Data Visualization Lab

The Tableau Workspace

Nov. 21, 2022

Is there anything you want to ask about Lecture 1?

The Tableau Workspace

Tableau Sheets

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Standard

Show Me

Data Analytics

Global Superstore Return...

Orders (Global Superstor...

Search

Tables

- Global Superstore Retu...
  - Order ID (Global Supe...
  - Region (Global Super...
  - Returned
- Orders
  - Category
  - City
  - Country
  - Customer ID
  - Customer Name
  - Market
  - Order Date
  - Order ID
  - Order Priority
  - Postal Code
  - Product ID
  - Product Name
  - Region
  - Row ID
  - Segment
  - Ship Date
  - Ship Mode
  - State
  - Sub-Category
  - Disrtibution center
  - *Measure Names*
- Orders

Pages

Filters

Marks

Automatic

Color Size Label

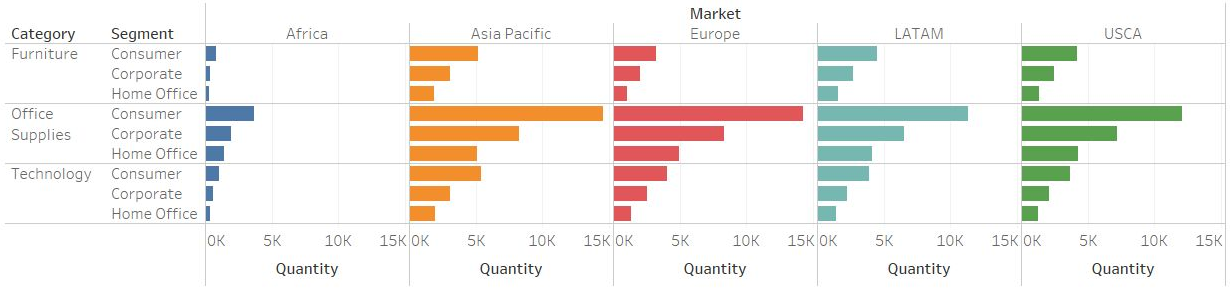
Detail Tooltip

Market

Columns: Market | SUM(Quantity)

Rows: Category | Segment

Sheet 1



Market
- Africa
- Asia Pacific
- Europe
- LATAM
- USCA

Data Source | Sheet 1

45 marks | 9 rows by 5 columns | SUM(Quantity): 178.312

Creating your first viz

All you have to do is dragging the fields out from the pane on the left, called **Data Pane**.

The Data Pane is divided into **Dimensions** and **Measures** that represent the column headers in the Excel sheet:

- ➔ **Dimensions** are categorical fields, often discrete and color coded blue in the data pane and in the view;
- ➔ **Measures** are metrics, often continuous and color coded green in the data pane and in the view.

To add dimensions and measures to the view to create charts, simply drag and drop them from the Data Pane onto the **Rows** and **Columns** shelves.

Look at the Data Pane, which fields are categorical (and which are metrics instead)?

Creating your first viz

To create the viz, let's bring:

- ➔ **Category** and **Segment** to Rows;
- ➔ **Quantity** and **Market** to Columns.

To make the view clearer drag and drop the **Market** field onto the **Color** tab in the Marks pane.

What are we seeing here? What can we conclude about our data from this visualization?

Creating your first viz

To create the viz, let's bring:

- ➔ **Category** and **Segment** to Rows;
- ➔ **Quantity** and **Market** to Columns.

To make the view clearer drag and drop the **Market** field onto the **Color** tab in the Marks pane.

What are we seeing here? What can we conclude about our data from this visualization?

We are visualizing how sales are looking per category, customer segment and market, in terms of number of items sold. Africa seems to be an emerging market.

Creating your first viz

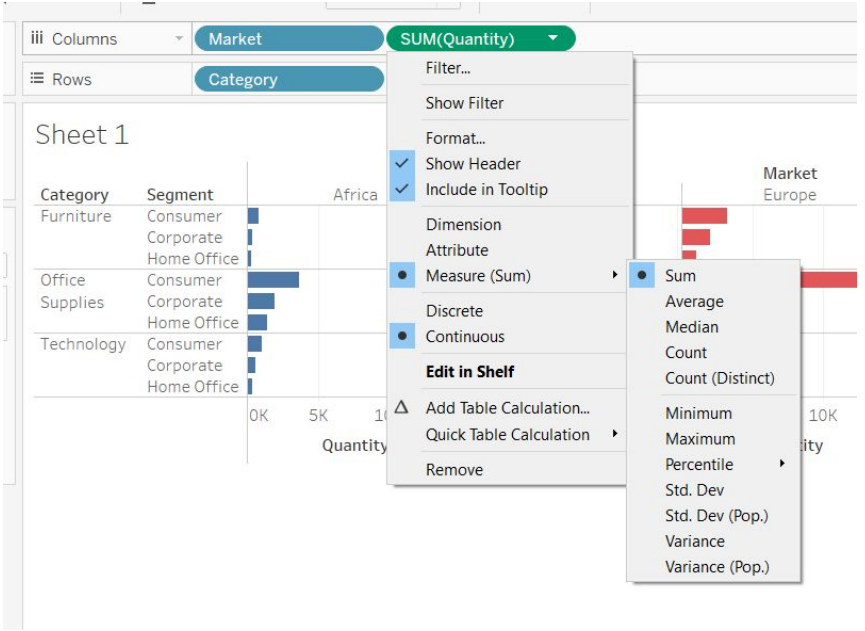
What happened to the Quantity field on the Columns shelf?

Creating your first viz

What happened to the Quantity field on the Columns shelf?

It displays the SUM of items sold per category, customer segment and market. TP automatically aggregates data with the supposed best measure.

Of course, you can change it as you need, either by selecting a predefined measure or by editing the formula “on shelf” (**Edit on shelf**).



Building views

Now suppose we want to analyze sales over time in our **Global Superstore Orders 2016** dataset.

Which measures and dimensions do we need?

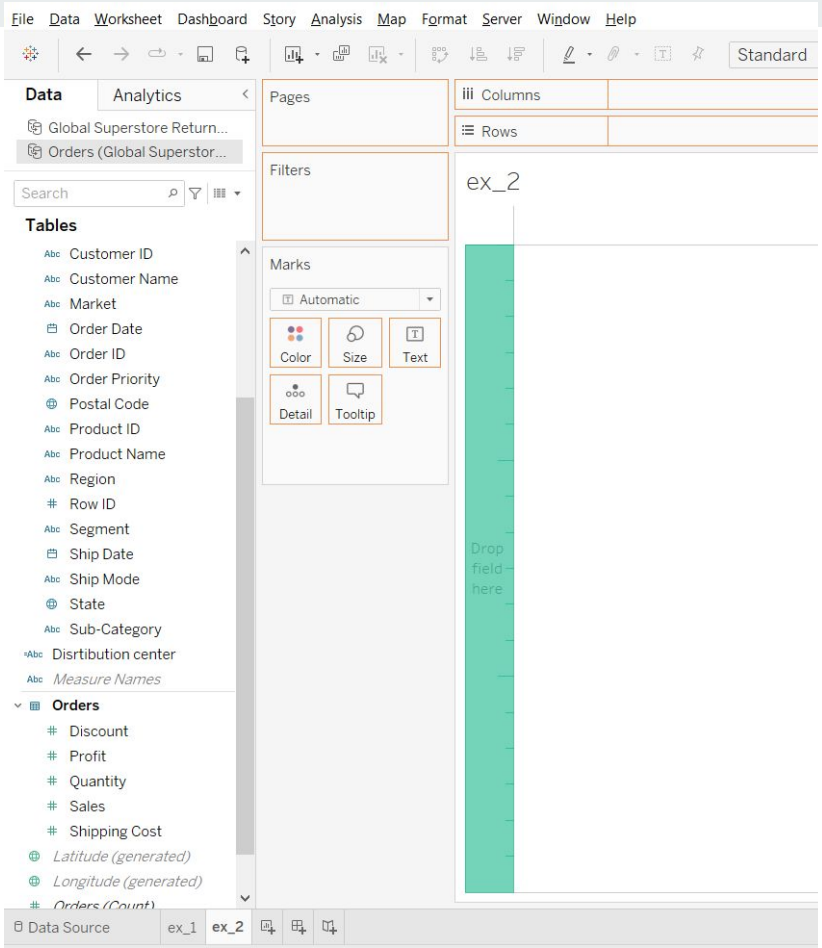
Building views

Now suppose we want to analyze sales over time in our **Global Superstore Orders 2016** dataset.

Which measures and dimensions do we need?

- **Sales** in Rows;
- **Order date** in Columns.

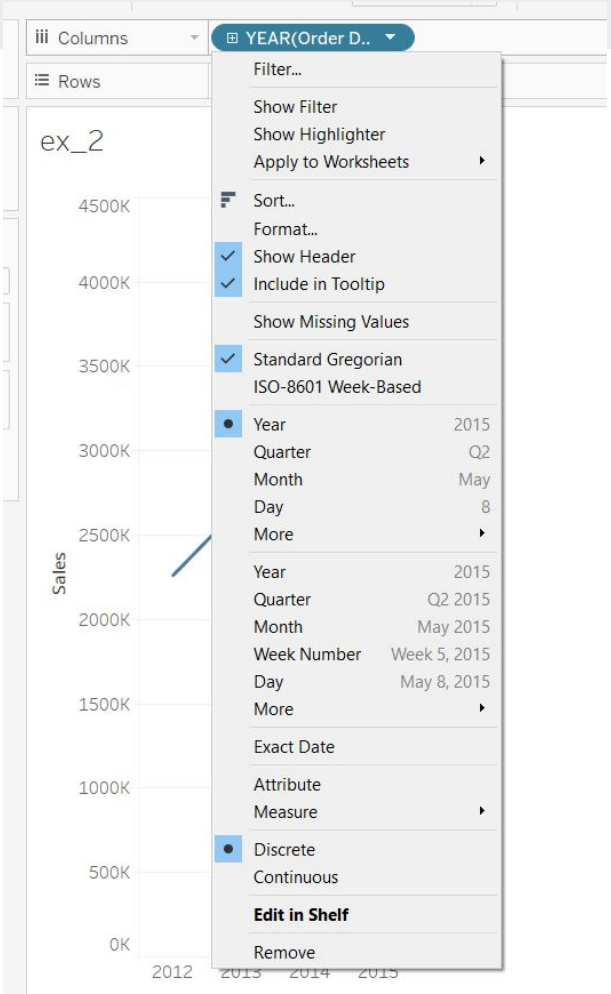
💡 **A little trick:** you can drag and drop measures and dimensions directly onto the columns/rows areas in the view instead of onto the shelves. You can drop fields onto any areas surrounded with an orange border



Building views

TP automatically aggregates sales by YEAR (Order date), but as with measures we can change that.
But before doing so …

Do you notice anything about the Order date pill on the Columns shelf?

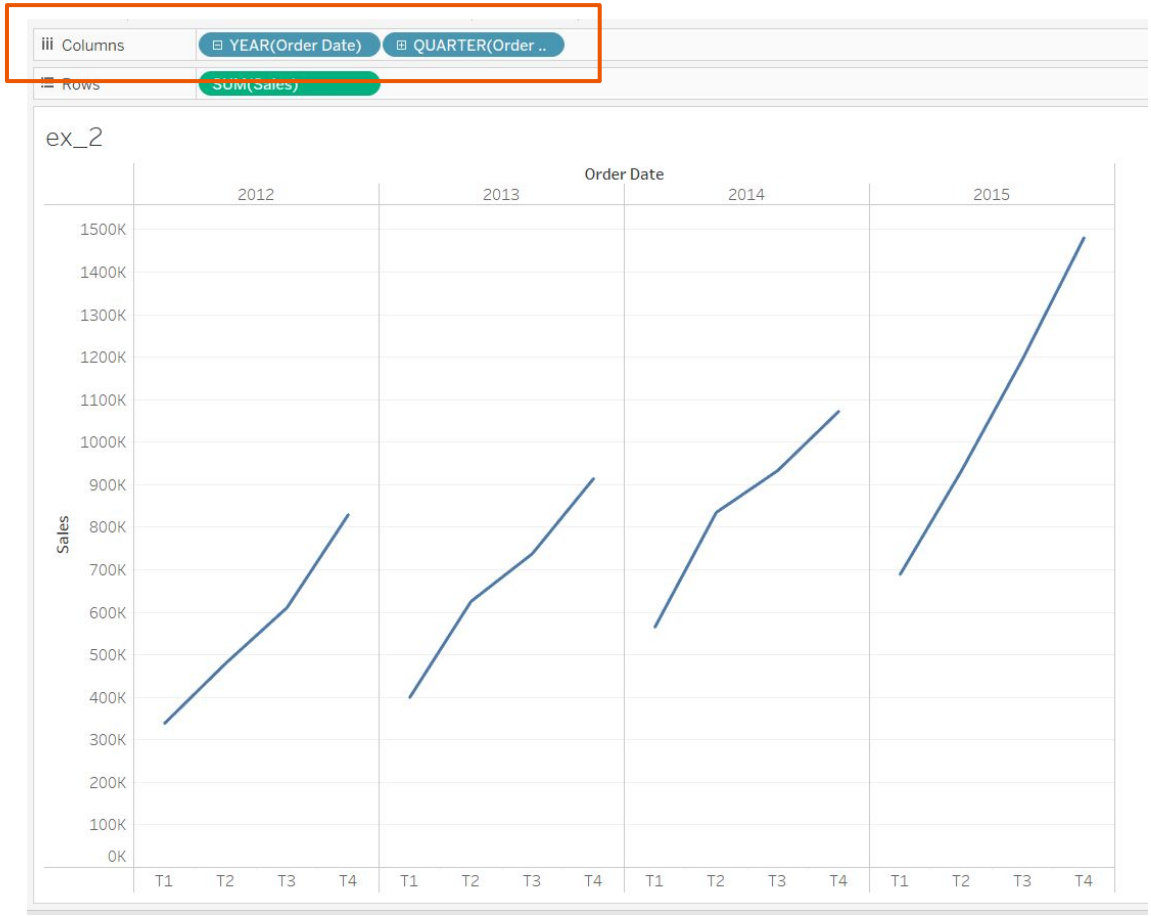


Building views

Suppose we want to visualize sales per quarters instead of years.

We can expand the YEAR (Order date) pill with the plus (+) symbol.

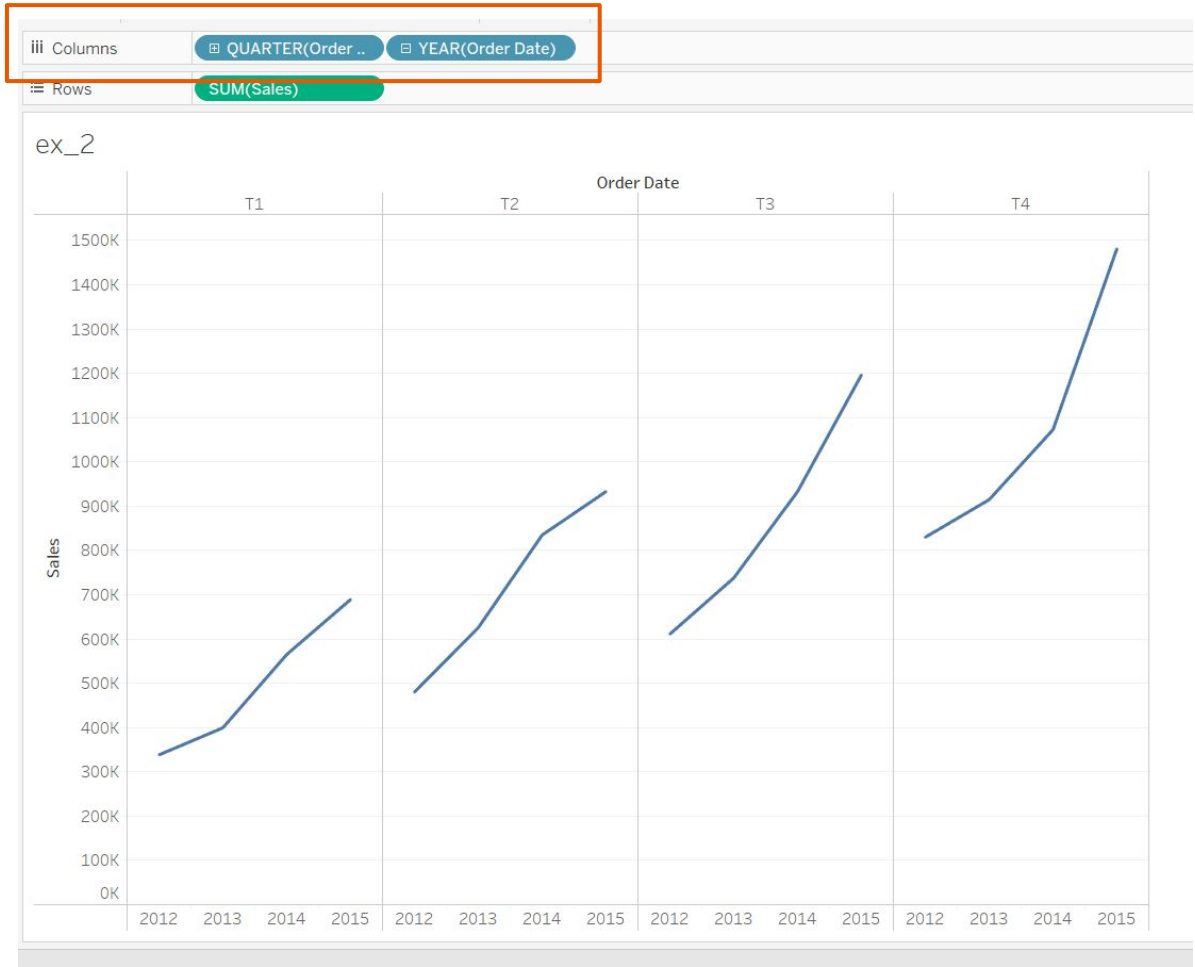
What if we wanted to compare sales in the same quarter over different years?



Building views

What if we wanted to compare sales in the same quarter over different years?

Simply swap the QUARTER (Order date) and YEAR (Order date) pills.



Building views

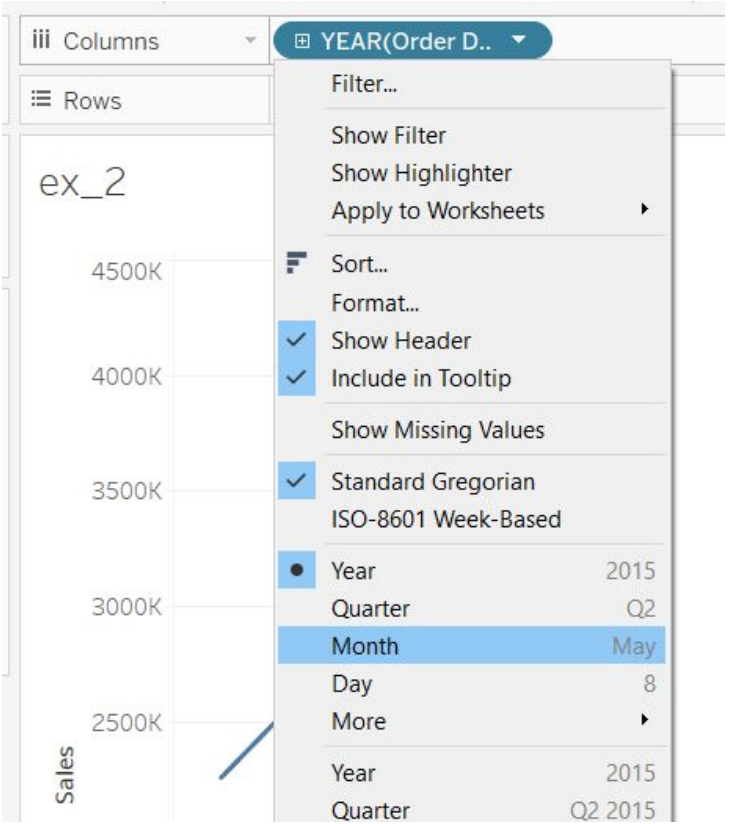
Now we want to analyze sales over MONTHS and compare YEARS in the same chart.

How can we do that? (Spoiler: 🎨)

Building views

How can we do that?

First, change the aggregation level to MONTH and then we can drag and drop the **Order date** field from the Data pane onto the **Color** tab in the Marks pane.



Pages

Columns | MONTH(Order Da..

Rows | SUM(Sales)

Filters

Marks

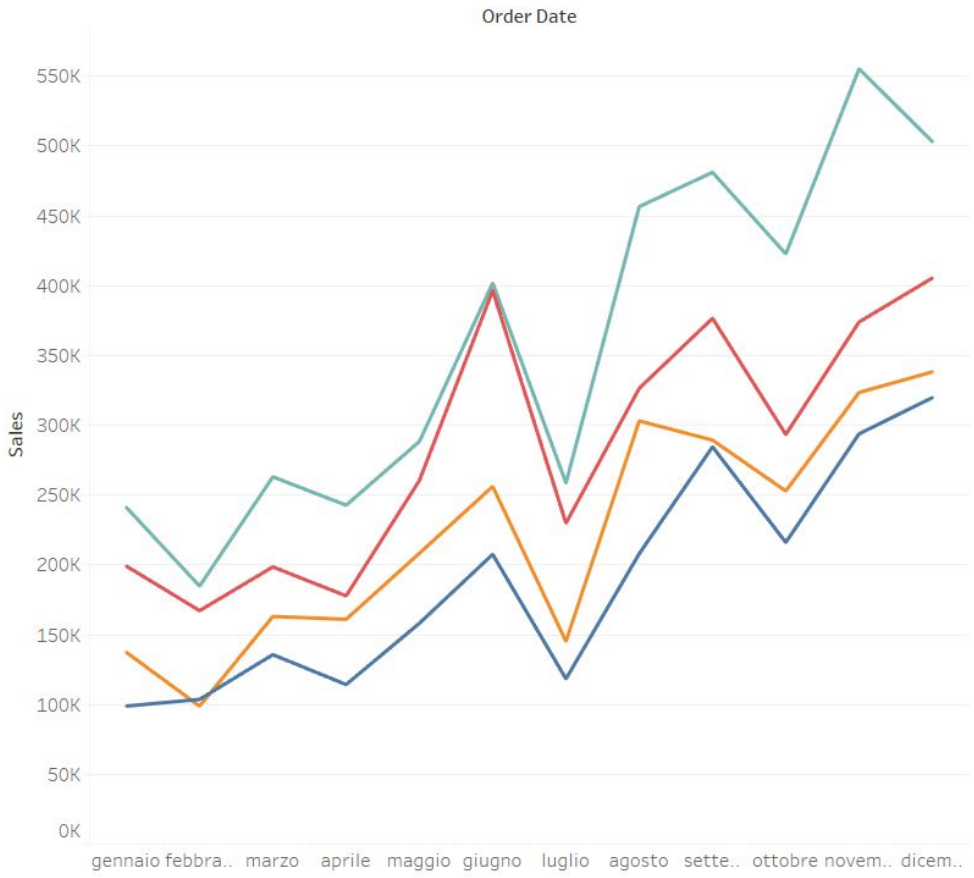
Automatic

Color | Size | Label

Detail | Tooltip | Path

YEAR(Order ..

ex_2



Quick table calculations

Up until now, we have only displayed measures and dimensions that were already present as column headers in the imported dataset. Suppose we want to visualize year over year growth in sales.

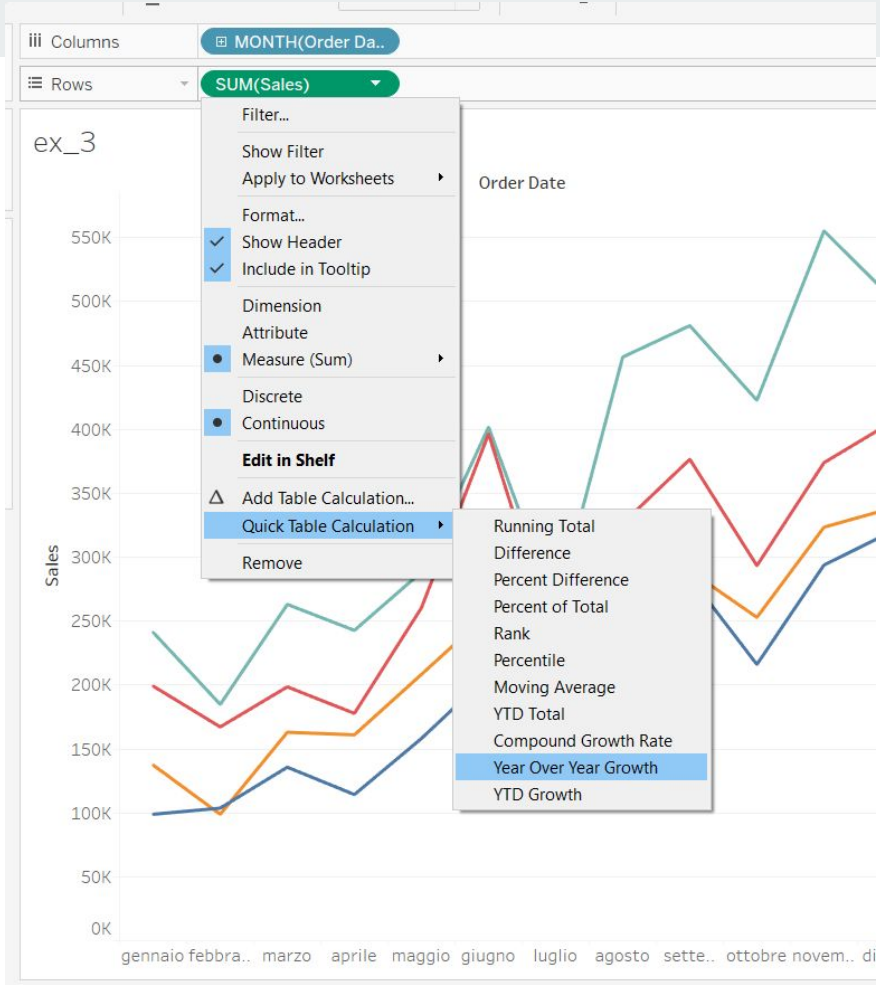
How can we compute that? 🤔

Quick table calculations

The **Quick table calculation** option allows you to add automatically computed measures to your visualization.

You won't need to work your way out of weird formulas, TP will do the hard work for you 🥳

Now, to compare total sales and year over year growth, simply add the **Sales** field to the Rows shelf again.



File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Fit Width | Show Me

Data | Analytics

Global Superstore Return...
Orders (Global Superstor...

Search

Tables

- Market
- Order Date
- Order ID
- Order Priority
- Postal Code
- Product ID
- Product Name
- Region
- Row ID
- Segment
- Ship Date
- Ship Mode
- State
- Sub-Category
- Disrtibution center
- *Measure Names*

Orders

- Discount
- Profit
- Quantity
- Sales
- Shipping Cost
- *Latitude (generated)*
- *Longitude (generated)*
- *Orders (Count)*
- *Measure Values*

Pages

Filters

Marks

All

Automatic

Color | Size | Label | Detail | Tooltip | Path

YEAR(Order ..

SUM(Sales)

SUM(Sales) Δ

Columns: MONTH(Order Da..

Rows: SUM(Sales) | SUM(Sales) Δ

ex_3

Order Date

Sales: 500K, 400K, 300K, 200K, 100K, 0K

% Differenza in Sales: 70%, 60%, 50%, 40%, 30%, 20%, 10%, 0%

>12 nulls

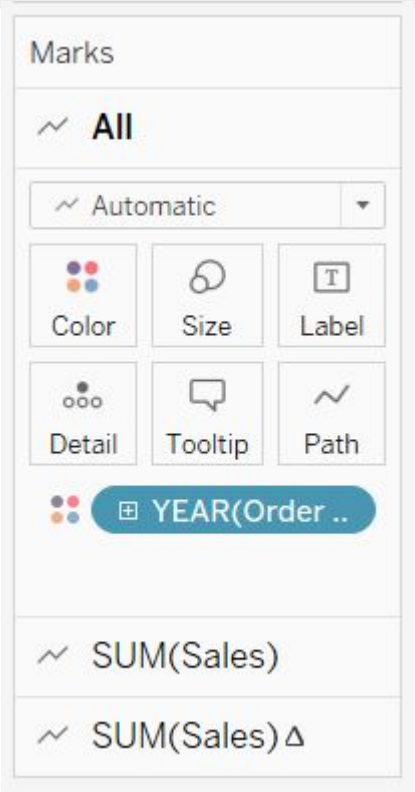
gennaio febbraio marzo aprile maggio giugno luglio agosto settembre ottobre novembre dicembre

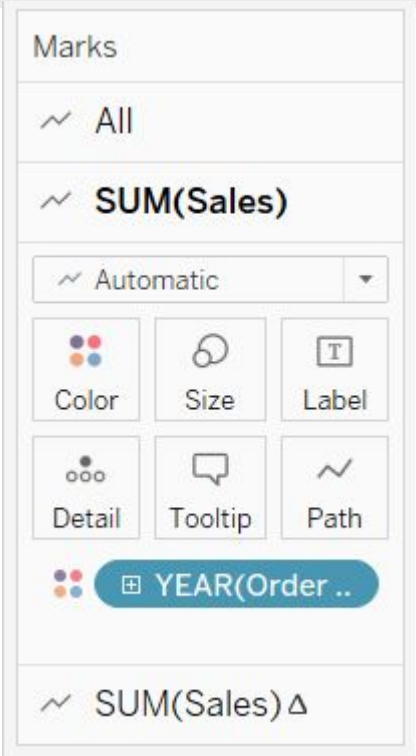
YEAR(Order Date)

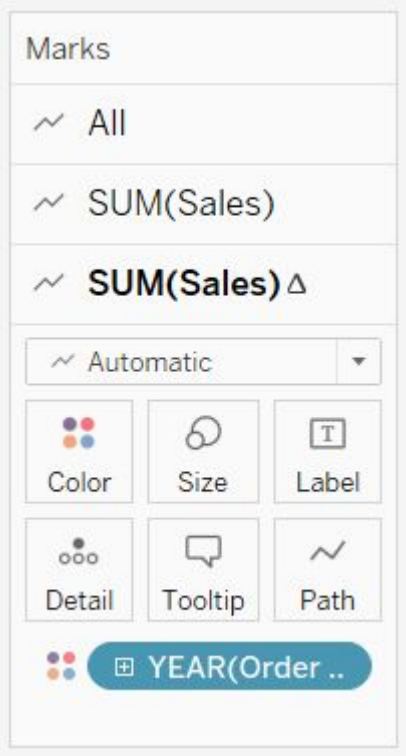
2012
2013
2014
2015

Data Source | ex_1 | ex_2 | ex_3

84 marks | 2 rows by 12 columns | % Difference in SUM(Sales): 936,48%







💡 **A little trick:** you can customize each measure (hence chart) independently in the **Marks** pane; in this case, you could adopt different color palettes for the lines depicting total sales and for those depicting year over year growth (SUM (Sales) Δ)

The Mark Pane

The **Mark Pane** allows you to customize your view with tooltips, colors and so on.

What if we want to display year over year growth in tooltips instead of having a separate chart? How can we do that?

File Data Worksheet Dashboard Story Analysis Map Format Server Window Help

Fit Width | Show Me

Data | Analytics

Global Superstore Return...
Orders (Global Superstor...

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Tables

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- Sub-Category
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- *Measure Names*

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- Discount
- Profit
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- Sales
- Shipping Cost
- *Latitude (generated)*
- *Longitude (generated)*
- *Orders (Count)*
- *Measure Values*

Pages

Filters

Marks

Automatic

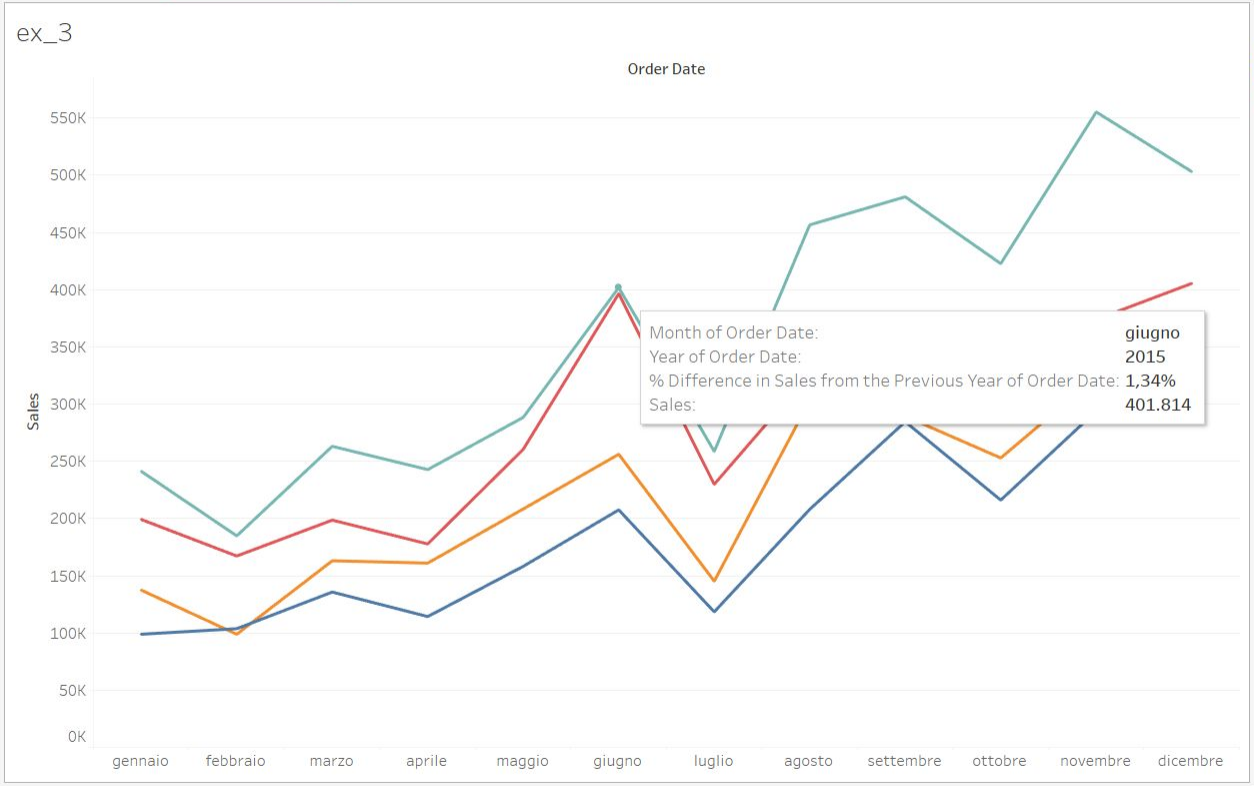
Color | Size | Label | Detail | Tooltip | Path

YEAR(Order ..
SUM(Sales)

Columns: MONTH(Order Da..

Rows: SUM(Sales)

ex_3



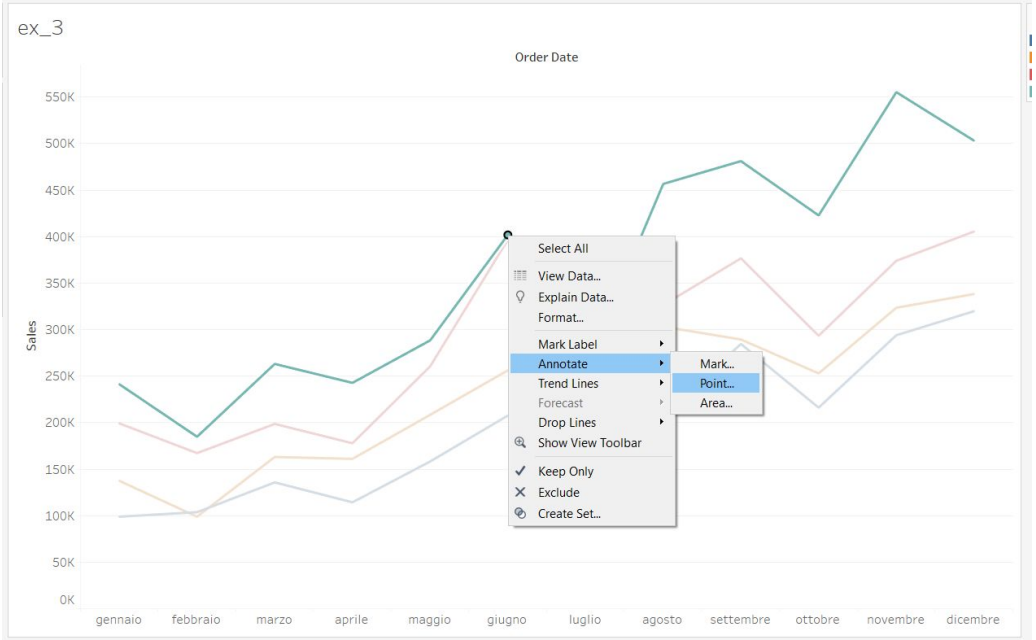
YEAR(Order Date)
2012
2013
2014
2015

Data Source | ex_1 | ex_2 | ex_3

48 marks | 1 row by 12 columns | SUM(Sales): 12.642.502

Annotating data

If you see something you want to point out on your view, simply right click on that point and add an annotation (***Annotate > Point***).



Visualizing Quick Table Calculation data

Suppose you want to visualize how sales in each category changed over the course of each year.

Right now our chart has:

1. **Lines** displaying the sum of sales over all categories (aggregated) by month;
2. **Colors** representing the years in which the sales occurred;
3. Year over year growth displayed in **tooltips**.

Where do we need to add the Category dimension?

Visualizing Quick Table Calculation data

Suppose you want to visualize how sales in each category changed over the course of each year.

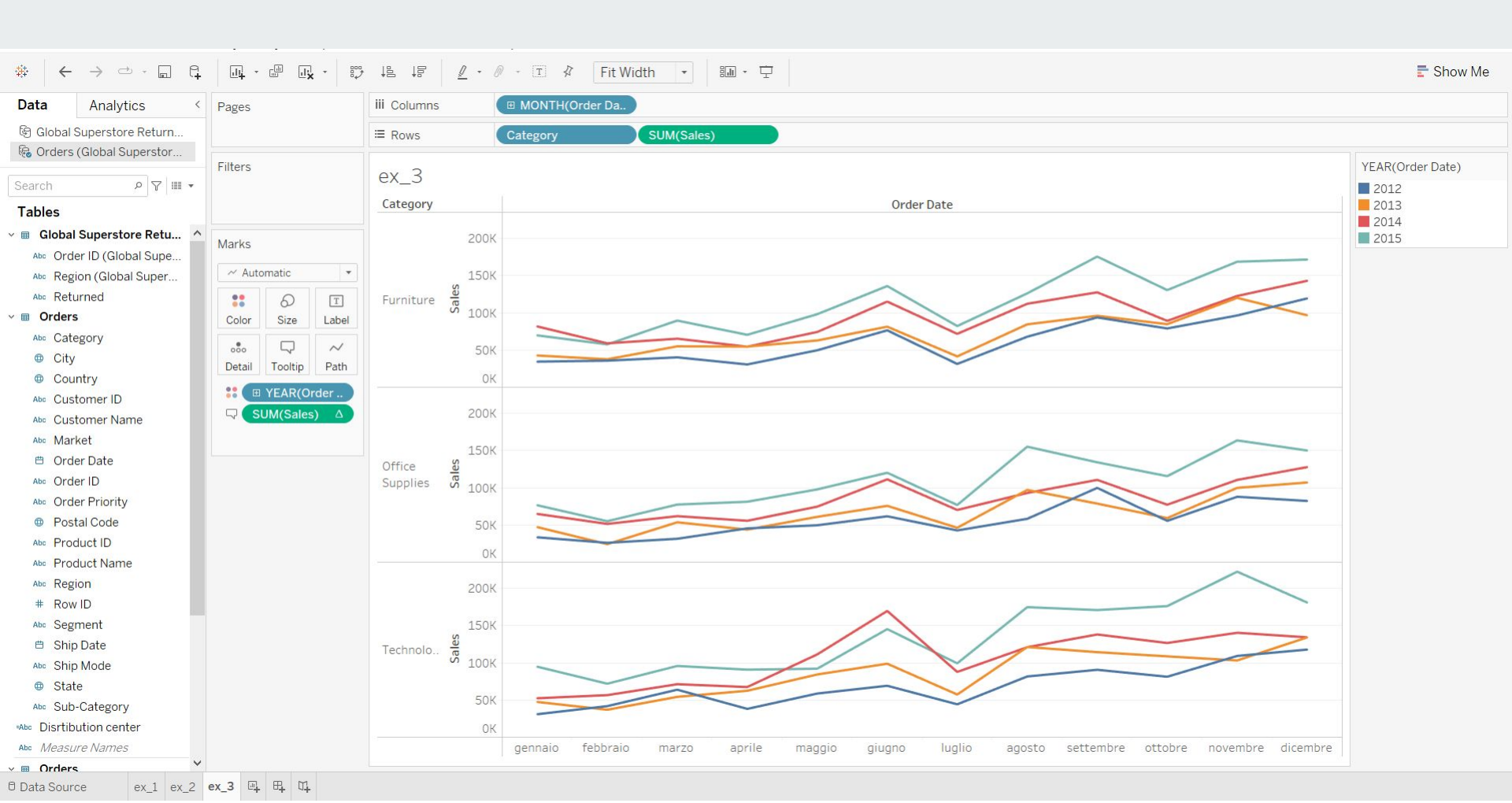
Right now our chart has:

1. **Lines** displaying the sum of sales over all categories (aggregated) by month;
2. **Colors** representing the years in which the sales occurred;
3. Year over year growth displayed in **tooltips**.

Where do we need to add the Category dimension?

Add **Category** to the Rows shelf.

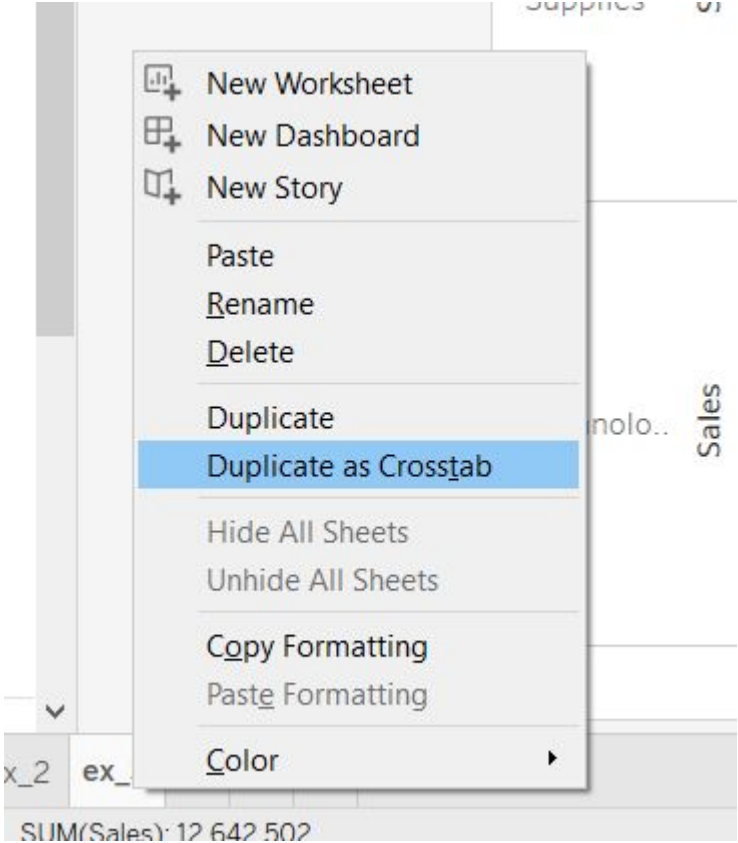
💡 Note that you can't swap **Category** and **SUM (Sales)** as we've done before


Fit Width
Show Me
Data
Analytics
Global Superstore Return...
Orders (Global Superstor...
Search
Tables
Global Superstore Retu...
Order ID (Global Supe...
Region (Global Super...
Returned
Orders
Category
City
Country
Customer ID
Customer Name
Market
Order Date
Order ID
Order Priority
Postal Code
Product ID
Product Name
Region
Row ID
Segment
Ship Date
Ship Mode
State
Sub-Category
Disrtibution center
Measure Names
Orders
Pages
Filters
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Path
YEAR(Order ..
SUM(Sales)
Columns
MONTH(Order Da..
Rows
Category
SUM(Sales)
ex_3
Category
Order Date
Furniture
Office Supplies
Technolo..
Sales
200K
150K
100K
50K
0K
gennaio
febbraio
marzo
aprile
maggio
giugno
luglio
agosto
settembre
ottobre
novembre
dicembre
YEAR(Order Date)
2012
2013
2014
2015
Data Source
ex_1
ex_2
ex_3

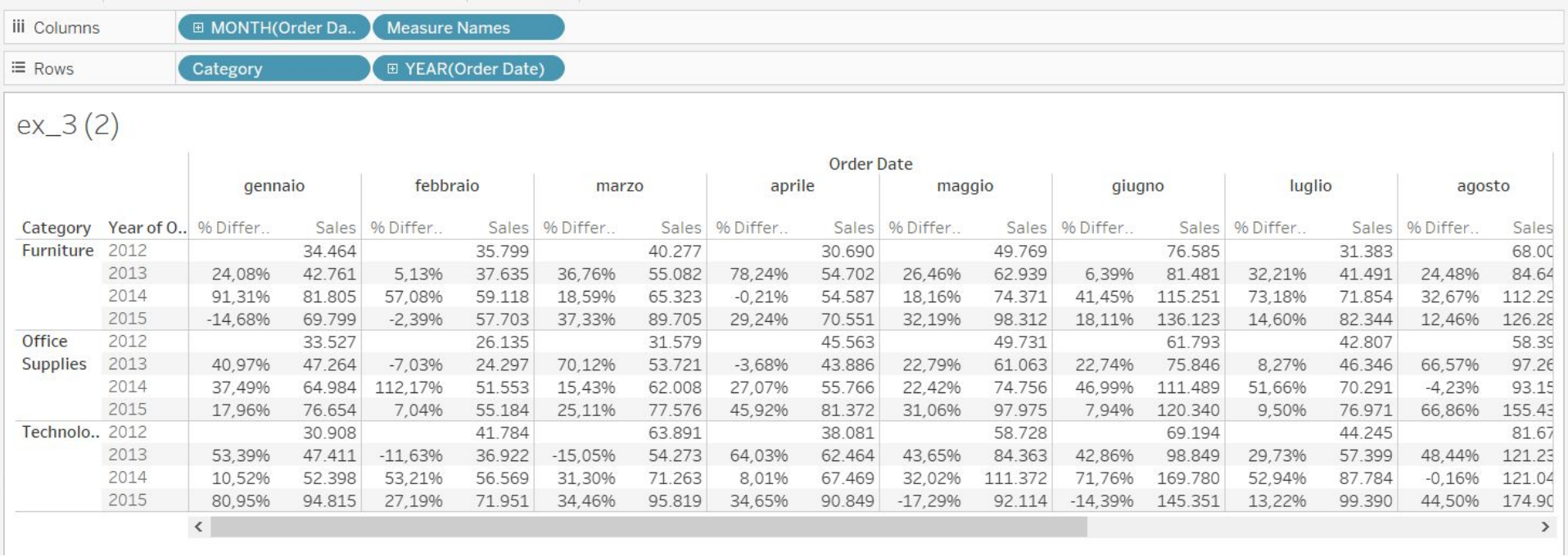
Visualizing Quick Table Calculation data

In TP you cannot export data, but you can visualize processed data (aka year over year growth) on a separate sheet.

To do that, simply right click on the **Sheet** tab and **Duplicate as Crosstab**.



			Order Date											
Category	Year of O..		gennaio	febbraio	marzo	aprile	maggio	giugno	luglio	agosto	settemb..	ottobre	novembre	dicembre
Furniture	2012	% Difference in Sale..												
		Sales	34.464	35.799	40.277	30.690	49.769	76.585	31.383	68.000	93.934	79.094	96.558	119.531
	2013	% Difference in Sale..	24,08%	5,13%	36,76%	78,24%	26,46%	6,39%	32,21%	24,48%	2,38%	7,24%	24,57%	-19,00%
		Sales	42.761	37.635	55.082	54.702	62.939	81.481	41.491	84.644	96.166	84.824	120.279	96.817
	2014	% Difference in Sale..	91,31%	57,08%	18,59%	-0,21%	18,16%	41,45%	73,18%	32,67%	32,79%	5,30%	2,10%	47,91%
		Sales	81.805	59.118	65.323	54.587	74.371	115.251	71.854	112.296	127.701	89.319	122.803	143.203
	2015	% Difference in Sale..	-14,68%	-2,39%	37,33%	29,24%	32,19%	18,11%	14,60%	12,46%	37,65%	46,33%	37,50%	19,95%
		Sales	69.799	57.703	89.705	70.551	98.312	136.123	82.344	126.284	175.777	130.701	168.849	171.768
Office Supplies	2012	% Difference in Sale..												
		Sales	33.527	26.135	31.579	45.563	49.731	61.793	42.807	58.390	99.987	55.700	88.080	82.424
	2013	% Difference in Sale..	40,97%	-7,03%	70,12%	-3,68%	22,79%	22,74%	8,27%	66,57%	-21,15%	6,61%	13,56%	30,11%
		Sales	47.264	24.297	53.721	43.886	61.063	75.846	46.346	97.260	78.844	59.383	100.020	107.244
	2014	% Difference in Sale..	37,49%	112,17%	15,43%	27,07%	22,42%	46,99%	51,66%	-4,23%	40,48%	30,33%	10,71%	19,28%
		Sales	64.984	51.553	62.008	55.766	74.756	111.489	70.291	93.150	110.762	77.393	110.736	127.926
	2015	% Difference in Sale..	17,96%	7,04%	25,11%	45,92%	31,06%	7,94%	9,50%	66,86%	21,33%	49,59%	47,97%	17,47%
		Sales	76.654	55.184	77.576	81.372	97.975	120.340	76.971	155.431	134.387	115.771	163.851	150.279
Technology	2012	% Difference in Sale..												
		Sales	30.908	41.784	63.891	38.081	58.728	69.194	44.245	81.673	90.667	81.320	109.309	117.852
	2013	% Difference in Sale..	53,39%	-11,63%	-15,05%	64,03%	43,65%	42,86%	29,73%	48,44%	26,15%	33,71%	-5,58%	13,87%
		Sales	47.411	36.922	54.273	62.464	84.363	98.849	57.399	121.239	114.379	108.733	103.214	134.196
	2014	% Difference in Sale..	10,52%	53,21%	31,30%	8,01%	32,02%	71,76%	52,94%	-0,16%	20,79%	16,52%	36,08%	0,10%
		Sales	52.398	56.569	71.263	67.469	111.372	169.780	87.784	121.043	138.157	126.695	140.451	134.325
	2015	% Difference in Sale..	80,95%	27,19%	34,46%	34,65%	-17,29%	-14,39%	13,22%	44,50%	23,77%	39,15%	58,47%	34,82%
		Sales	94.815	71.951	95.819	90.849	92.114	145.351	99.390	174.905	170.994	176.295	222.579	181.097



ex_3 (2)

		Order Date													
		gennaio		febbraio		marzo		aprile		maggio		giugno		luglio		agosto	
Category	Year of O..	% Differ..	Sales	% Differ..	Sales	% Differ..	Sales	% Differ..	Sales	% Differ..	Sales	% Differ..	Sales	% Differ..	Sales	% Differ..	Sales
Furniture	2012		34.464		35.799		40.277		30.690		49.769		76.585		31.383		68.00
	2013	24,08%	42.761	5,13%	37.635	36,76%	55.082	78,24%	54.702	26,46%	62.939	6,39%	81.481	32,21%	41.491	24,48%	84.64
	2014	91,31%	81.805	57,08%	59.118	18,59%	65.323	-0,21%	54.587	18,16%	74.371	41,45%	115.251	73,18%	71.854	32,67%	112.29
	2015	-14,68%	69.799	-2,39%	57.703	37,33%	89.705	29,24%	70.551	32,19%	98.312	18,11%	136.123	14,60%	82.344	12,46%	126.28
Office Supplies	2012		33.527		26.135		31.579		45.563		49.731		61.793		42.807		58.39
	2013	40,97%	47.264	-7,03%	24.297	70,12%	53.721	-3,68%	43.886	22,79%	61.063	22,74%	75.846	8,27%	46.346	66,57%	97.26
	2014	37,49%	64.984	112,17%	51.553	15,43%	62.008	27,07%	55.766	22,42%	74.756	46,99%	111.489	51,66%	70.291	-4,23%	93.15
	2015	17,96%	76.654	7,04%	55.184	25,11%	77.576	45,92%	81.372	31,06%	97.975	7,94%	120.340	9,50%	76.971	66,86%	155.43
Technolo..	2012		30.908		41.784		63.891		38.081		58.728		69.194		44.245		81.67
	2013	53,39%	47.411	-11,63%	36.922	-15,05%	54.273	64,03%	62.464	43,65%	84.363	42,86%	98.849	29,73%	57.399	48,44%	121.23
	2014	10,52%	52.398	53,21%	56.569	31,30%	71.263	8,01%	67.469	32,02%	111.372	71,76%	169.780	52,94%	87.784	-0,16%	121.04
	2015	80,95%	94.815	27,19%	71.951	34,46%	95.819	34,65%	90.849	-17,29%	92.114	-14,39%	145.351	13,22%	99.390	44,50%	174.90

💡 Swap dimensions to make the view a bit clearer

15 minute break

Answer the Wooclap when you come back:

👋 **Wooclap here!**

Up next:

- ➔ 10 minutes to answer the Wooclap
- ➔ Lessons learned and recap
- ➔ 15-minute Q&A at the end of the lesson

Play around with what we've seen today with different data sources (or start working on your projects)

Additional free data sources are available 🔗 here

Recap and lessons learned

Recap

- Data import:
  - Relationships and joins;
  - Data formatting.

- Data visualization:
  - Measures and dimensions;
  - Expanding/aggregating dimensions;
  - Quick table calculations;
  - Intro to the Mark Pane;
  - Crosstab duplication.

Takeaway

- ➔ Always double check for the relations between sheets/tables that Tableau automatically creates;
- ➔ Relationships **do not merge** data, joins do;

Link to the solution workbook for the lesson: 🔗 TBD