

Tableau Power Start Workshop “Cheat Sheet”

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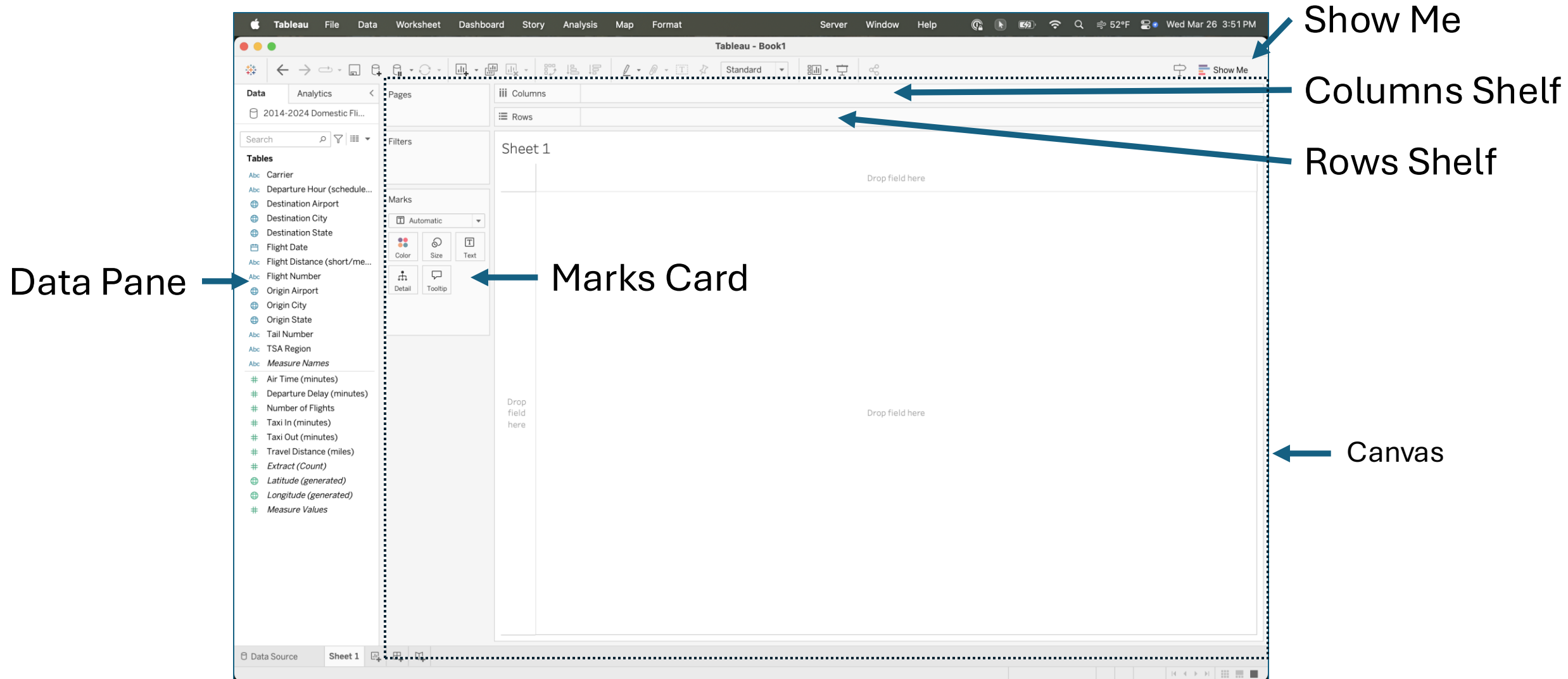


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Paul Albert, 2025

Part 1: How To Think Like Tableau

- At its heart, Tableau is an aggregation machine that slices, dices and visualizes our data the way we tell it to. We mostly tell Tableau how to do this by moving pills around on our Canvas.
- We just can't teach Tableau to think like us. However, we can learn to "think like Tableau."
- The easiest way to up your Tableau game is to successfully learn how to read the Tableau Canvas.
- When Tableau isn't doing what you think you told Tableau to do, the answer can almost always be found by reading the Tableau Canvas.

The Tableau Workspace



Data

Analytics

2014-2024 Domestic Flights D...

Search

Tables

Abc

Carrier

Abc

Departure Hour (scheduled)

🌐

Destination Airport

🌐

Destination City

🌐

Destination State

📅

Flight Date

Abc

Flight Distance (short/medium/l...

Abc

Flight Number

🌐

Origin Airport

🌐

Origin City

🌐

Origin State

#

Tail Number

#

TSA Region

Abc

Measure Names

#

Air Time (minutes)

#

Departure Delay (minutes)

#

Number of Flights

#

Taxi In (minutes)

#

Taxi Out (minutes)

#

Travel Distance (miles)

#

Extract (Count)

🌐

Latitude (generated)

🌐

Longitude (generated)

#

Measure Values

The “Data Pane”

Dimensions (categorical/discrete data) fields are put above the line

- When we drag a Dimension pill onto the canvas, it will show up as a blue pill. When Tableau sees Blue pills, it will create headers in your viz. (Blue pills determine your worksheet’s “granularity/level of detail”)

Measures (quantitative/continuous data) fields are put below the line

- When we drag a Measure pill onto the canvas, it shows up as green. When Tableau sees Green pills, it will create an axis in your viz.

Note:

- Tableau puts icons to the left of our fields indicating whether are assigned a string, a geographic, a date or a number type. We can change a field’s data type by clicking on these icons. (More on [Tableau’s visual cues.](#))
- Tableau does its best to assign the proper data type to your fields (in this example, Tableau saw a field called “Destination Airport” in the dataset and automatically treated it as a geographic field designating airport latitudes and longitudes). About 5% of the time in my experience, Tableau will make a bad guess. In these cases, you need to click on the icon to the left of the field to modify the field’s data type.
- Some numeric fields (for example, Flight Number or Tail Number) we might want to have treated as Categorical data instead of Quantitative data (we can drag these pills above the line to change how they are treated).
- Tableau will automatically generate some fields not in your data for you and put them into *italics*. In this example, the field *Extract (Count)*, was generated by Tableau to give the total number of rows of the dataset. Tableau gave this field this specific name based on the name of the data file (“Extract”) that was read into Tableau.

Columns		
Rows		
Sheet 1		
Carrier	TSA Region	
Alaska	Region 1	Abc
	Region 2	Abc
	Region 3	Abc
	Region 4	Abc
	Region 5	Abc
	Region 6	Abc
	Region 7	Abc
American	Region 1	Abc
	Region 2	Abc
	Region 3	Abc
	Region 4	Abc

The “Rows Shelf”

When we drag pills onto the Rows Shelf, Tableau arranges things up and down.

Tableau “reads” left to right. For pills on the row shelf, Tableau will create a major row grouping for each carrier and then a grouping for each TSA region. We can keep adding fields to the canvas to further slice our data.

Note:

- Each time we drag pills onto a shelf, Tableau will profile all our data and only list relevant values. In this case, if Alaska Airlines did not have any records with data for TSA Region 1, Region 1 would not be listed.

The “Columns Shelf”

When we drag pills onto the Columns Shelf, Tableau arranges our pills left and right.

Tableau “reads” left to right. For blue Dimension pills on the column shelf, Tableau will create a major pane grouping for each carrier and then a placeholder for each TSA region. We can keep adding fields to further slice our data.

Note:

- Each time we drag pills onto a shelf, Tableau will profile all our data and only list relevant values. In this case, if Alaska Airlines did not have any records with data for TSA Region 1, Region 1 would not be listed.

Columns

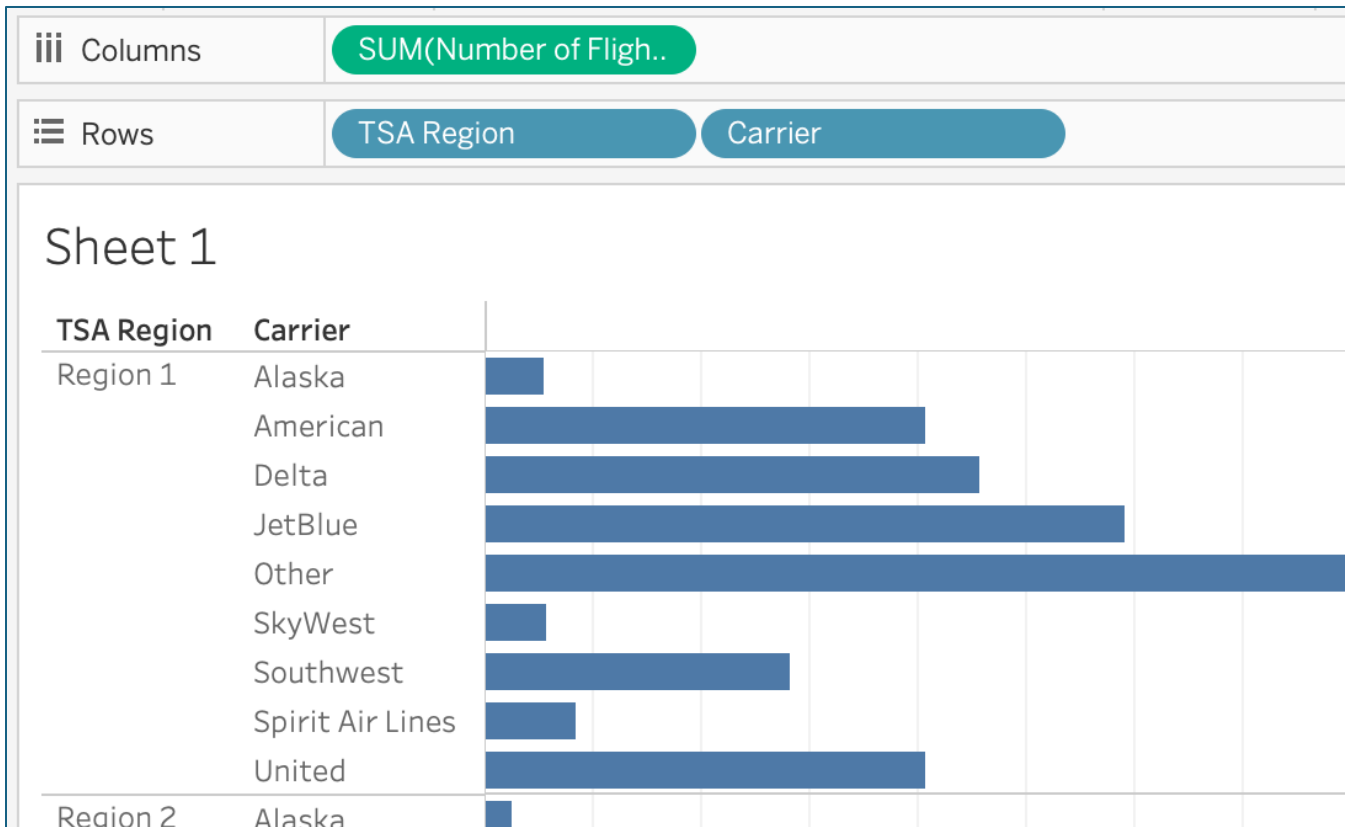
Carrier

TSA Region

Rows

Sheet 1

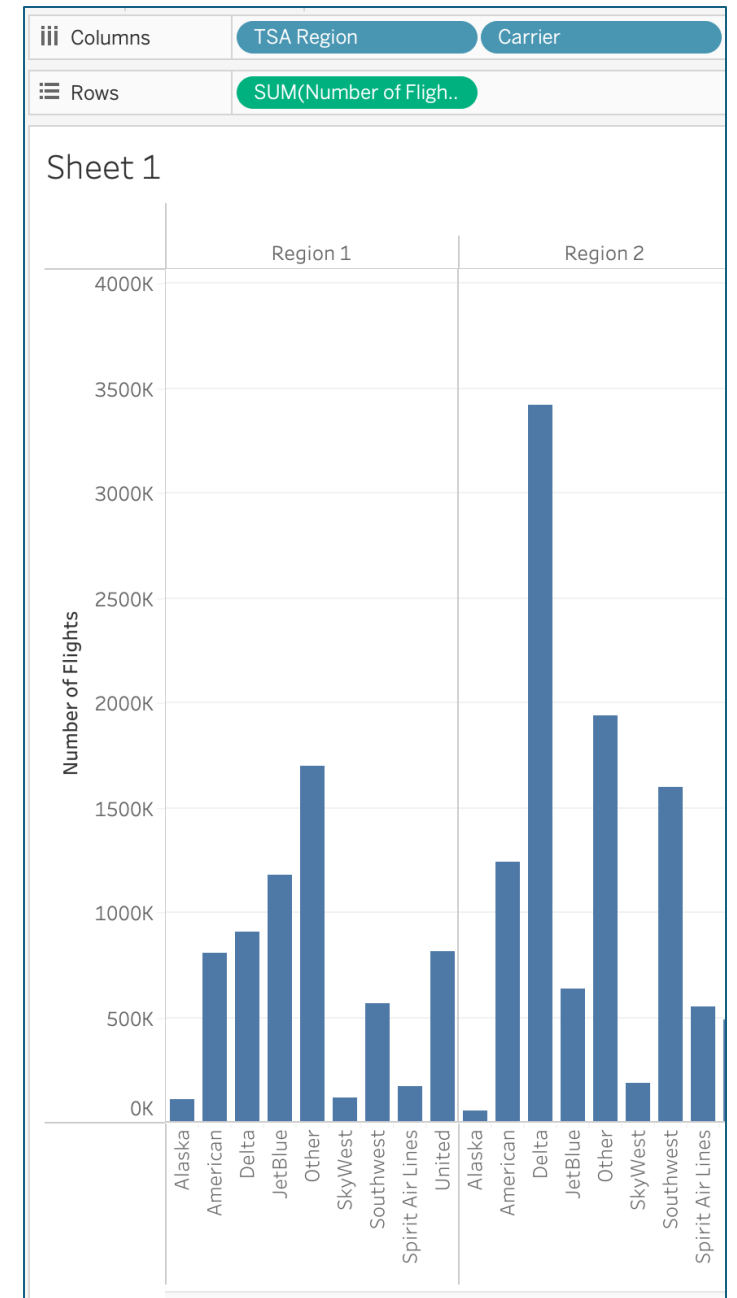
Alaska							Carrier / TSA Region				
Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	American				
Abc	Abc	Abc	Abc	Abc	Abc	Abc	Region 1	Region 2	Region 3	Region 4	Region 5
							Abc	Abc	Abc	Abc	Abc



When we put a green Measure pill on the Rows Shelf, Tableau will show the mark (in this case, a bar) as going left to right.

When we put a green Measure pill on the Columns Shelf, Tableau will show the mark (in this case, a bar) as going up and down.

Note: TSA Region and Carrier pills order has been shifted from the past examples on Pages 5 and 6. Notice how it affects the order of groupings.



Various types of aggregation for green Measure Pills

✓ Measure (Sum) ▶

Discrete

✓ Continuous

Edit in Shelf

Add Table Calculation...
Quick Table Calculation ▶

Dual Axis
Mark Type ▶

Remove

✓ Sum

Average

Median

Count

Count (Distinct)

Minimum

Maximum

Percentile ▶

Std. Dev

Std. Dev (Pop.)

Variance

Variance (Pop.)

SUM(Departure Delay..)

MAX(Departure Delay..)

AVG(Departure Delay ..)

MIN(Departure Delay ..)

Data Danger: When we tell Tableau to change our aggregation to Average, Tableau takes a SUM and then divides by the number of records. In this dataset case, each flight is a record, so it sums the delay minutes and divides by the number of flights. If our dataset, instead, had multiple flights counted in a single record (say, each record reflected data for an entire day instead of a single flight), changing our aggregation to Average would yield incorrect results.

Aggregating our Data

When we right click on a green Measure Pill on the canvas, we can change how Tableau aggregates the data. By default, Tableau will use SUM and add all the numbers up.

Tableau tells us how it is aggregating our Measure fields in the pill on the Canvas! See examples.

Note, even blue Dimension Fields can be aggregated (and turned into green pills)

Measure ▶

Edit in Shelf

Mark Type ▶

Minimum

Maximum

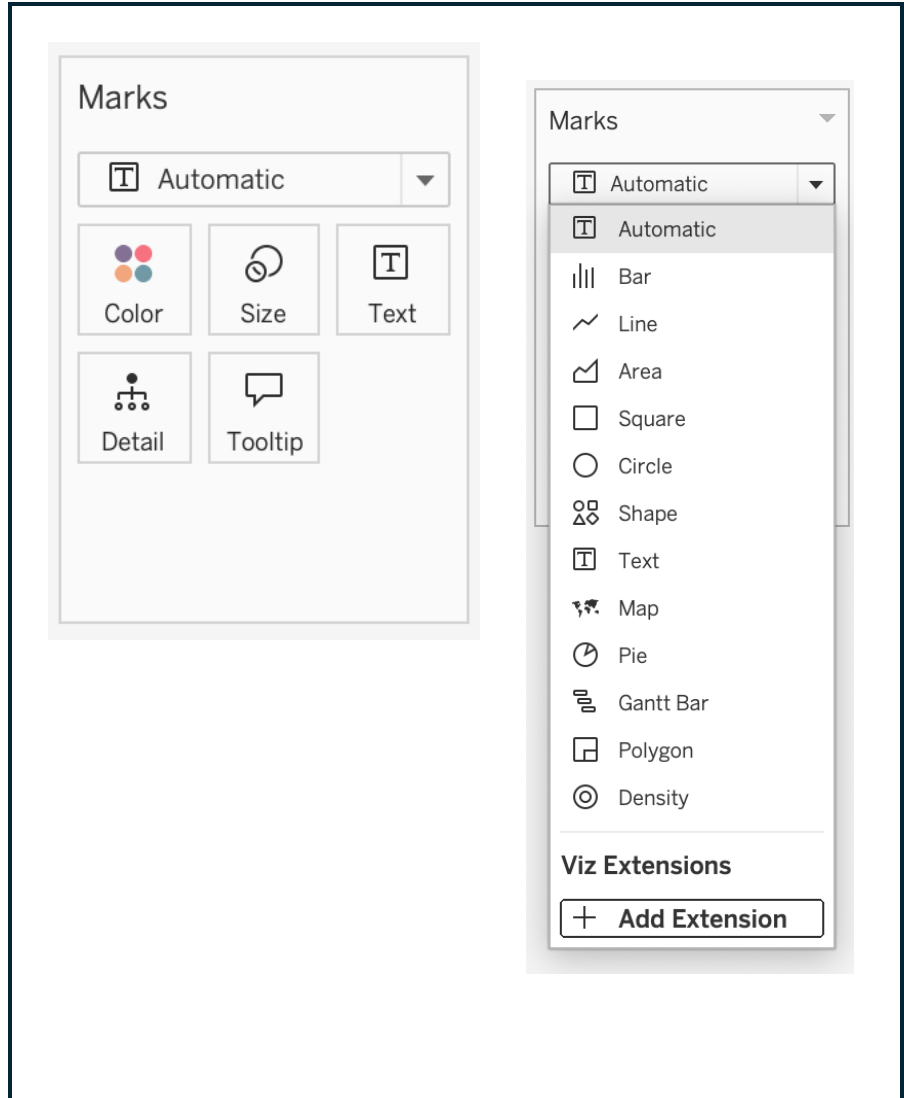
Count

Count (Distinct)

Carrier

→

CNTD(Carrier)



The “Marks Card”

The pills we put onto the Rows and Columns shelf determine the “scaffolding/structure” of our analysis; the pills we put onto the marks card modify the way our data is presented.

The pulldown at the top changes the chart type for how our data will be represented.

Pills put on the Color Tile affect how things are colored.

Pills put on the Size Tile affect how things are sized.

Pills put on the Text Tile affect how things are labeled.

Pills put on the Detail Tile affect how things are broken out.

Pills put on the Tooltip Tile affect information shown in the Tooltip.

When we put pills on the marks card, Tableau will give us visual cues telling us where they’ve been put! For more, see [here](#).

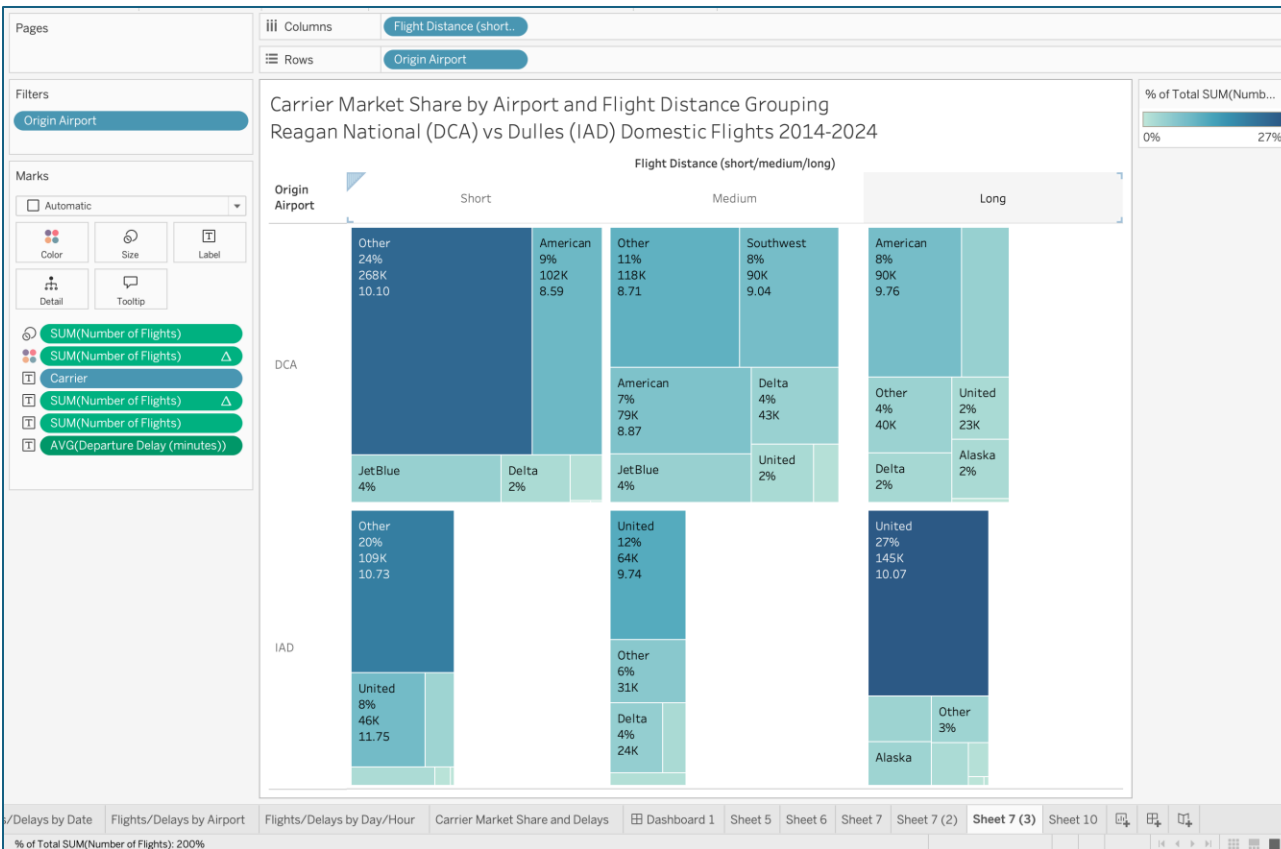
Putting it All Together

The way to read this canvas is that Flight Distance Group (Columns Shelf) will go across, while Airports (Rows Shelf) will go up and down.

On our marks card, we tell Tableau to make this a “Square” chart type (pulldown), size the squares by % of flights, color the squares by Number of Flights, label each of the boxes with Carrier Name, % of flights for the Airport, and Number of Flights and Average Departure Delay minutes by Carrier/Airport/Flight Distance combinations.

Tableau reads our pills in the Marks Card from top to bottom. We could reorder our labels in this viz by switching the order of the label pills in the Marks card.

Note: the % of Market Share pill shows a triangle (Delta) symbol to indicate that it is a table calculation. A quick check that we’ve done this calculation correctly is the fact that, at the bottom left, Tableau tells us these percentages add up to 200%. Since we have two regions, this is what we’d want.



Every viz is a compromise; this viz’s purpose is to help explain how to read the Tableau canvas. It might not be the best choice of a viz aimed at a general audience.

Putting it All Together (2)

We can also go from "reading" the Viz to reverse engineer how the Canvas is arranged.

Here we see the horizontal data title showing as "Region/Order Date." This would mean we have the Region Pill and then the Order Date Pill on our Columns Shelf.

On the left, we see the field name "Category" with a major row for each member of field. This means we have the Category Pill on the Row Shelf.

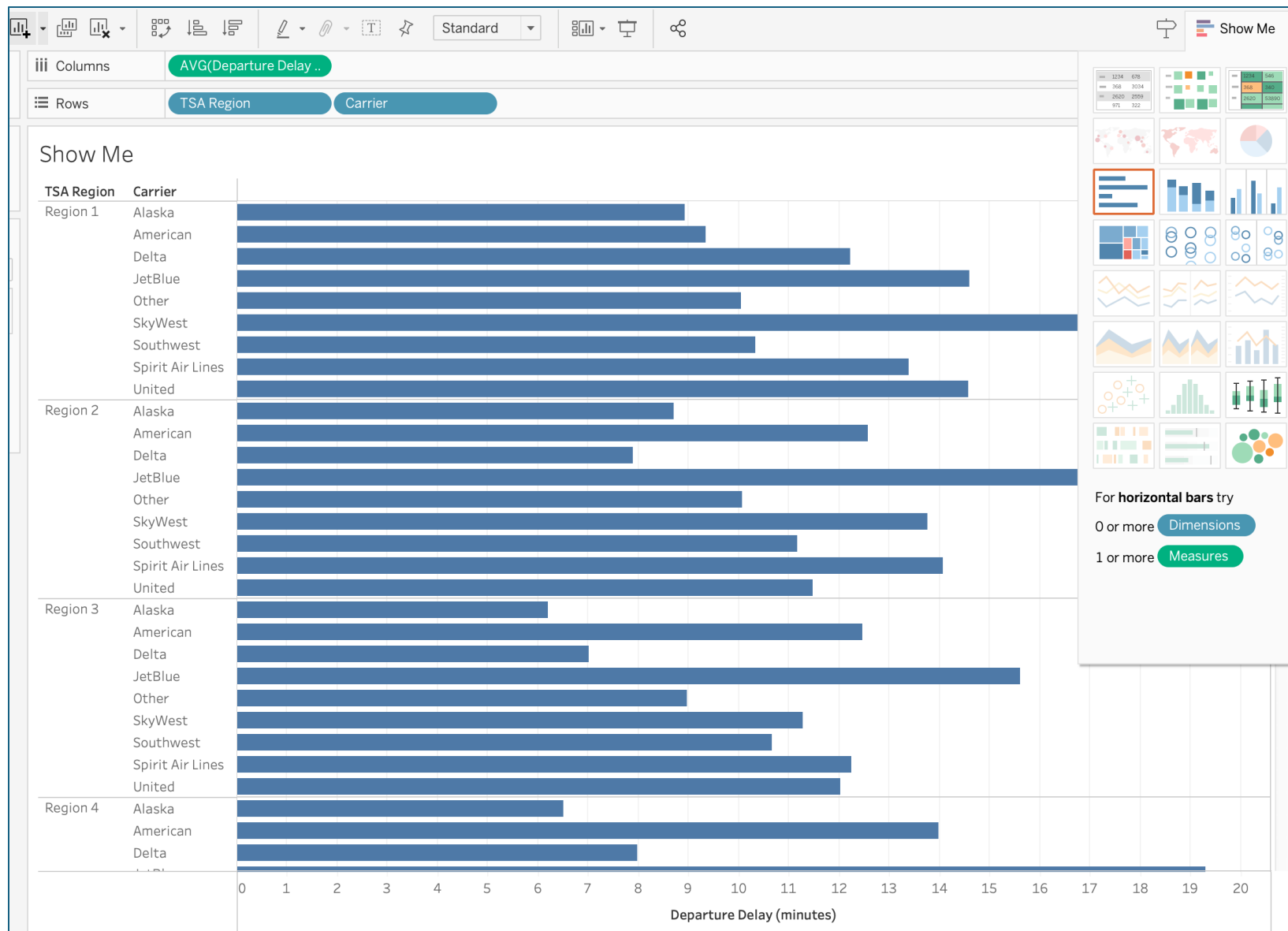
We see a line with a Y axis (going up and down) for Sales. This means we have the measure Sales Pill on our Row Shelf as well.

Finally, because our lines are colored and titled by Segment, we know that the Segment Pill was placed on both the Color and Labels tiles on the Marks card.



Part 2: Show Me

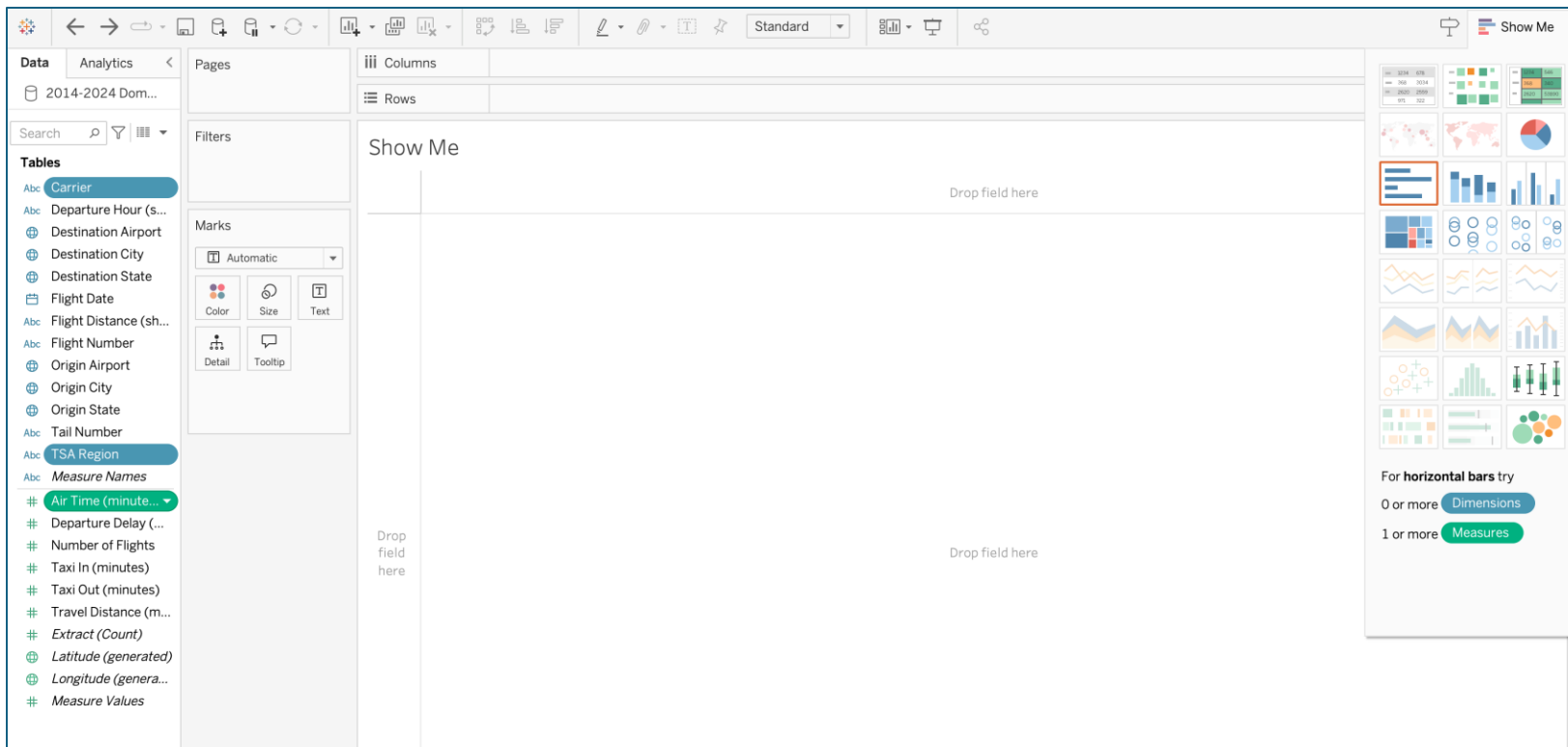
- When learning Tableau, learning how to read the Tableau Canvas is the fastest way for you to understand why Tableau is doing what it is doing (and why Tableau might not be doing what you want it to do!).
- Show Me is your friend. When beginning to use Tableau, using Show Me is the easiest way to get quick results from Tableau.
- **All Show Me does (in general) is just move pills around the Canvas for us. Use Show Me for quick results but also learn how to read the Canvas for long-term growth!**



Show Me

When any combination of pills are put onto the the Rows or Columns shelf and Show Me is selected, Tableau will show you and allow you to select different viz types that can be shown for the pills on the Canvas.

- Tableau only shows a select gallery of possible common viz types, many other viz types are possible in Tableau.
- **All Show Me really does is move pills around the Canvas for us.** We can replicate anything Show Me does by moving pills yourself directly on the Canvas.
- Show Me does not necessarily follow best practices; you might want to modify anything it creates for you.



Show Me - Bonus

We don't even need to drag our pills of interest onto the shelves, we can merely highlight them in the data pane while Show Me is activated to see possible viz choices.

Part 3: Aggregating Ratios in Tableau

- The most common analytical mistake I see in student's work is improper aggregations of ratios. This is an incredibly easy to make mistake not only in Tableau, but in any data analysis program you might use (Excel, Python, R, SAS, etc.).
- Anytime you have a measure in your data that describes a ratio (e.g., fields that measure averages or report "X per Y"), beware that you might be falling into this trap.
- The easiest way for you to check your work and avoid this trap is to build a table of the data and review your results.

Pages

Filters

Measure Names

Automatic

Color

Size

Text

Detail

Tooltip

Measure Values

Measure Values

SUM(Profit)

SUM(Budget)

SUM(ROI - Profit/Bu..)

AVG(ROI - Profit/Bu..)

AGG(Calculated ROI)

Columns

Rows

Measure Names

Rating

Aggregating Ratios

Rating	Profit	Budget	ROI - Profit/Budget per Film	Avg. ROI - Profit/Budget per ..	Calculated ROI
G	13,828,774,269	2,890,858,706	230	6.8	4.8
PG	58,163,485,359	16,295,830,494	1,181	6.2	3.6
PG-13	155,116,026,257	42,779,149,787	2,763	4.9	3.6
R	70,385,442,530	21,639,907,790	5,320	8.4	3.3

Calculated ROI

Workshop Data 1 (Movies)

SUM([Profit])/SUM([Budget])

The calculation is valid.

1 Dependency

Apply

OK

Aggregating Ratios

In the data source for this viz, every record has a field called “ROI-Profit/Budget per Film.” This measure, Return on Investment (ROI), reports “for every dollar spent on a film, how many dollars were returned in profit?”

If we look at this table, we see G movies had a combined Profit of 13.8B and a combined Budget of 2.9B and the sum of the ROI-Profit/Budget per Film is 230.

This would suggest that for every dollar spent on making G movies, \$230 of profit was realized. However, this is not true! If we simply divide 13.8 by 2.9, we get 4.8, not 230.

What we need to do is create a new calculated field that forces Tableau to make the right aggregation.

Page 16

ROI – For every dollar spent, how many dollars do we get back?

Movie	Profit	Budget	Return on Investment (Profit/Budget)
Finding Nemo	\$1,150M	\$119M	9.7
Toy Story 3	\$1,366	\$214	6.4
SUM	\$2,416	\$333	16.1

Which is the correct ROI for these movies as a group?

- 1) **16.1** $(9.7 + 6.4)$ *Sum of the ratios*
- 2) **8.05** $(9.7 + 6.4)/2$ *Average of the ratios*
- 3) **7.26** $(1,150 + 1,366)/(119 + 214)$ *“Ratio of the sums”*

$$16.1 * 333 = 5,361$$

$$8.05 * 333 = 2,681$$

$$7.26 * 333 = 2,147$$

Aggregating Ratios Correctly

Here are different ways of aggregating the ROI ratio for a group of just two movies.

Can you see why taking the **SUM** or **AVG** does not work, and we need to create a new calculation in Tableau?

	A	B	C	D
1	All the G movies in sample dataset			
2	Title	Profit	Budget	ROI - Profit/Budget per Film
3	A Bug's Life	687,260,989	64,310,954	10.69
4	Anastasia	210,726,769	76,915,621	2.74
5	Cars	734,798,625	80,905,744	9.08
6	Cars 2	571,293,519	207,138,157	2.76
7	Cats Don't Dance	-36,023,788	46,439,620	-0.78
8	Chicken Run	395,844,528	56,822,152	6.97
9	Cinderella	242,501,891	4,208,591	57.62
10	Finding Nemo	1,510,435,315	119,012,174	12.69
11	Fly Me to the Moon 3D	50,964,195	27,056,408	1.88
12	Herbie Fully Loaded	191,030,092	59,651,656	3.20
13	Hercules	406,073,989	101,586,669	4.00
14	High School Musical 3: Senior Year	383,067,107	11,904,819	32.18
15	Ice Princess	29,961,438	29,825,828	1.00
16	Monsters, Inc.	966,069,291	151,322,285	6.38
17	Mulan	477,502,052	128,621,908	3.71
18	Muppets from Space	12,040,159	33,563,089	0.36
19	Ponyo	201,735,894	36,796,715	5.48
20	Quest for Camelot	29,933,176	57,165,293	0.52
21	Ramona and Beezus	41,272,871	16,023,478	2.58
22	Ratatouille	767,374,974	168,531,522	4.55
23	Rio	560,453,316	93,212,171	6.01
24	Rugrats in Paris: The Movie	202,647,075	40,587,251	4.99
25	Spirit: Stallion of the Cimarron	129,169,027	103,614,337	1.25
26	Tarzan	663,267,658	202,776,994	3.27
27	The Emperor's New Groove	214,561,997	135,290,838	1.59
28	The Hunchback of Notre Dame	483,627,399	148,516,493	3.26
29	The Jungle Book 2	207,138,386	25,321,739	8.18
30	The Princess and the Frog	293,579,953	114,001,818	2.58
31	The Princess Diaries	320,513,163	39,475,379	8.12
32	The Princess Diaries 2: Royal Engagement	212,381,550	55,493,679	3.83
33	The Santa Clause 2	319,976,237	84,186,649	3.80
34	Toy Story 2	933,068,486	125,861,583	7.41
35	Toy Story 3	1,366,016,782	213,646,368	6.39
36	Winnie the Pooh	48,510,154	31,070,724	1.56
37		13,828,774,269	2,890,858,706	230
38		=SUM(C2:C35)	=SUM(D2:D35)	=SUM(D2:D35)
39				

Rule of Transitivity:

$$(2/5)+(2/6) = 0.733$$

$$(2+2)/(5+6) = 0.366$$

Aggregating Ratios Correctly

Here is a spreadsheet showing data for all the G movies in our dataset.

The ROI field in our original dataset correctly calculates the Profit/Budget at the line level (in this case, for each individual film).

Can you see why we don't want to **SUM** up the total of each *individual movie's* ROI value to get the correct Return on Investment value for the *entire group of G movies*?

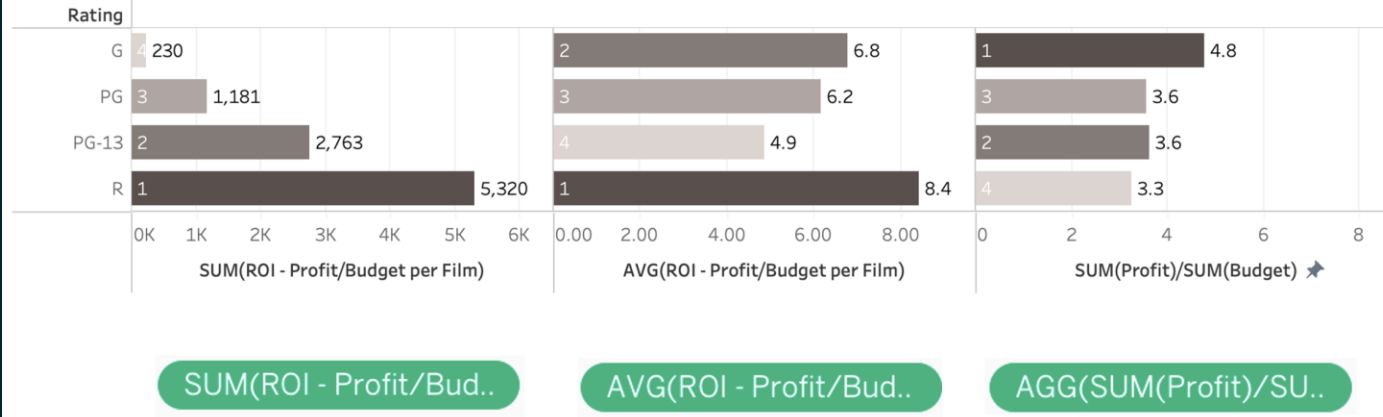
When aggregating ratios, we want to take the *Ratio of the Sums* NOT the *Sum of the Ratios*.

Sum of
Ratios =
230
(**wrong!**)

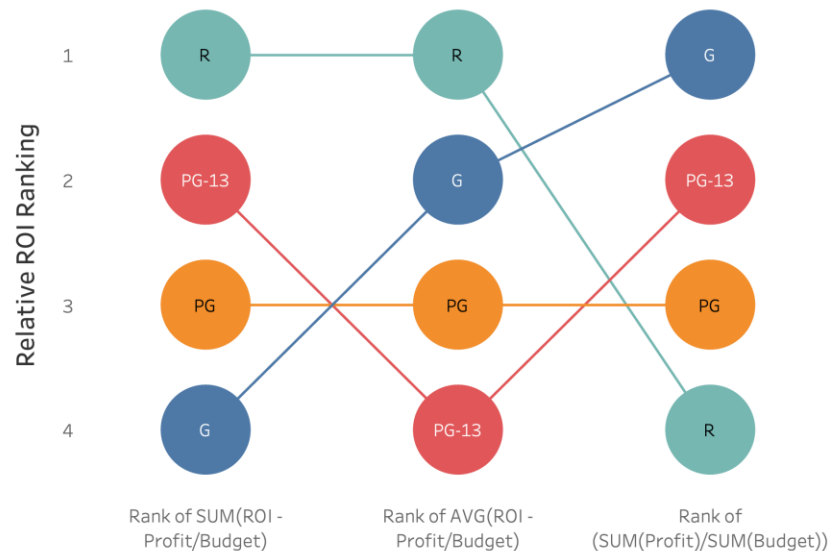
Ratio of
Sums $\cong$
4.8
(13.8/2.9)
(**right!**)

Faulty Aggregations ⇒ Misleading Comparisons

ROI by Rating



Relative Rankings of ROI by ROI Aggregation Method



Why This Matters

I argue that the main reason we should visualize data is to facilitate comparisons between things (versus, say, making our page prettier!).

If we take the Tableau default of summing each record's Return on Investment value in the data source, R-rated movies rank as having the highest return per dollar spent.

If we tell Tableau to instead average each record's ROI calculation in the data source, R-rated movies still rank as having the highest ROI.

If we instead create a new calculation "SUM(Profit)/SUM(Budget)" to facilitate a correct comparison, we see that, in fact, G movies have the highest ROI and R movies have the lowest ROI.

Note the AGG notation shown by Tableau for this pill. In this case, Tableau is aggregating our measure by Rating, but the calculation would work no matter how we slice and dice the data. For example, this custom calculation would work if we chose to aggregate by Genre instead of Rating.

Part 4: Data Pivoting

- Many of us start our data vizzing journey using data that looks good to the human eye in Excel or when printed onto a page. Quite often this data needs to be “pivoted” in Tableau for us to work with it easily.
- As a general rule of thumb, if you feel you are banging your head into a wall working with your data, you might want to try pivoting it.
- **If all the quantitative data going across the columns is the same thing (e.g., Sales, Population, Yield, etc.), it will almost always need to be pivoted. Another good rule of thumb is if you can make a title that describes a *single* measure for your data (e.g., "CO2 Emissions by Year and Region" vs., say, "CO2 Emissions and Population by Year and Region") you likely want to pivot your data.**
- A good video on data pivoting is [here](https://www.youtube.com/watch?v=_ZrNdrUvTQ) - https://www.youtube.com/watch?v=_ZrNdrUvTQ

Part 5: How Can We Make Our Vizs Better?

- We should measure our vizs by the [SPEED](#) they can be interpreted, the [ACCURACY](#) in how they are interpreted, and the [ATTENTION DEMANDS](#) needed for interpretation. It is not what we put on the paper that matters, it is what the user takes away that matters.
- Beware of the instinct to simply throw data against the wall and ask the users to figure things out themselves.
- We can often get more out of vizs that show less. The less the cognitive load of a viz, the more impactful it can be.
- Pie Charts are pretty, but people often [can't get the insights from them](#) the way they can from other types of vizs.
- Bar charts should almost always have an axis starting at 0 (accuracy ↑, attention demands ↓).
- A ninja way to make your vizs more impactful is [put a takeaway in your title](#) (attention demands ↓). People always read titles, but might not always study your viz.
- Give your vizs a purpose! Use tools like the [Big Idea Worksheet](#) to establish why we are communicating and what we want users to take away. Use these goals to establish a criteria for judging your vizs.
- Test your vizs by soliciting peer/client review.

Part 6: Essential Tableau Topics With Learning Links

This is a list of major topics to be aware of when learning Tableau

Chart Types:

[Bar \(also here\)](#)

[Line \(also here\)](#)

[Treemap](#)

[Maps](#)

[Scatterplot](#)

[Word Cloud](#)

[Highlight Table/Heatmap](#)

[Sparklines](#)

[Chart Catalogs: \(1, 2, 3\)](#)

(Note: The Superstore data set used in many of these linked examples can be found [here](#).)

Tableau Techniques:

[Show Me](#)

[Filtering](#)

[Grouping](#)

[Table Calcs](#)

[Custom Calculations \(also here and here\)](#)

[Level of Detail Calcs](#)

[Number Formatting](#)

[Multiple measures in chart](#)

[Reference Lines](#)

[Relating Data](#)

[Viz in Tooltips](#)

[Shade Banding](#)

[Blue vs. Green](#)

[Top N Filters](#)

[Dashboards](#)

Viz Fundamentals:

[Cognitive load](#)

[Data to Ink](#)

[Give your titles a takeaway](#)

[Pie chart limitations](#)

[Start bar charts at 0](#)

[Give your vizs a purpose](#)

[Meaningful Mapping](#)

Analysis Fundamentals:

[Data granularity \(also here\)](#)

[Properly aggregating ratios](#)

[Data Pivoting](#)

[Document dashboards](#)

[Work checklists](#)

[Use tables to check work](#)

Part 7: Where Next?

- Above all else, people learn how to use Tableau by using Tableau. If you want to get good at Tableau, practice, practice, practice.
- Many learning Tableau resources are listed on my website at www.vizalyst.com.
- Above all else, join the community. Community challenges like Makeover Monday and community resources found in blogs and YouTube videos will help speed and direct your journey.
- The number one resource I personally used in learning Tableau is www.vizwiz.com.
- The number one resource type I personally use in troubleshooting Tableau are AI services like Perplexity or ChatGPT.

Happy Data Journeys

Keep on Vizzing!

Paul Albert
www.vizalyst.com