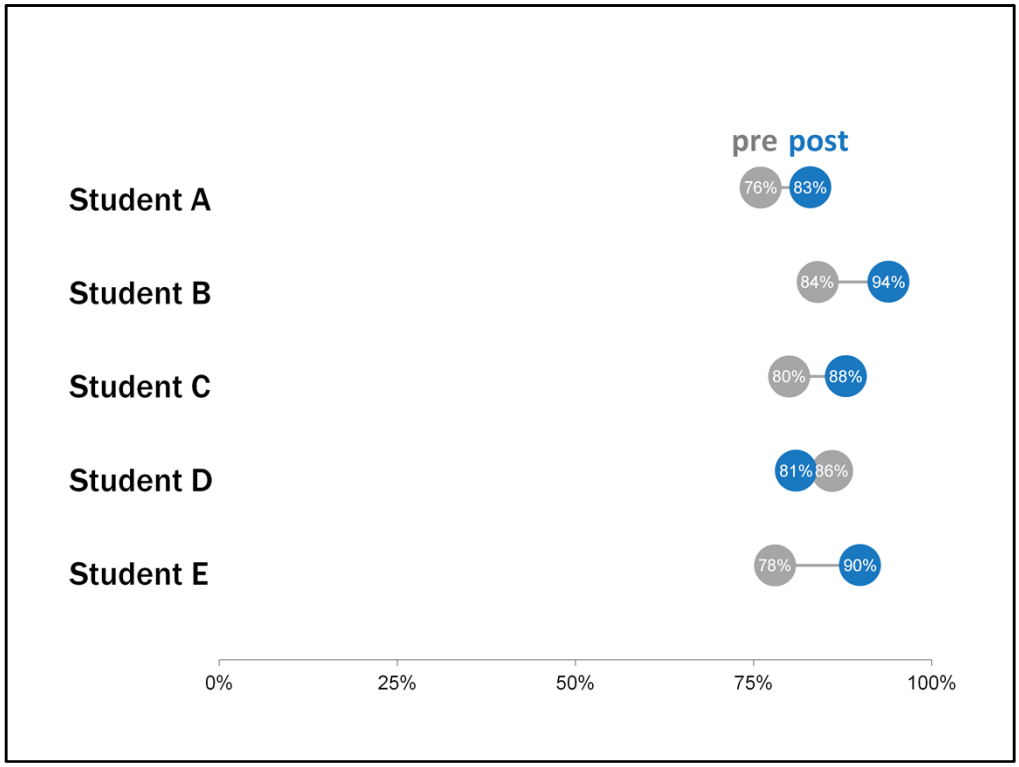
The x-axis. And then we need to modify the markers.



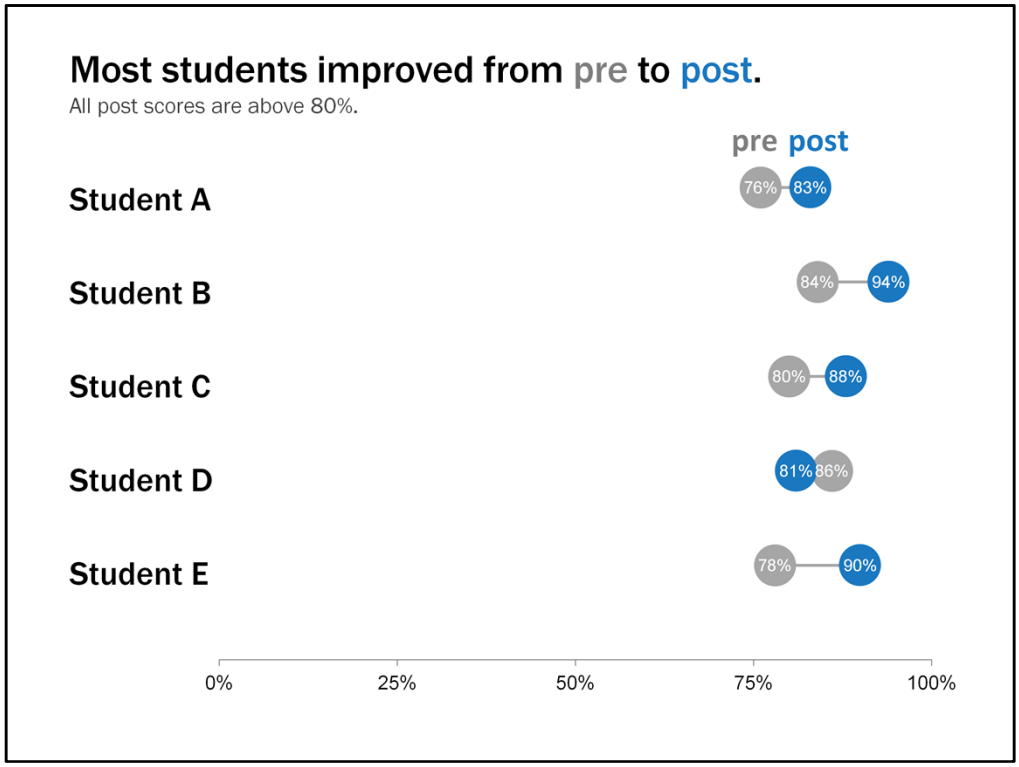
Here I changed them all to what looks like a sunburst in the menu of marker options but it actually appears as a circle. I also fiddled with size and color. Since my focus here is the post-test scores, I emphasize them with bright blue and deemphasized the pre-test scores with gray.



Add in the x-value data labels

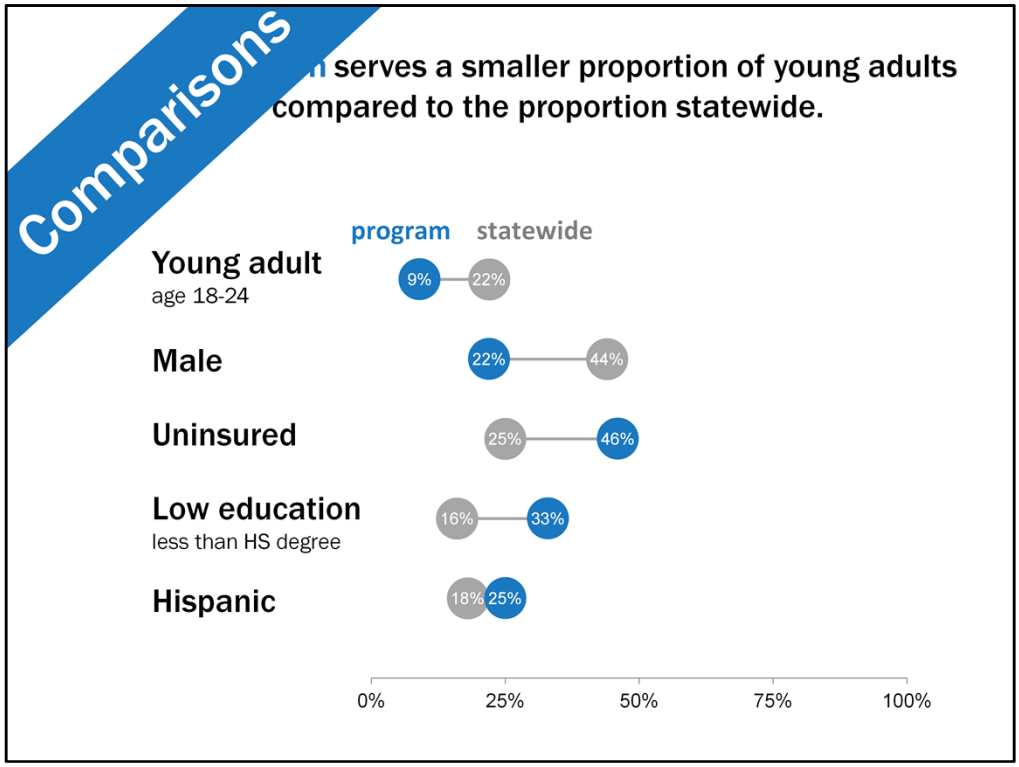


And some labeling

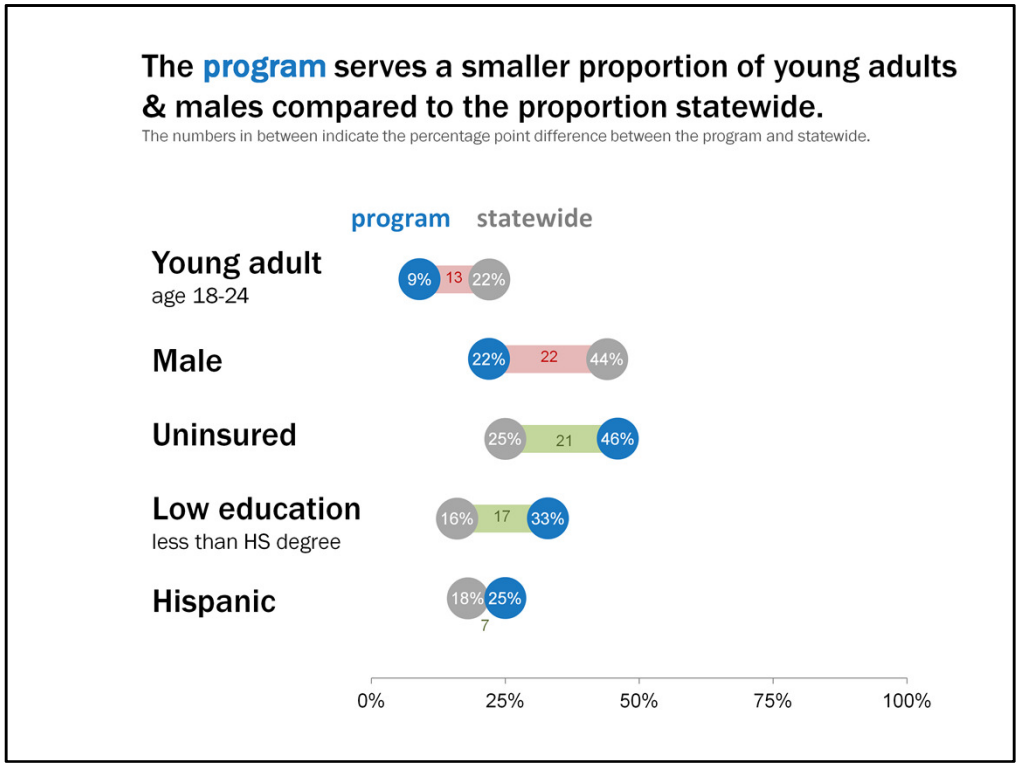


And an interpretive title. And there you go.

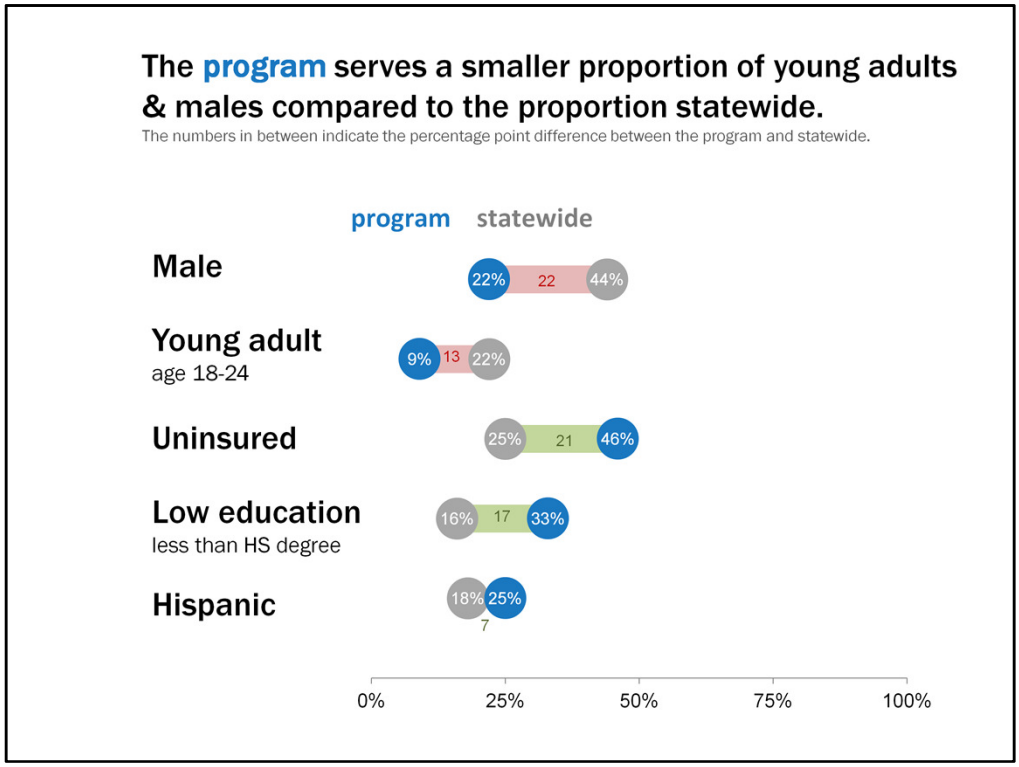
Please don't fret if I totally lost you. Again, Stephanie Evergreen has some step by step instructions about this on her blog, and I'm happy to answer any questions you have after this presentation or even a few days, weeks or months from now if you try to do this on your own and can't quite make it work. The first time I read about creating this chart I was like what?! But then I tried it once on my own and was like oooooh. I get it.



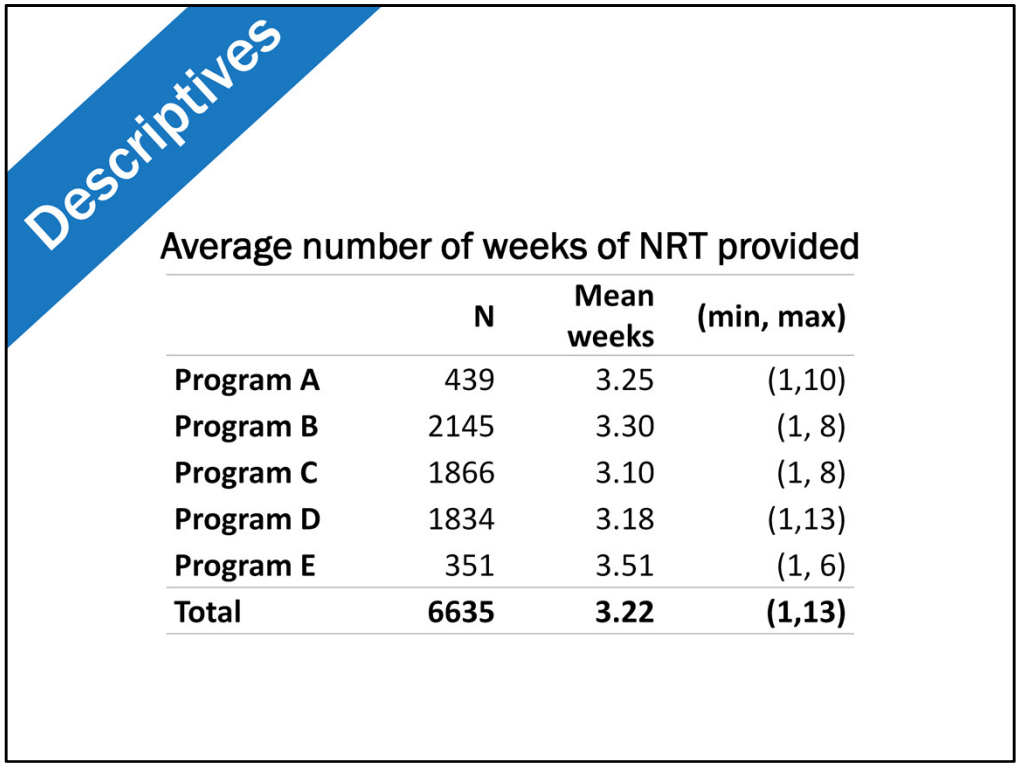
You can also use this type of dot plot to make comparisons between two groups. Here we have some differences in some key demographics between a program and statewide data. so I set this up in the exact same way as the pre post example.



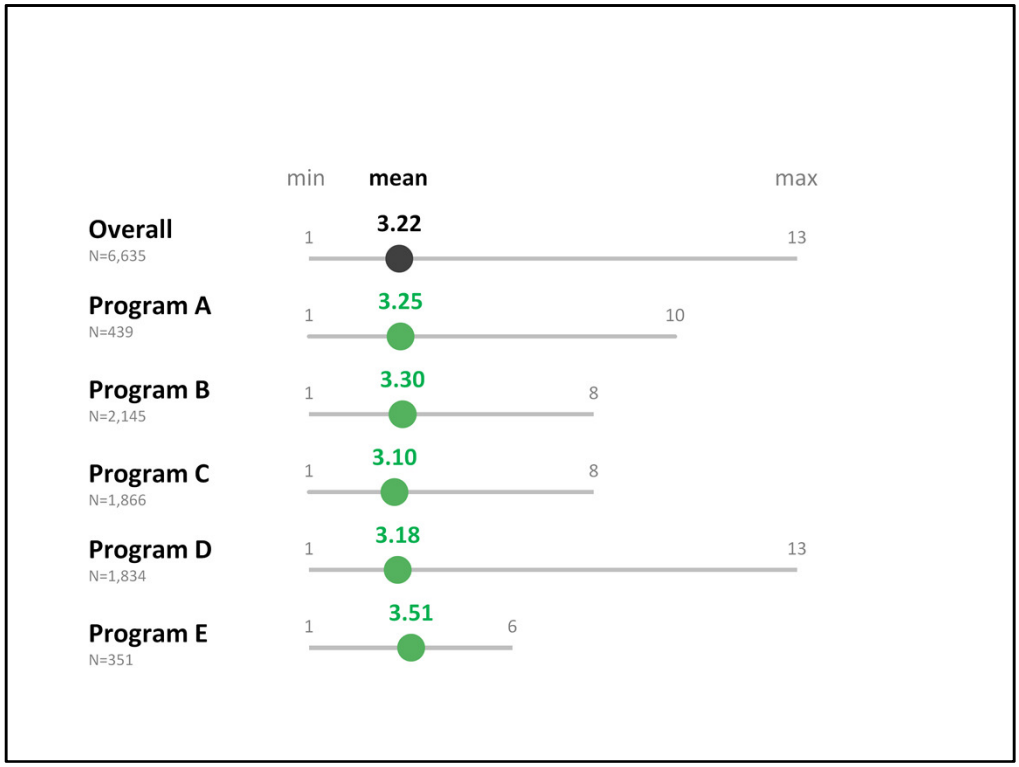
You can also highlight the difference in percentage points by widening the line between the data points and adding a text box for that number. I also added some interpretation to this by making the bars red when the program underserved a demographic group and made the bars green when the program was well serving a demographic group. This is another time where I'd want to think more about the order of these categories.



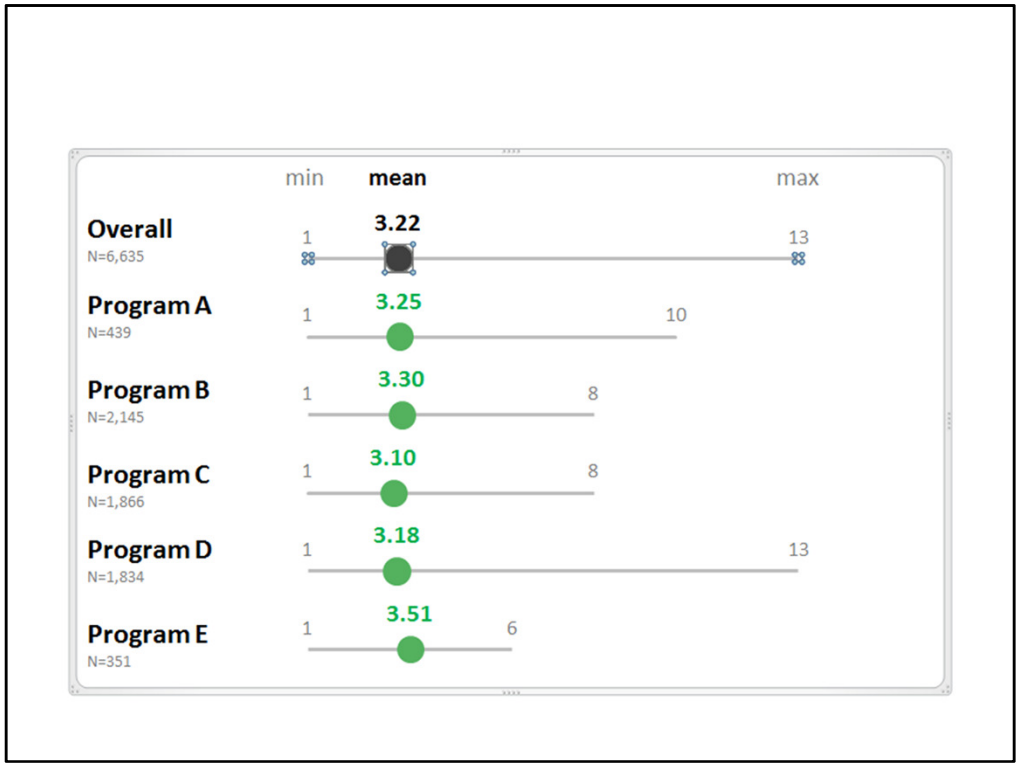
In this case I might make males the first category since they are the most underserved. Or maybe in another iteration I'd start with the good news first and put the underserved at the bottom. Whatever it is, try to be intentional with the order of categories when possible.



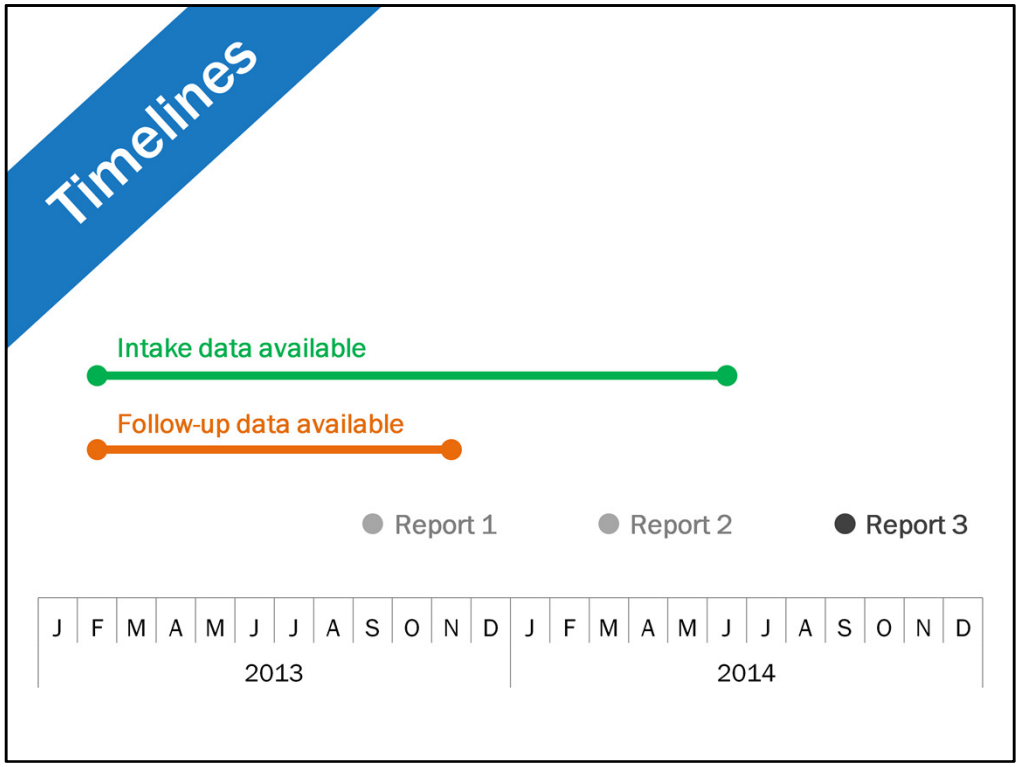
I've also used this idea to chart descriptive statistics. I was helping a co-worker with a report, and she had a bunch of tables like this. I thought there has to be a way to better visualize this.



I applied a dot plot concept and came up with this. It's set up the same as the one I showed you,



except you have 3 points of data and therefore 3 y values. You also format the data points differently so that, in this case, the mean is represented by the large circle, and the min and max has no marker.



I've also used this concept to create timelines. This is actually a line chart so that the dates show up like this.

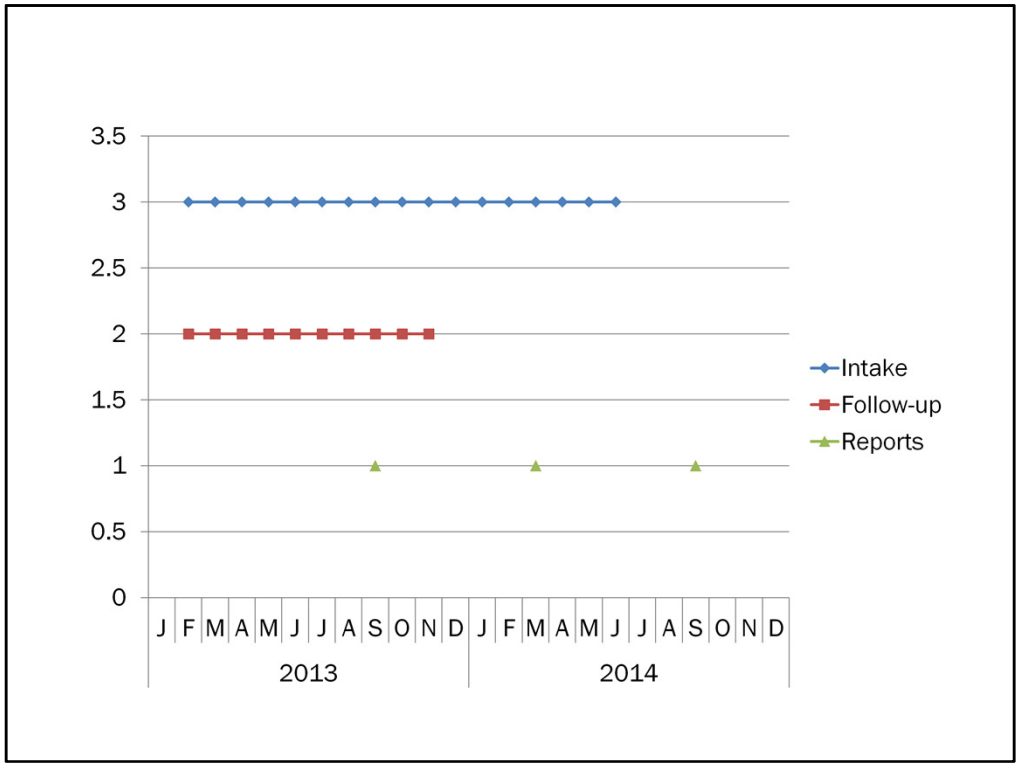
Before I get into the steps for creating this, I want to point something that was new to me recently. This might not be news to you, but do you notice how the year appears under the months, as if they're two separate levels of x-axis labels? Well not too long ago I learned that excel will automatically set up the labels in this way if you simply set up the data like this. Crazy right? So looking at how the data is set up…

	Month	Intake	Follow-up	Reports
2013	J			
	F	3	2	
	M	3	2	
	A	3	2	
	M	3	2	
	J	3	2	
	J	3	2	
	A	3	2	
	S	3	2	1
	O	3	2	
	N	3	2	
	D	3		
2014	J	3		
	F	3		
	M	3		1
	A	3		
	M	3		
	J	3		
	J			
	A			
	S			1
	O			
	N			
	D			

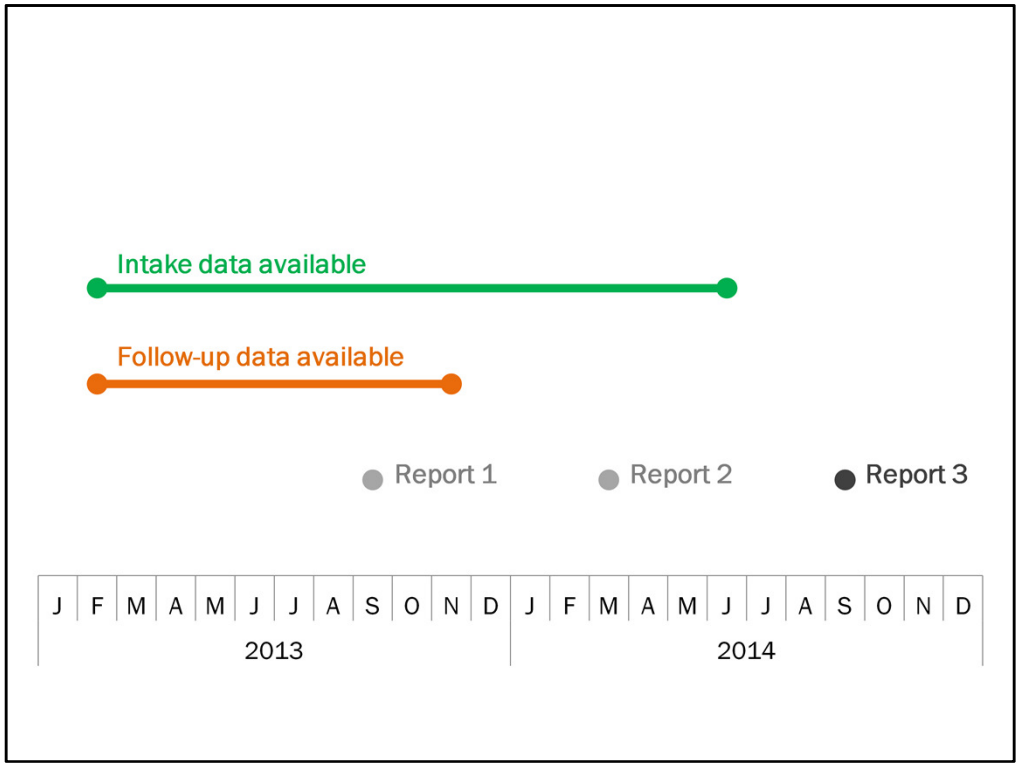
Here you see year in first column, month in the second. So Excel figured, hey I bet she wants both of these to be the x-axis labels. Thanks Excel.

	Month	Intake	Follow-up	Reports
2013	J			
	F	3	2	
	M	3	2	
	A	3	2	
	M	3	2	
	J	3	2	
	J	3	2	
	A	3	2	
	S	3	2	1
	O	3	2	
	N	3	2	
	D	3		
2014	J	3		
	F	3		
	M	3		1
	A	3		
	M	3		
	J	3		
	J			
	A			
	S			1
	O			
	N			
	D			

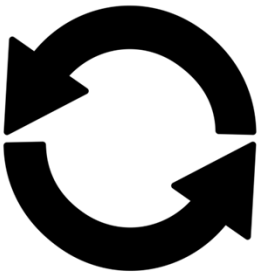
Now let's turn our attention to the timeline data. I have a column for each category – intake, followup, and reports. So knowing that I have 3 separate categories to show, and I want the order to be intake, follow-up, reports, I typed in a 3 for each month for which there is intake data available. I did the same for the follow- up data with the number 2. And then for the reports, since these happen at one point in time versus being continuous, I typed a 1 in the month in which a report is submitted, but left the cells in between blank.



At first the chart is going to look something like this.



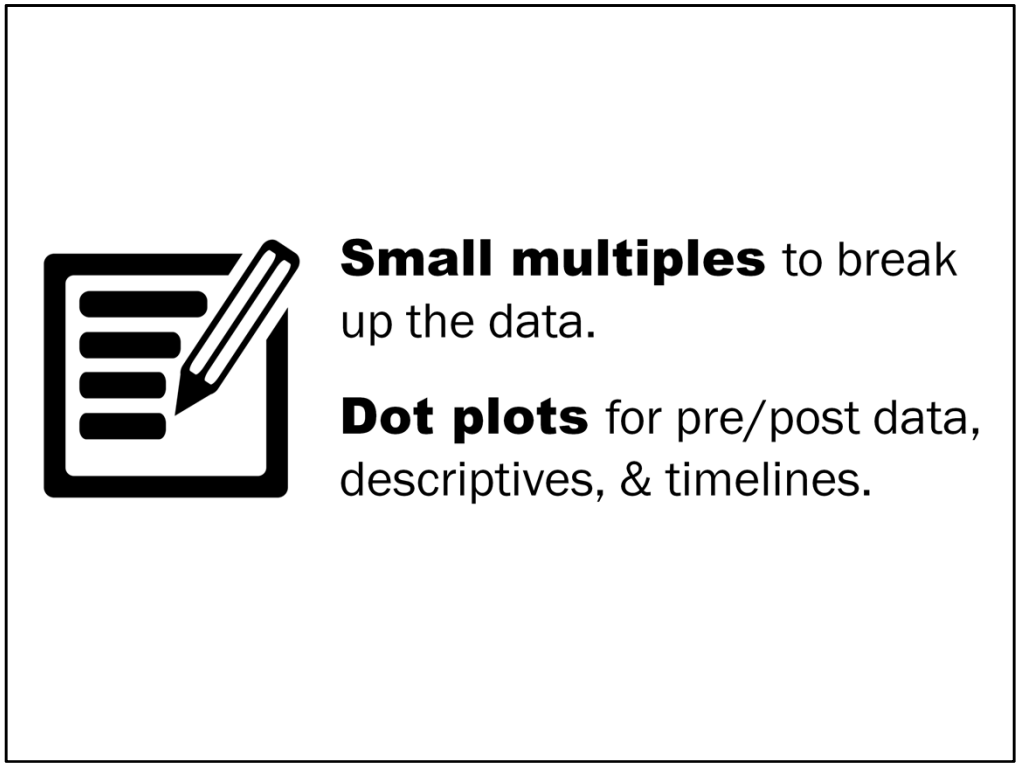
But by getting rid of some lines, directly labeling, and re-formatting the markers and lines, you'll end up with something like this. I've created timelines in a few different ways and so far this is my favorite.



Small multiples to break up the data.

Dot plots for pre/post data, descriptives, & timelines.

So to recap – choose your story, choose your visual, and choose your charts wisely.



Let's revisit your example. Do any of these new charts change the game? Would they be a better fit? If not, can you envision using these charts for any data that you commonly work with? Pre/Post scores? Comparing groups? Descriptive stats? Timelines?

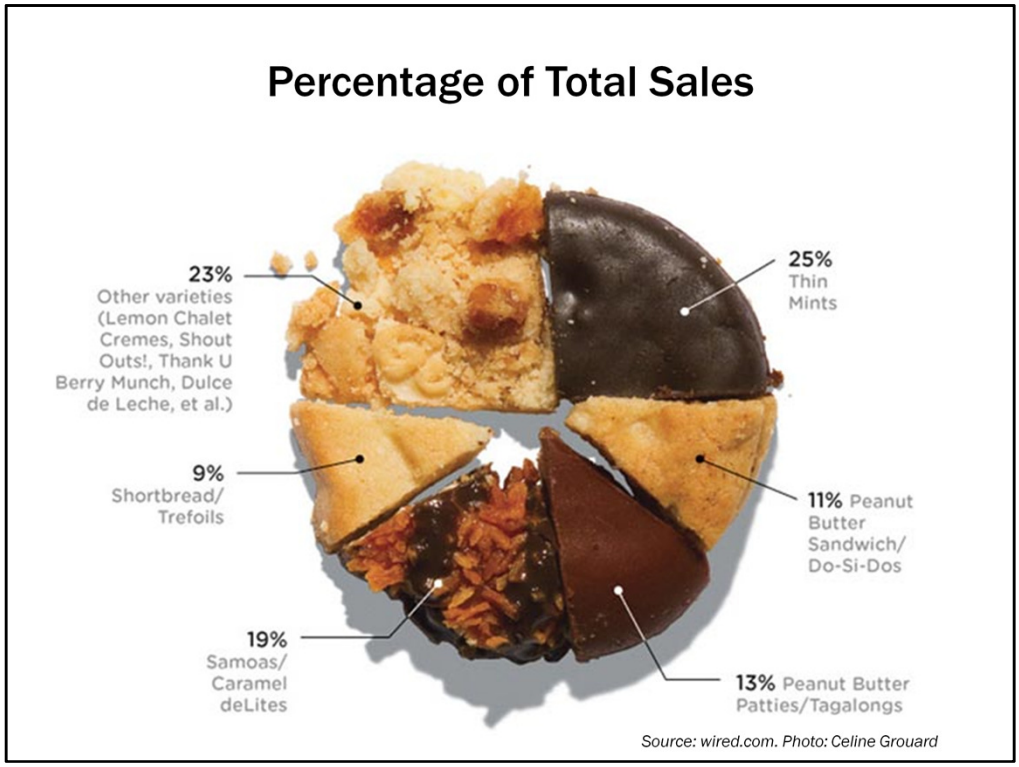
Practice using one of these new charts under letter C in your handout.

All right. Now we're going to get a little social with one another. I want you to turn to your neighbor or neighbors – groups of 2 or 3. I would like each of you to share your data viz sketch or sketches, and your process. Share the story you're trying to tell.

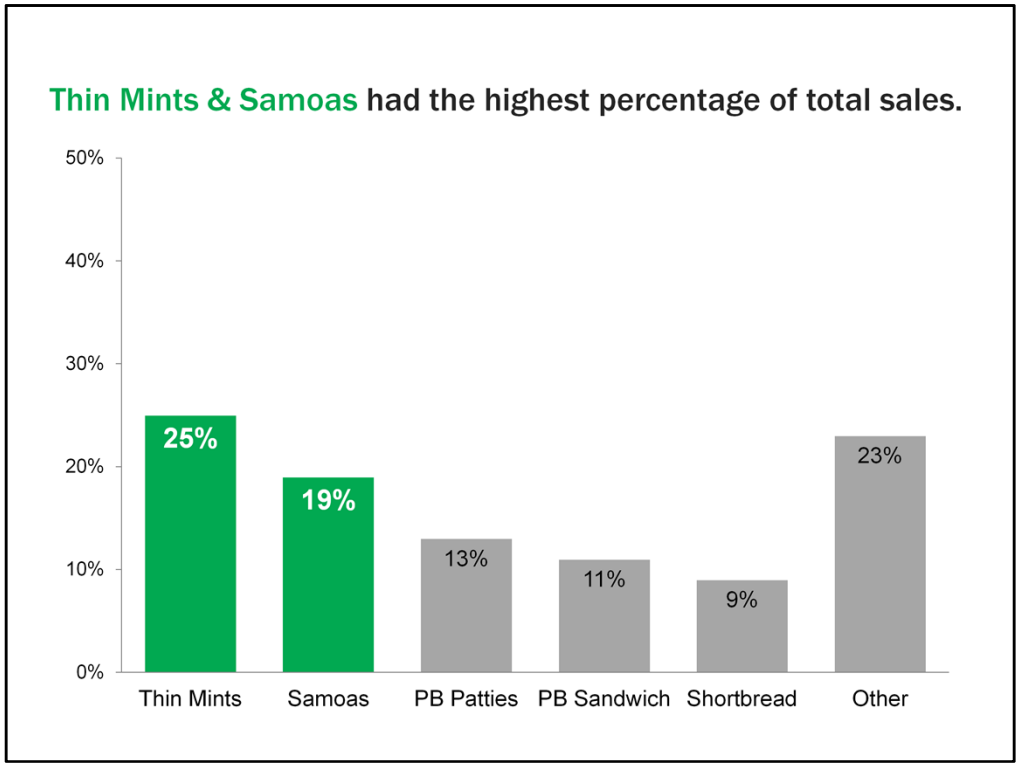
If your example is from your past work, did you do anything differently? What helped relay your story more clearly?

If your example is from your current or future work, what are some ways that you are adding emphasis and interpretation?

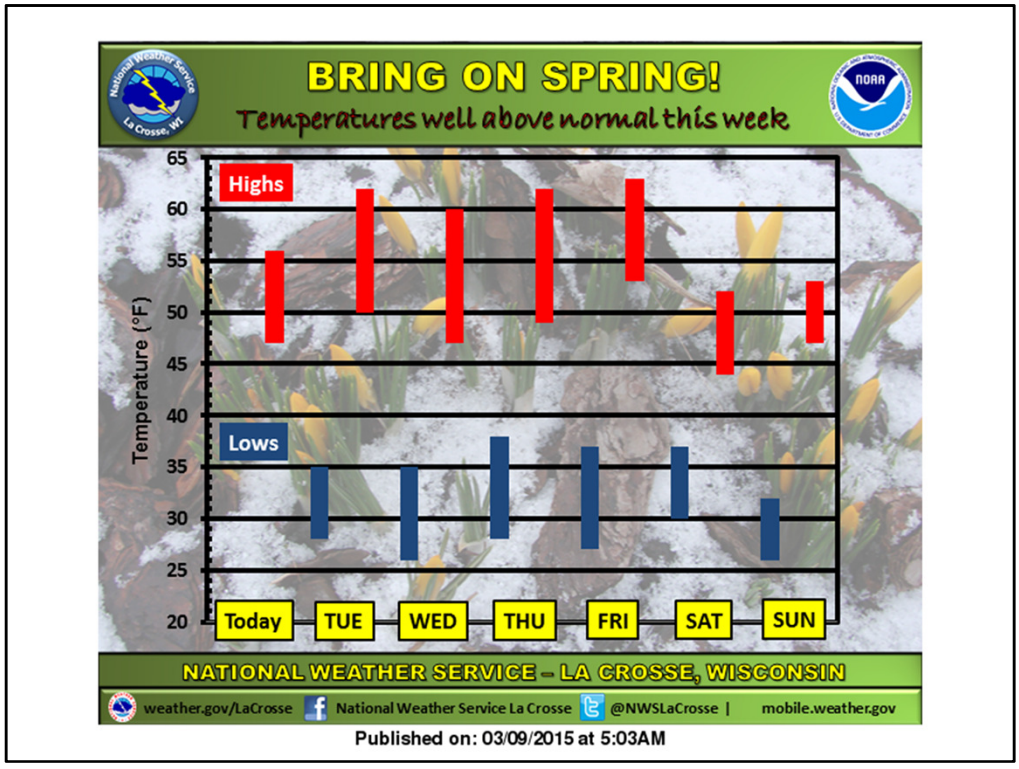
All right, let's do some chart make overs applying what we've learned so far.



I couldn't resist this chart given that it's girl scout cookie season. I actually think this is pretty cute given the subject matter. But even if I stuck with this cookie chart, there are a few things the author could have done to improve it a little. Any guesses?

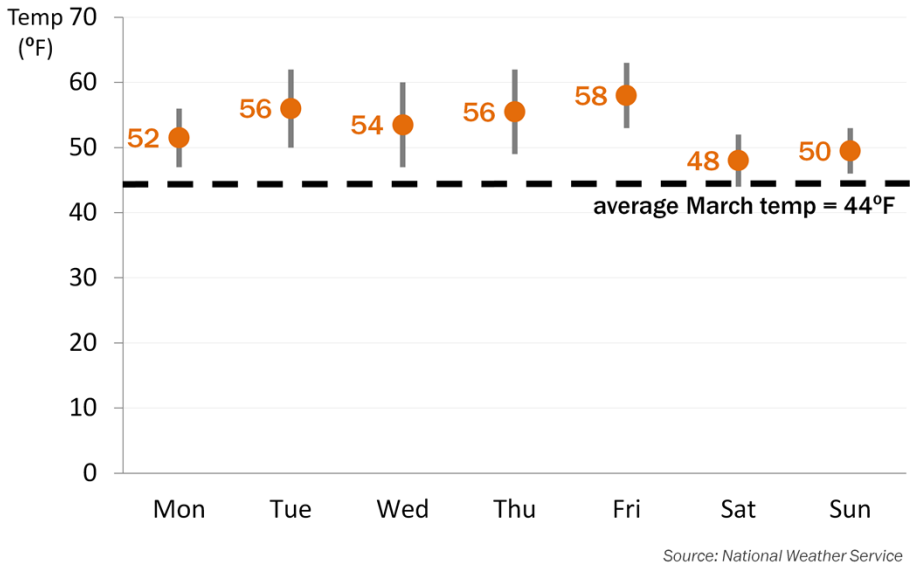


But if I did a true makeover, I'd make it a bar chart, put the values in descending order (except for the other category, which I often keep on the end). Let's pretend we're interested in the most common cookies, so I highlight the top 2 in girl scout green and add an interpretative title.

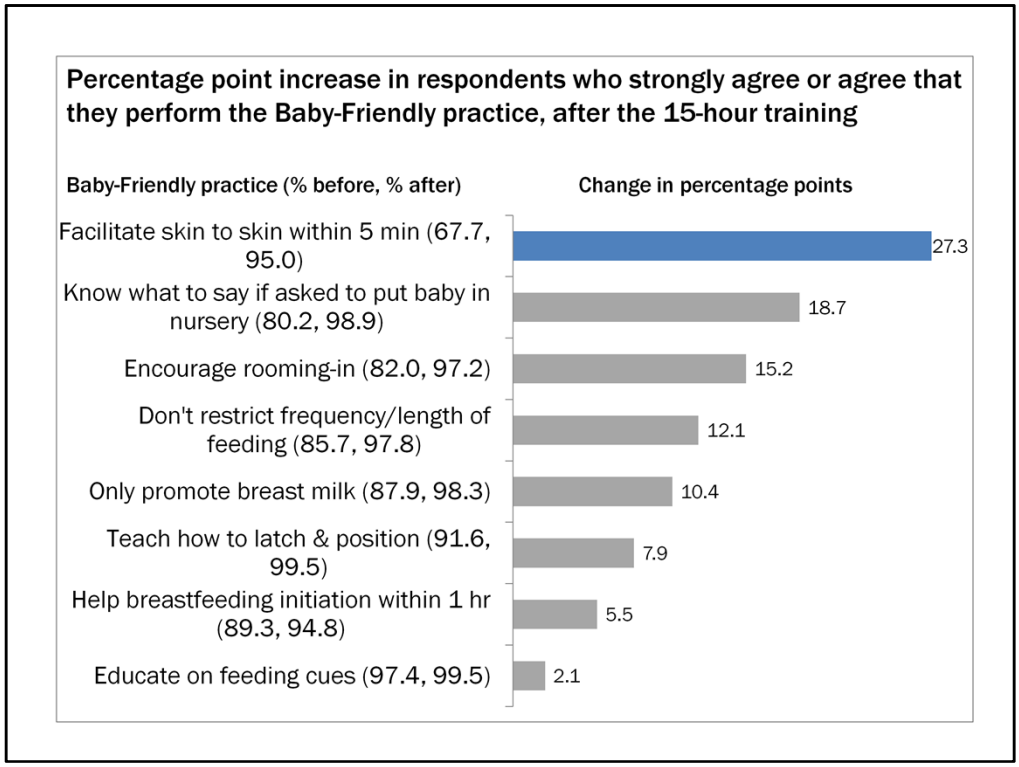


Next up. how could we get through this week without talking about the weather? Who am I kidding though – weather is a daily conversation topic. I pulled this chart from MPR's updraft weather blog. The title indicates that temperatures are well above normal this week, and then charts the highs and lows each day this week. What are some ways you would improve this?

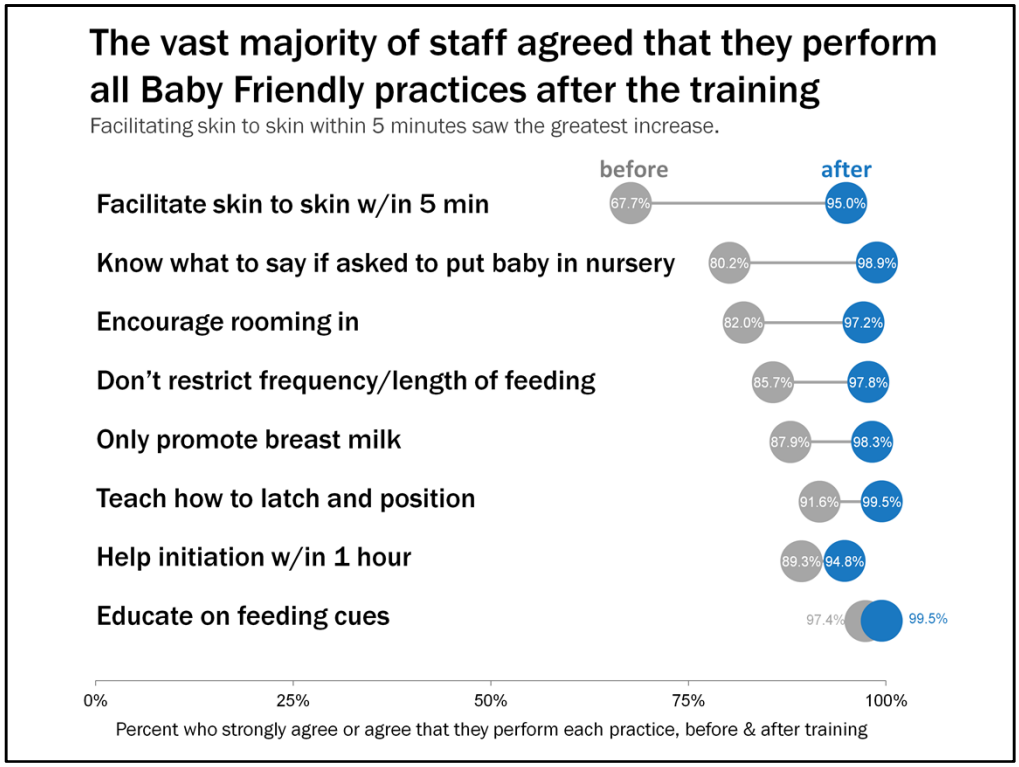
High temperatures well above normal this week!



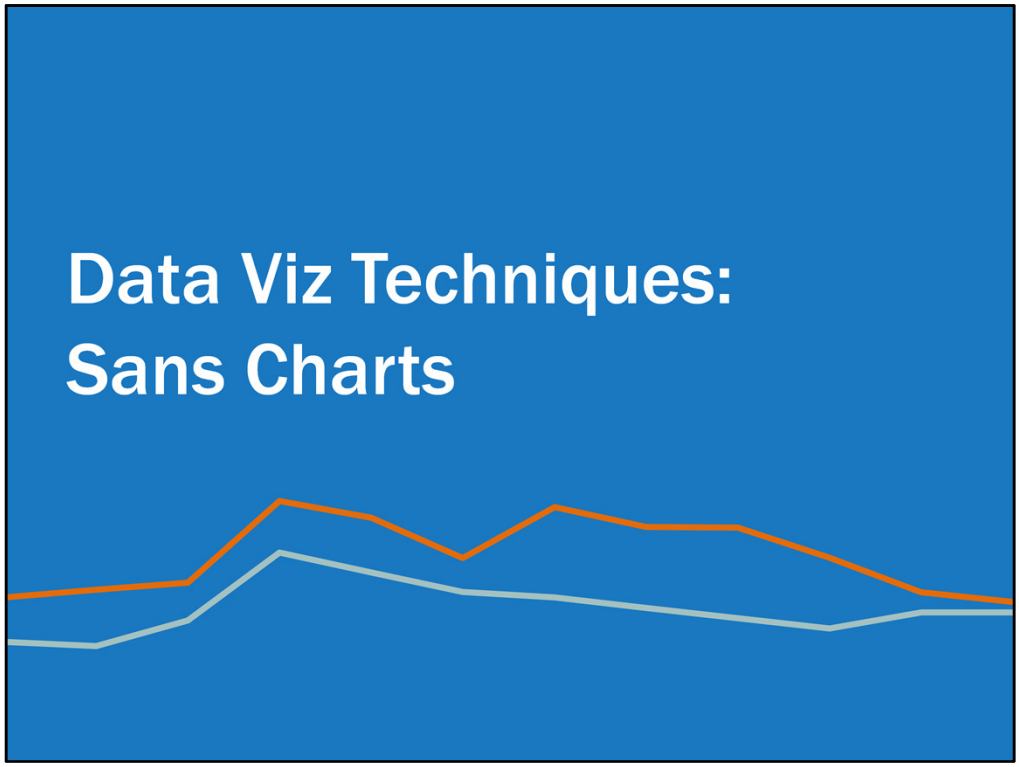
Source: National Weather Service



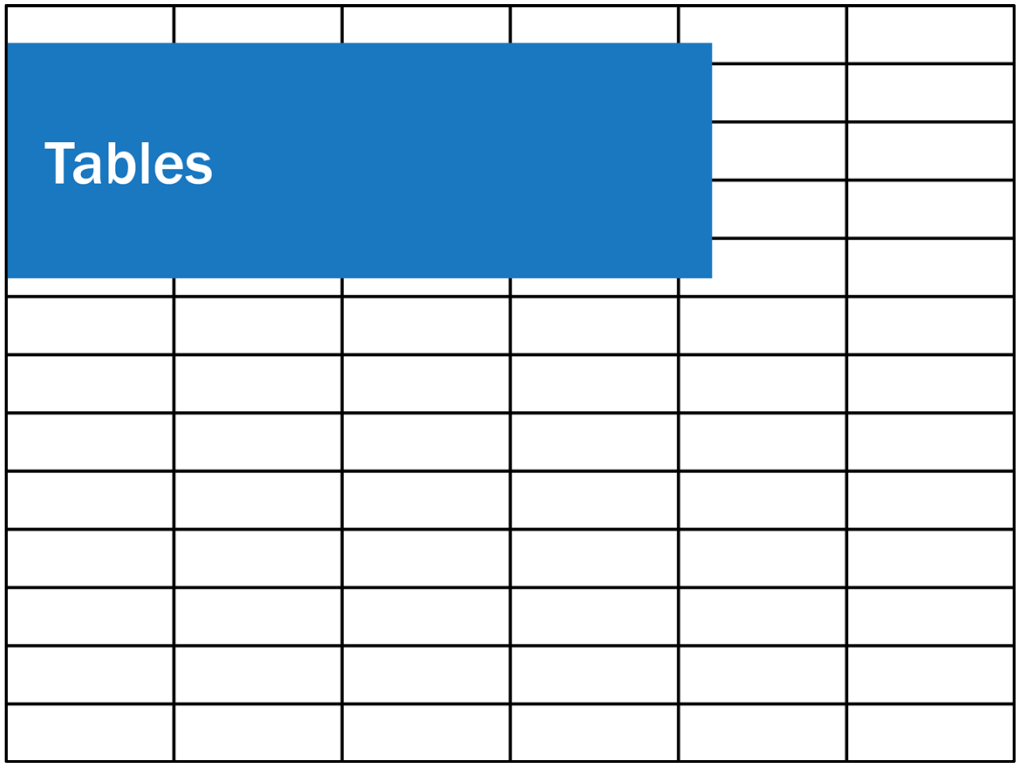
Ok, time to pick on myself rather than other people. I dug up a report that I wrote 3 years ago about our evaluation of one state's baby friendly hospital initiative. I thought this chart was absolutely perfect for this presentation. I didn't include all of the categories. The chart is about the percent of respondents who strongly agreed or agreed that they perform these baby friendly practices before and after receiving a training. The chart shows the change in percentage points in scores from before and after the training. You'll notice within the category labels, I included the actual % before and the % after. Any thoughts on what you would do differently with this chart?



It's really that a lot of staff were already doing this practice before the training, so there wasn't much room for moving up. by charting it this way, we see that staff are doing all of the practices pretty consistently, which is a major strength to highlight. Facilitating skin to skin within 5 min was the most improved.



Certainly charts aren't what we always use to visualize data. There are lots of other ways we can visualize data.



Of course there are tables. I don’t use tables very often. It’s harder to see a trend in tables. But they certainly have their purpose. A meeting agenda is probably my most common purpose for using a table.

Program	N	Mean	Median	Range
Alpha	143	2.71	2	1—12
Beta	278	3.26	2	1—18
Gamma	113	1.86	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

But let's use data data. Now if you enter data into a table in Microsoft Word or PowerPoint, you're probably going to get something like this. Not my favorite. Let's go through the steps to improve this table.

Program	N	Mean	Median	Range
Alpha	143	2.71	2	1—12
Beta	278	3.26	2	1—18
Gamma	113	1.86	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

First we want to get rid of the shading. It's more distracting than anything, and less is more. We'll use a little color later on.

Program	N	Mean	Median	Range
Alpha	143	2.71	2	1—12
Beta	278	3.26	2	1—18
Gamma	113	1.86	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

Next let's add in some borders. Every cell does not need a border around it. I like to put a border under the header row and above the total row, if there is one. that's all that is needed.

Program	N	Mean	Median	Range
Alpha	143	2.71	2	1—12
Beta	278	3.26	2	1—18
Gamma	113	1.86	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

Next we'll adjust the height of the columns ever so slightly. You don't want them to be too squished or too far apart. A 1:1 ratio is best.

Program	N	Mean	Median	Range
Alpha	143	2.71	2	1—12
Beta	278	3.26	2	1—18
Gamma	113	1.86	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

Now we adjust the alignment. I left the far left column left aligned. This is typical of the first column as well as text alignment. Numbers should almost always be right aligned. This ensures that the tenths line up correctly. In some cases it would be ok for numbers to be center aligned, if they all contain the same number of digits. The alignment of the column headings should match the contents below.

Now since we right aligned the means, I noticed that the last three entries are rounded to one decimal place instead of going out to two. This messes up the alignment.

Program	N	Mean	Median	Range
Alpha	143	2.71	2	1—12
Beta	278	3.26	2	1—18
Gamma	113	1.86	2	1—14
Delta	143	6.50	6	1—19
Epsilon	99	5.70	5	1—22
Overall	776	4.00	3	1—22

We need to add in the second decimal place for these values, of if we were ok with less precision

Program	N	Mean	Median	Range
Alpha	143	2.7	2	1—12
Beta	278	3.3	2	1—18
Gamma	113	1.9	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

We could round them all down to one decimal place. whatever works for you, just be consistent.

Now as we did with our charts, we want to emphasize the most important finding.

Program	N	Mean	Median	Range
Alpha	143	2.7	2	1—12
Beta	278	3.3	2	1—18
Gamma	113	1.9	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

Maybe it's the means, so we put them all in blue font.

Program	N	Mean	Median	Range
Alpha	143	2.7	2	1—12
Beta	278	3.3	2	1—18
Gamma	113	1.9	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

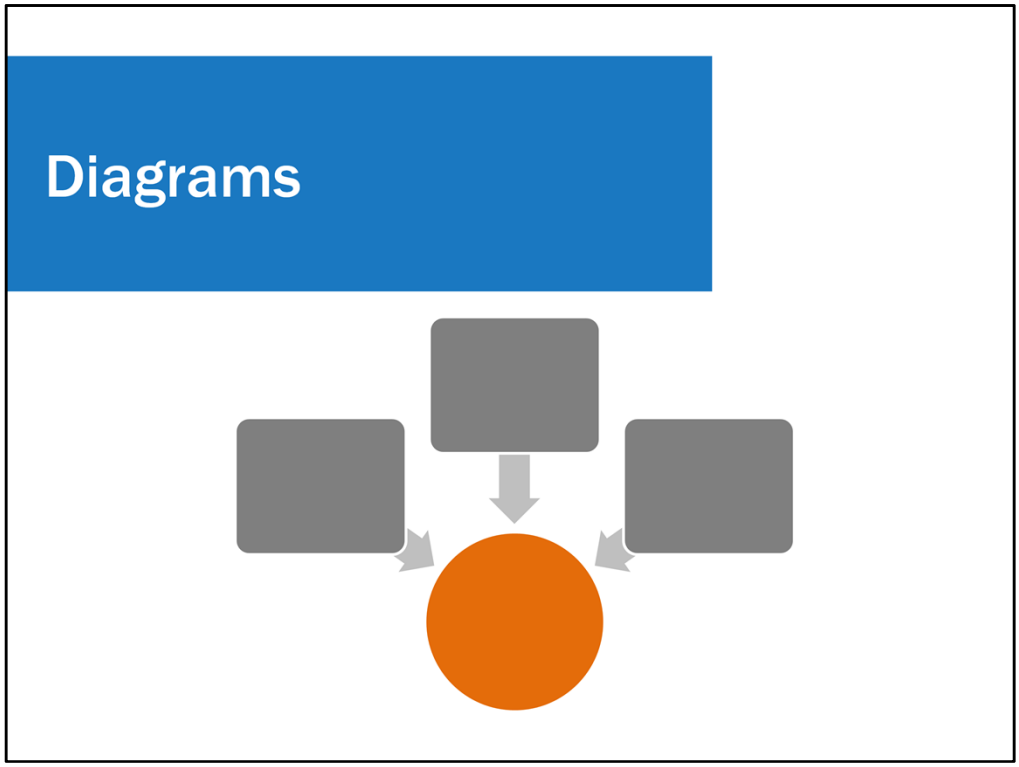
Or we put a border around those cells.

Program	N	Mean	Median	Range
Alpha	143	2.7	2	1—12
Beta	278	3.3	2	1—18
Gamma	113	1.9	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

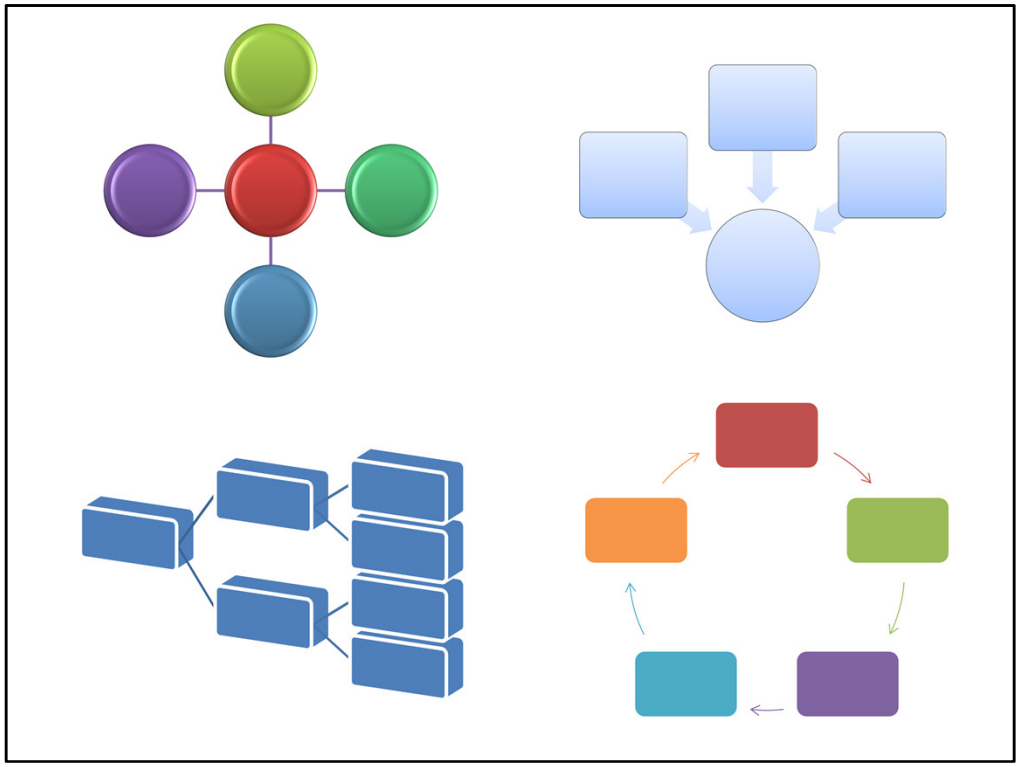
Maybe we highlight the program that has the highest mean, either with shading...

Program	N	Mean	Median	Range
Alpha	143	2.7	2	1—12
Beta	278	3.3	2	1—18
Gamma	113	1.9	2	1—14
Delta	143	6.5	6	1—19
Epsilon	99	5.7	5	1—22
Overall	776	4.0	3	1—22

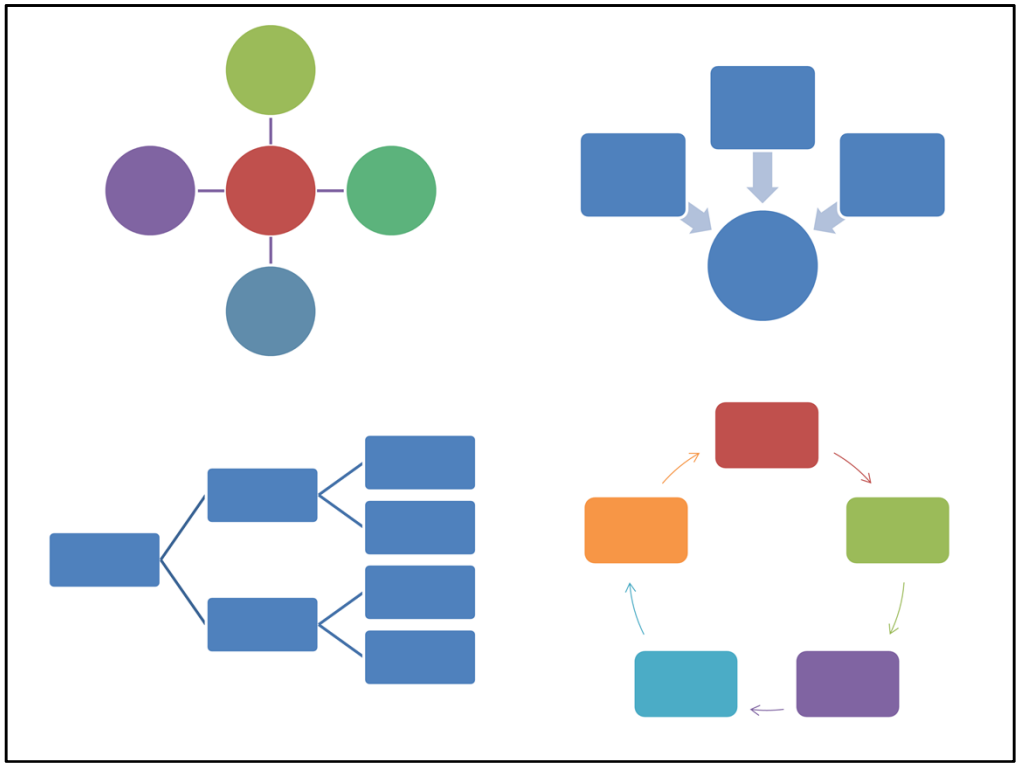
Or changing the font color. There are lots of options.



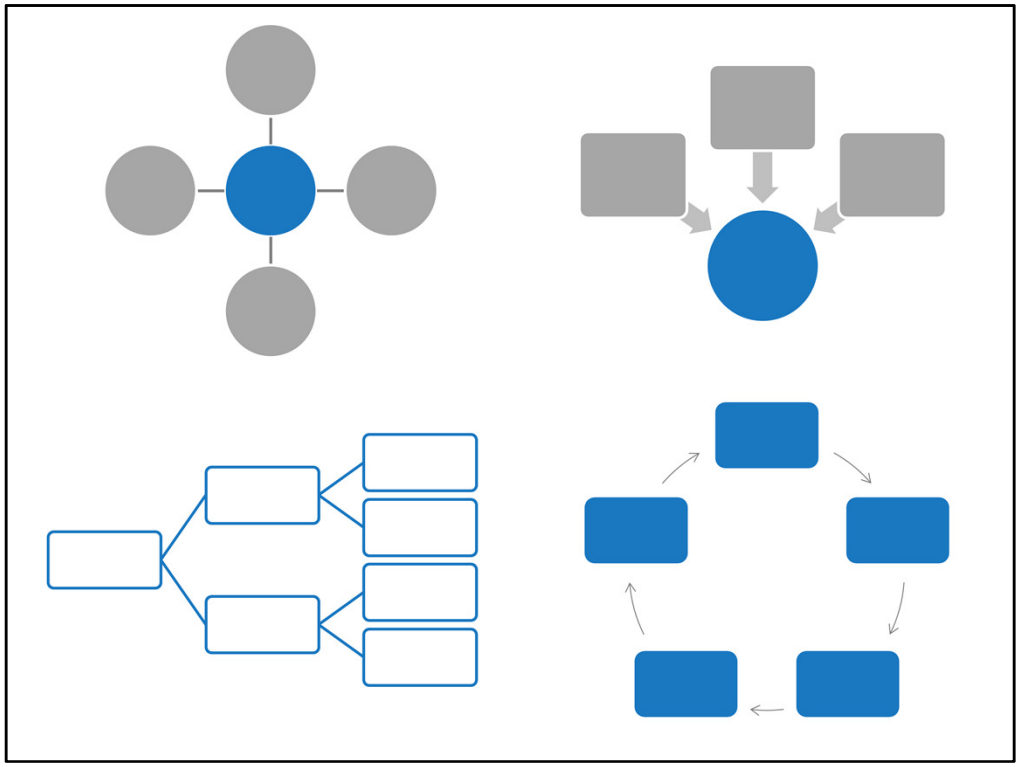
Diagrams are another way to visualize data.



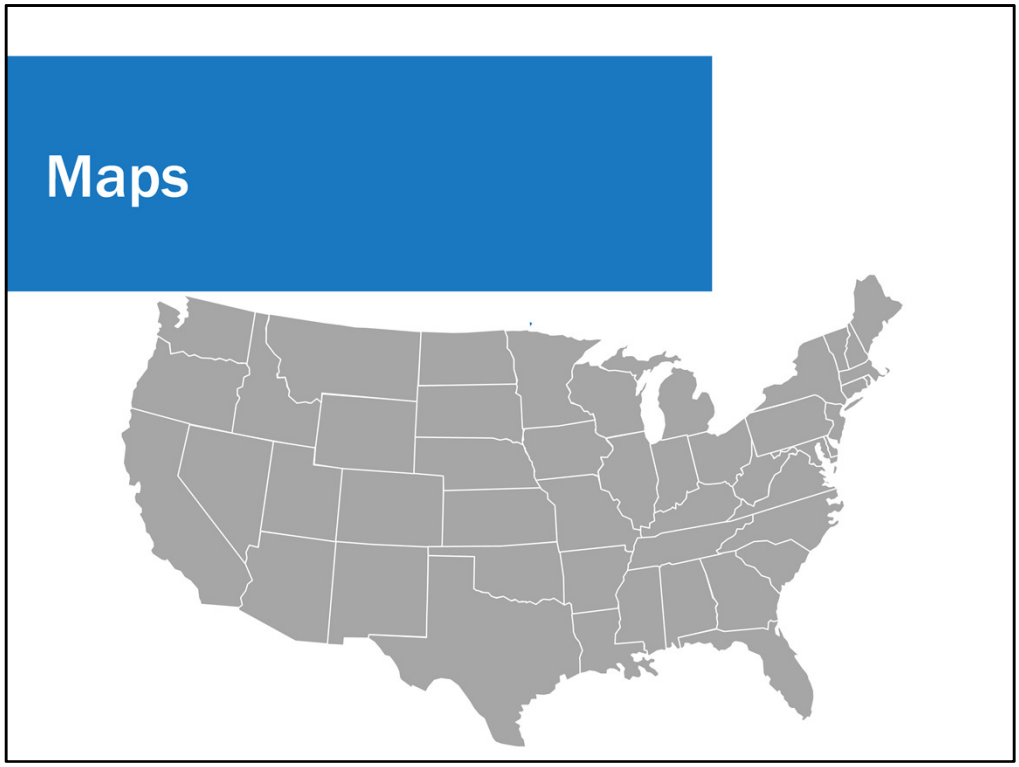
Here are 4 different diagrams I inserted from the SmartArt menu. I applied 4 different styles to show the range of options available to you.



But I advise you to just use the regular plain old flat style. Again, it's all about simplicity. Making a diagram look 3D, or adding shading, or color gradation does not add to comprehension. It's just Microsoft's way of showing – hey look what I can do! But it has no actual functionality. So flat designs…

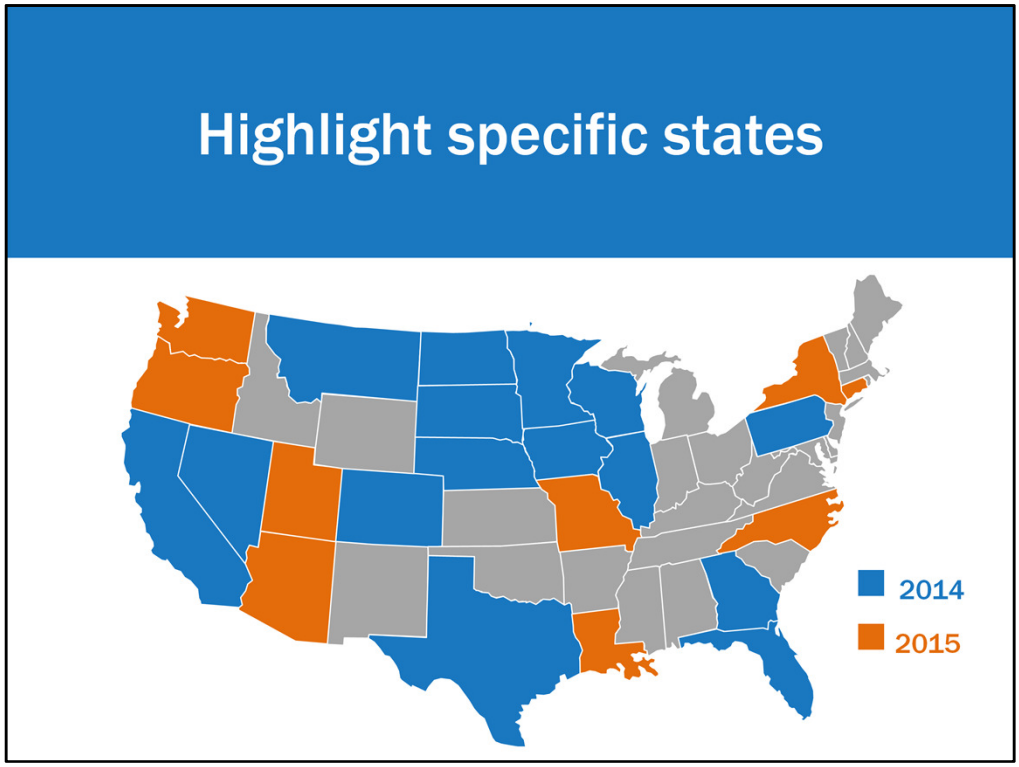


And again be intentional with your color and simplify as best you can.

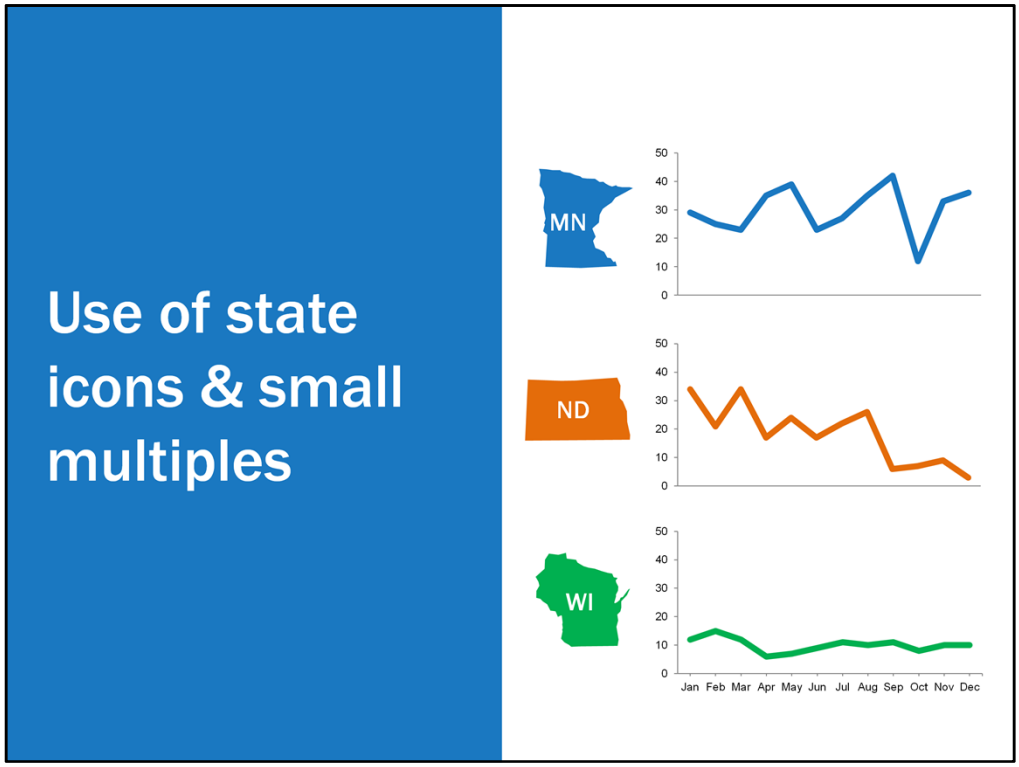


Maps. I don’t work with maps much, but I wanted to share a map resource with you.

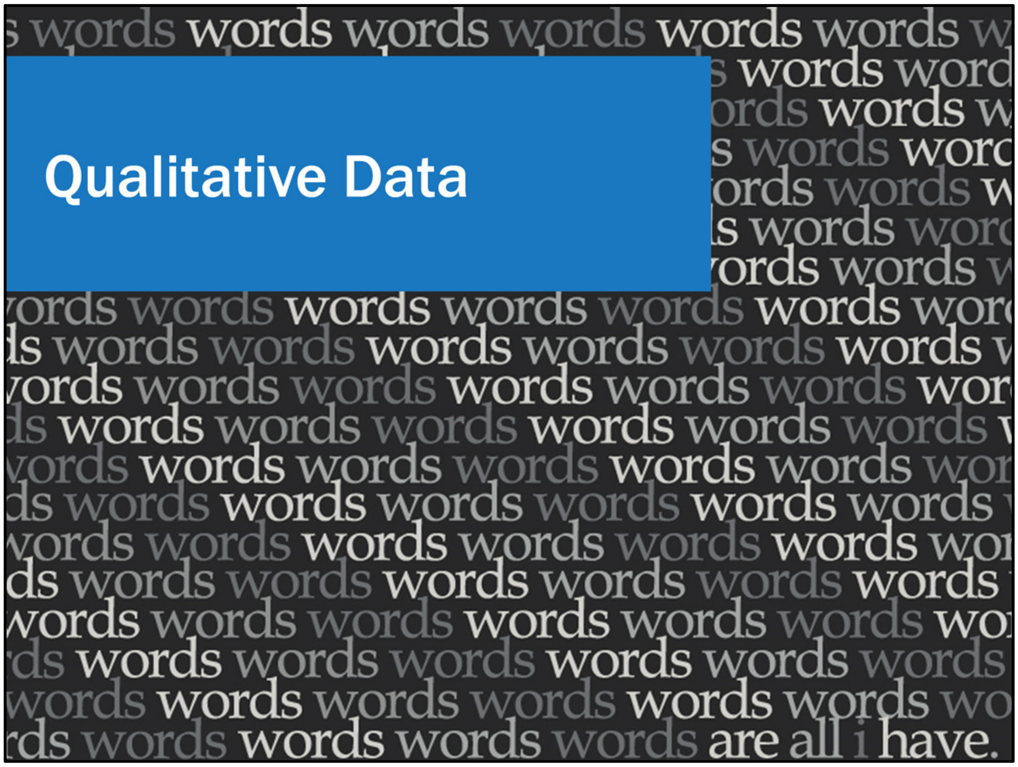
Presentation Magazine's website has a PowerPoint presentation you can download for free. The presentation includes a slide with a US map on it, and a slide for each individual US state, including Alaska and Hawaii, which aren't pictured here. You can change the color of the states.



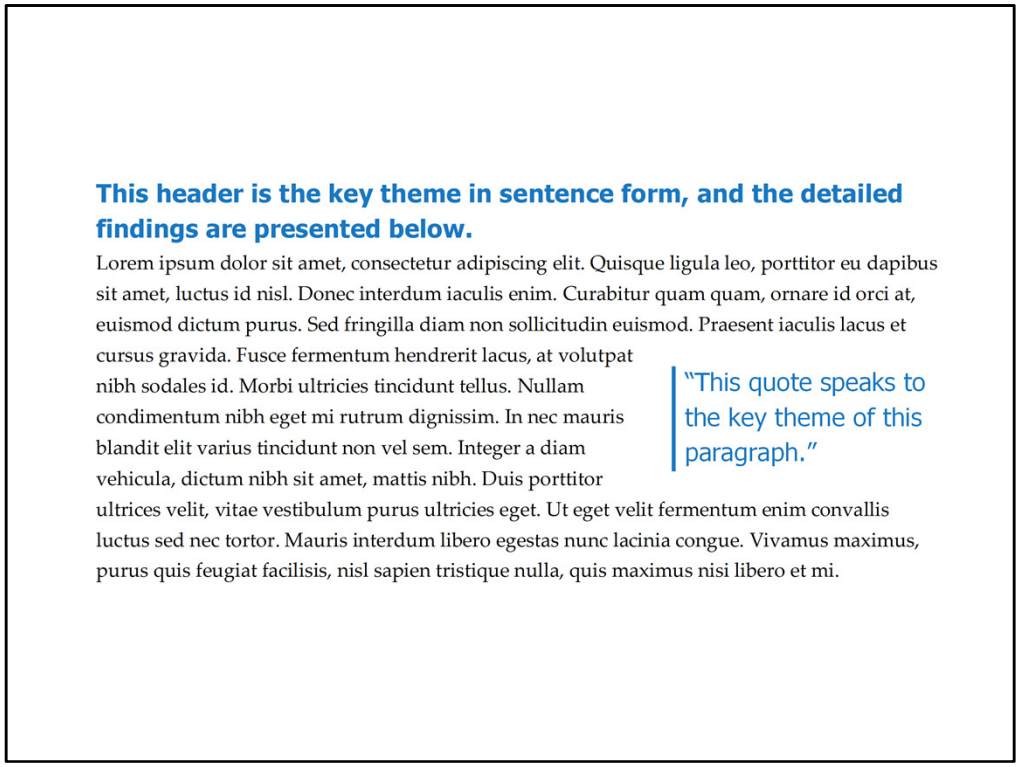
And highlight specific states based on your data.



Or use individual states in conjunction with small multiple charts. Here I also added in a text box for the state abbreviations in case someone isn't sure if this square state is north dakota, for example.

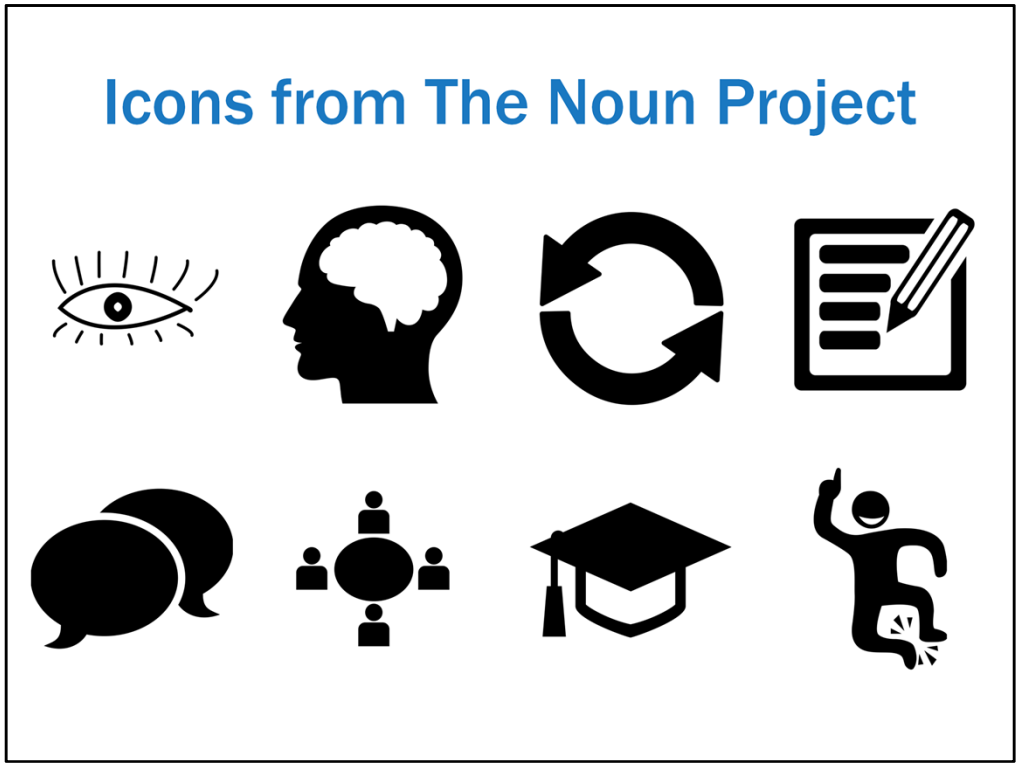


Qualitative data. a little bit trickier to visualize. I don’t work with qualitative data as much, but I do have some suggestions, some of which came from Ann Emery.

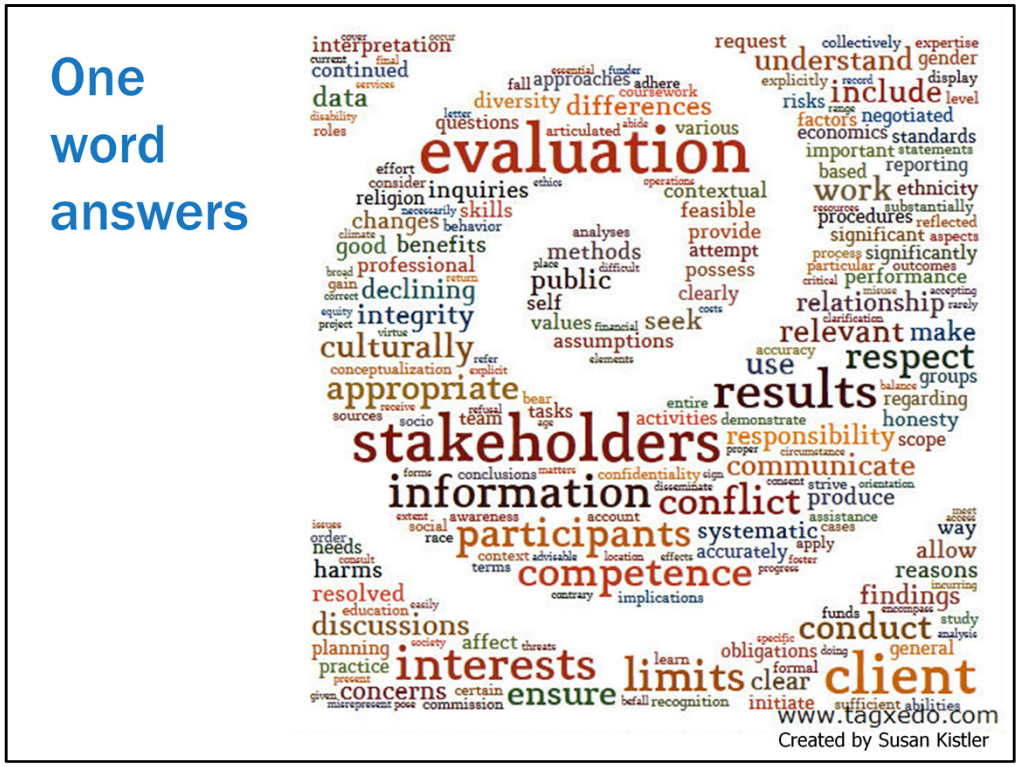


I think a classic way of showing qualitative data is putting your key themes or findings as the header, writing more about the findings from that theme in the paragraph below, and then maybe inserting a quote that really speaks to that theme. Not a novel idea, but this is what I often do.

Another way of showing quotes is by adding a picture or silhouette. This gives a little more life to the quote. My co-worker recently used two silhouettes in a poster presentation at a conference.



Another idea is to add an icon next to the finding. This would be great for a summary. I highly recommend the noun project if you're ever in need of some basic icons to relay a concept. These are just 8 examples of icons I've downloaded from the noun project, all for free. They do have paid subscriptions to their service which gives you access to more icons, but so far we've done just fine with the free membership. I absolutely love The Noun Project. Great to follow on twitter too.

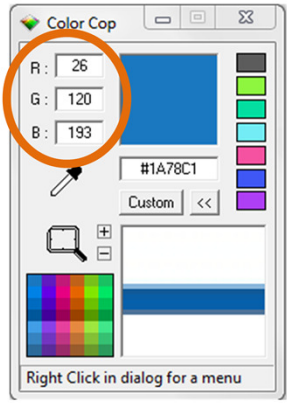


Word clouds are pretty well known. Some love them, some hate them. I don't use these very often. Probably the only use I like them for is if you incorporated an interview question that asks for a one-word answer. The word cloud can then be a useful way to show what one word participants said. And then you would of course have lots of other data and findings and context presented in your report.

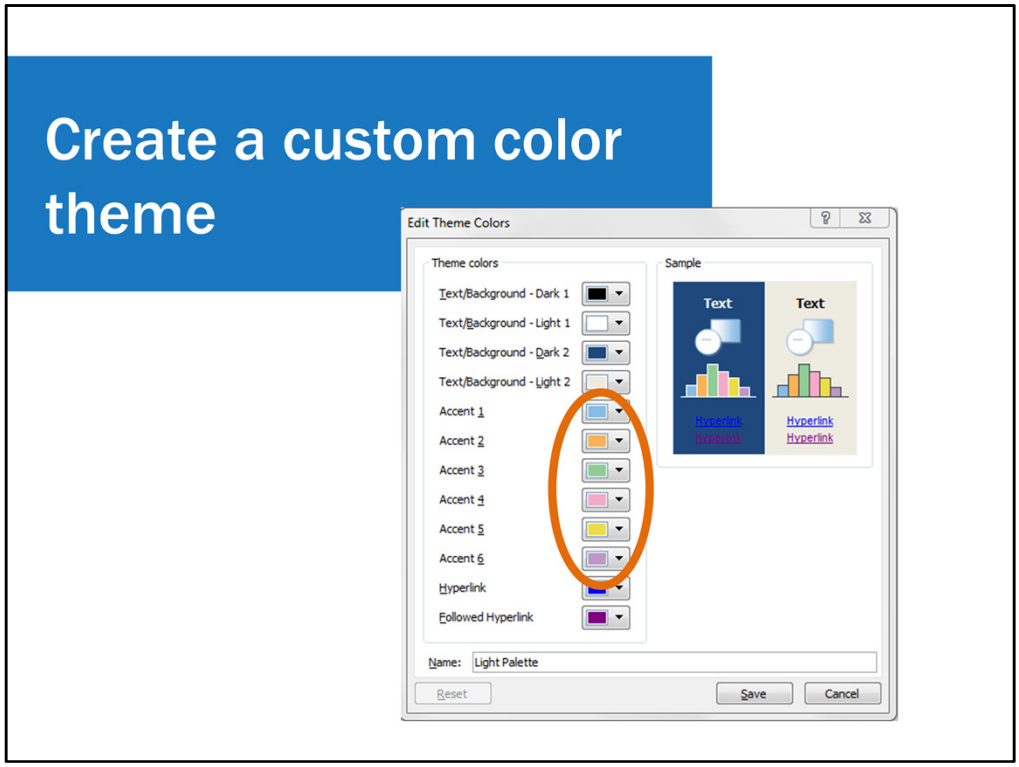
Here is a word cloud created by Susan Kistler using the AEA Guiding Principles for Evaluators. She used a program called tagxedo. Wordle is another option.

One last thing I want to touch on is color. 1) It's right up there with font types for me. and 2) it can be so helpful for you! I've talked about being intentional with color, but how do you do that if you don't know the exact color of your own brand or your client's brand? Do you just kind of pick a blue that looks like the blue in your logo no? OMG no. There are lots of free resources for this. One is Adobe Kuler. Another one that I often use is Color Cop. It's free for you to download and super easy to use.

Use custom colors

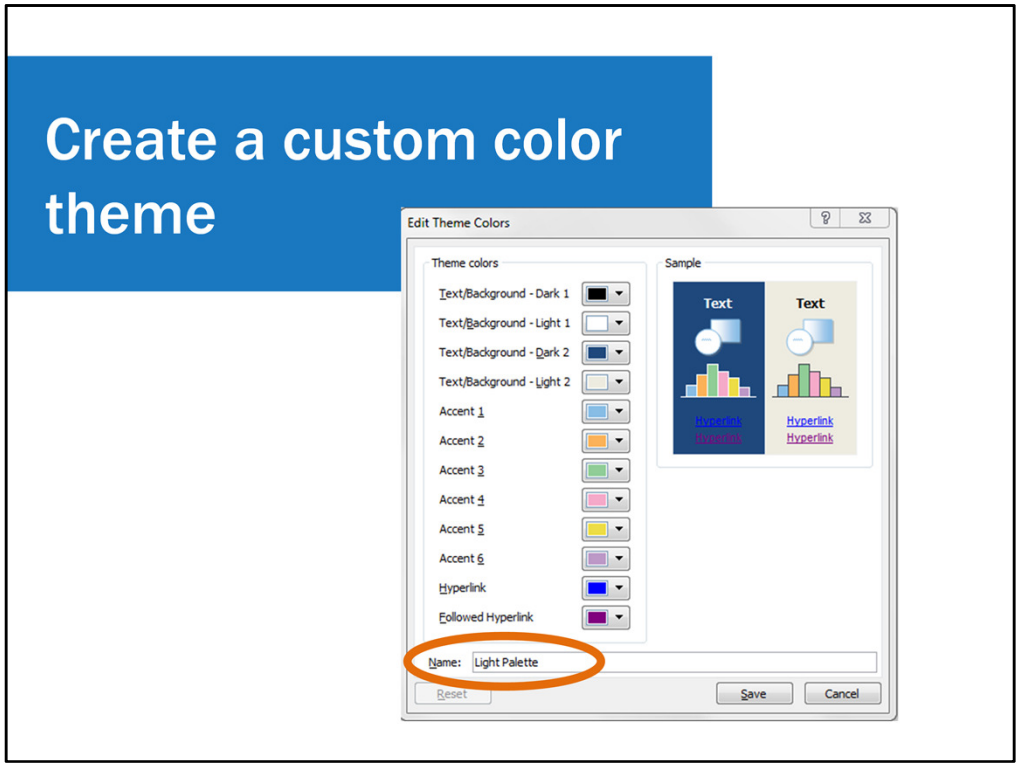


All you do is open up Color Cop, put your mouse on the eye dropper, and then drag it over your color of interest. So you could have your client's website open and drag the eye dropper over their logo. And Color Cop will show you the RGB codes.* RGB – that's red, green, blue. These are the 3 numbers that make up a color. At PDA, our main blue color = 26, 120, 193. Back in Word or PowerPoint, you then enter that code into the custom font color or shape fill and voila. There's your customized color.

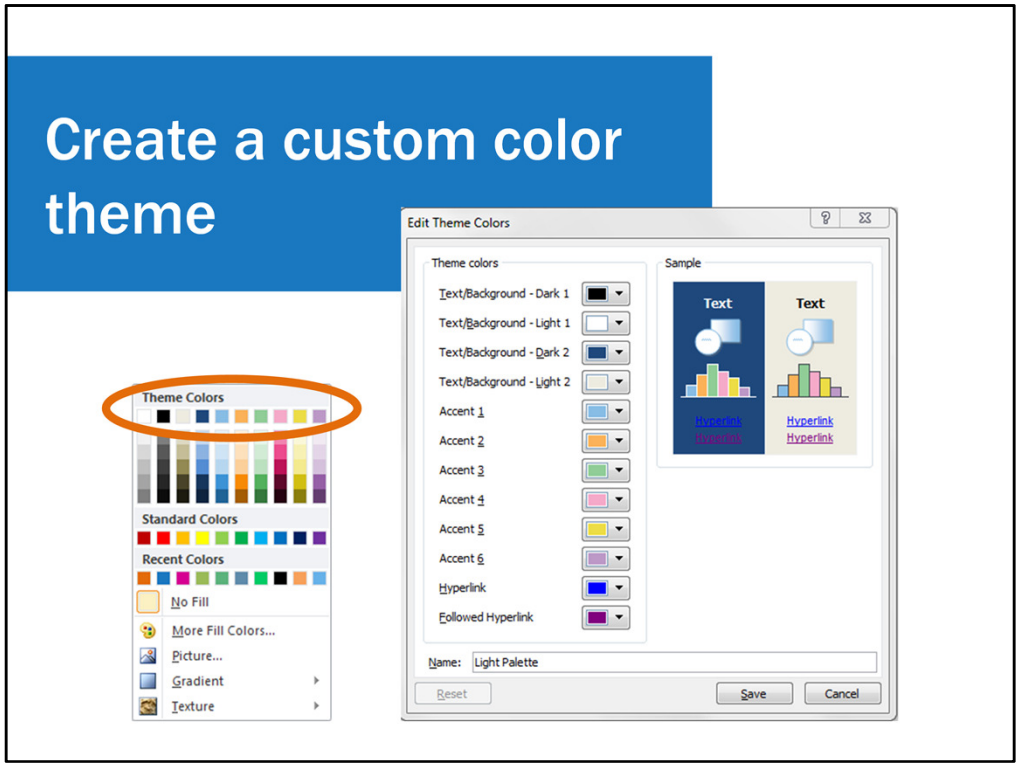


If you have a group of colors you use consistently, or especially if you want your charts to default to a certain color palette, you can create a Custom Color Scheme in Microsoft Word or PowerPoint, and then you can easily access these colors anytime rather than having to memorize the RGB codes or type the codes in every time.

In Microsoft Word or PowerPoint there is a Design Tab, and then there's a dropdown menu called Colors with a bunch of different color themes to choose from. At the bottom of that menu you can choose to Create a New Theme. Then a dialog box like this pops up. I usually just change the 6 accent colors. Here's an example of 6 different colors I chose for a color theme.



I named it light palette. I also have a medium and a dark palette. You could create a color theme for each client or school or whatever your needs are.



Once your document is set to this color theme, these are the default colors that will show when you go to change the color of anything, whether it's the font or a shape fill or shape outline. I highly recommend creating custom color themes.

Well that was a lot to learn and apply. So what now?

I encourage you to keep the momentum going. these are some resources that greatly helped me in my data viz journey. I didn't always know how to do this stuff. I highly recommend you checking out these resources to further your data viz knowledge. And there are of course many many more.

I hope that this presentation gave you some ideas for how to tell your story in a way that makes it easier for your client to understand and remember. And I hope that by applying those ideas your clients will have an easier time making decisions and taking action to improve their programs and highlight their successeses.

I'm more than happy to take your questions now.

Well I know I went over a lot of information today. This is stuff I've learned over the course of several years and crammed into 2 hours. Don't expect yourself to go from the before to the after overnight. Don't be like this fish and make a big leap right away. It's a long ways to go. So start small. Start with one thing – maybe it's reducing clutter or being more intentional with color or adding interpretation. Start with that one thing and build up your skills. Once you get comfortable with that one thing, move on to another element. Be patient and good luck.

And if you totally stumble or have any questions, please don't hesitate to contact me.