

Tableau: Power Start Workbook

WORKSHOP MODULES

- 0) Connect to Data
- 1) Overview of Tableau Basics and Concepts
- 2) Going to the Bar (Chart)
- 3) Toeing the Line (Chart)
- 4) Making Sense of the Whole (Tree Chart)
- 5) Taking it to the Table (Chart)
- 6) Calculations
- 7) Mapping our Data
- 8) Dashboarding
- 9) Next Steps

HOW THE WORKSHOP “WORKS”

At the beginning of each module, the instructor will demonstrate the drills to be done. Then, the student will be asked to do the drills on their own. Feel free to work at your own pace. The instructor will be circulating while you do the drills. If you run into a problem, please raise your hand. At the end of each module is a STRETCH TIME / BONUS WORK section. If you are ahead of the class, feel free take a non-disruptive stretch and do the bonus work. Please wait for the instructor before going to the next module.

ABOUT THE DATA

The data set used for these examples is a subset of a movie data from several sources including IMDB and the web site FiveThirtyEight. For learning purposes, primary country values have been adjusted from the original data.



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Module 0: Connect to data and data transformations

DRILL 1: CONNECT TO A DATA

- 1) Open Tableau Desktop.
- 2) Click on the  icon on the top left, review the options offered on this screen.
- 3) On the Connect Pane, click Excel.
- 4) Navigate to the **Movies Dataset** file on your PC and open it.
- 5) View the data in the preview pane below. Note, based on the data in the Excel sheet, Tableau has assigned data types. See how Tableau assigned the Country field a geographic type and noted that with a globe and how Release Date was assigned a date type noted by a calendar page.
- 6) Now, click onto "Sheet 1" at the bottom to get started!

STRETCH TIME / BONUS WORK:

- 1) This workshop tags the topic "CONNECT TO AND CLEAN DATA" as Module 0, not Module 1. Why?
 - 2) Go to **Tableau Online Help** by selecting **Open Help** from the **Help** option on the **Toolbar**. Search for the term "Excel" using the top right search field. Review the various help pages. Search for "data interpreter" and review the various help pages.
 - 3) Mute your computer and click on the  icon on the top left and then, on the right Discover pane, click on the "Connecting to Data" topic. Remember this option for when you can play videos with audio.
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Module 1: Overview of Tableau Basics and Concepts

- 1) We want to aim to go beyond merely describing data to analyzing data in order to gain insight. A good way to approach data analysis is to start by asking questions of the data. If we do this right, the questions we ask will often change based on the previous answers we get from the data. Data analysis is an iterative journey, not a final destination.
- 2) Fields are broken up into Dimensions and Measures.
 - **Dimensions** (blue) are categorical fields. They are the labels in a visualization, the buckets that data falls into such as locations, product names, etc.
 - **Measures** (green) are quantitative fields. They are the axes in a visualization, the numbers that can be analyzed, such as price and counts of records.
- 3) Tableau creates some fields that can be used in a visualization that do not exist in the original data set.
 - If the data set contains geographic fields, such as country or city, Tableau searches an internal database and generates **Latitude** and **Longitude** fields. This enables the geographic data to be plotted on a map.
 - **Number of Records** is a simple count of rows in the data set.
- 4) **Show Me** can be accessed in the upper right corner of the screen. With field(s) selected, Show Me offers one-click options for chart types.
- 5) The Tableau Canvas:
 - Data window – purple – drag fields from here to bring them into the view, either data fields or, if you're on the Analytics tab, items like reference lines and box plots.
 - Shelves – blue – areas where fields can be placed to control exactly how they appear in the view.
 - Canvas – green – where the visualization is built. Fields can be placed directly here as well as on shelves.
 - Toolbar and ribbon – orange – additional controls and menu options, including Undo and Clear Sheet.

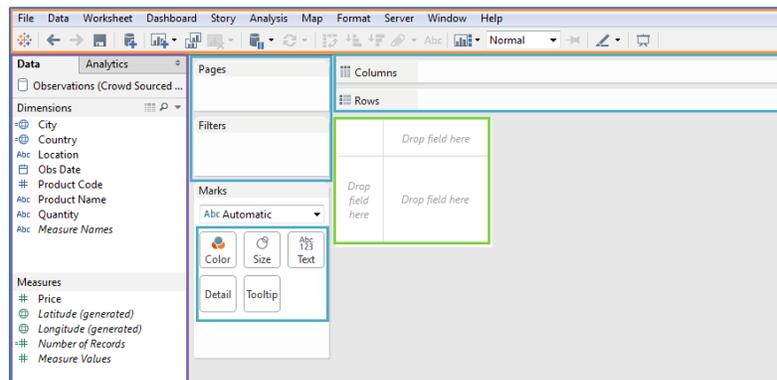


Figure 1. Tableau Elements

Take the next few minutes and explore Tableau and the data. Drag some fields from **Dimensions** and **Measures** on the left to the **Rows** and **Columns Shelves** to see what happens. Hover over the various Ribbon icons at the top to display what they do. Ask a question and try to answer it, play with dragging fields to different places or using Show Me to get a feel for how the software behaves.

Practice using the “Undo” and “Redo” buttons on the Toolbar ().

Module 2: Going to the Bar (Chart)

DRILL 2.1: SHOW NUMBER OF MOVIES BY RATING

- 2.1 Clear the sheet  (in the ribbon) or create a new sheet  (at the bottom)
- Double click **Number of Records** from the data pane on the left.
 - Congratulations! You’ve made your first chart in Tableau!
 - Note, Tableau has taken the measure **Number of Records** and placed a pill on the Rows shelf. Also note, Tableau is telling us what the canvas is showing by listing Number of Marks and Sum(Number of Records) at the bottom left.
 - Tableau labels the Y axis of our chart “Number of Records” since that is the title of the measure we used.
 - Let’s make that a bit more descriptive, by renaming this field. Right click on **Number of Records** in the data pane and rename it “**Number of Movies**”.
 - Note how the Y axis has now changed
 - Drag out **Rating** from the data pane and place it on the Columns Shelf.
 - Take a look at this chart, how has it changed? (You can use the undo/redo arrows  in the ribbon bar to highlight this.)
 - How has the information in the very bottom changed?
 - Highlight the bars with your mouse, note that a tooltip with more information about the bars appears when you do so.
 - Let’s name our chart by clicking on the sheet tab at the bottom () and renaming it “Number of Movies by Rating.” See how Tableau makes things easy by putting this name onto the chart title!

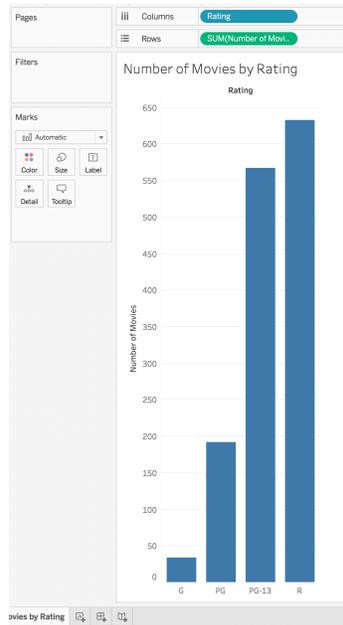


Figure 2. Drill 2.1 Results

DRILL 2.2: SHOW AVERAGE BUDGET OF MOVIES BY RATING

- 2.2 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Budget** from the data pane on the left and drop it on the rows shelf.
 - Drag **Rating** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the bars and see what the tooltips are telling you.
 - What is the measure that Tableau is showing? From the rows shelf, we see that it is reporting the total budget for all films that fall into the different rating buckets. While this gives an important picture, it is not the picture we might want. Rather than seeing the total spent for each rating, let's suppose that we want to see the average budget for all the films broken out by rating buckets.
 - To accomplish this, we want to tell Tableau to aggregate budget not by SUM but by AVERAGE. Right click on the **Budget** pill on the rows shelf and change the measure from SUM to AVERAGE. Mouse over the bars to see how the tooltips have changed.

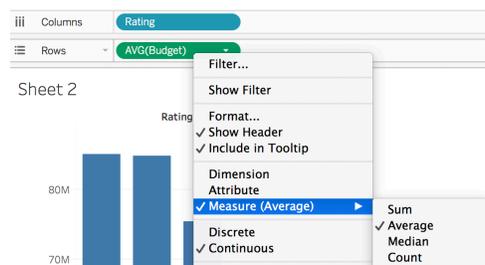


Figure 3. Changing measure aggregation

- Let's rename the tab to "Avg Budget by Rating" and we should end up with this.

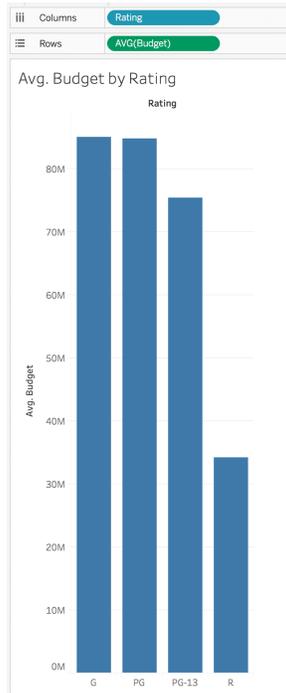


Figure 4. Drill 2.2 Results

DRILL 2.3: SHOW AVERAGE GROSS OF MOVIES BY RATING

2.3 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed



- Drag **Gross** from the data pane on the left and drop it on the rows shelf.
- Drag **Rating** from the data pane on the left and drop it on the columns shelf.
- Mouse over the bars and see what the tooltips are telling you. What is the measure that Tableau is showing? Rather than seeing the total spent for each rating, let's suppose that we want to see the average budget for all the films broken out by rating buckets.
- Right click on the **Gross** pill on the rows shelf and change the measure from SUM to AVERAGE. Mouse over the bars to see how the tooltips have changed.
- Let's rename the tab to "Avg Gross by Rating."
- Your chart should look like what is shown in Figure 5.

DRILL 2.4: SHOW AVERAGE PROFIT OF MOVIES BY RATING

- 2.4 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Profit** from the data pane on the left and drop it on the rows shelf.
 - Drag **Rating** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the bars and see what the tooltips are telling you. What is the measure that Tableau is showing? Rather than seeing the total profit for each rating, let's suppose that we want to see the average profit for all the films broken out by rating buckets.
 - Right click on the **Profit** pill on the rows shelf and change the measure from SUM to AVERAGE. Mouse over the bars to see how the tooltips have changed.
 - Now let's title our chart by renaming its tab "Avg Profit by Rating."
 - Your chart should look like what is shown in Figure 5.

DRILL 2.5: SHOW AVERAGE VOTES FOR MOVIES BY RATING

- 2.5 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **IMDB Votes** from the data pane on the left and drop it on the rows shelf.
 - Drag **Rating** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the bars and see what the tooltips are telling you. What is the measure that Tableau is showing? Rather than seeing the total number of votes for each rating, let's suppose that we want to see the average number of votes for all the films broken out by rating buckets.
 - Right click on the **IMDB Votes** pill on the rows shelf and change the measure from SUM to AVERAGE. Mouse over the bars to see how the tooltips have changed.
 - Now let's title our chart by renaming its tab "Avg Votes by Rating."
 - Your chart should look like what is shown in Figure 5.

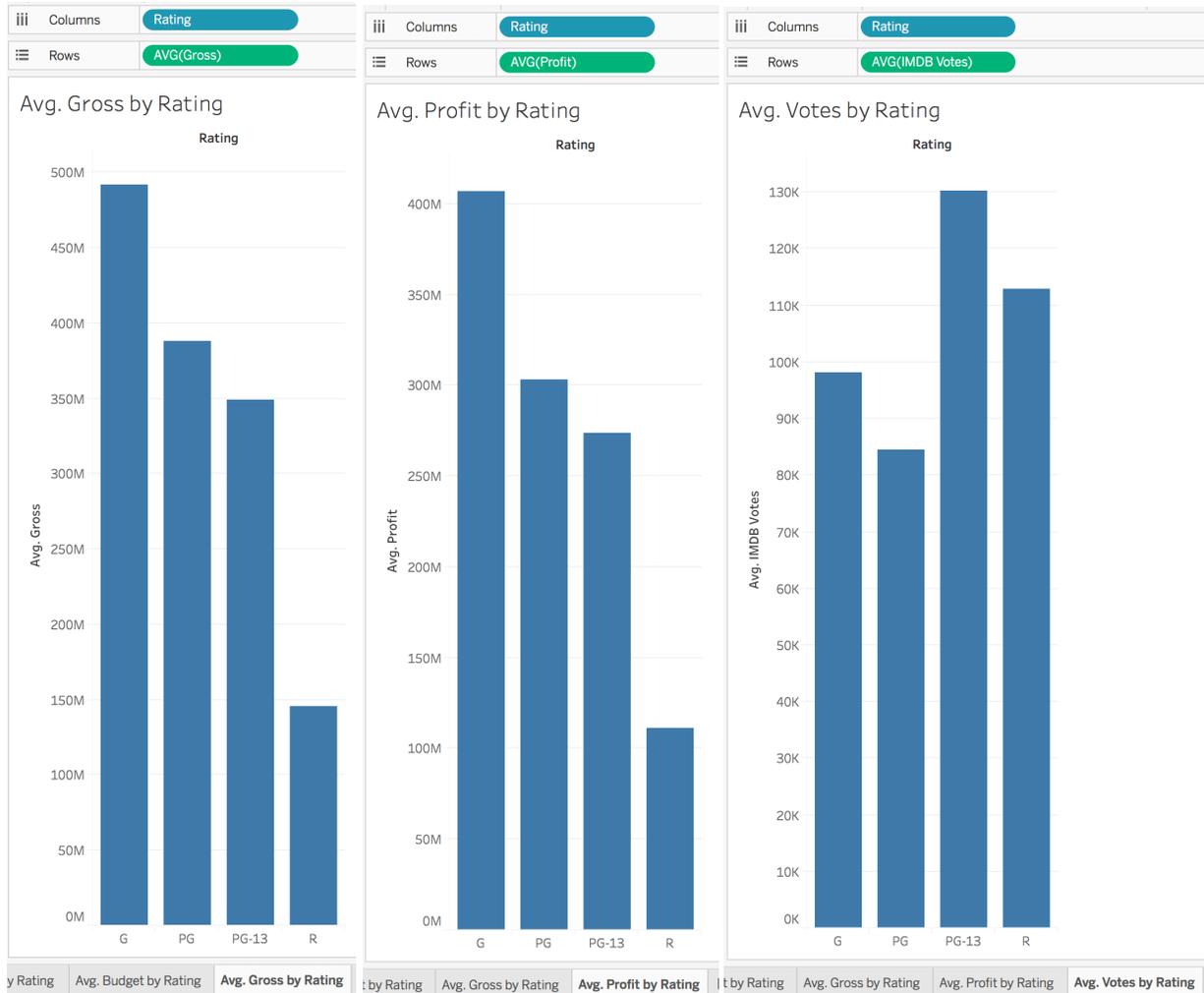


Figure 5. Views obtained from Drills 2.3, 2.4 and 2.5

DRILL 2.6: SHOW BAR VALUES AND FORMAT NUMBERS

- 2.6 For this drill, we want to take the chart created in Drill 2.5 and work with it.
- Method 1: In the Ribbon Bar, click on the Show Marks Values icon (). Notice the change and then click the icon again to hide bar values so we can practice Method 2.
 - Method 2: Drag IMDB Votes from the data pane and drop it onto the label card (). Tableau is now showing us the sum of votes on top of each bar.

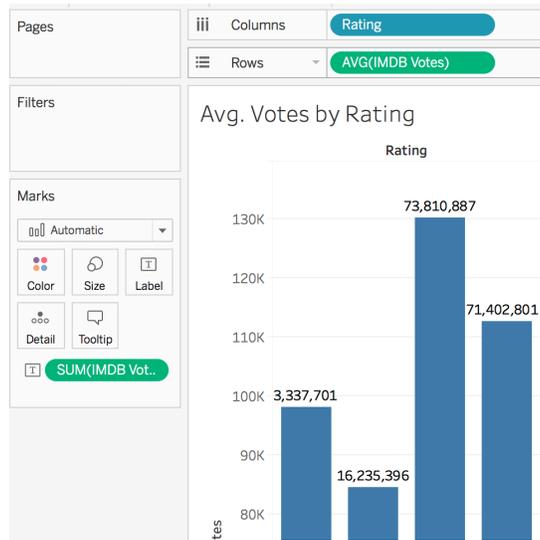


Figure 6. Showing Bar Labels

- c. Do you see a problem here? While the bars are showing an average, the labels are showing the sum of the number of votes. Right click on the pill on the text card () and changes its aggregation to average by changing the measures option.
- d. Now we have the aggregation for the bars and the text agreeing.

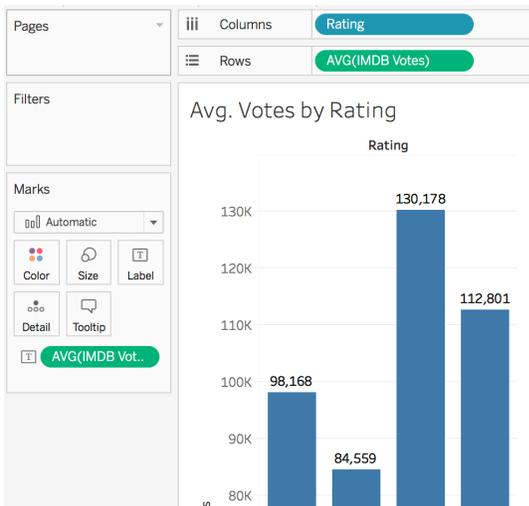


Figure 7.

However, the text is perhaps showing more precision than we might need. Let's change the way the text is displayed by right clicking on the pill for label and choosing Format.

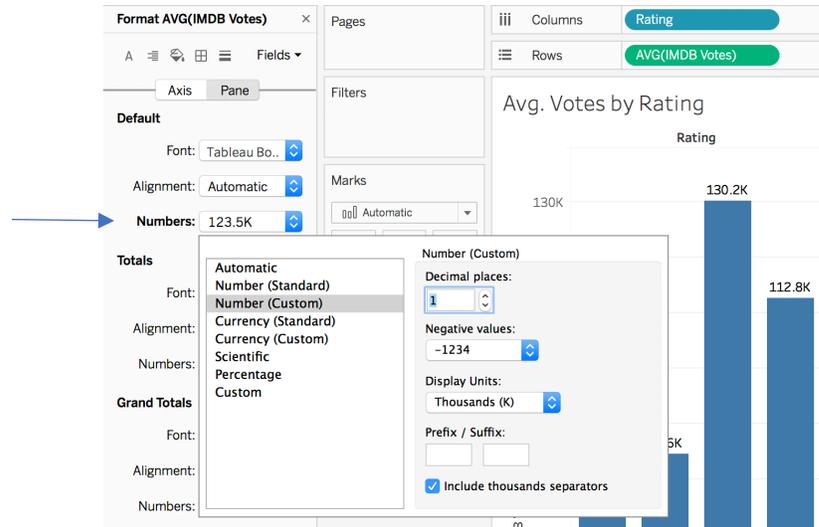


Figure 8.

- e. Let's go ahead on change the Default Number format to display numbers in units of Thousands with just 1 Decimal Place. Close the formatting pane.
- f. Look at the finished result. Is it better to have the numbers to have the numbers displayed on top of the bars? Try dragging the text pill off the Marks Card. Use the undo/redo arrows to compare the two visualizations.

DATA TO INK

Steven Tufte, one of the founders of modern data visualization, speaks about something called the Data to Ink ratio. Tufte observes, that at some point, the more “ink” (or pixels) used to visualize data, the harder it is to understand what is being visualized. Tufte argues that visualizations must be made as simple as possible in order to become as powerful as possible.

Not only would this idea apply to putting value labels above bars, it also applies to gridlines, icons, chart boxes, 3-D effects, etc. Tufte argues for these five rules in approaching data visualization:

1. Above all else show the data.
2. Maximize the data-ink ratio.
3. Erase non-data ink.
4. Erase redundant data-ink.
5. Revise and edit.

Want to learn more? Google “data to ink ratio.”

Advanced tip: But wait! While I firmly believe that adhering as much as possible to Tufte's rules will lead to better results as you begin your data visualization journey, there are times where like with any set of rules, it might make sense to break them. For more, see this [video](#).

STRETCH TIME / BONUS WORK:

- 1) Go to **Tableau Online Help** by selecting **Open Help** from the **Help** option on the Toolbar. Click on **Build Charts and Analyze Data** on the left. Click **Build Common Chart Types**. Explore the different types of charts that can be built in Tableau.
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Module 3: Toeing the Line (Chart)

In the last section, we made a number of bar charts to allow us to visually compare values for different measures across movie ratings. Let's take a look at comparing these measures across time.

DRILL 3.1: SHOW NUMBER OF MOVIES BY RELEASE YEAR

- 3.1 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
 - a. Drag **Number of Movies** from the data pane on the left and drop it on the rows shelf.
 - b. Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - c. Mouse over the line and see what the tooltips are telling you.
 - d. Now let's title our chart by renaming its tab "Number of Movies by Release Year."

DRILL 3.2: SHOW BUDGET BY RELEASE YEAR

- 3.2 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Budget** from the data pane on the left and drop it on the rows shelf.
 - Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the line and see what the tooltips are telling you.
 - Now let's title our chart by renaming its tab "Movie Budget by Release Year."

DRILL 3.3: SHOW GROSS BY YEAR

- 3.3 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Gross** from the data pane on the left and drop it on the rows shelf.
 - Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the line and see what the tooltips are telling you.
 - Now let's title our chart by renaming its tab "Movie Gross by Release Year."

DRILL 3.4: SHOW PROFIT BY RELEASE YEAR

- 3.4 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Profit** from the data pane on the left and drop it on the rows shelf.
 - Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the line and see what the tooltips are telling you.
 - Now let's title our chart by renaming its tab "Movie Gross by Release Year."

DRILL 3.5: SHOW IMDB VOTES BY RELEASE YEAR

- 3.5 Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Gross** from the data pane on the left and drop it on the rows shelf.
 - Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - Mouse over the line and see what the tooltips are telling you.
 - Now let's title our chart by renaming its tab "IMDB Votes by Release Year."

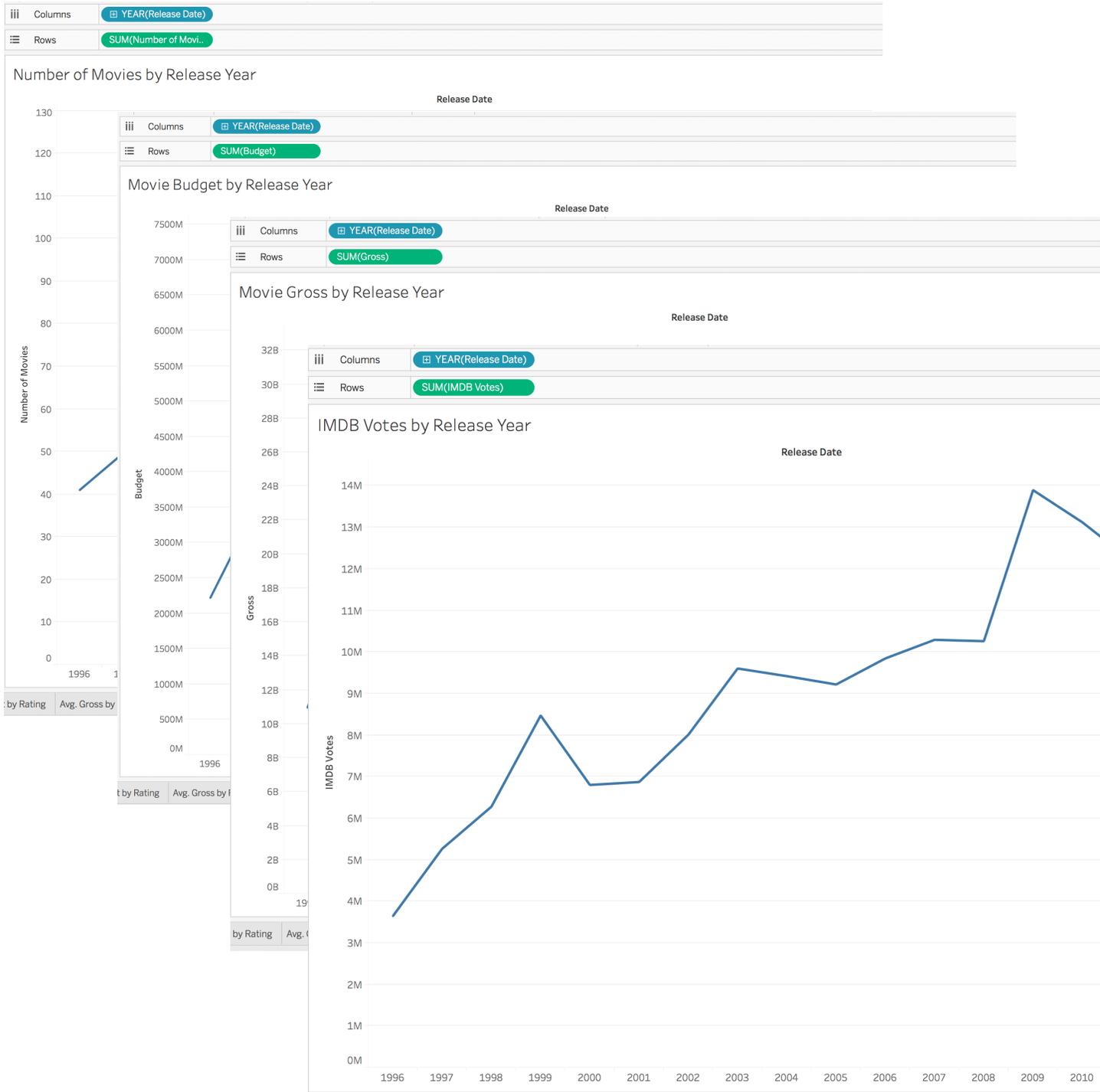


Figure 9. Line Charts from Drills 3.1 to 3.5

DRILL 3.6: MAKING OUR LINES SHOW MORE

- 3.6 Let's take the last line chart created, "IMDB Votes by Year" and have it show a little more information.
- Change the aggregation of IMDB Votes on the row shelf from Sum to Average by right clicking on the pill on the row shelf. Use the undo/redo arrows to note the difference. What is the difference showing? Is one type of aggregation better than the other? Leave the chart to show IMDB Votes aggregated by average.
 - Drag Profit from the data pane on the left and drop it on the size card
 - Drag Profit from the data pane on the left and drop it on the color card
 - Note how the line color and shape suggest the greatest total profit came after 2008.
 - Now change the aggregation level for both the size and color pill to show average. Use the undo/redo arrows to see how these changes affect the view. Leave the view to show average aggregations.

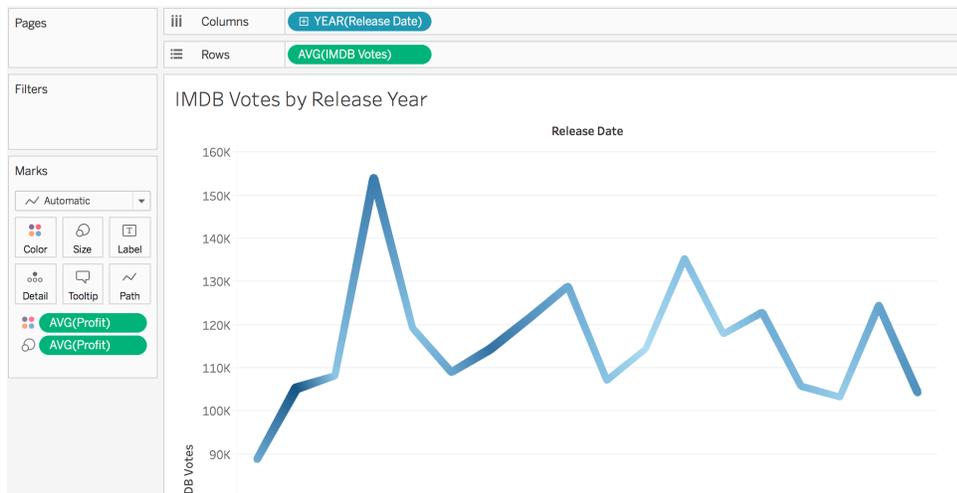
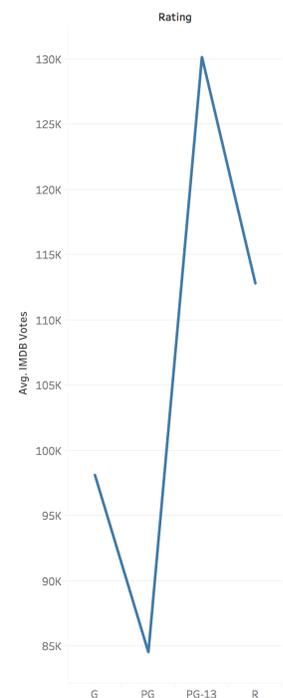


Figure 10.

Consider the humble line chart. What is it good for?

Unlike the bar chart we started with, the line chart offers a linkage between the data points that makes it easier to spot trends over time. While we might have used a bar chart showing a bar for each year, it really would not had made sense to use a line chart comparing IMDB votes by rating.



Module 4: Making Sense of the Whole

While line charts and bar charts have their places, quite often people want to show how different pieces contribute to the whole. For this, Tableau defaults to something called a “Tree Graph.”

DRILL 4.1 SHOW SHARE OF MOVIES BY GENRE

- 4.1. Let’s create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
 - a. Drag **Genre** from the data pane on the left and drop it on the rows shelf.
 - b. Drag **Number of Movies** from the data pane on the left and drop it on the columns shelf.
 - c. Now, go to the “Show Me” tab in the upper right of the canvas and pull it down. Try playing with the different options to see what they will do. End your exploration by choosing the Treemap icon ()
 - d. Now let’s title our chart by renaming its tab “Share of Movies by Genre.”

DRILL 4.2 SHOW SHARE OF MOVIE BUDGET BY GENRE

- 4.2. Let’s create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
 - a. Drag **Genre** from the data pane on the left and drop it on the rows shelf.
 - b. Drag **Budget** from the data pane on the left and drop it on the columns shelf.
 - c. Now, go to the “Show Me” tab in the upper right of the canvas and pull it down. Try playing with the different options to see what they will do. End your exploration by choosing the Treemap icon ()
 - d. Now let’s title our chart by renaming its tab “Share of Movie Budget by Genre.”

DRILL 4.3 SHOW SHARE OF MOVIE PROFIT BY GENRE

- 4.3. Let’s create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
 - a. Drag **Genre** from the data pane on the left and drop it on the rows shelf.
 - b. Drag **Profit** from the data pane on the left and drop it on the columns shelf.
 - c. Now, go to the “Show Me” tab in the upper right of the canvas and pull it down. Try playing with the different options to see what they will do. End your exploration by choosing the Treemap icon ()
 - d. Now let’s title our chart by renaming its tab “Share of Movie Profit by Genre.”

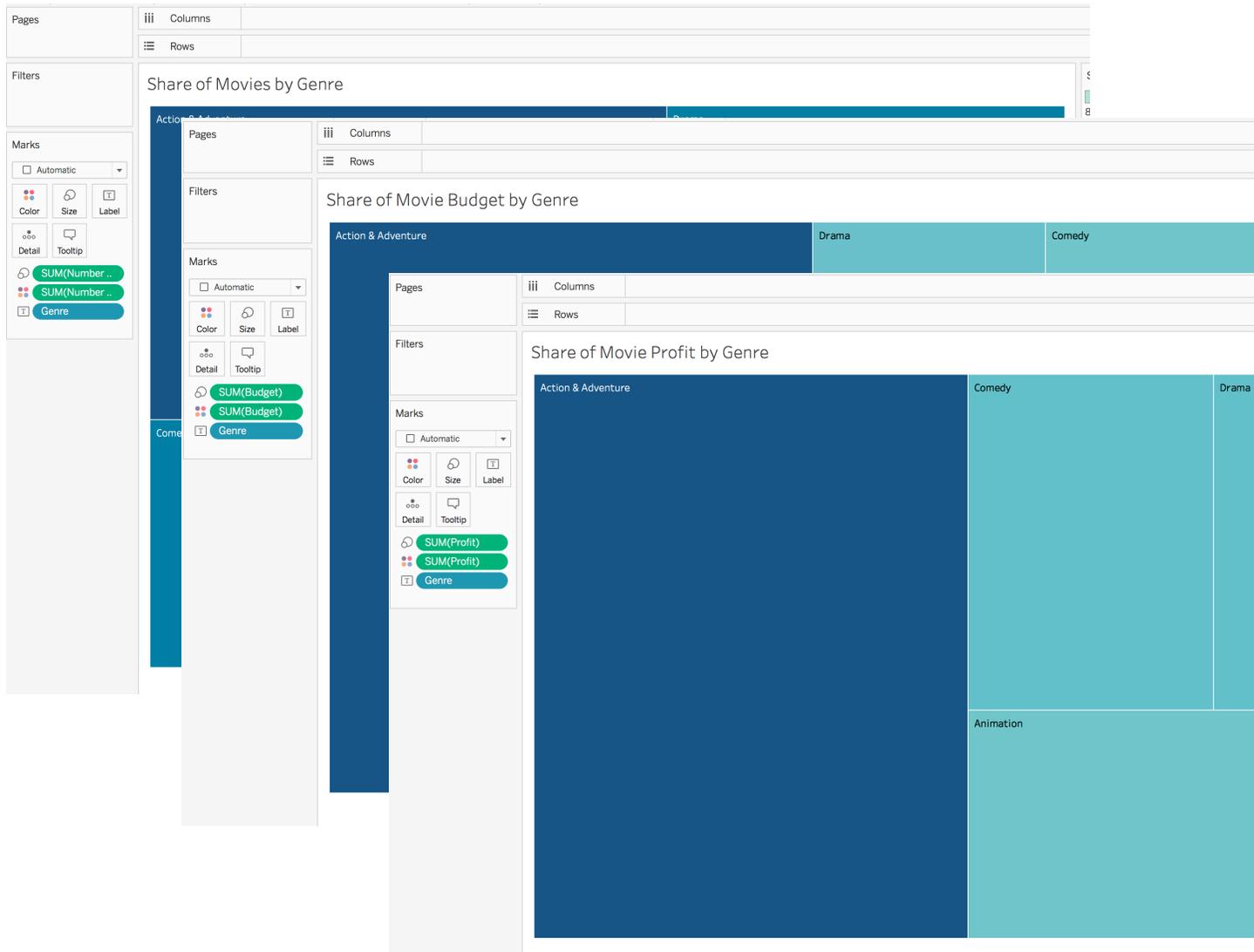


Figure 11. Charts for Drill 4.1 - 4.3

ARE PIE CHARTS EVIL?

When looking at visualizations in the wild, it is rare to find a pie chart that is the best choice. The problem with pie charts is that they are harder to interpret than alternative ways of visualizing the data.

Consider the arguments proposed [here](#) by Stephen Few and [here](#) by Cole Nussbaum.

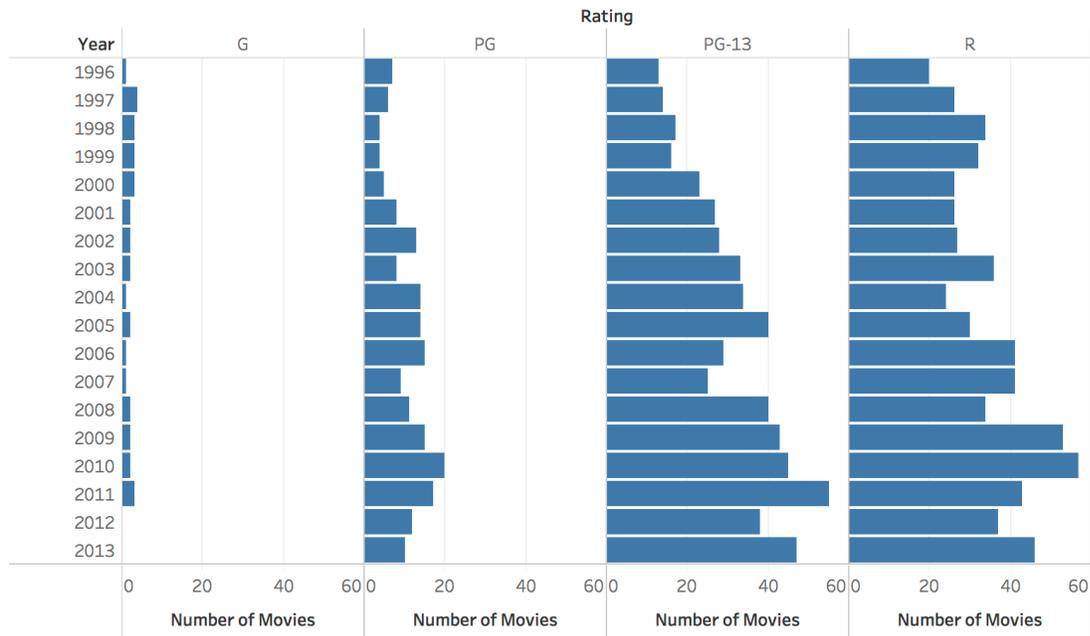
Module 5: Taking it to the Table (Chart)

Writers in the field of Data Visualization often point to data tables as the opposite of data visualization. In truth, however, data tables are just a different type of visualization.

Consider the following exercise, how quickly are you able to spot and judge the relative magnitudes of number of movies in our dataset by genre and rating when we visualize this as a data table? For example, how long does it take you to figure out what year has the most R rated movies?

Year	Rating			
	G	PG	PG-13	R
1996	1	7	13	20
1997	4	6	14	26
1998	3	4	17	34
1999	3	4	16	32
2000	3	5	23	26
2001	2	8	27	26
2002	2	13	28	27
2003	2	8	33	36
2004	1	14	34	24
2005	2	14	40	30
2006	1	15	29	41
2007	1	9	25	41
2008	2	11	40	34
2009	2	15	43	53
2010	2	20	45	57
2011	3	17	55	43
2012		12	38	37
2013		10	47	46

In contrast, now let's visualize this information as a multiple bar chart. In the chart below, how long does it take you to figure out what year has the most R rated movies? How long does it take you figure out what year had the fewest R rated movies?



Looking between the two charts, how relatively easy would it be to estimate what years had the most movies overall?

Tables are a great way to visualize data when you want to look up exact values. Tables are not often the best choice when you want to compare values and gain insight from that comparison.

Homework: Next time you see information presented as a table, ask yourself if the table was the right format to use. In my experience, I believe over 75% of the time, the table is not the best way to present information.

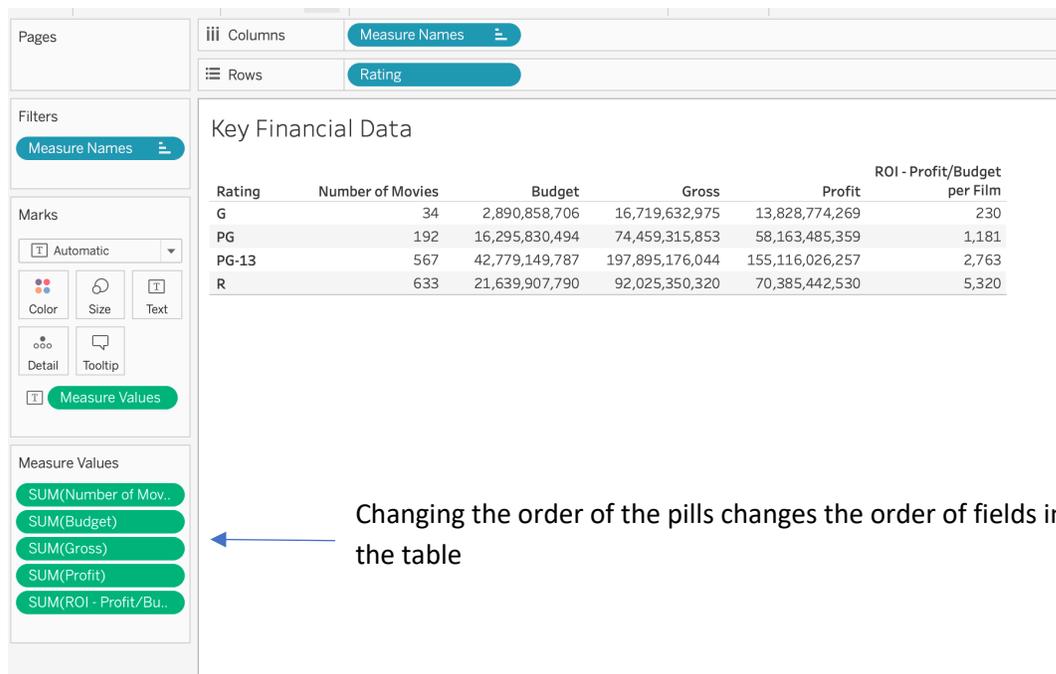
With that in mind, let's see how we can use Tableau to create data tables.

DRILL 5.1 SHOW MOVIES BY YEAR AND RATING

- 5.1. Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
 - a. Drag **Release Date** from the data pane on the left and drop it on the rows shelf.
 - b. Drag **Rating** from the data pane on the left and drop it on the columns shelf.
 - c. Drag **Number of Movies** and place pill on the Abc text block in the main canvas.
 - d. Now let's title our table by renaming its tab "Movies by Year and Rating."

DRILL 5.2 SHOW KEY FINANCIAL DATA BY RATING

- 5.2. Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Rating** from the data pane on the left and drop it on the rows shelf.
 - Drag **Number of Movies** and place pill on the Abc text block in the main canvas.
 - Drag **Budget** and place pill in the main canvas
 - Drag **Gross** onto table in main canvas
 - Drag **Profit** onto table in main canvas
 - Drag **ROI** onto table in main canvas
 - Now let's title our table by renaming its tab "Key Financial Data."
 - Your canvas should now look the one below. If not, raise your hand so we can help get it that way.



Key Financial Data

Rating	Number of Movies	Budget	Gross	Profit	ROI - Profit/Budget per Film
G	34	2,890,858,706	16,719,632,975	13,828,774,269	230
PG	192	16,295,830,494	74,459,315,853	58,163,485,359	1,181
PG-13	567	42,779,149,787	197,895,176,044	155,116,026,257	2,763
R	633	21,639,907,790	92,025,350,320	70,385,442,530	5,320

Changing the order of the pills changes the order of fields in the table

The good news is that we now have a nice table, the bad news is while the table is telling us information, it is not telling us the correct data.

Module 6: Making to the Right Calculations

After reviewing well over 100 Tableau homework assignments, the number one mistake I've seen users make in using Tableau is in aggregating ratios. This section is meant to help you detect and remedy that!

Consider a simple poll looking at ice cream flavor preference:

Group	# Subjects	# Prefer Peppermint	# Prefer Chocolate	% Prefer Chocolate
1	100	10	90	$(90/100) = 90\%$
2	10	4	6	$(6/10) = 60\%$

A very easy mistake would be to say the average % liking chocolate ice cream is 75% $((90\% + 60\%)/2)$. In fact, the average % of both groups liking chocolate ice cream is 87% $(96/110)$.

Make sense?

Let's apply this to Tableau and our dataset. In the movie business, a key indicator used is Return on Investment (ROI). For any given movie, this is determined by taking the Profit and dividing that by the Budget. The ROI ratio measures how much profit was earned for each dollar invested.

Let's turn back to our last chart, Key Financial Data and see how we are calculating Profit Ratio for the table. What the table suggests right now is that for every dollar spent on making an R movie, one can expect \$5,320 dollars back in profit.

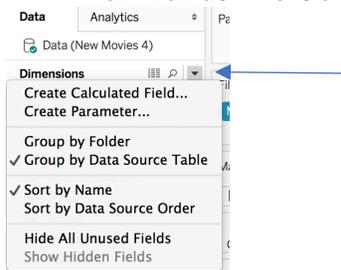
To understand why Tableau is telling us this, take a look at the ROI Ratio pill on the Measures Values card. The measure Profit Ratio is being calculated by taking the sum of the value given for each record. Using the ice cream preference example given above, this would be the same as saying the average preference for chocolate ice cream is 150% $(60\% + 90\%)$.

What if we just tell Tableau to just display the average of the ROI ratio by changing the aggregation type on the pill to Average. If we do that, what we tell Tableau to do is to sum the Profit Ratio for each bucket and then divide by the number of movies in each bucket. To do this would be to make exactly the mistake made in the ice cream example where we take the average of the two percentages and wrongly conclude that the average percentage liking ice cream is 75%.

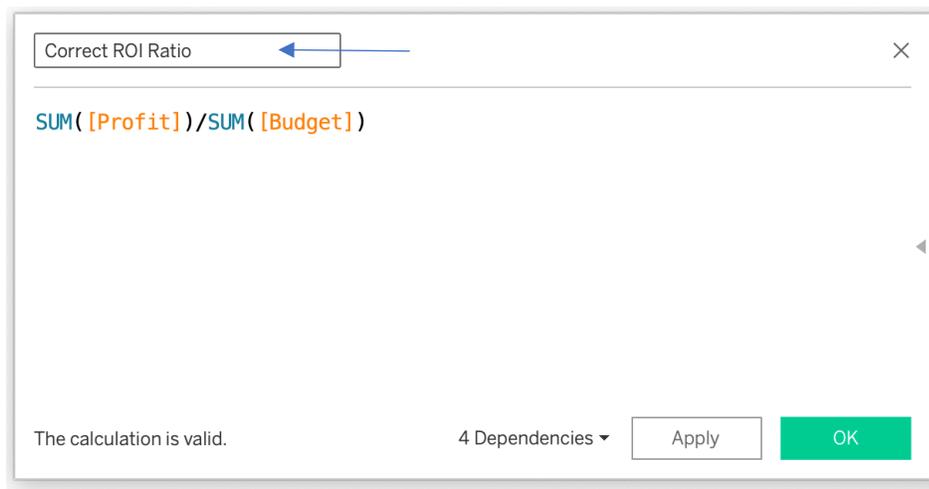
Rather than taking the average of the ratios, we need to create a new ratio of the sums. We need to tell Tableau that for each bucket to take the sum of the profit and divide that by the sum of the budget. Let's go ahead and create this calculation.

DRILL 6.1 CREATE A CALCULATION TO SHOW CORRECT PROFIT RATING

- 9.1. Starting on the tab showing Key Financial Data that we just created –
 - a. Create a calculated field to show profit ratio.
 - b. Pull down the arrow on the box next to Dimensions on the upper left.



- c. Select “Create Calculated Field...” option
- d. This will open a calculation editor where we can make our calculation.
- e. Name the calculation “Correct Ratio Ratio” in the header box.
- f. What we want Tableau to do is take the sum of the profit and then divide that by the sum of the budget. To do so, enter the following calculation into the editor:



Note that as do you type, Tableau offers guidance you can click on in formatting the calculation. Also note, in the bottom left of the calculation editor, Tableau checks your calculation as you type and lets you know if it is valid.

Click on the “OK” button.

- g. Now, let's check our work by adding the Correct ROI Ratio value to our Key Financial Data table.
- h. Drag Correct ROI Ratio onto the table to add the field.
- i. Since we want more understanding of the profit ratio by having it display two decimal places, go ahead and right click on the Correct Profit Ratio on the data pane and choose Default Properties / Number Format / Number Custom and verify the number will be shown to two decimal places. *Note: In past exercises, we've changed the number format displayed on a chart by right clicking on the measure's pill in the canvas. By right clicking on a measure in the data pane and changing default number format we change how this measure is displayed as a default for all our visualizations in our workbook.*

The screenshot shows the Tableau interface with a table titled 'Key Financial Data'. The table has columns for Rating, Number of Movies, Budget, Gross, Profit, ROI - Profit/Budget per Film, and Correct ROI Ratio. The data rows are G, PG, PG-13, and R. Below the table is the 'Measure Values' shelf containing six pills: SUM(Number of Mov..), SUM(Budget), SUM(Gross), SUM(Profit), SUM(ROI - Profit/Bu..), and AGG(Correct ROI Rat..). An arrow points from the text 'Changing the order of the pills changes the order of the fields in the table' to the 'AGG(Correct ROI Rat..)' pill.

Rating	Number of Movies	Budget	Gross	Profit	ROI - Profit/Budget per Film	Correct ROI Ratio
G	34	2,890,858,706	16,719,632,975	13,828,774,269	230	4.78
PG	192	16,295,830,494	74,459,315,853	58,163,485,359	1,181	3.57
PG-13	567	42,779,149,787	197,895,176,044	155,116,026,257	2,763	3.63
R	633	21,639,907,790	92,025,350,320	70,385,442,530	5,320	3.25

What we learn from this exercise is the R rated movies, overall, earn \$3.25 of profit for every dollar spent.

STRETCH TIME / BONUS WORK:

- 1) Go to **Tableau Online Help** by selecting **Open Help** from the **Help** option on the **Toolbar**. Click on **Design Views and Analyze Data** on the left. Click on **Advanced Analytics**. Explore the different pages under **Calculated Fields** and then the pages under **Analytics**.
- 2) Mute your computer and click on the  icon on the top left and then, on the **Discover Pane** on the right, click on the “**More training videos**” topic. Click on the pulldown for the **Calculations** topic to display available videos. Remember this option for when you can play videos with audio.

Module 7: Mapping our Data

DRILL 7.1 SHOW NUMBER OF MOVIES BY COUNTRY

- 7.1. Let's create a new tab by clicking on the New Worksheet button next to our last tab



- a. Drag **Country** from the data pane onto the main canvas.
- b. Drag **Number of Movies** from the data pane on the left and drop it onto the Color card.
- c. Now let's title our chart by renaming its tab “Number of Movies by Country.”

DRILL 7.2 SHOW PROFIT RATIO BY COUNTRY

- 7.2. Let's create a new tab by clicking on the New Worksheet button next to our last tab



- a. Drag **Country** from the data pane onto the main canvas.
- b. Drag **Correct Profit Ratio** (note, do not use the original “Profit Ratio” measure!) from the data pane on the left and drop it onto the Color Card.
- c. Now let's title our chart by renaming its tab “Profit Ratio by Country.”

DRILL 7.3 IMPROVING TOOLTIPS

- 7.3. Tooltips are a great tool to help explore data. Let's see how we can improve our Profit Ratio by Country map chart.
- Mouse around the different countries and see the tooltips that are displayed.
 - If you wanted to make the most back from your money, what country would want to make a new movie in?
 - Drag **Number of Movies** from the data pane onto the main canvas and drop it onto the Tooltip Card.
 - Now mouse around the different countries and see how the tooltip has changed.
 - Does this new information change which country you might want to make a new movie in?
 - Click directly on the Tooltip Card and try reformatting how the text is displayed. Use undo/redo to view results.

Module 8: Dashboards

So far, we've just been looking at single visualizations in isolation. Let's go ahead and construct a dashboard with multiple visualizations.

To judge any single visualization or dashboard, one must ask the question "what is this going to be used for?" For the purposes of this exercise, let's pretend that we want to make a movie and show our investors that we are seeking to give them the best return for investment.

DRILL 8.1 SHOW PROFIT RATIO BY GENRE AND RATING

- 8.1. Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- Drag **Rating** from the data pane on the left and drop it on the columns shelf.
 - Drag **Genre** from the data pane on the left and drop it on the columns shelf.
 - Drag **Correct Profit Ratio** from the data pane on the left and drop it on the rows shelf.
 - Stop and review your work. What type of movie would you recommend making based on this chart so far?
 - But wait, we are only working with a limited data set here. What if we want to account for the fact that we might not have a representative sample? As a start, drag **Number of Movies** from the data pane and add it the tooltip.
 - Stop and review your work. Would you still make the same recommendation?

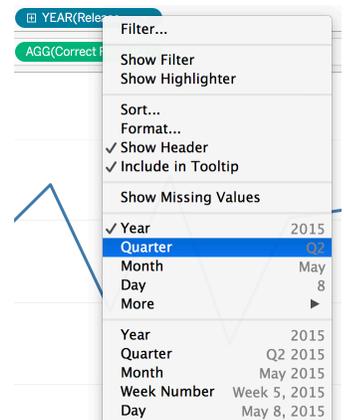
- g. I'm convinced there is something there to consider the number of records in each bucket in making our recommendation. Let's make the visualization show more clearly by dragging **Number of Movies** onto the Color Card.
- h. Is it easier now to do the analysis that we did before?
- i. Rename the tab "Profit Ratio by Rating and Genre."

DRILL 8.2: SHOW AVERAGE BUDGET AND PROFIT RATIO BY RELEASE YEAR

- 8.2. Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- a. Drag **Budget** from the data pane on the left and drop it on the rows shelf.
 - b. Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - c. This is the same chart we created in Drill 3.2. However, we want to go a little further.
 - d. Let's start by changing the Budget measure to show average rather than sum. Right click on the Budget pill on the rows shelf and change the measure.
 - e. Drag **Correct Profit Ratio** from the data pane on the left and put it on the Color Card.
 - f. Drag **Correct Profit Ratio** from the data pane on the left and put it on the Size Card.
 - g. Now let's title our chart by renaming its tab "Average Budget and Profit Ratio by Release Year."

DRILL 8.3: SHOW PROFIT RATIO BY RELEASE QUARTER

- 8.3. Let's create a new tab by clicking on the New Worksheet button next to the tab we just renamed ()
- a. Drag **Release Date** from the data pane on the left and drop it on the columns shelf.
 - b. Drag **Correct Profit Ratio** from the data pane on the left and drop it on the rows shelf.
 - c. What we have now is a line graph showing years. Let's tell Tableau we want to look at our data by Quarter by highlighting Release Date and pulling down the small arrow and then choosing Quarter. 
 - d. Now we want to show this as a bar chart. Go to Show Me in the upper right and choose a bar chart.
 - e. For our final product, we want to have the bars go vertically rather horizontally. To do this, we can click on the swap rows and columns buttons icon () in the Tool Ribbon across the top.



- f. We also want our bars to reflect the idea of number of movies being reported on. To do that drag **Number of Records** from the data pane on the left and drop it on the Color Card.
- g. Now let's title our chart by renaming its tab "Profit Ratio by Release Quarter."

DRILL 8.4: CREATE A DASHBOARD

- 8.4. To start our dashboard clicking on the New Dashboard button on the bottom right ().
 - a. What you see now is a blank canvas with all the worksheets we've done on the left.
 - b. Drag the **Profit Ratio by Rating and Genre** worksheet out onto the canvas.
 - c. Drag the **Average Budget and Profit Ratio by Release Year** out onto the canvas and put it below the first worksheet.
 - d. Drag the **Profit Ratio by Release Quarter** worksheet out onto the canvas it but it below the first worksheet and to the right of the second worksheet.
 - e. Name the tab for the dashboard "What Type of Movie Should We Make?."
 - f. To display this tab name as the dashboard title, select Dashboard from the menu at the top and check Show Title."

DRILL 8.5: MAKE THE DASHBOARD INTERACTIVE

- 8.5. We have three very pretty charts next to each other. Let's make them "talk" to each other.
 - a. Click on each chart, to the right of the chart box an option box will appear. For each one of the charts, click on the funnel icon to make it white.



- b. What this does is make each chart a filter for the other charts. Try clicking on an element of one of the charts. Notice how the other charts change? You can undo your selection by clicking on the element again or just hitting your escape key.
- c. Explore the dashboard, what type of movie would be best to make? When would be the ideal time to release it?

DRILL 8.6: PUBLISH THE DASHBOARD TO MAKE IT SHAREABLE

- 8.6. So now we have a dashboard, how can we share it? If you've created a Tableau Public account, we can do that very easily.
 - a. As a first step, we need to create what is called an "extract" of our data. This compresses our data to allow for more efficient storage on the Tableau Public cloud account.
 - b. Go to *Data* in the top menu and the name of our data file "Movies" and then select *Extract* and then click *Extract* at the next screen.

- c. Now we are ready to publish our work. Select *Server* from the menu at the top. Go to *Tableau Public* and then to *Save to Tableau Public*.
- d. Interact with the chart and note that it allows the same type of interaction as with on your desktop.

Bravo! Job well done!

Module 9: NEXT STEPS

This workshop was meant to give you just a taste of what Tableau is capable of accomplishing. We've barely scratched the surface!

Congratulations for taking a great first step on what I hope is a rewarding journey. Here are some suggestions that might help you along your way.

9.1. Learning Tableau

- a. The Tableau web site is great! Under the Learning link in their header you will find tons of free learning videos, the ability to sign up for free online instructor lead hour long classes and a lot of free whitepapers.
- b. Viz of the Day. Every day, Tableau sifts through hundreds of submissions and chooses a viz of the day. This is an inspiring and entertaining free daily email. Subscribe [here](#).
- c. Make Over Monday. Every week the good folk at www.makeovermonday.co.uk issue a new data set to be visualized. At the end of the week, the top five or so visualizations are singled out in a blog post. Hundreds of people participate in this every week. There is no better way to start your journey than to practice what you've learned. This is a fun opportunity to strengthen your chops. There is also a very strong community on Twitter around this initiative.
- d. DC Tableau User Group. Regular meetings held in DC for Tableau enthusiasts. Learn more at dctug.com.
- e. VizWiz.com. Andy Kriebel has built an archive of Tableau tips that is hard to beat.

9.2. Learning Visualization and Data Analysis

- a. There is no better single book to get than Alberto Cairo's *The Truthful Art*.
- b. Only slightly behind on my list are any of the books on visualization by Stephen Few, Edward Tufte or Cole Nussbaum Knaffic.