PENS Project Learning Analytics

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Agenda

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The training briefly describes aspects of the Tableau platform and how visual analytics can be used.

Emphasis is given on sharing good practice of how learning analytics are used to produce dashboards representing emerging patterns of behaviour, and activity.

Outline

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- The need for visual analytics
- Using Tableau
- Examples of learning analytics

From papers to digital

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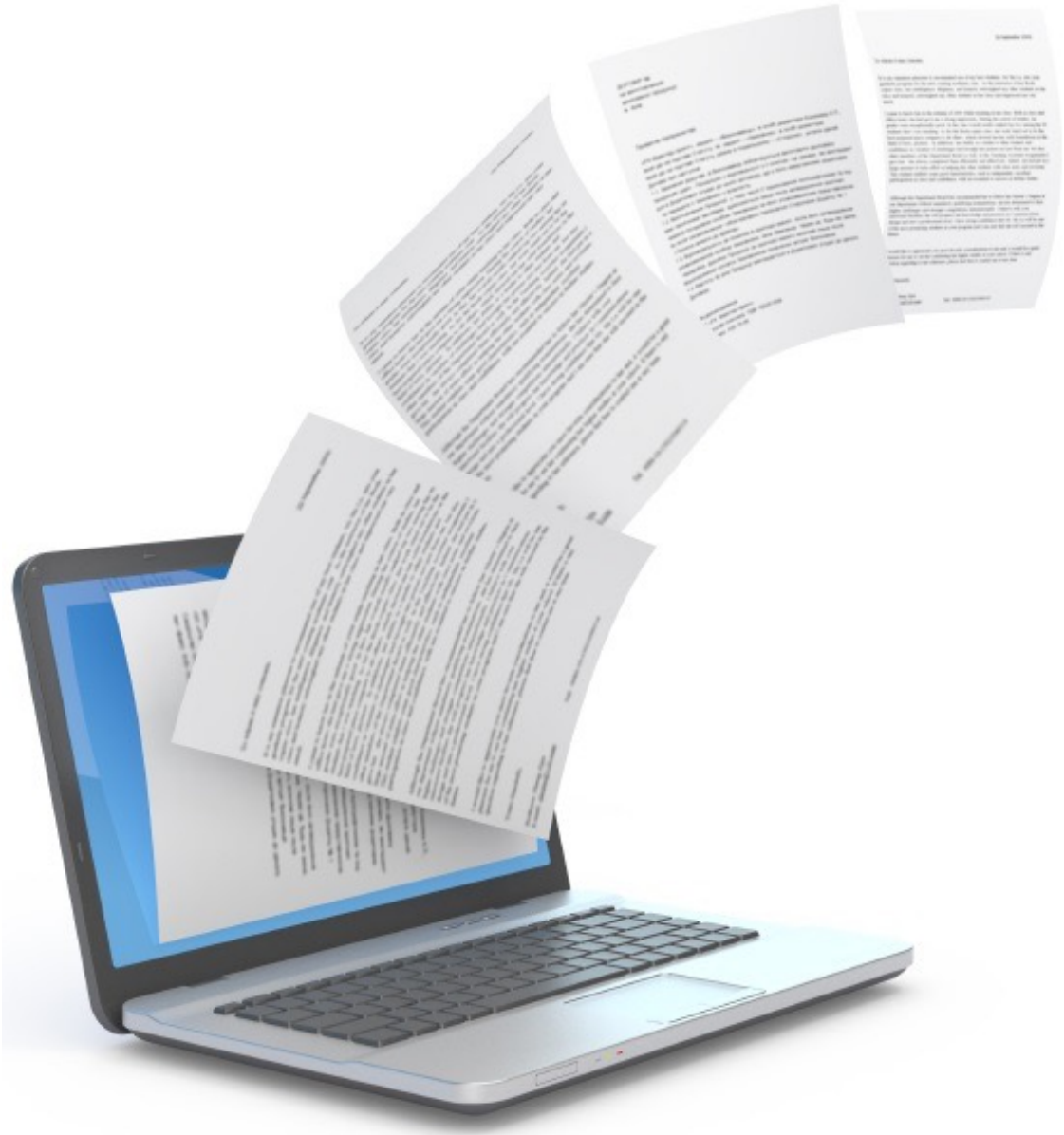

Drowning in Data

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Too much of Data

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Traffic of Data

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Social networks

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Data Sources

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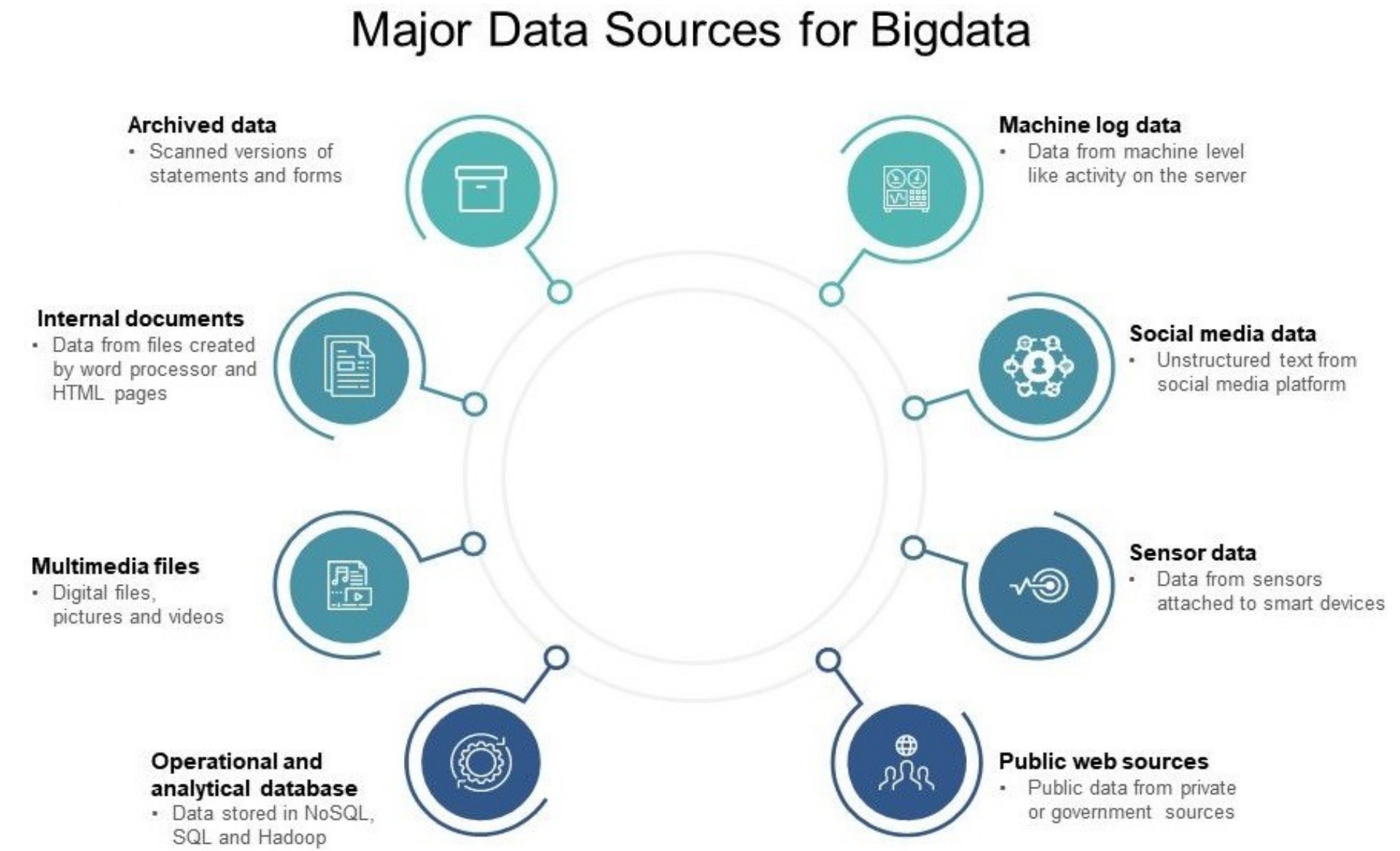

Light in the end of tunnel

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What to do with Data

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Data Collections

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Data Storage

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Cloud Storage

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Data Analysis

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Data Analysis

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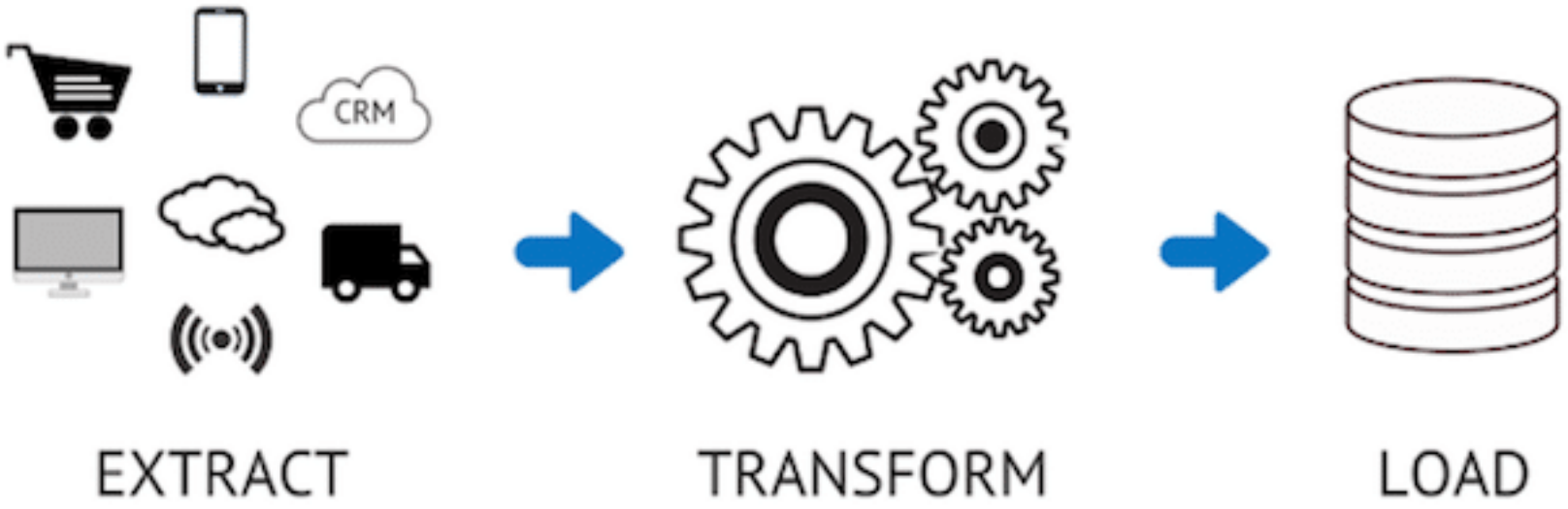
- **Data analysis** is a process of inspecting, cleansing, transforming and modelling the data with the goal of discovering useful information, informing conclusion and supporting decision-making.
- Data analysis has multiple facets and approaches, including different techniques.
- **Data mining** is a particular data analysis technique that focuses on statistical modelling and knowledge discovery for predictive rather than purely descriptive purposes, while **Business Intelligence (BI)** covers data analysis that relies heavily on aggregation, focusing mainly on business information.
- **Data integration** is a precursor to data analysis and data analysis is closely linked to Data Visualization and Data Dissemination.

Source:
https://www.predictiveanalyticstoday.com/data-analysis//

ETL Process



What is ETL Process

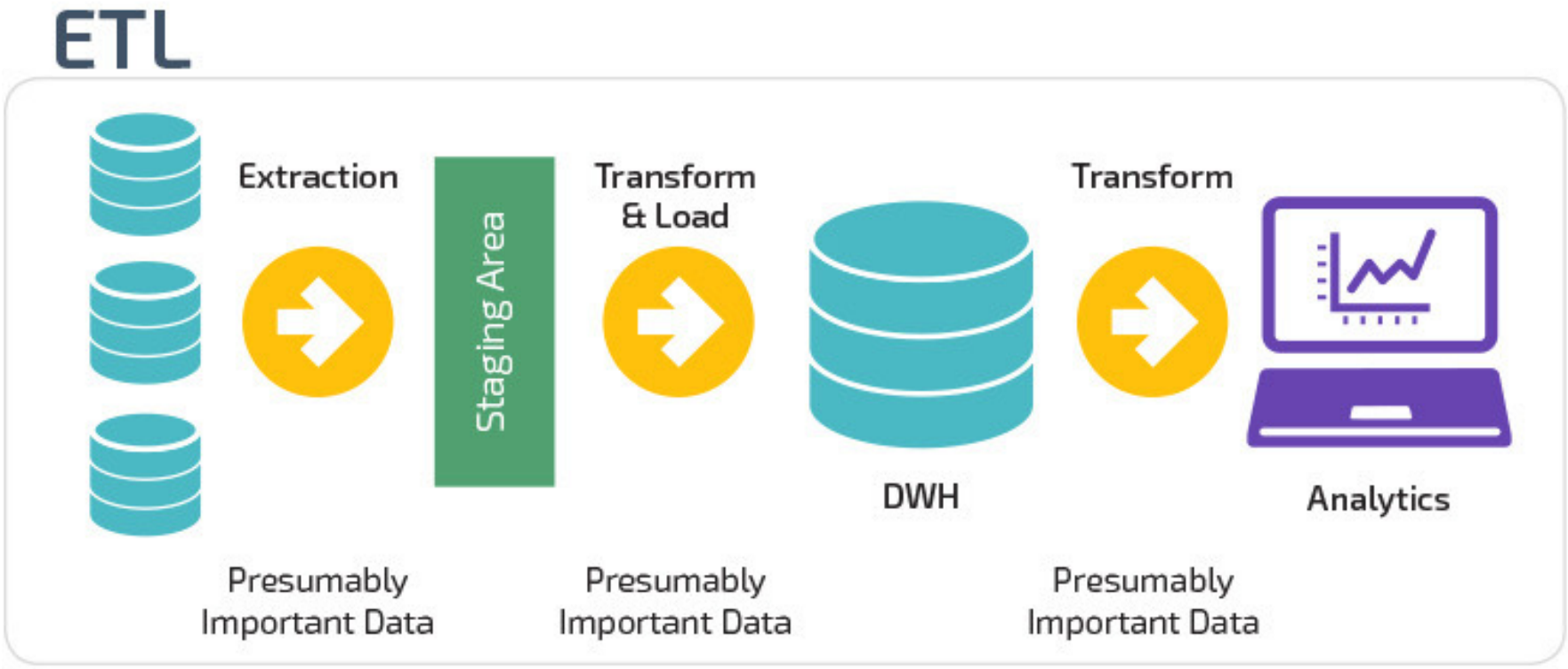
- **ETL** stands for **Extract, Transform, Load** and refers to the process of transferring data from one location to another. In addition to migrating data from one database to another, it also converts (transforms) databases into a single format that can be utilized in the final destination.

- The ETL Process became a popular concept in the 1970s and is often used in Data Warehousing.

- The ETL Process is preparing data for Analysis and Visualizations.

Source:
https://blog.aimultiple.com/etl/

ETL Process


ETL
Extraction
Staging Area
Transform & Load
DWH
Transform
Analytics
Presumably Important Data
Presumably Important Data
Presumably Important Data

Data Cleaning

Data Cleaning

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Data Cleansing (or Data Scrubbing) is the action of identifying and then removing or amending any data within a database that is:

- Incorrect
- Incomplete
- Duplicated

And under the GDPR:

- Irrelevant
- Unnecessary

Source:
https://www.experian.co.uk/business/glossary/data-cleansing//

Data Cleaning Check list

Source:
https://www.analyticsinhr.com/blog/hr-analytics-data-cleaning-guide//

Data Visualization

Source: https://www.sas.com/en_gb/insights/big-data/data-visualization.html.

Why is data visualization important

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Because of the way the human brain processes information, using charts or graphs to visualize large amounts of complex data is easier than poring over spreadsheets or reports. Data visualization is a quick, easy way to convey concepts in a universal manner – and you can experiment with different scenarios by making slight adjustments.

Data visualization can also:

- Identify areas that need attention or improvement.
- Clarify which factors influence learner behaviour.
- Help you understand which learning activities to place where.
- Predict learning activity and behavioural patterns.

Source: https://www.sas.com/en_gb/insights/big-data/data-visualization.html.

Why Tableau

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- Tableau is a very effective tool to create interactive data visualizations very quickly. It is very simple and user-friendly.
- Tableau can create complex graphs giving a similar feel as the pivot table graphs in Excel. Moreover, it can handle a lot more data and quickly provide calculations on datasets.
- Users can create visualizations quickly and switch between types easily to find the model that best represents the message.
- It is extremely easy to integrate with multiple data sources and the user interface is well-organized.
- It can create visualizations for a large amount of data without crashing.

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Introduction to Tableau

Tableau Home page

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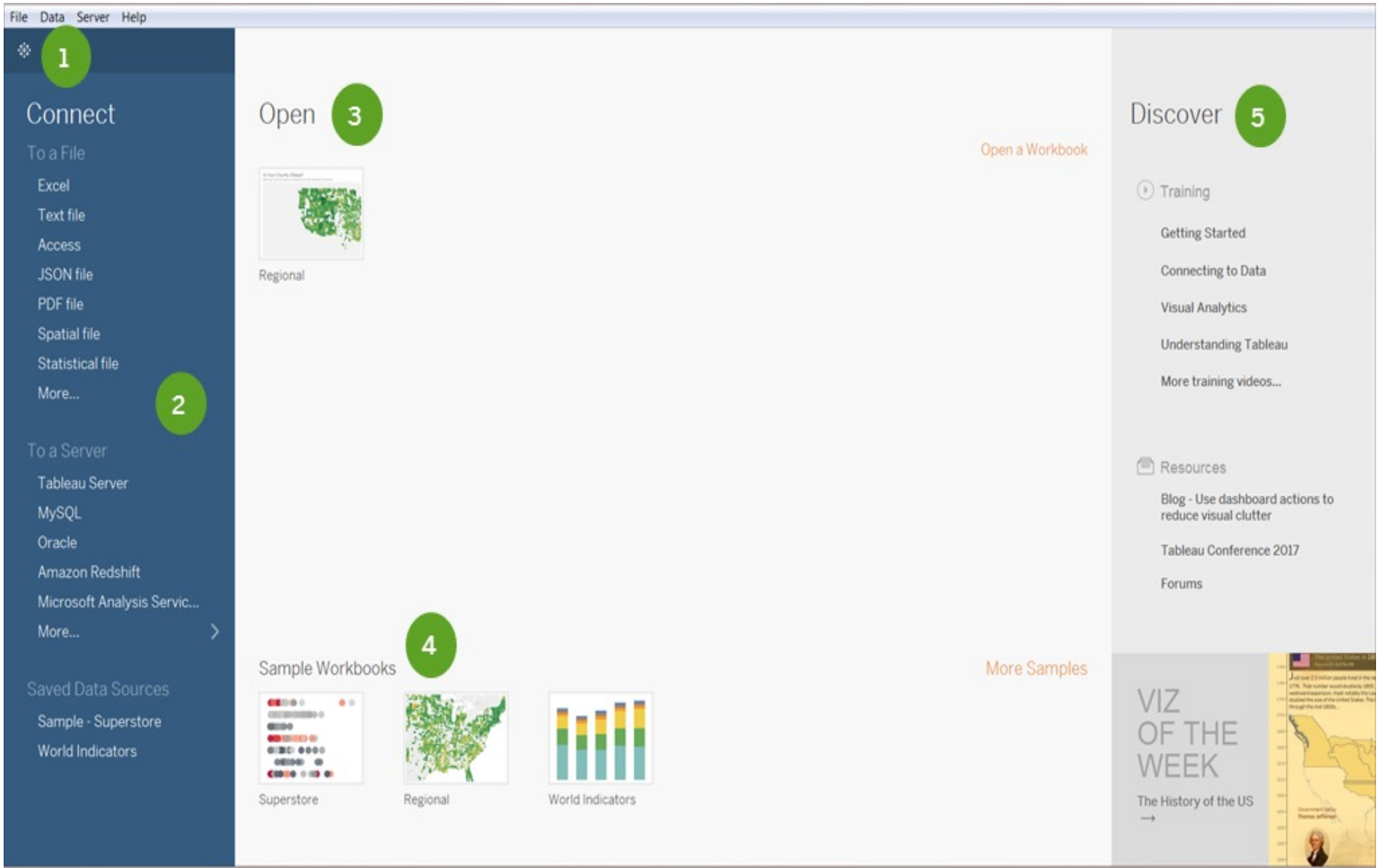

Tableau's Connections

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Search

- Actian Matrix
- Actian Vector
- Amazon Athena
- Amazon Aurora
- Amazon EMR Hadoop Hive
- Amazon Redshift
- Anaplan
- Apache Drill
- Aster Database
- Azure SQL Data Warehouse
- Box
- Cloudera Hadoop
- Databricks
- Denodo
- Dropbox
- Exasol
- Firebird
- Google Ads
- Google Analytics
- Google BigQuery
- Google Cloud SQL
- Google Drive
- Google Sheets
- Hortonworks Hadoop Hive
- IBM BigInsights
- IBM DB2
- IBM PDA (Netezza)
- Intuit QuickBooks Online
- Intuit QuickBooks Online (9.3-2018.1)
- Kognitio
- MapR Hadoop Hive
- MariaDB
- Marketo
- MarkLogic
- MemSQL
- Microsoft Analysis Services
- Microsoft PowerPivot
- Microsoft SQL Server
- MonetDB
- MongoDB BI Connector
- MySQL
- OData
- OneDrive
- Oracle
- Oracle Eloqua
- Oracle Essbase
- Pivotal Greenplum Database
- PostgreSQL
- Presto
- Progress OpenEdge
- Salesforce
- SAP HANA
- SAP NetWeaver Business Warehouse
- SAP Sybase ASE
- SAP Sybase IQ
- ServiceNow ITSM
- SharePoint Lists
- Snowflake
- Spark SQL
- Splunk
- Teradata
- Teradata OLAP Connector
- TIBCO Data Virtualisation
- Vertica
- Web Data Connector

- Other Databases (JDBC)
- Other Databases (ODBC)

Tableau Joins

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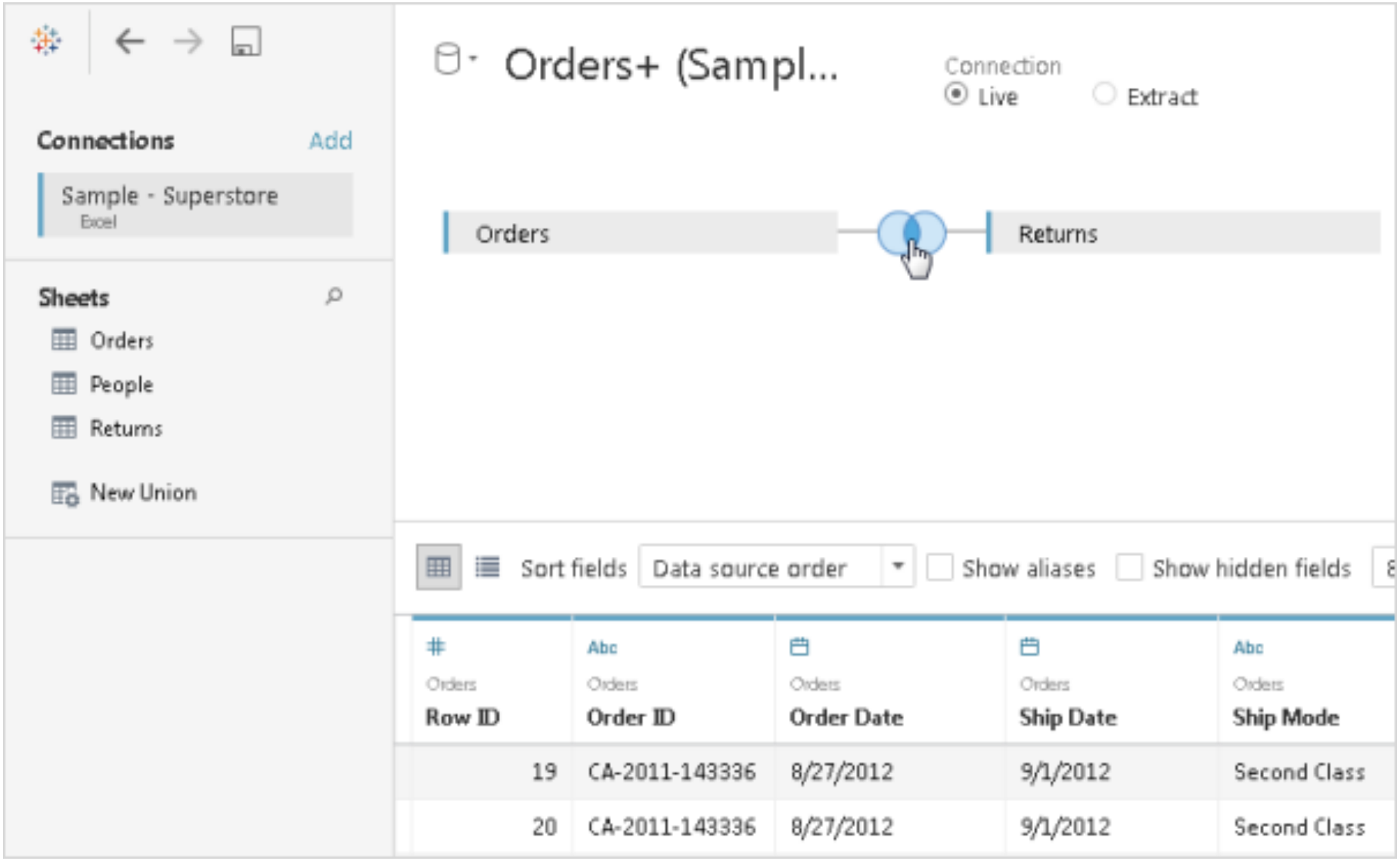
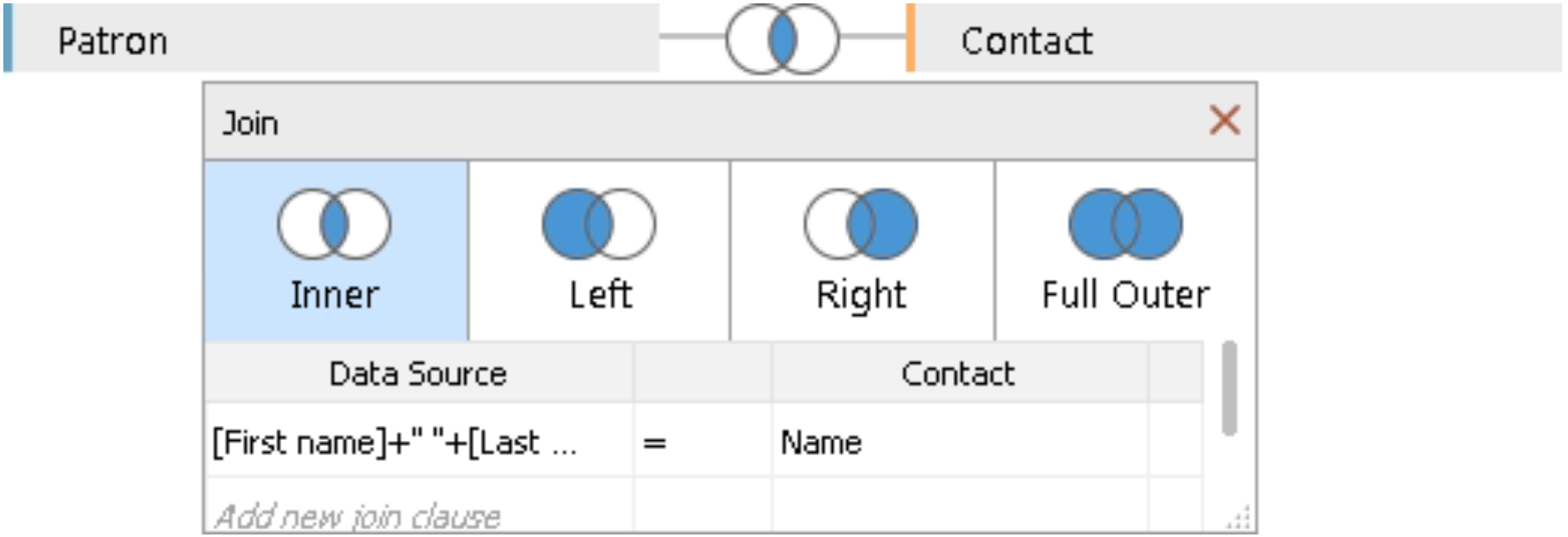


Tableau Joins



SQL Joins

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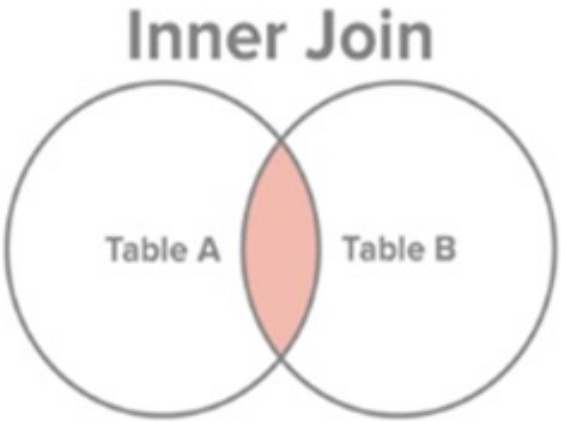

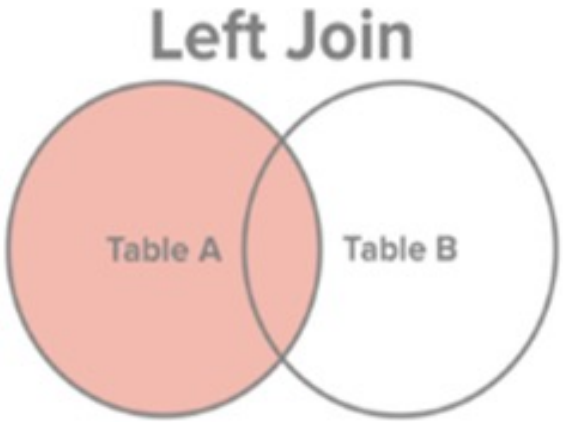

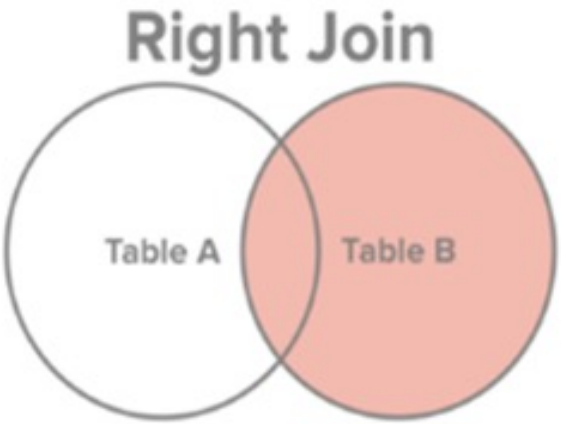

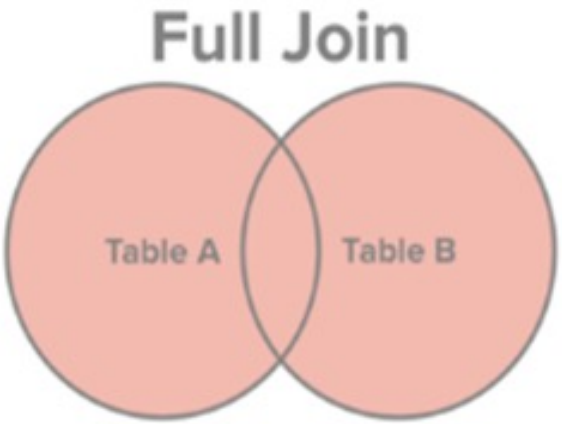

Source:
https://http://www.sql-join.com/sql-join-types

Dimensions & Measures

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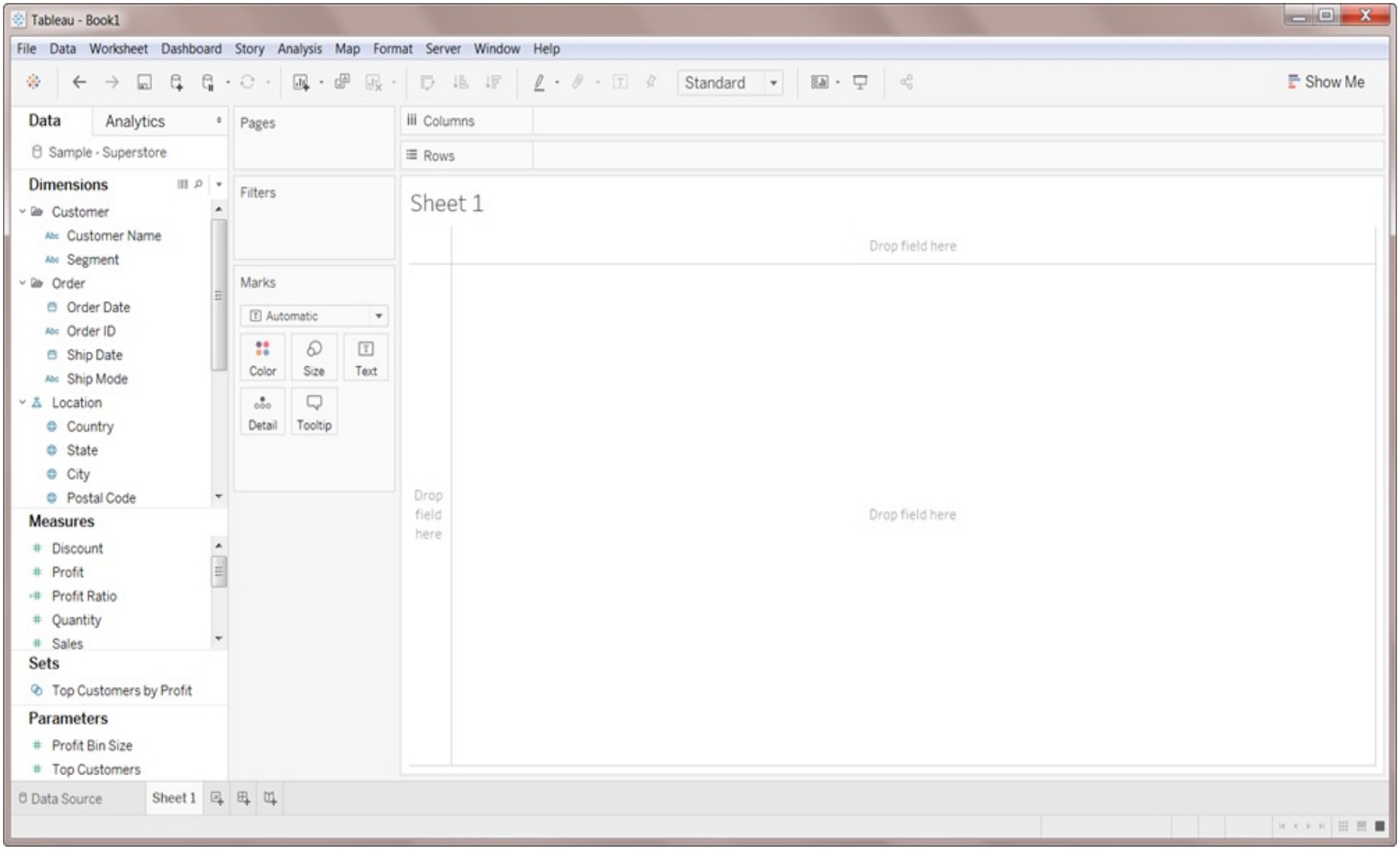

Dimensions & Measures

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- **Dimensions** contain qualitative values (such as names, dates, or geographical data). Dimensions are used to categorize, segment, and reveal the details in our data. Dimensions affect the level of detail in the view.
- **Measures** contain numeric, quantitative values that you can measure. Measures can be aggregated. By dragging a measure into the view, Tableau by default applies an aggregation to that measure.

Dimensions vs Measures

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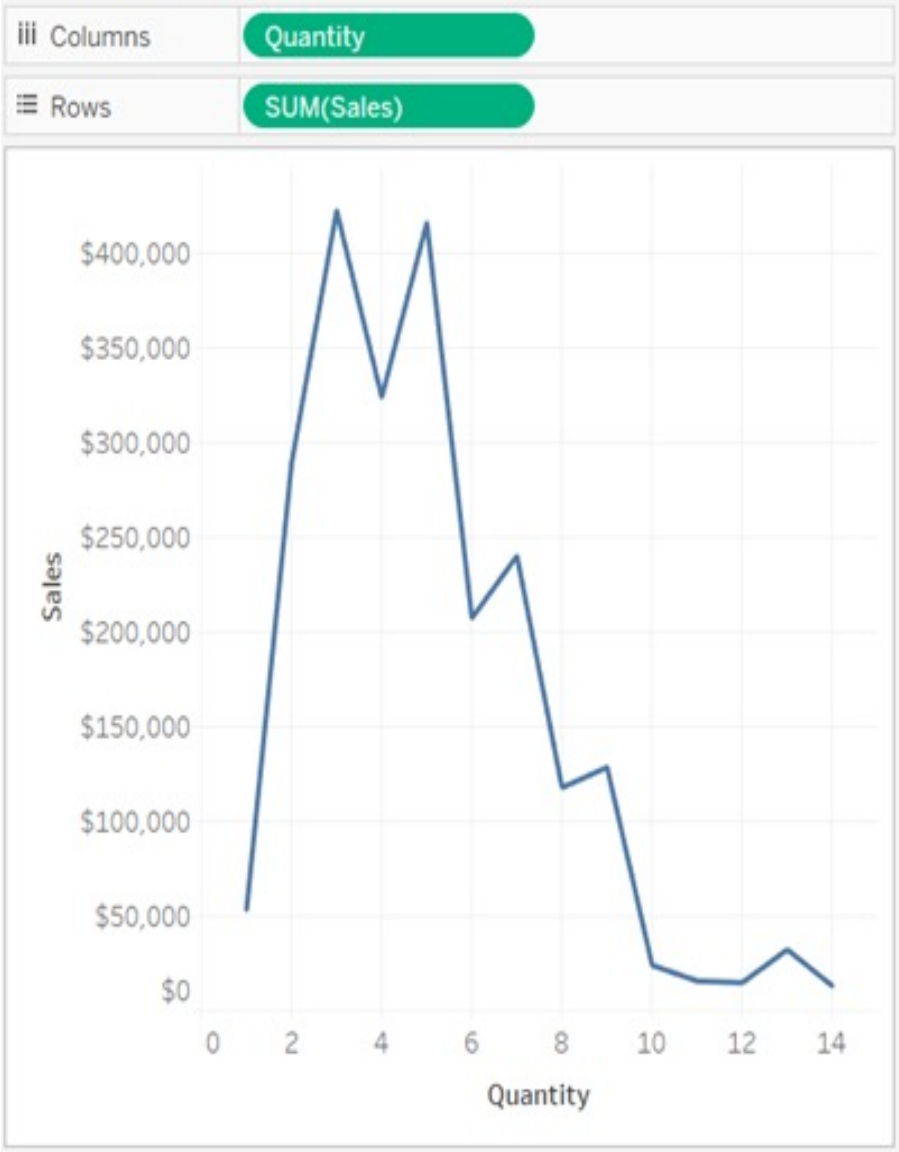
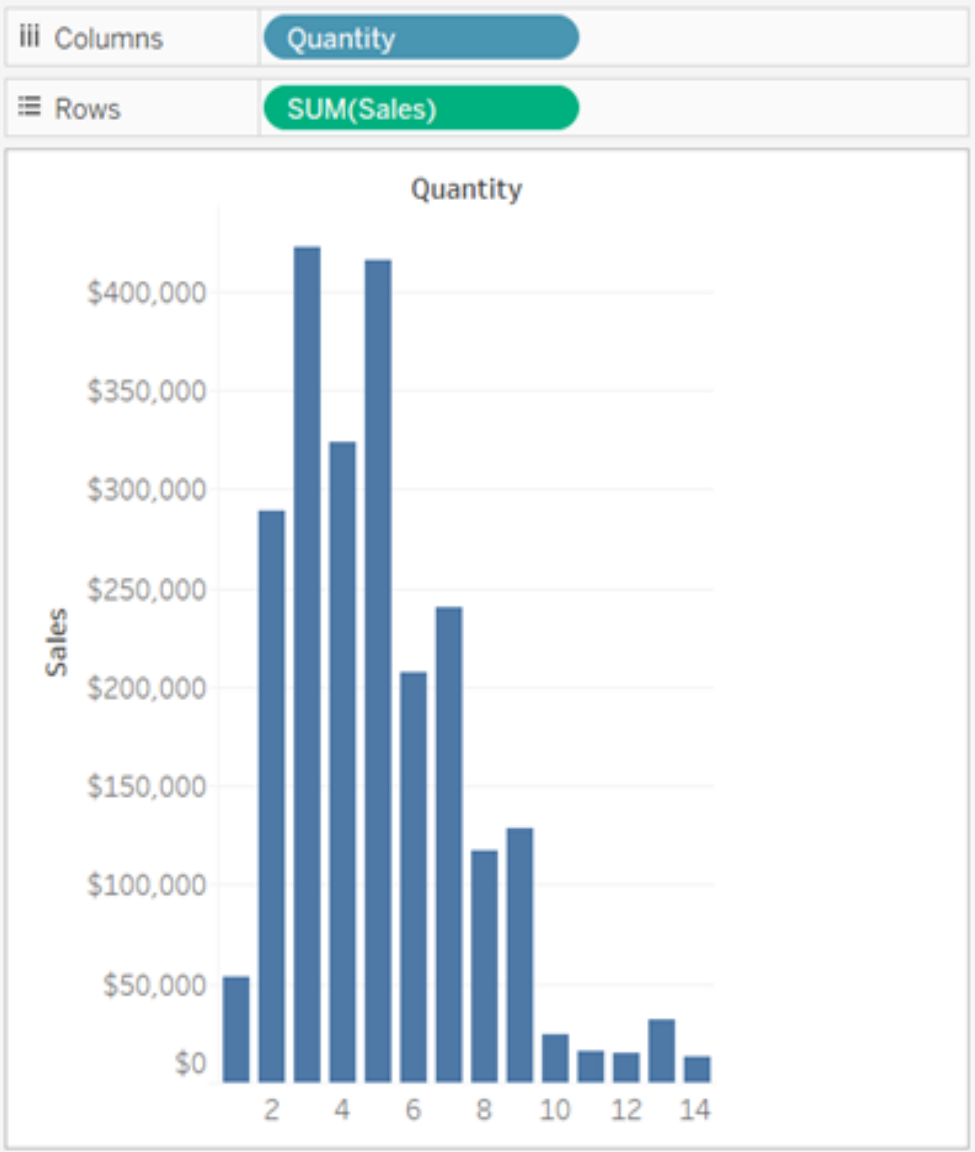
Tableau represents data differently in the view depending on whether the field is discrete (**blue**), or continuous (**green**).

Continuous and discrete are mathematical terms.

- **Continuous** means "forming an unbroken whole, without interruption“.
- **Discrete** means "individually separate and distinct.

Continuous vs Discrete





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FILTERING DATA

Data Filtering

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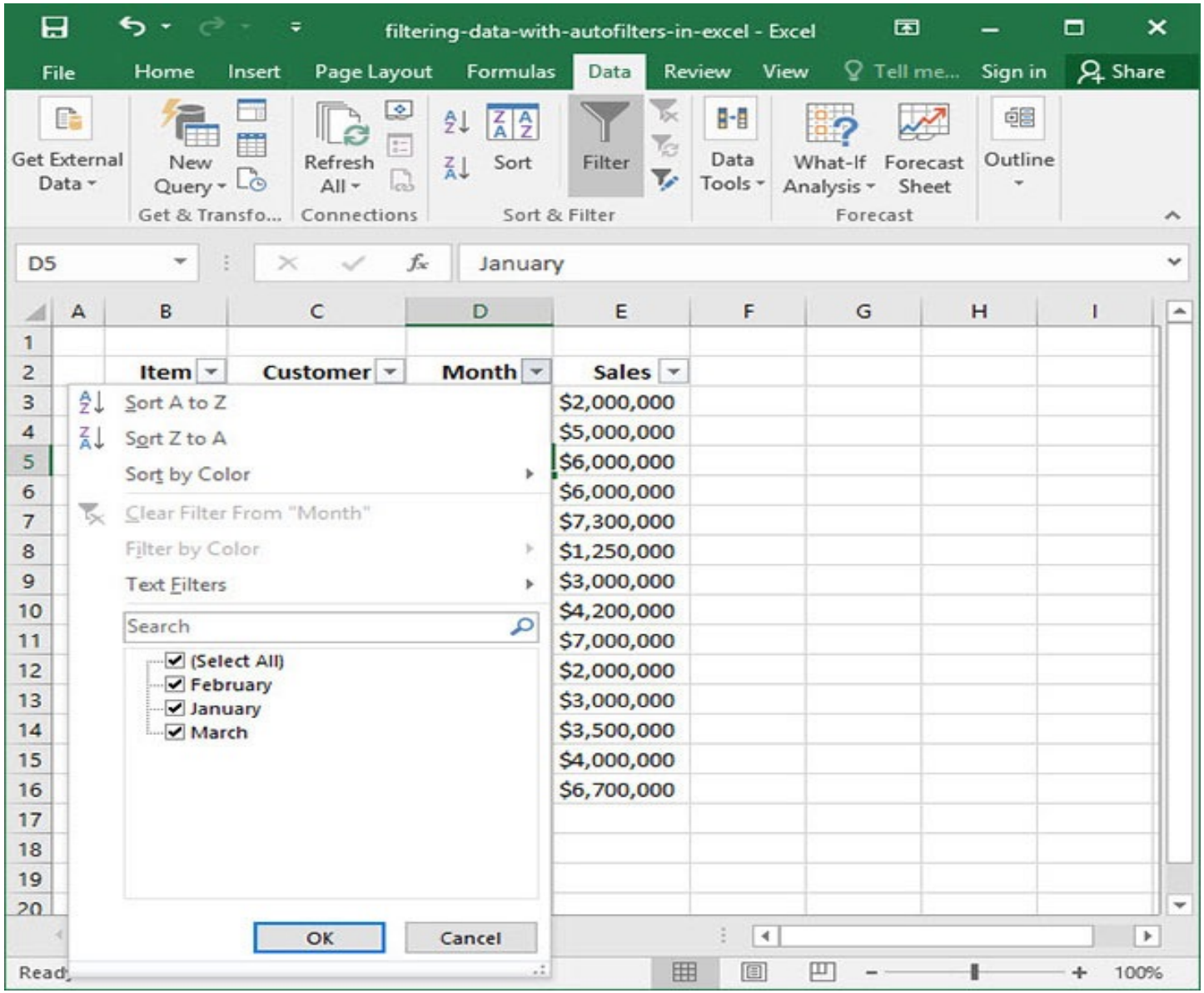

Data Filtering

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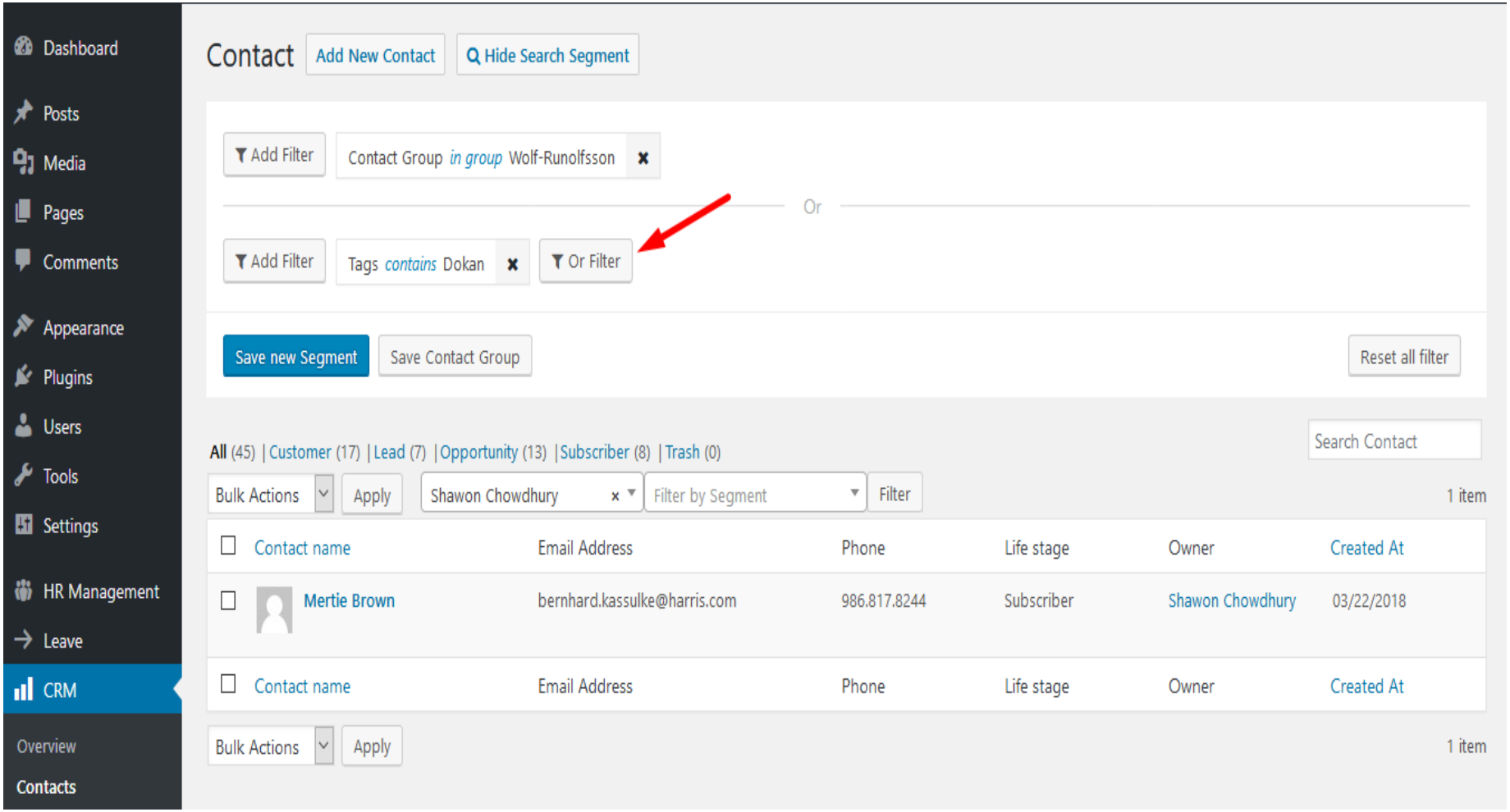

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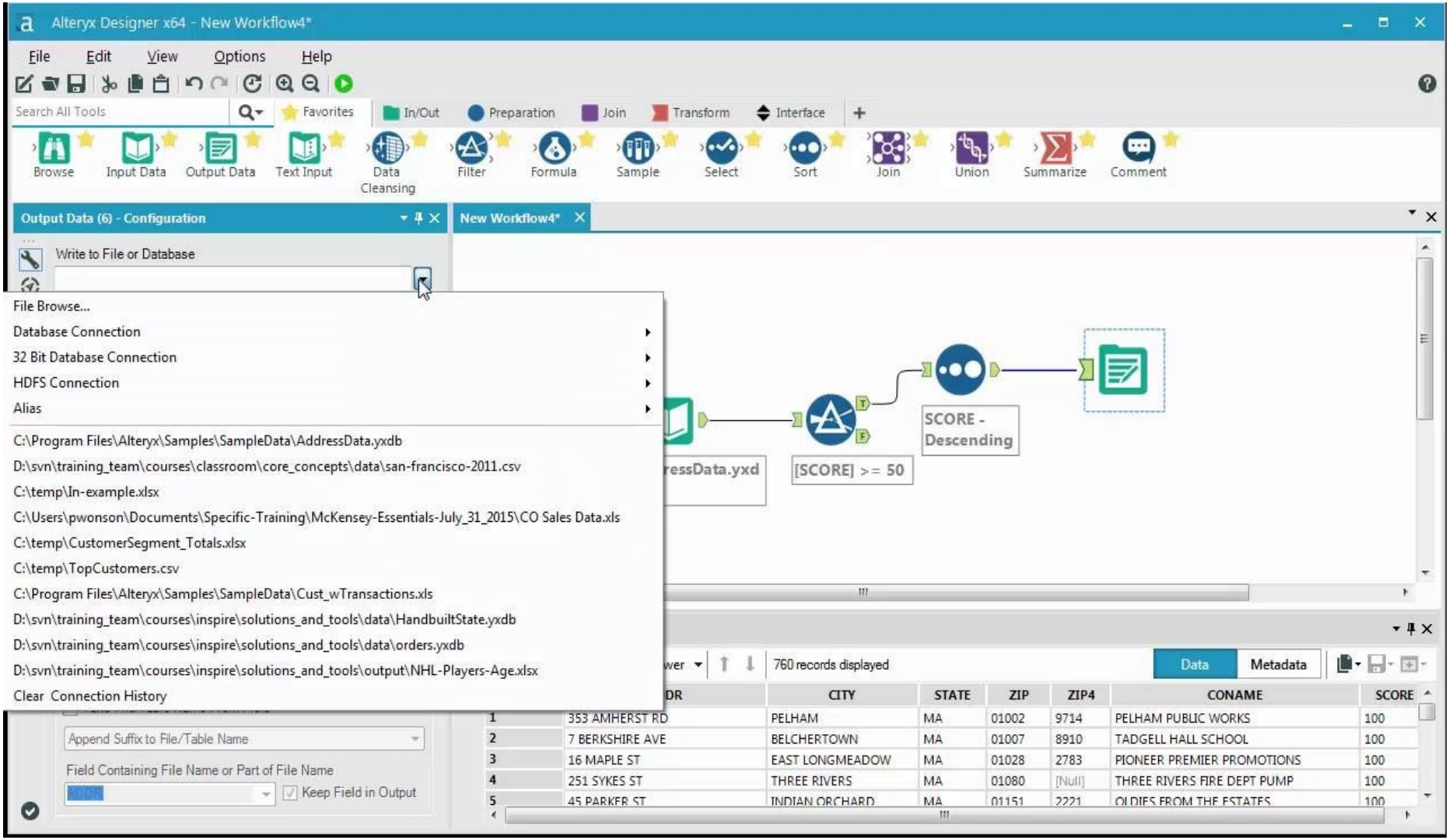

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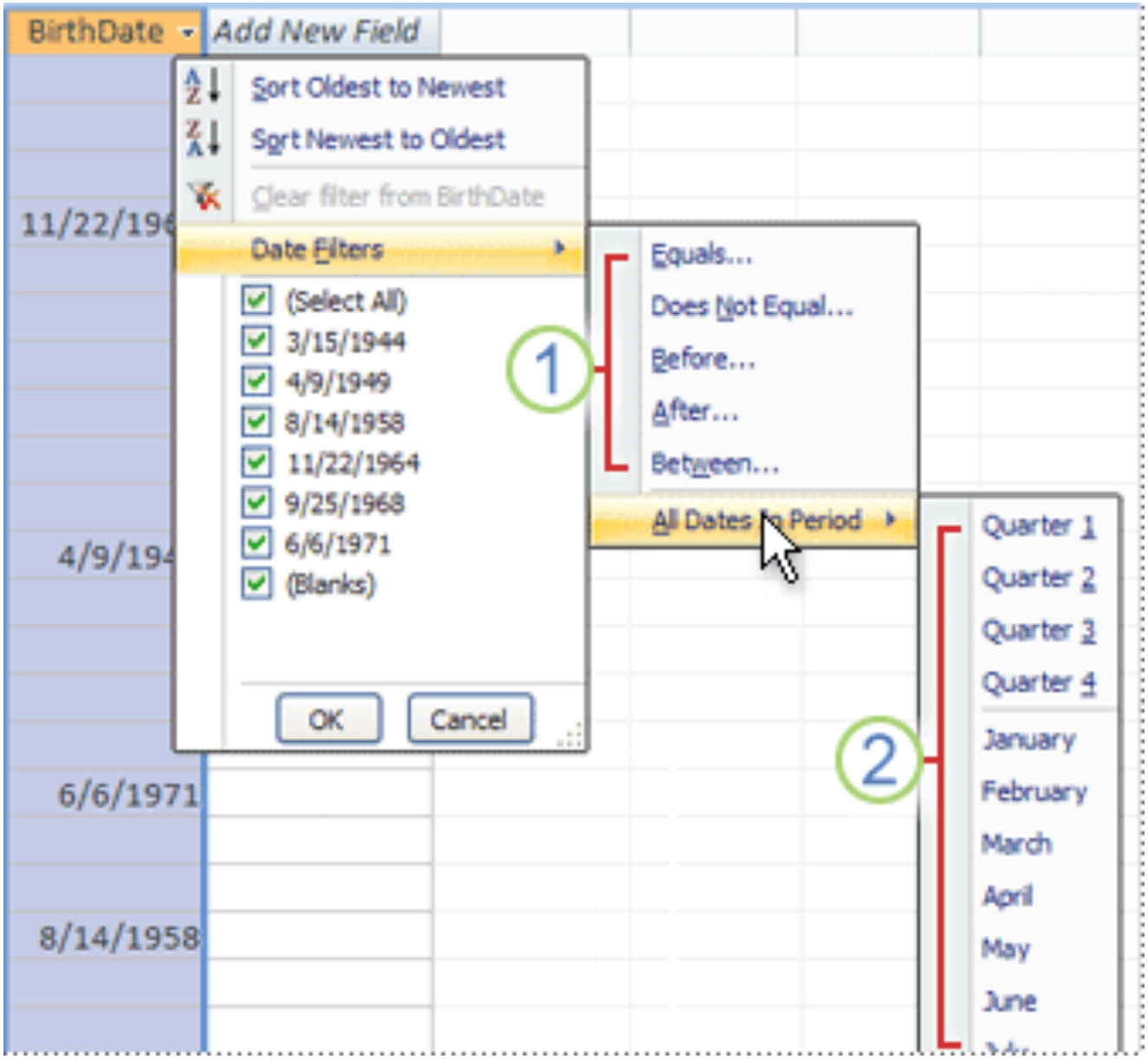

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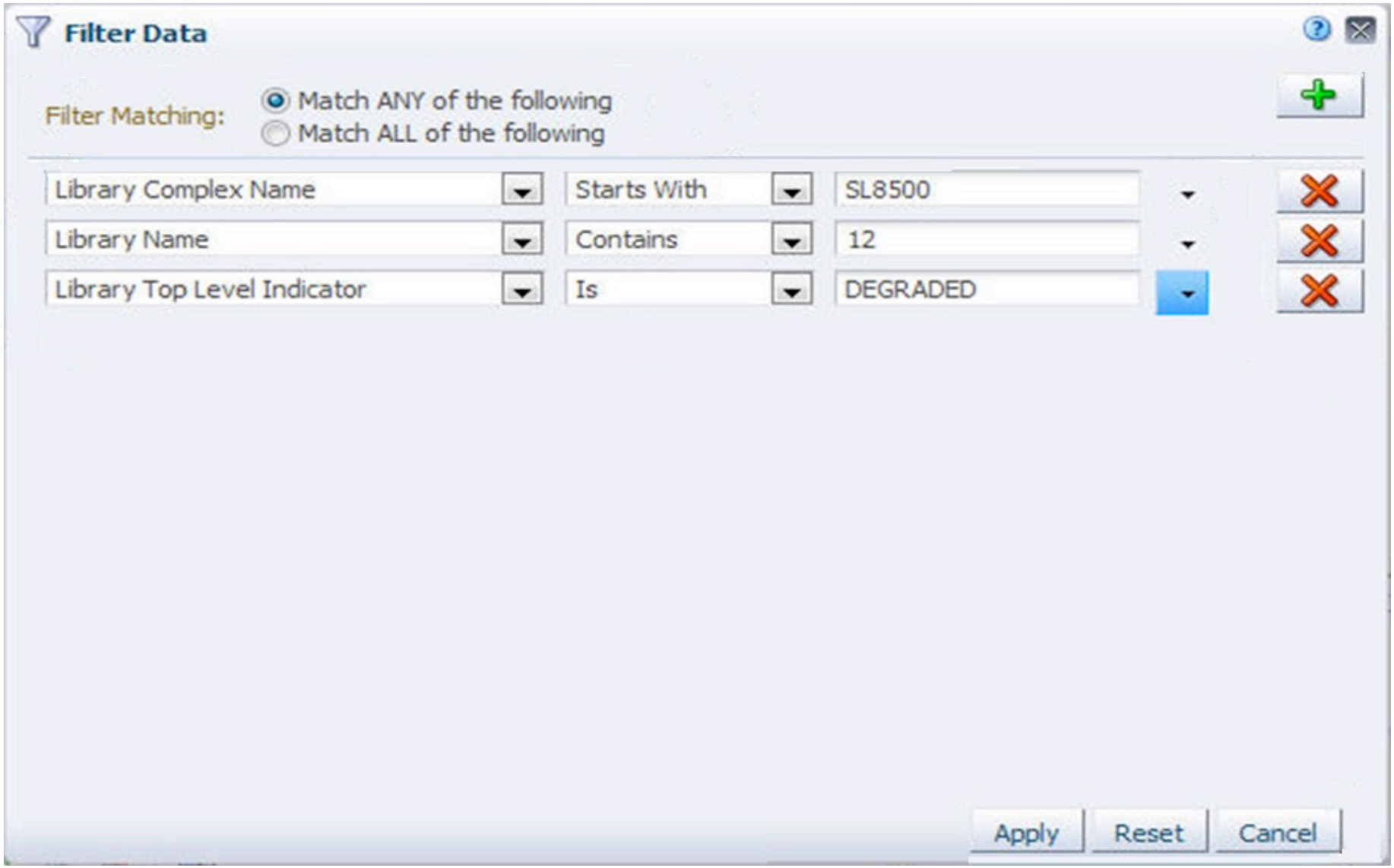

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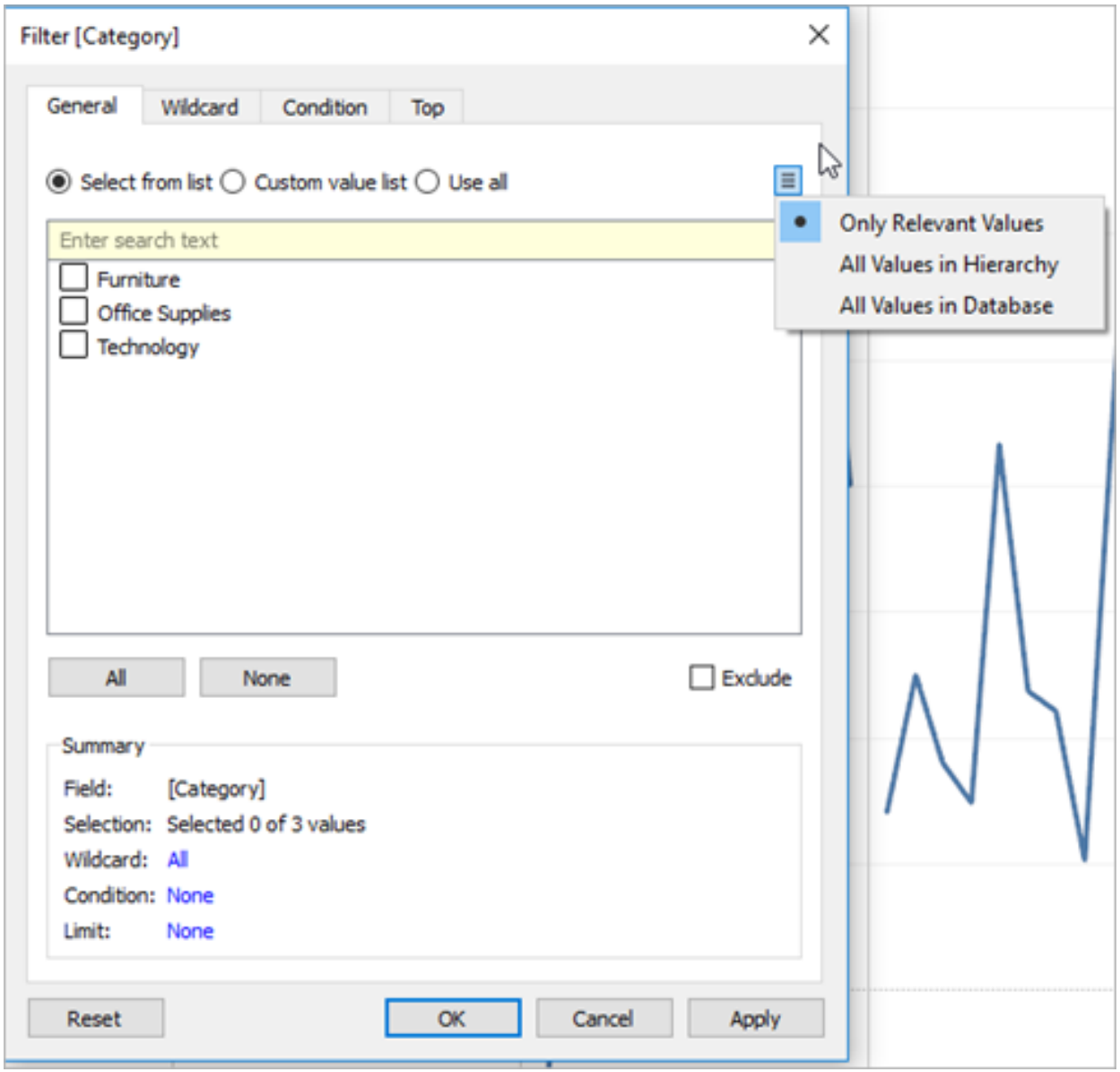

Data Filtering

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- **Filtering data** means to set conditions so that only certain **data** is displayed. It is done to make it easier to focus on specific information in a large dataset or in a table of data.
- **Filtering** does not remove or modify data; it simply changes which rows or columns appear.

Filtering Data

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- Tableau performs a numbers of filters on the view in a very specific order; this is called the Order of Operations. Filters are executed in the following order:
  1. Extract filters
  2. Data source filters
  3. Context filters
  4. Filters on dimensions (whether on the Filters shelf or in filter cards in the view)
  5. Filters on measures (whether on the Filters shelf or in filter cards in the view)

Data Filtering

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- Extract filters
  - Extracts are saved subsets of data that are used to improve performance or to take advantage of Tableau functionality that is not available or supported in your original data.
  - After data extraction, the total amount of data can be reduced by using filters and configuring other limits.

Data Filtering

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- Extract filters
  - After the creation of an extract, the data can be refreshed from the original data source.
  - By refreshing the data, there are 2 options:
    - either do a full refresh, which replaces all of the contents in the extract,
    - or an incremental refresh, which only adds rows that are new since the previous refresh.

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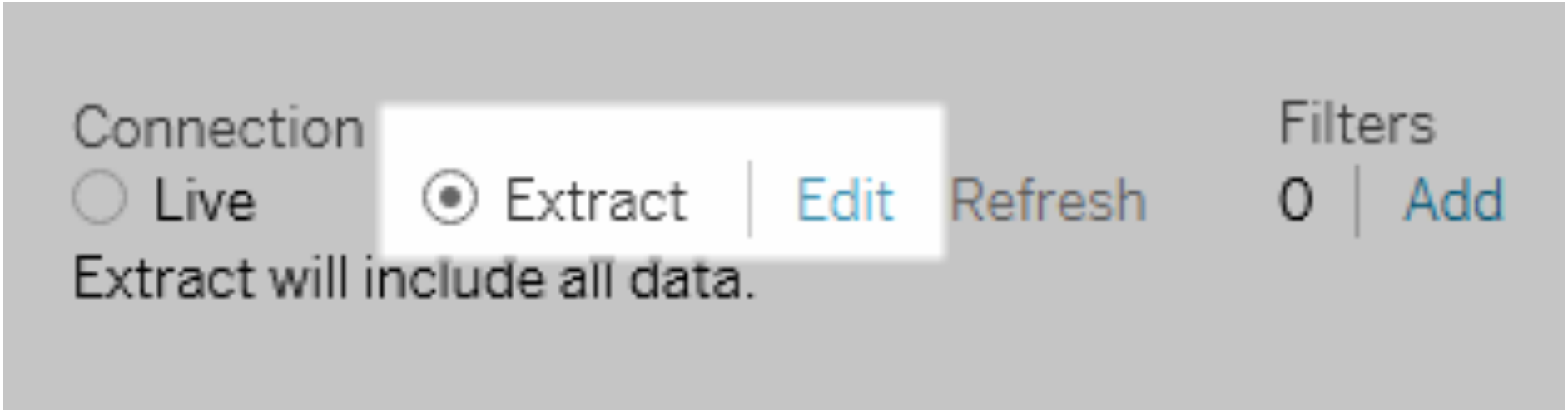
Extract filters

- The primary method to create an extract of the data



Data Filtering

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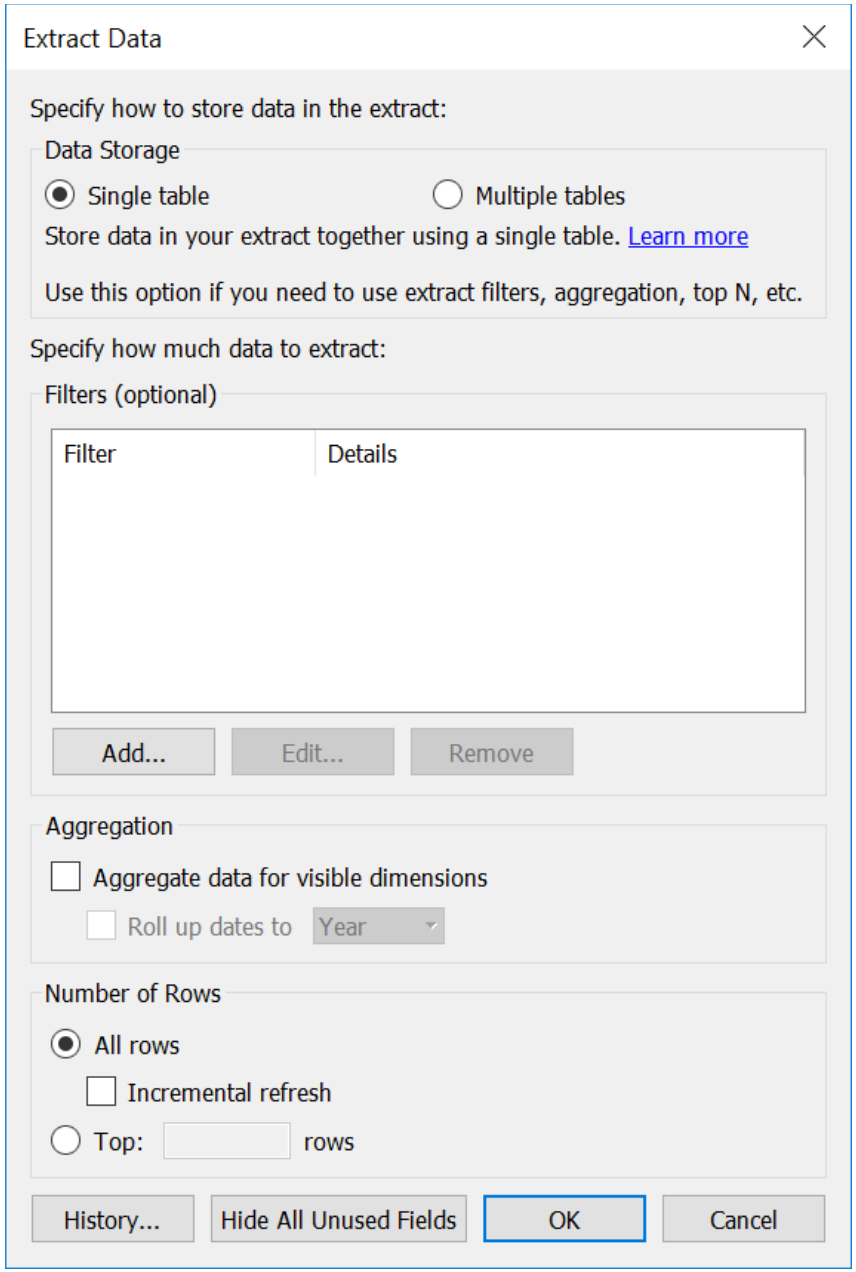

Data Filtering

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- Data source filters
  - You create filters on a data source, in order to reduce the amount of data in the data source.
  - Are really useful for restricting the data that users can see when you publish a workbook or a data source.

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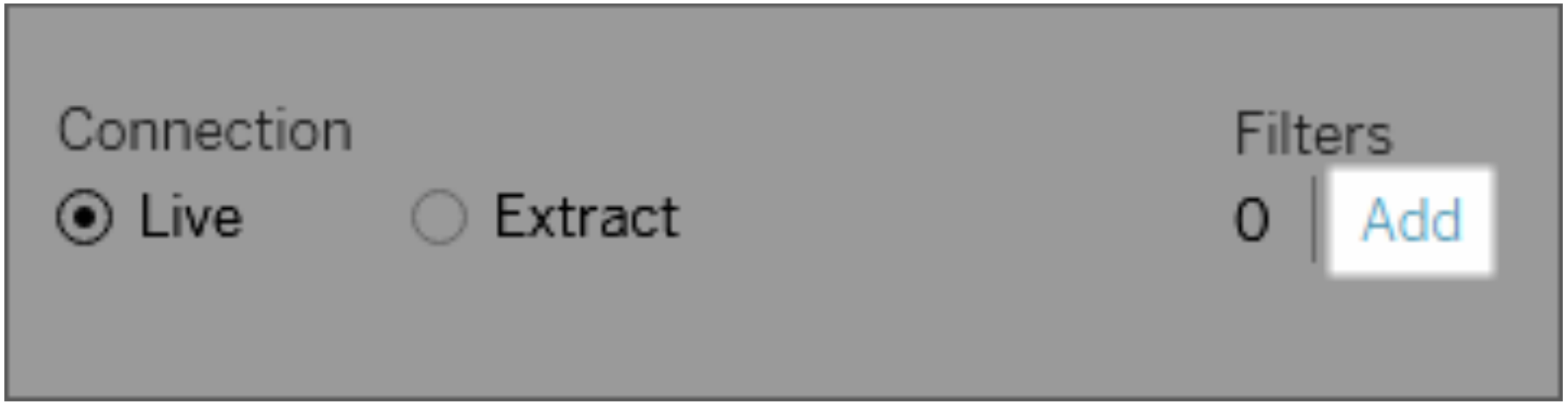
Data Source filters

- The primary method to create a data source filter



Data Filtering

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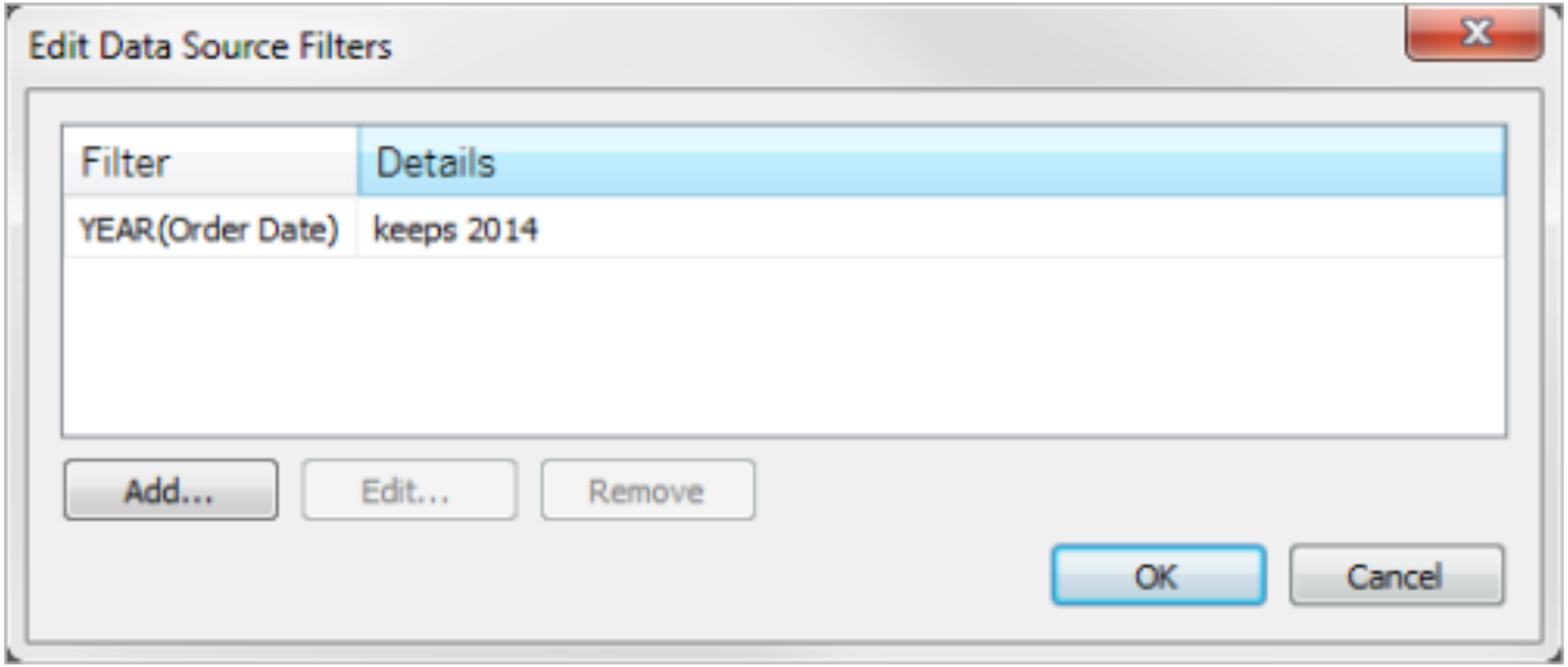

Data Filtering

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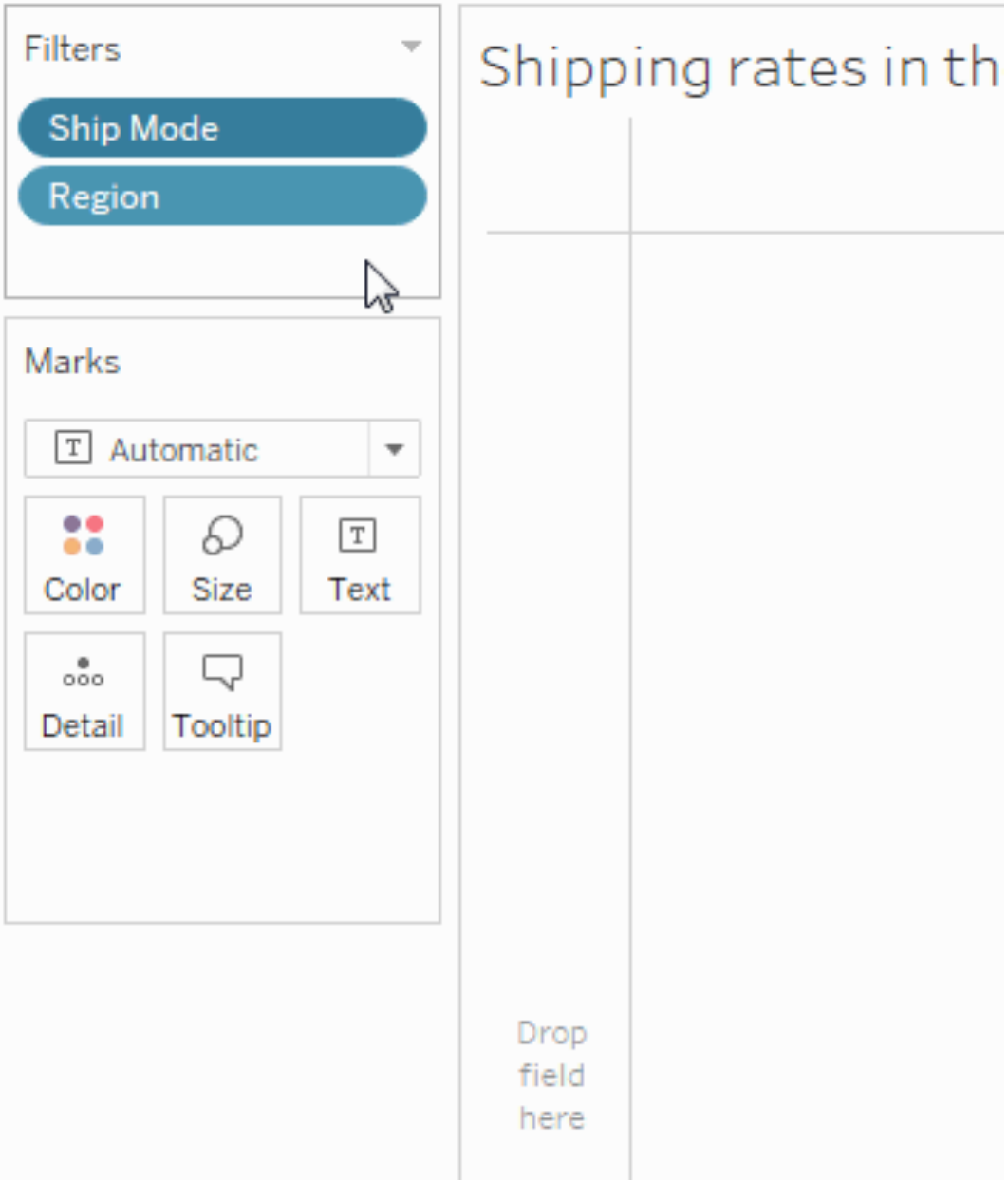
- Context filters
  - **Improve performance** – If you set a lot of filters or have a large data source, the queries can be slow. You can set one or more context filters to improve performance.
  - **Create a dependent numerical or top N filter** – You can set a context filter to include only the data of interest, and then set a numerical or a top N filter.

Data Filtering



Data Filtering

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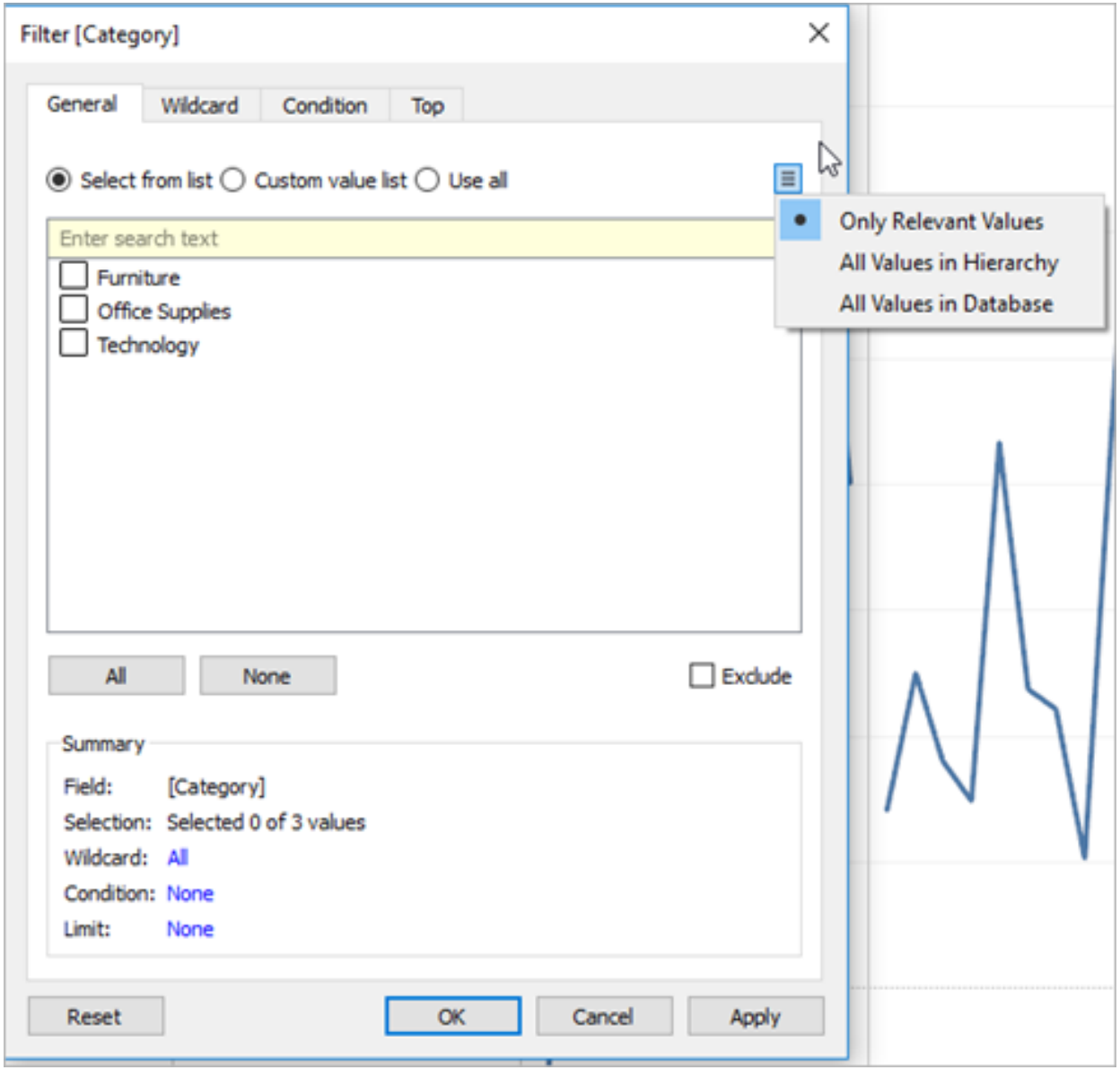
- Filters on dimensions (whether on the Filters shelf or in filter cards in the view)
  - **Dimensions** contain discrete categorical data, so filtering this type of field generally involves selecting the values to include or exclude.

Data Filtering



Data Filtering

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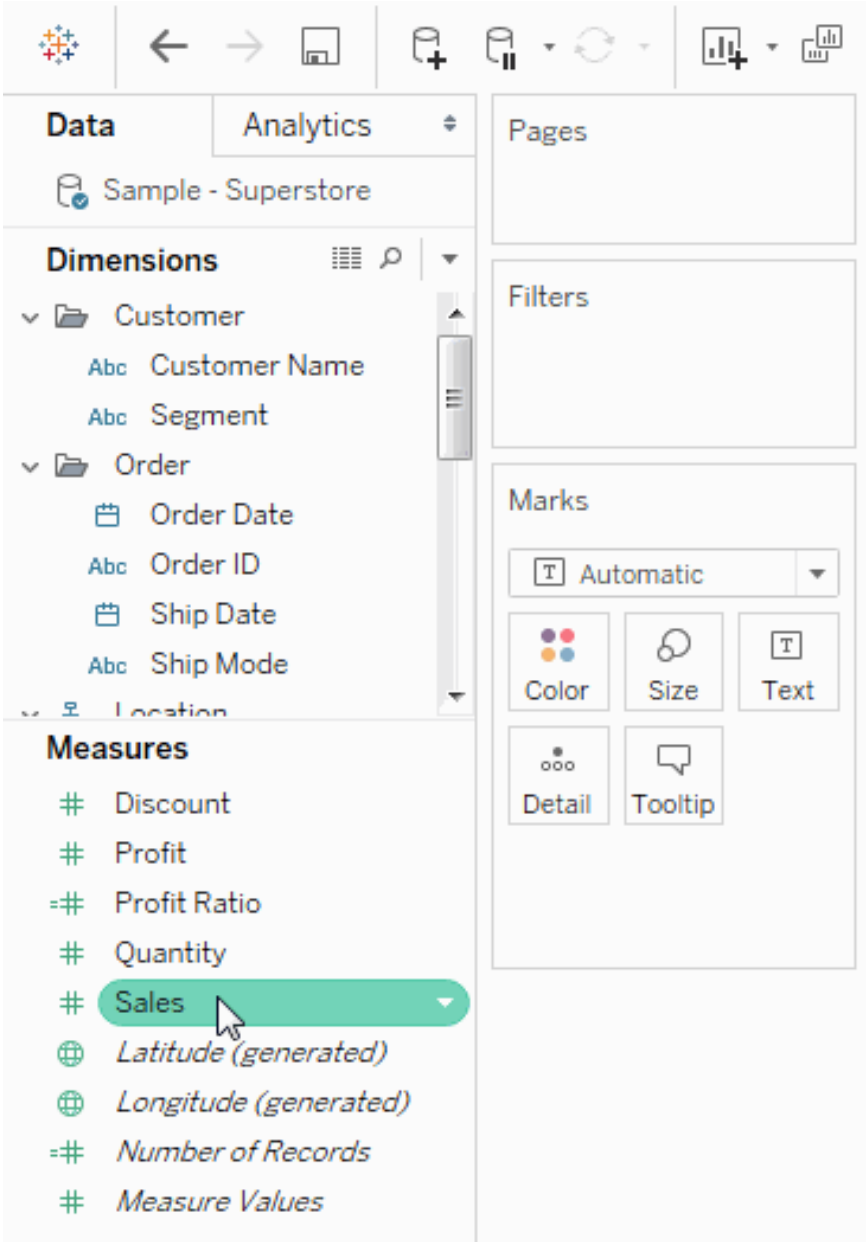
- Filters on measures (whether on the Filters shelf or in filter cards in the view)
  - **Measures** contain quantitative data, so filtering this type of field generally involves selecting a range of values that you want to include.

Data Filtering



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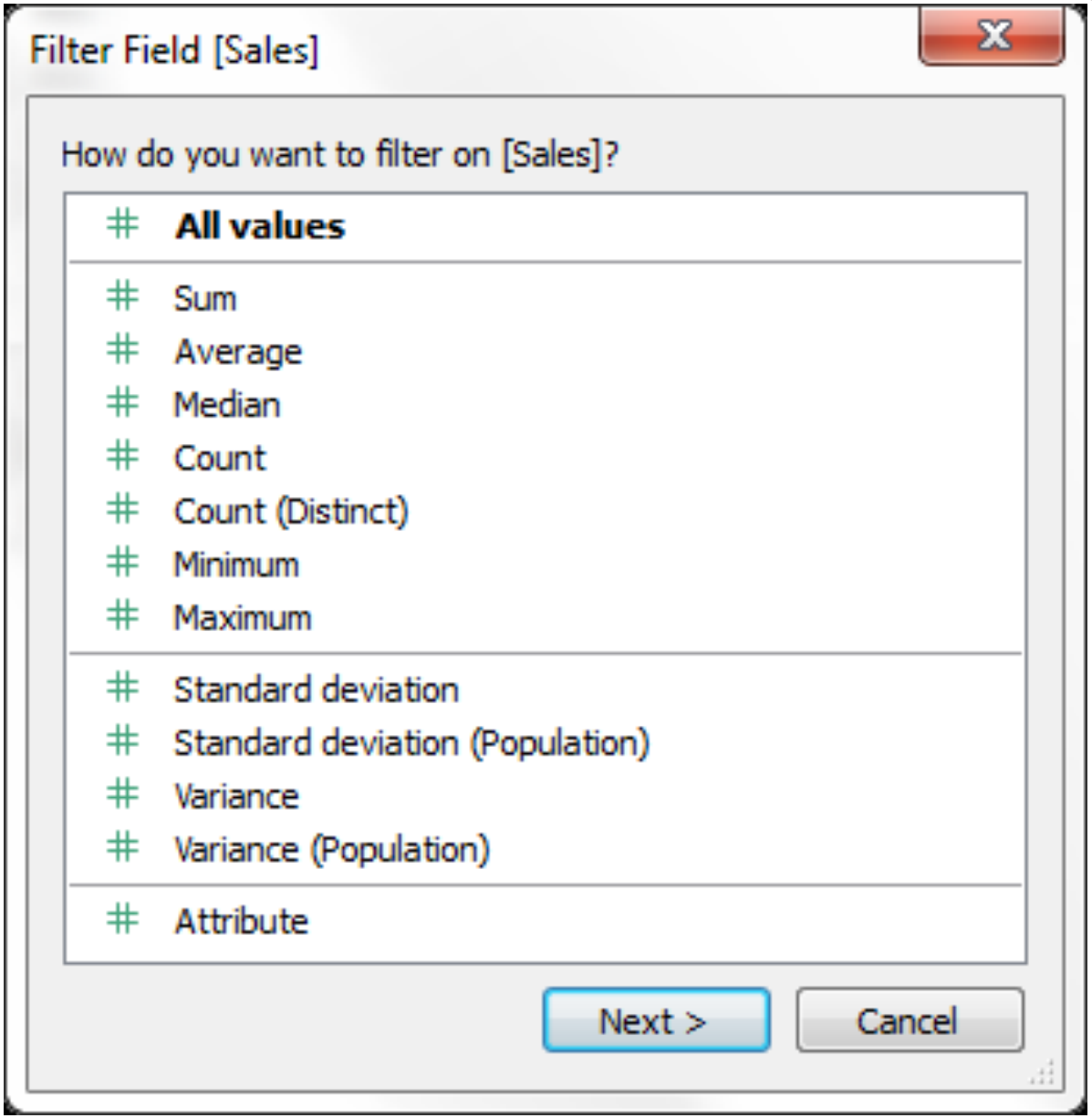

Data Filtering

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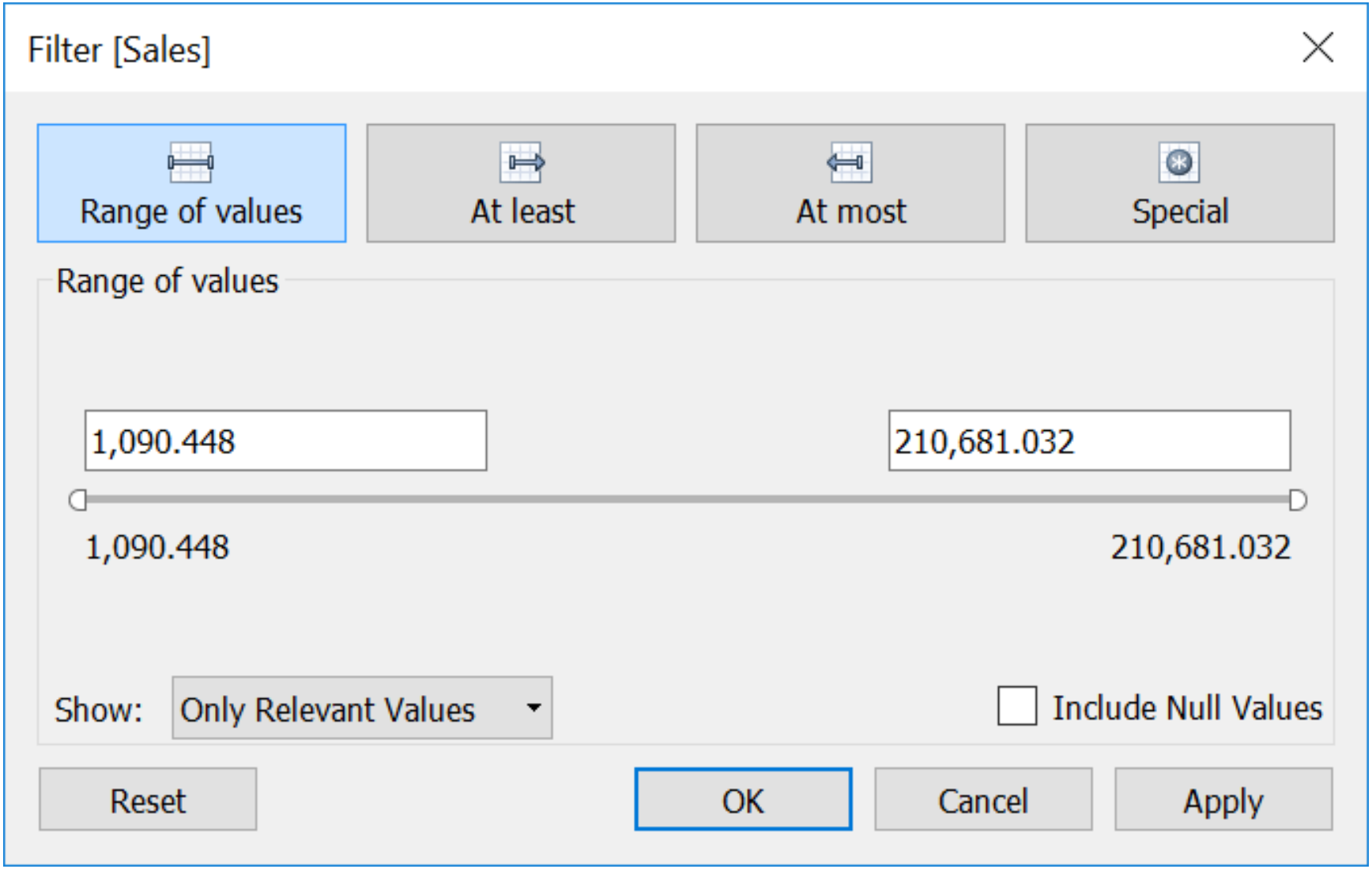

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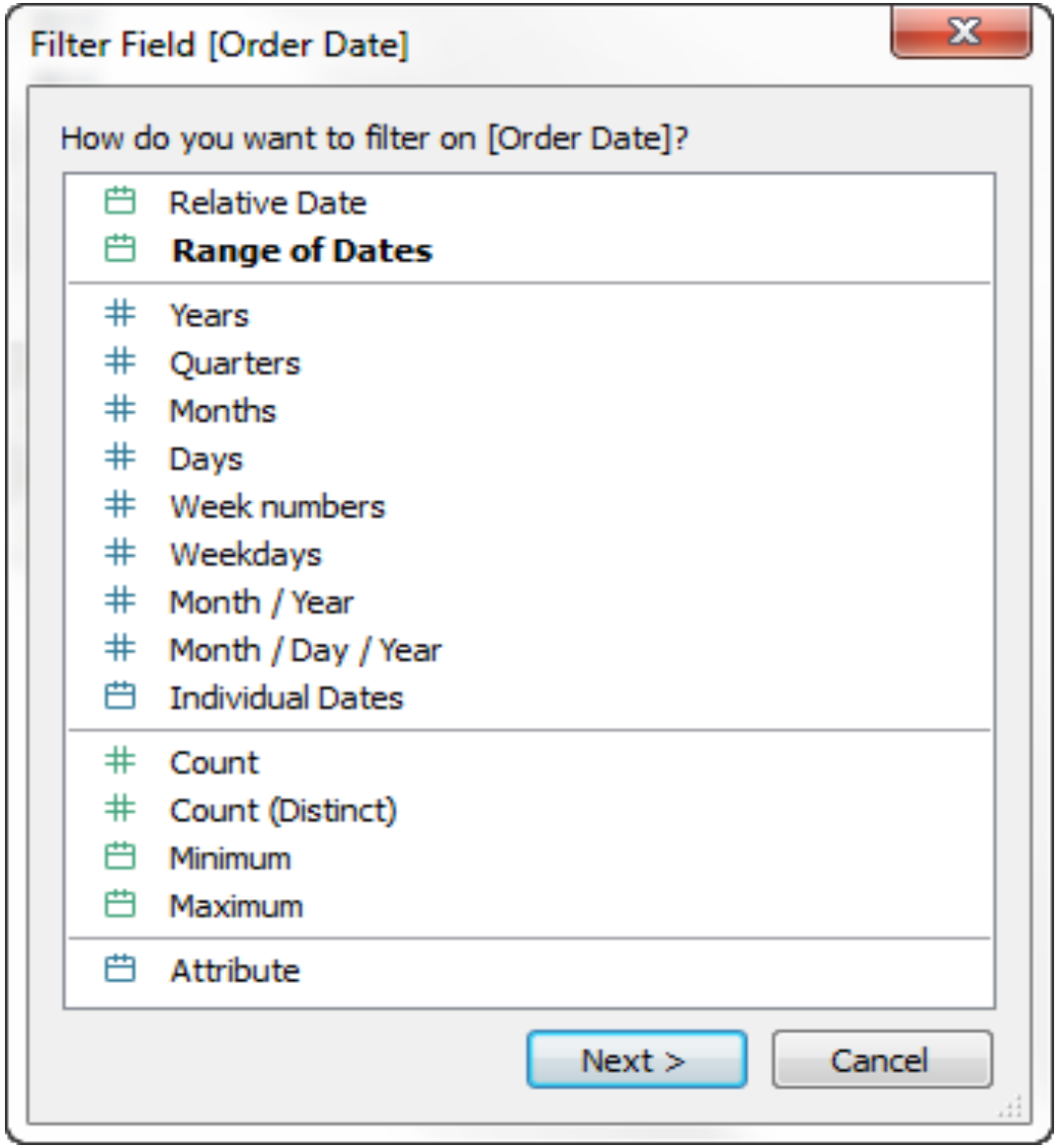
Additional Filtering

Data Filtering

- Filter dates



Data Filtering

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- Select to Keep or Exclude Data in your View
  - You can filter individual data points (marks), or a selection of data points from your view.
  - To filter marks from the view, select a single mark (data point) or click and drag in the view to select several marks.

Data Filtering

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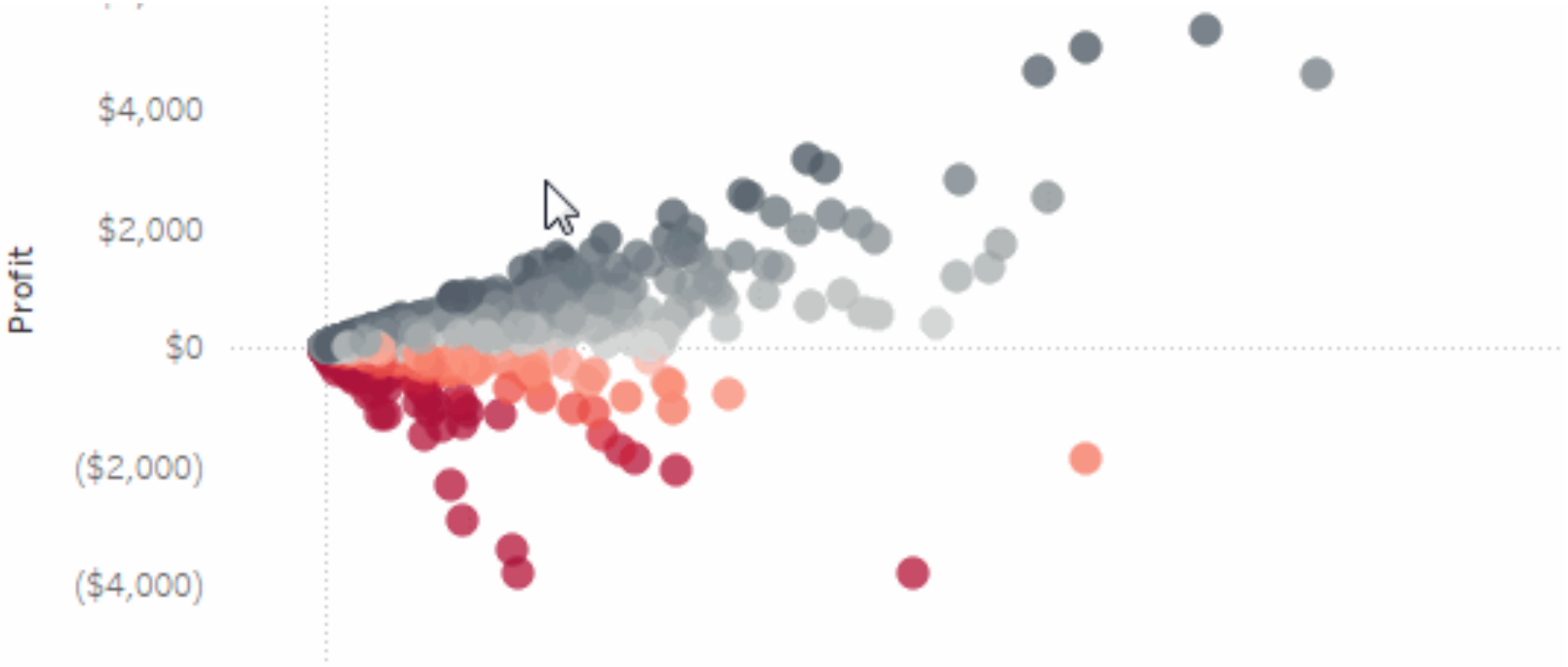

Data Filtering

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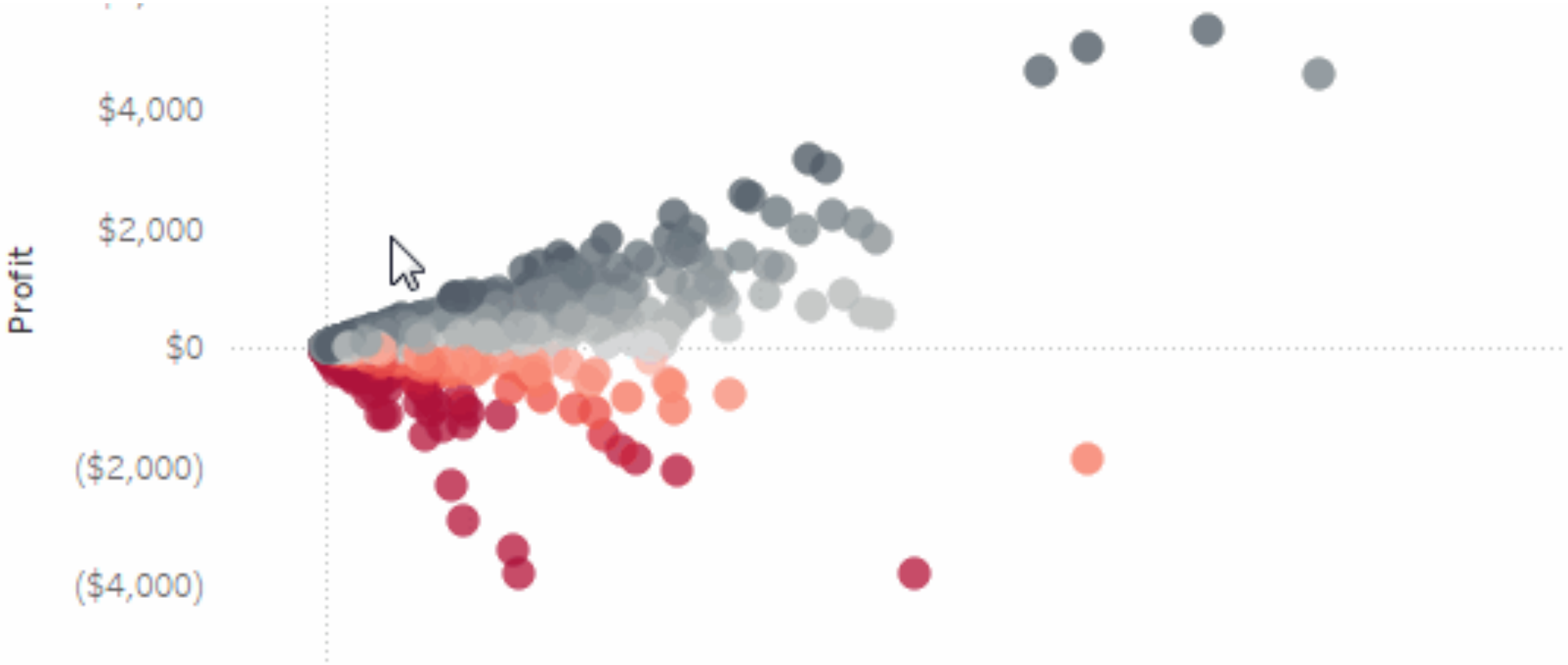

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- Apply filters to Multiple worksheets
  - When a filter is added to a worksheet, by default it filter applies only to the current worksheet. Sometimes, however, this filter have to be applied to other worksheets in the workbook.
  - You can select specific worksheets to apply the filter to or apply it globally to all worksheets that use the same data source or related data sources.

Sort Data

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Sorting Data

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- Why Data Sorting is important?
  - **Data sorting** is the process that involves arranging our **data** into some meaningful order to make it easier to understand, analyse or visualize them.
  - When working with research **data**, **sorting** is a common method used for visualizing **data** in a form that makes it easier to comprehend the story the **data** is telling.

Sort Data

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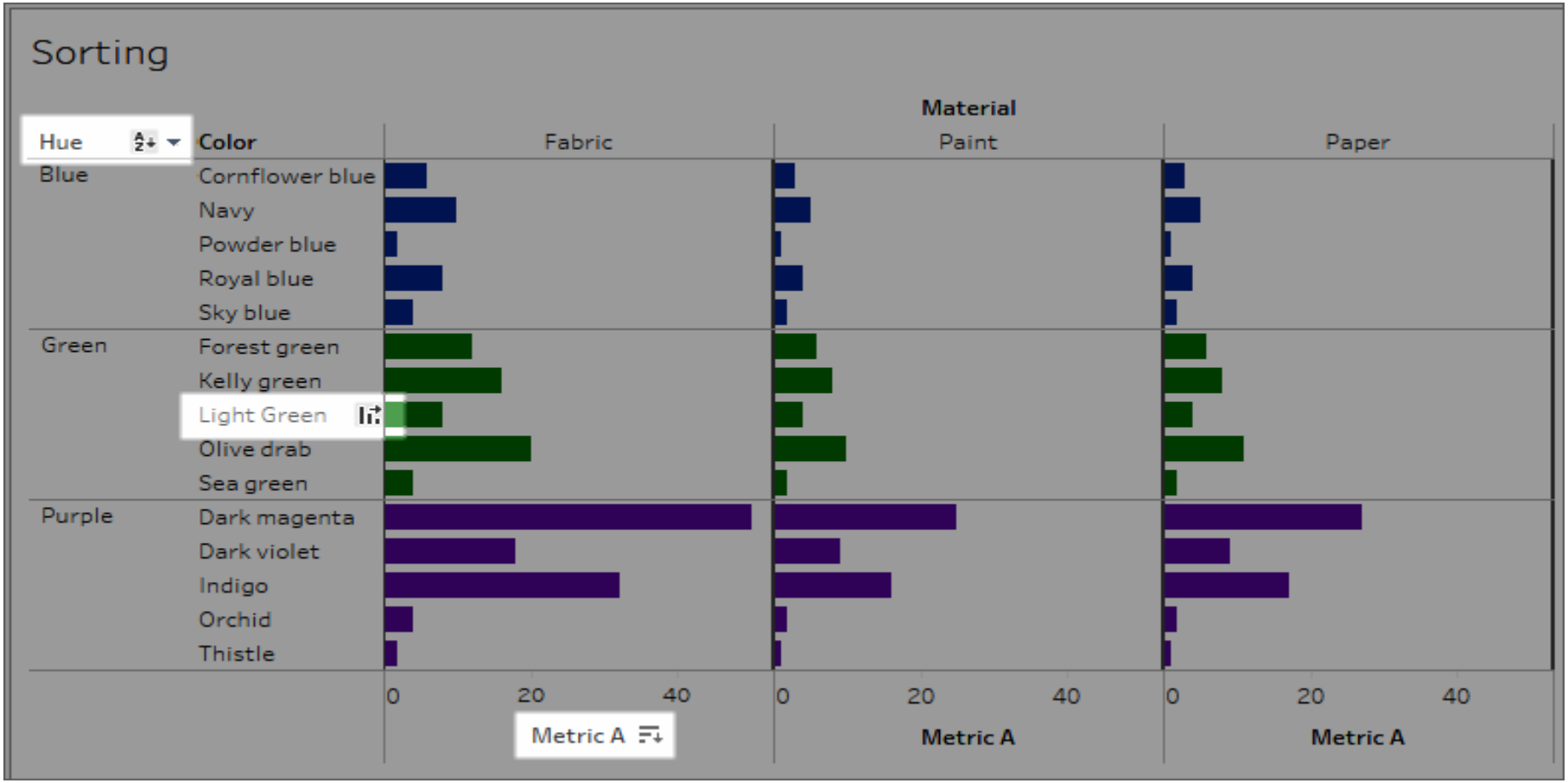
- There are many ways to sort data in a visualization:
  - Sort data on an axis
  - Sort specific fields in the visualization
  - Sort data using the toolbar
  - Sort data using headers or legends
  - Create a nested sort

Sorting Data

- Sort from an Axis



Sorting Data

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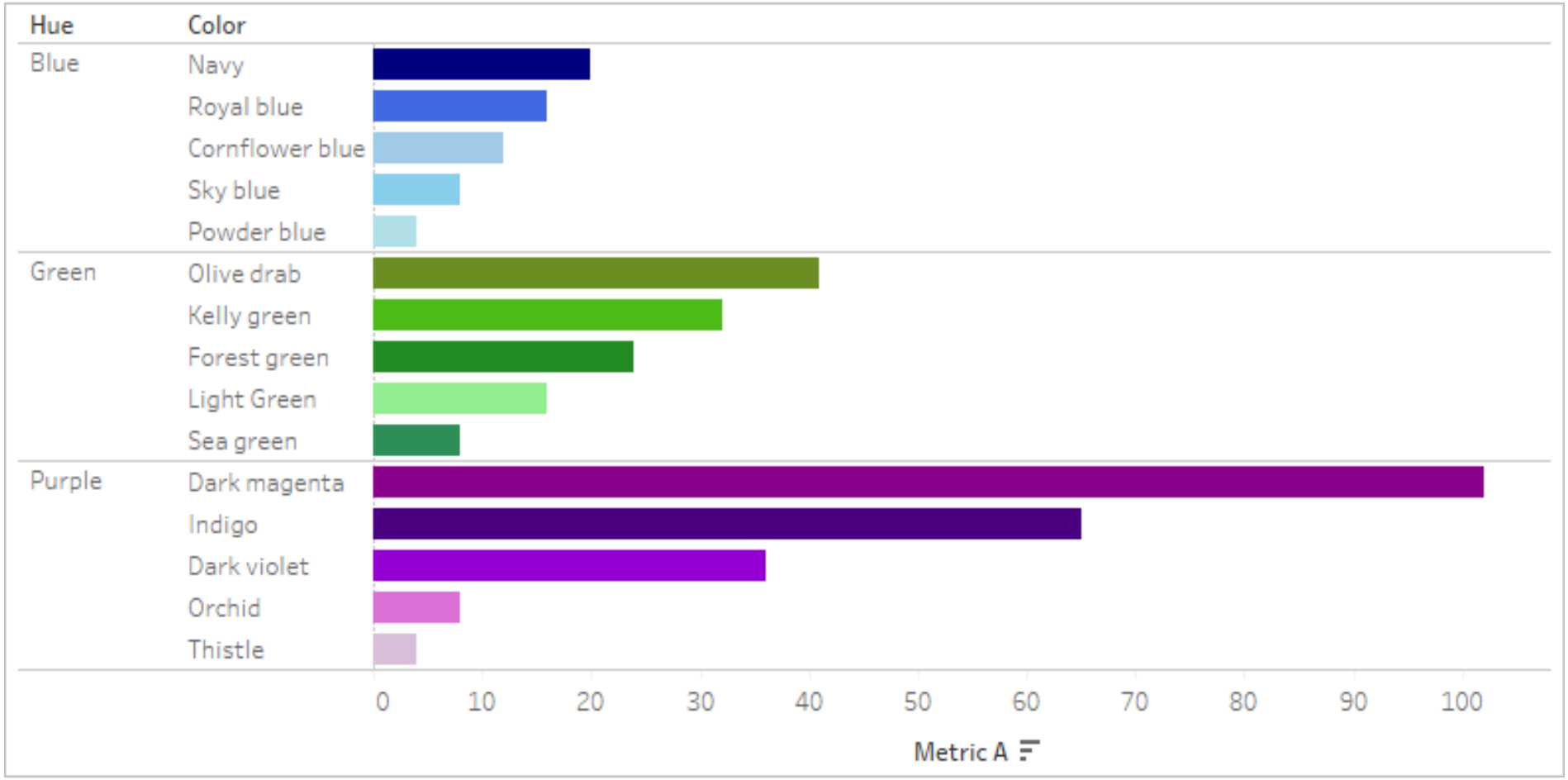
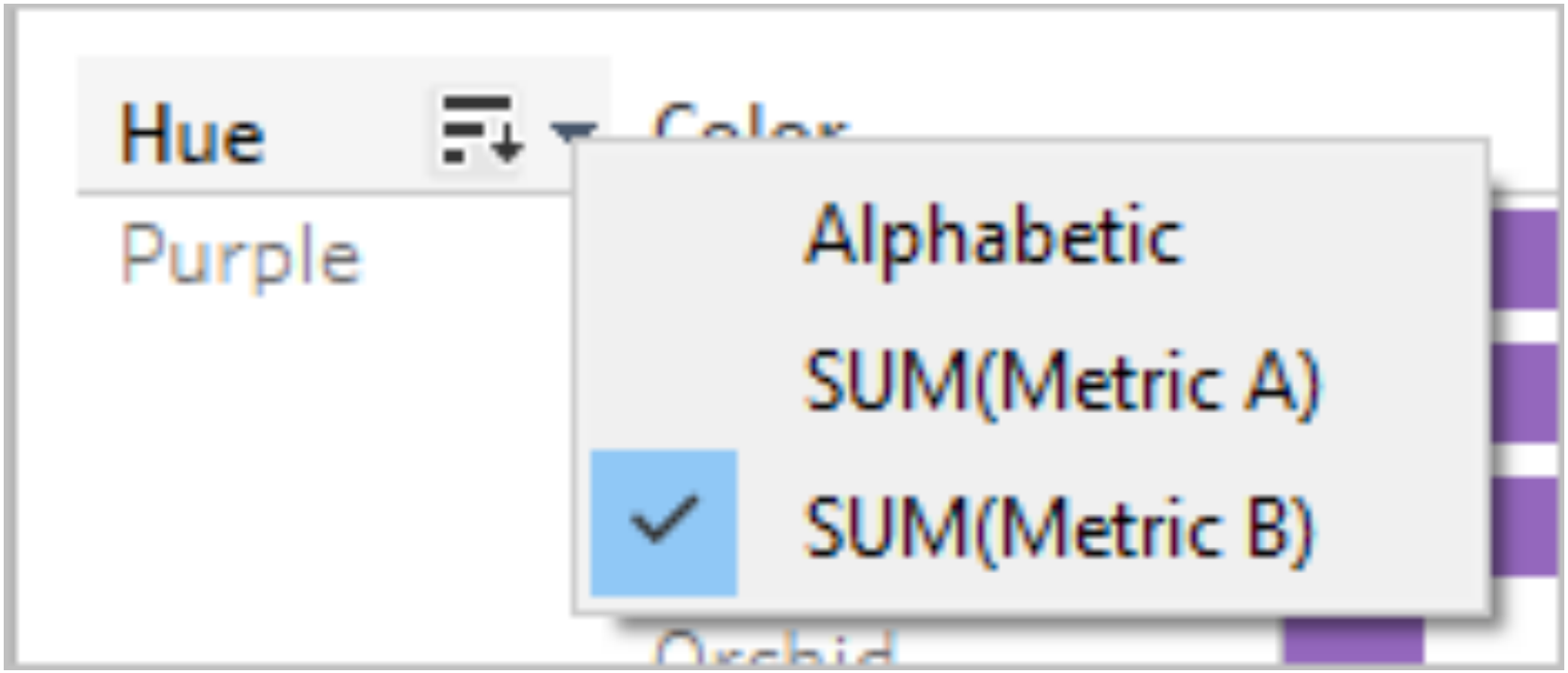
- Sort from an Axis



Sorting Data

- Sort from specific fields in the visualization



Sorting Data

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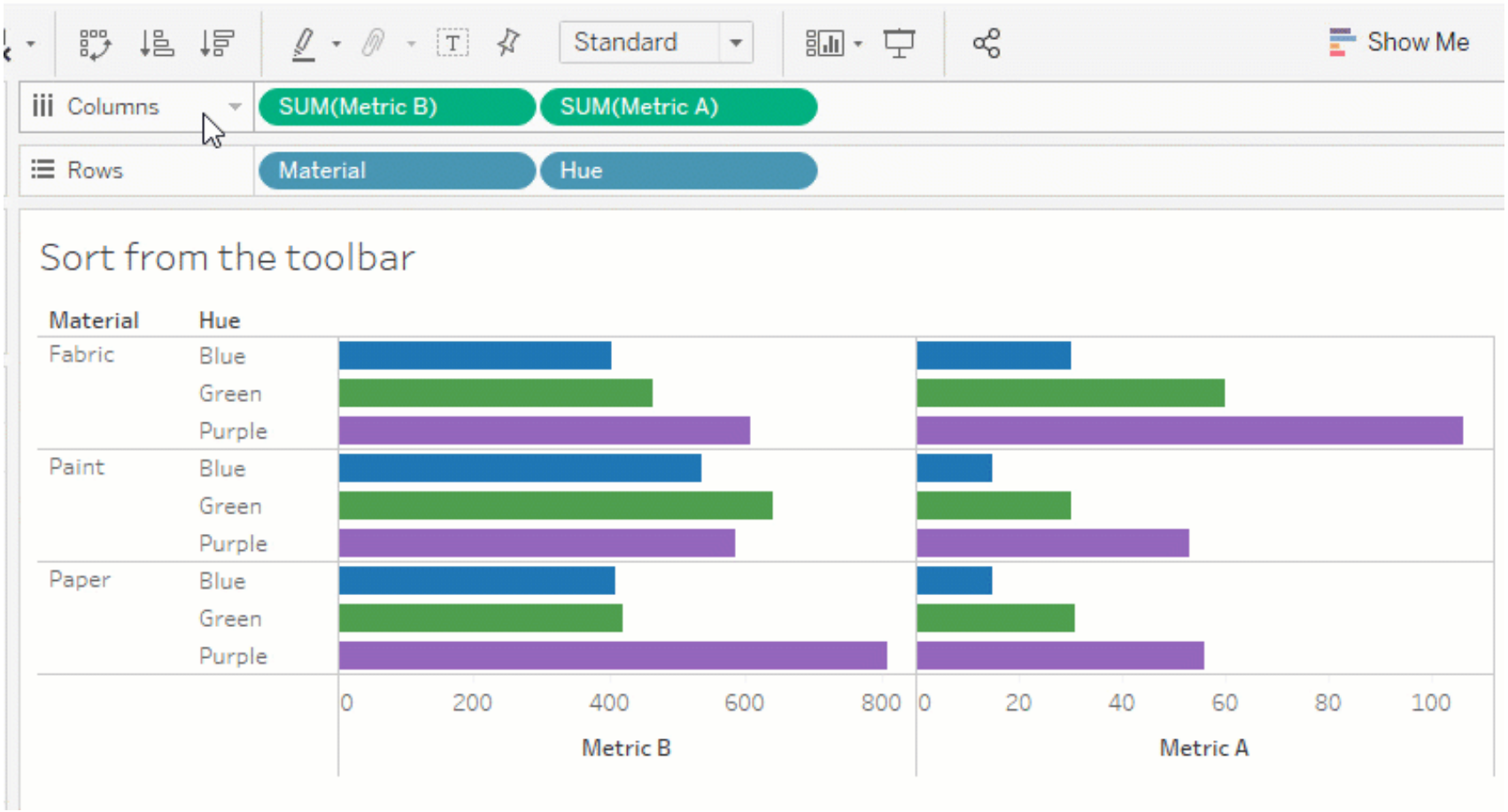
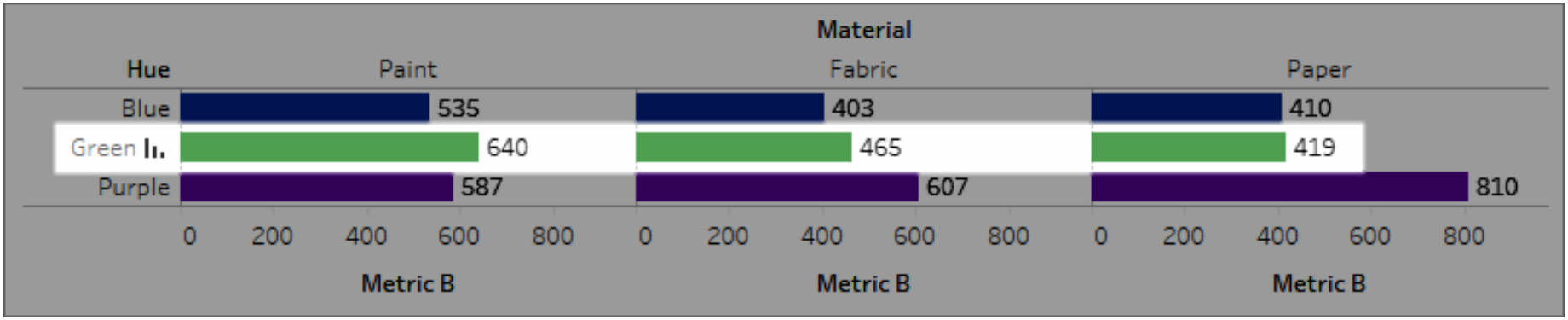
- Sort Data using Toolbar



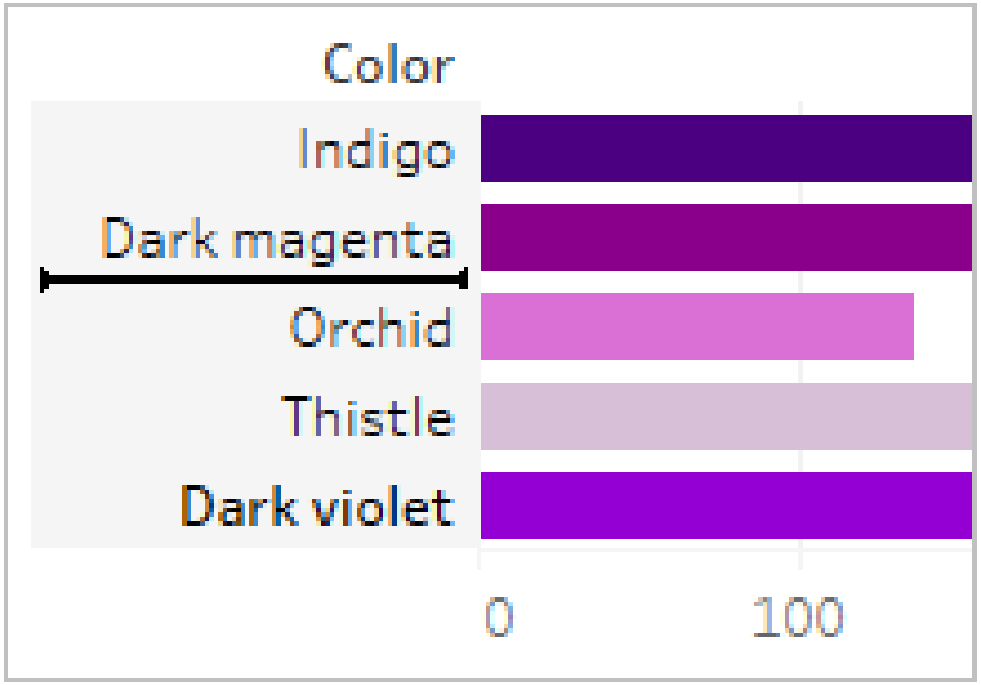
Sorting Data

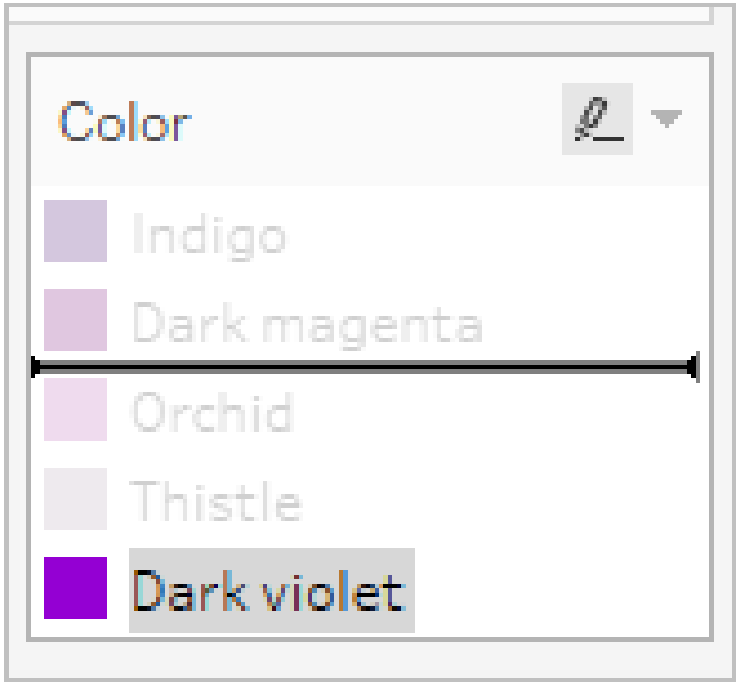
- Sort Data using headers or legends



Sorting Data

- Sort by Drag and Drop

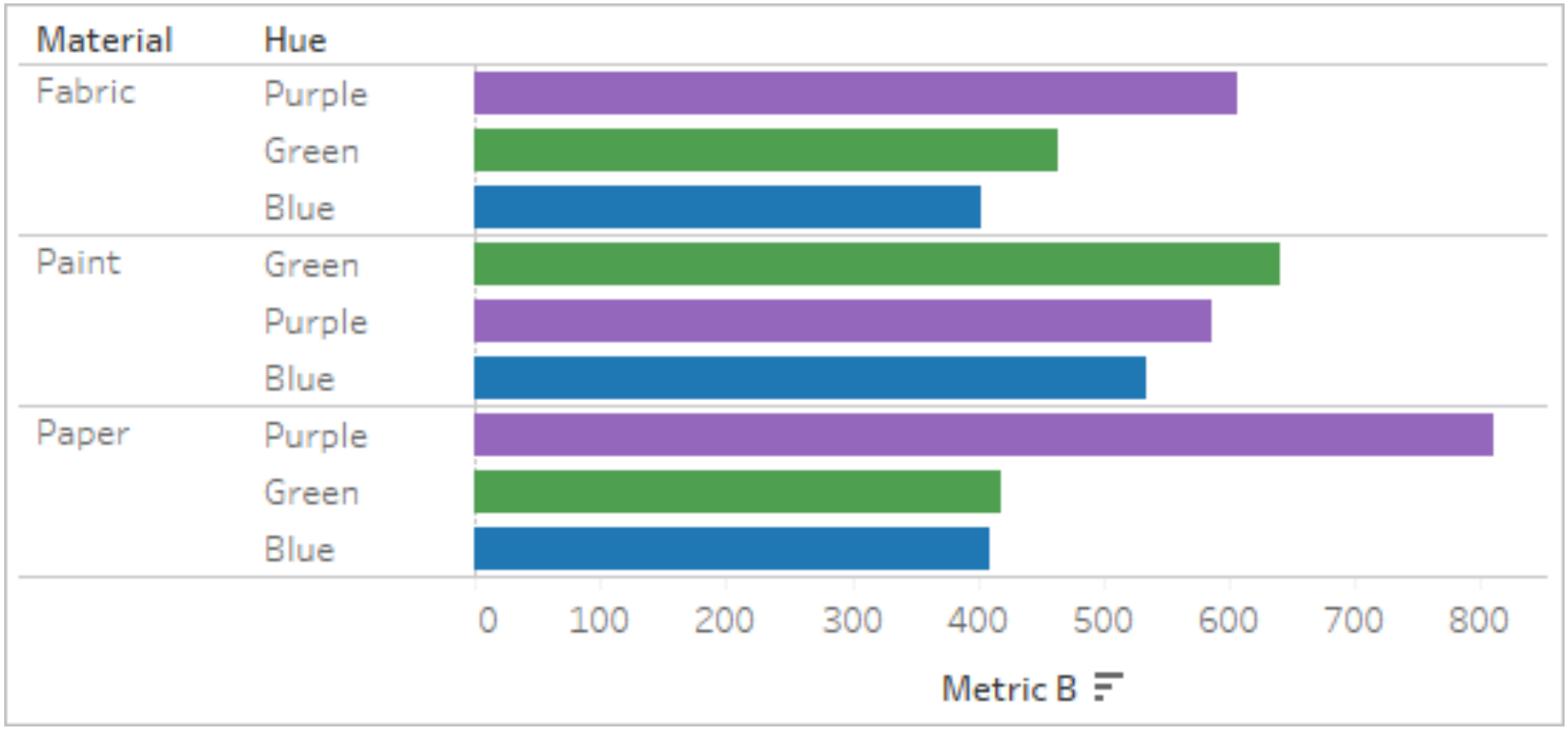




Sorting Data

Middlesex University London

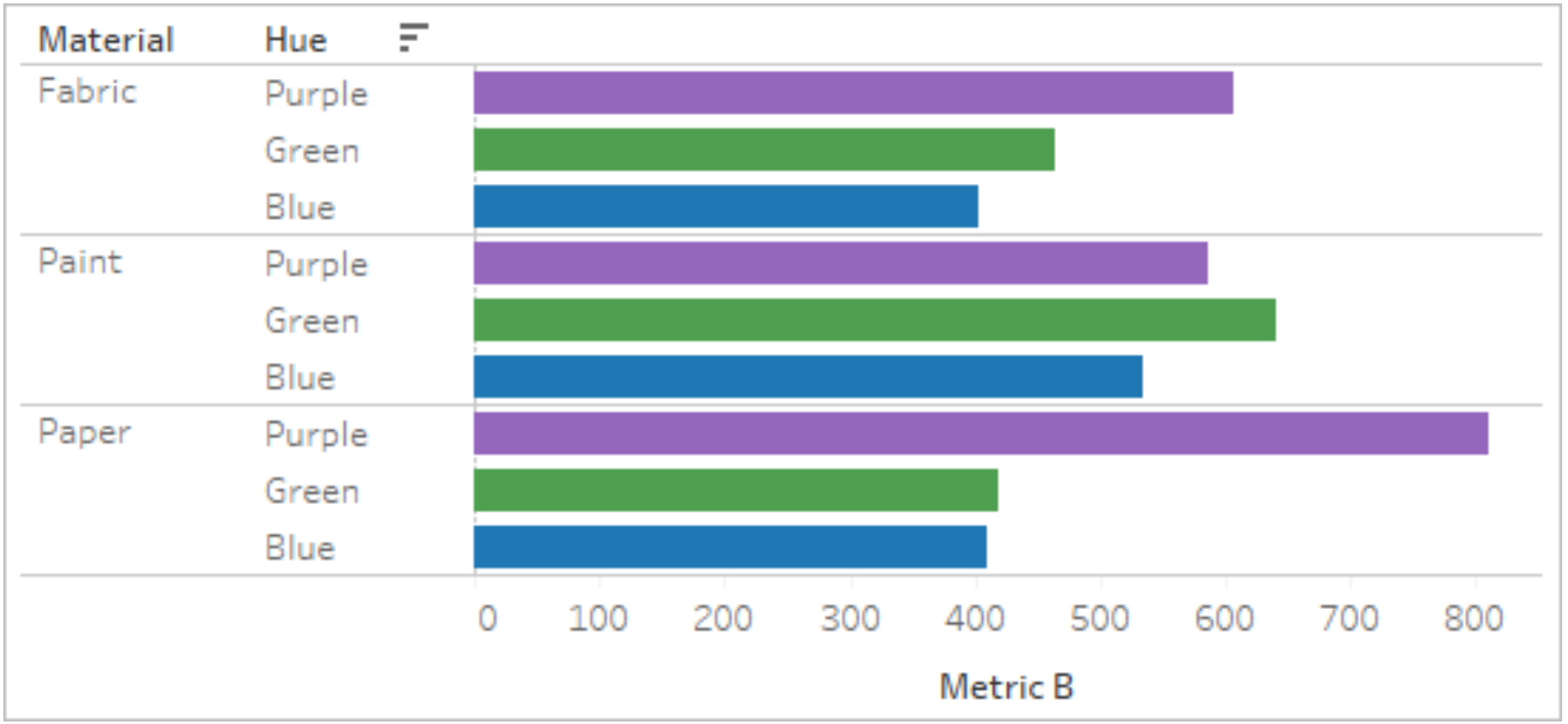
- Create an Nested Sort



Sorting Data

Middlesex University London

- Create an Non-Nested Sort



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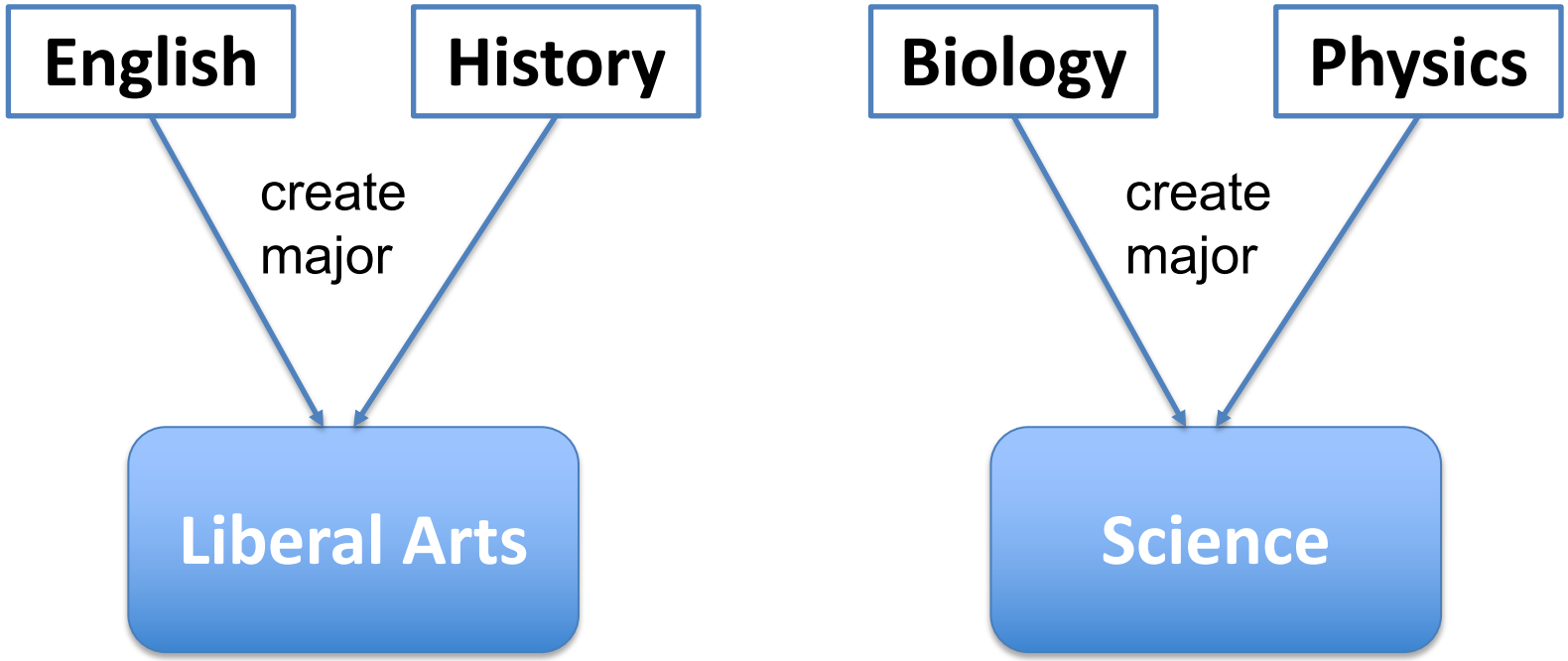
Group your Data

- On Tableau ‘Groups’ are used for:
  - to combine related members in a field
  - correcting data errors
  - answering "what if" type questions

Group your Data

- Combine related members in a field



Group your Data

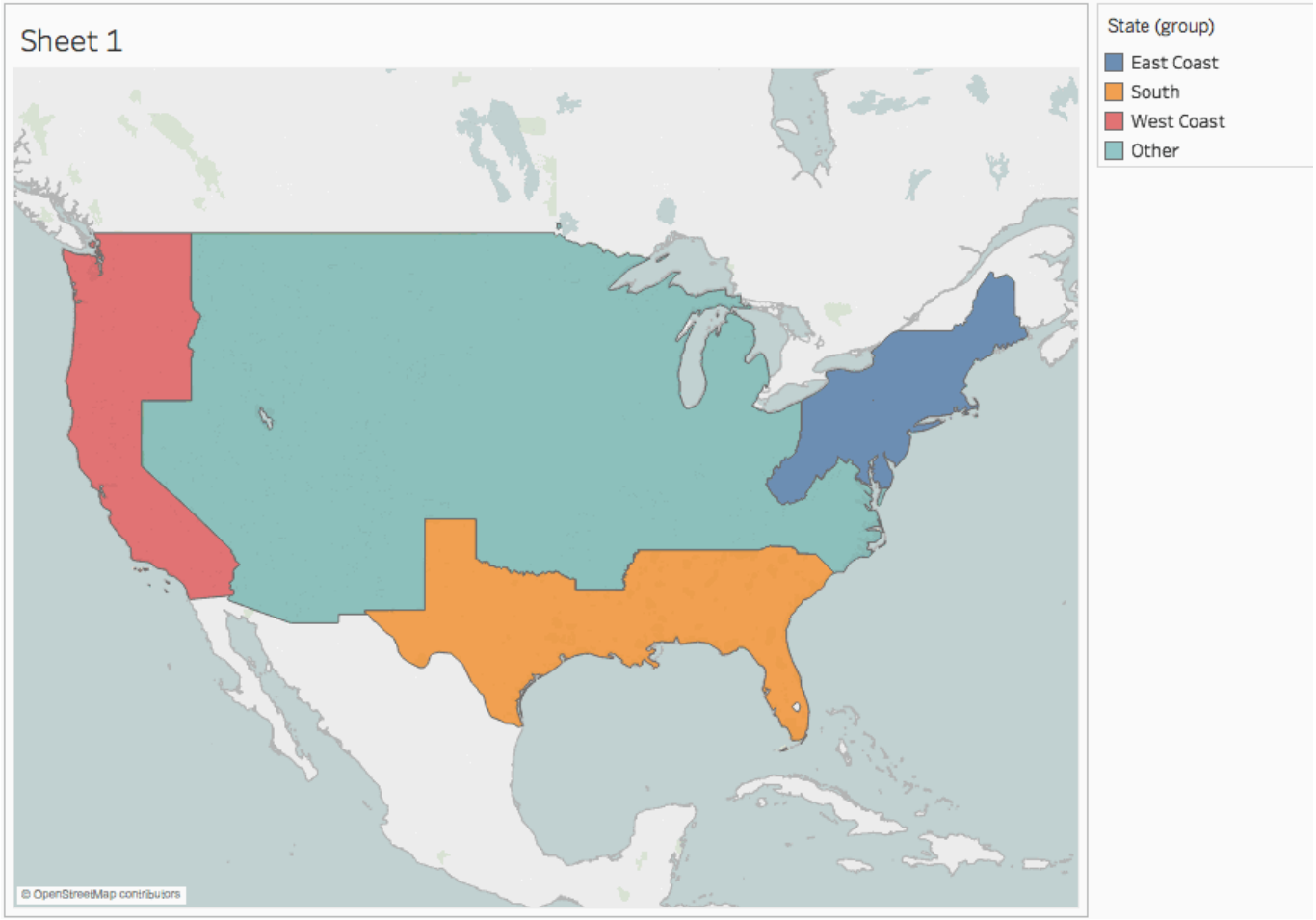
Middlesex University London

- Correcting data errors

EXAMPLE 1	EXAMPLE 2
combining '**CA'**, **'Calif**.' and **'California'**	combining '**Cst 3340'**, **'cst-3340'**, and **'CST 3340'**
into one data point '**CA**'	into one data point '**CST3340**'

Group your Data

- ‘What if’ type questions



Group your Data

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- How to create a Group

There are various ways to create a group.

- By creating a group from a field in the **Data** pane.
- By selecting data in the view and then clicking the group icon.

Group your Data

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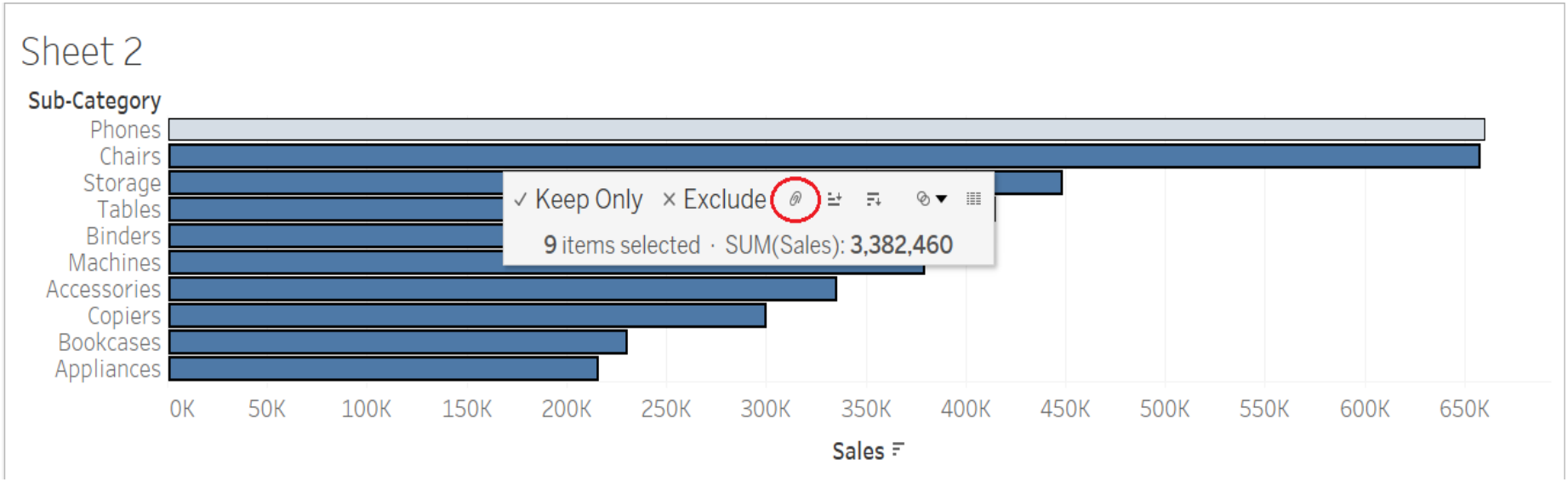
- Group by selecting data in the view

- In the view, select one or more data points and then, on the tooltip that appears, click the group icon.

Group your Data

- Group by selecting data in the view



Group your Data

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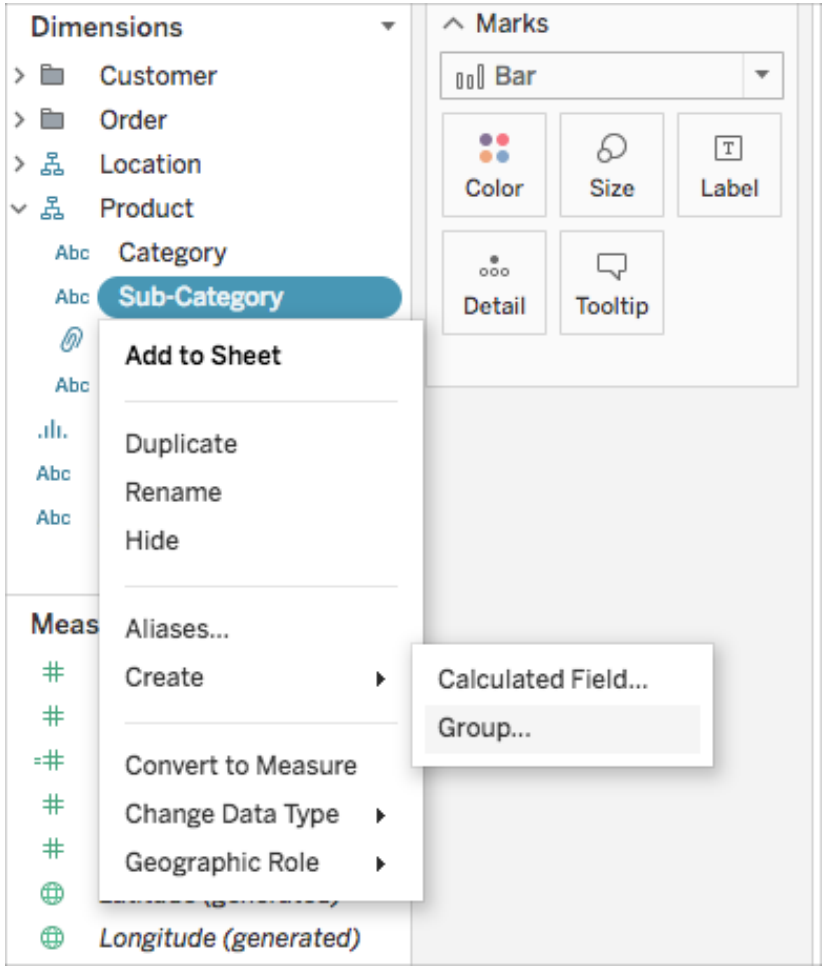
- Group from a field in the Data pane

- In the **Data** pane, right-click a field and select **Create** → **Group**.

Group your Data

- Group from a field in the Data pane



Group your Data

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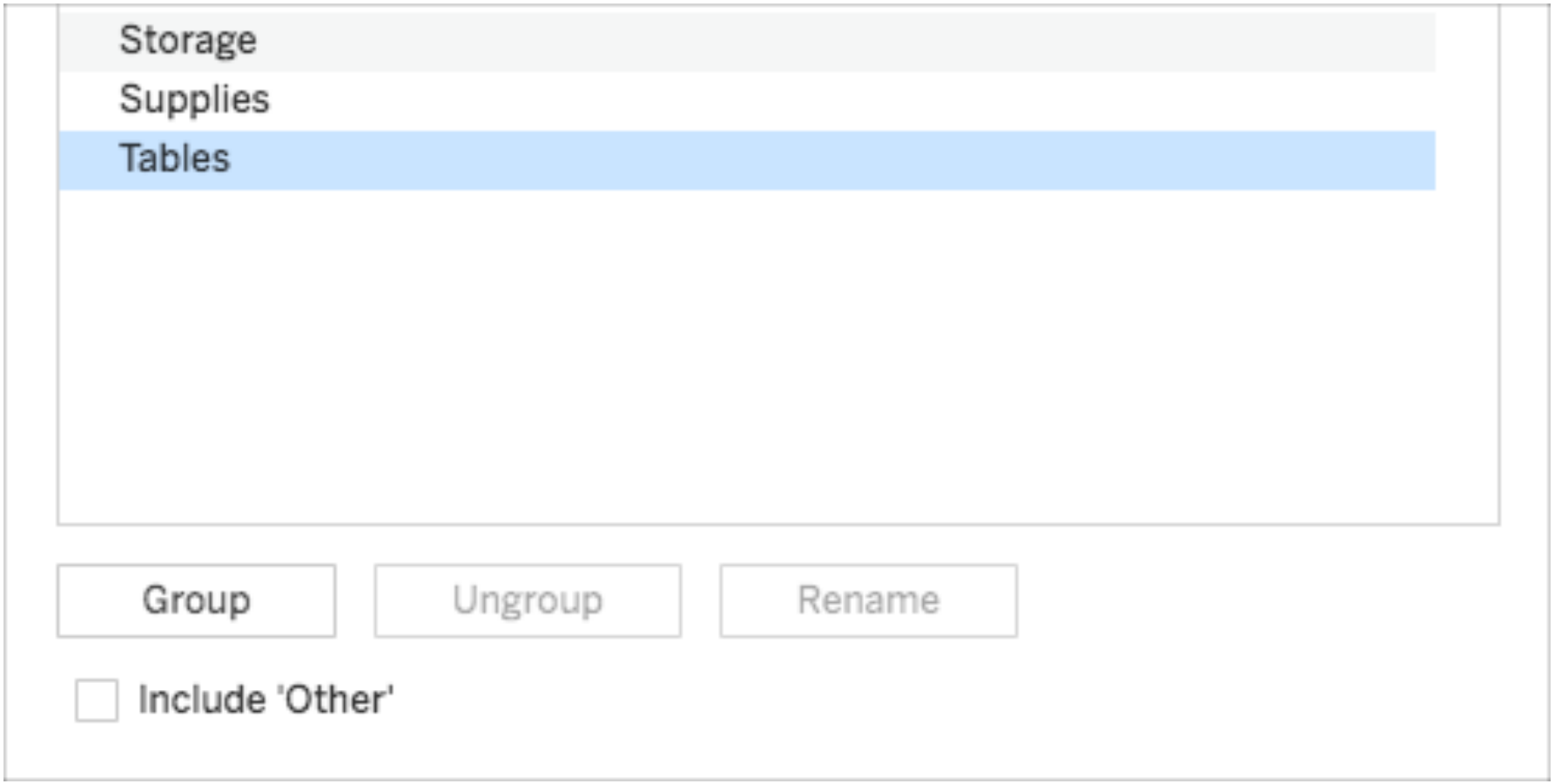
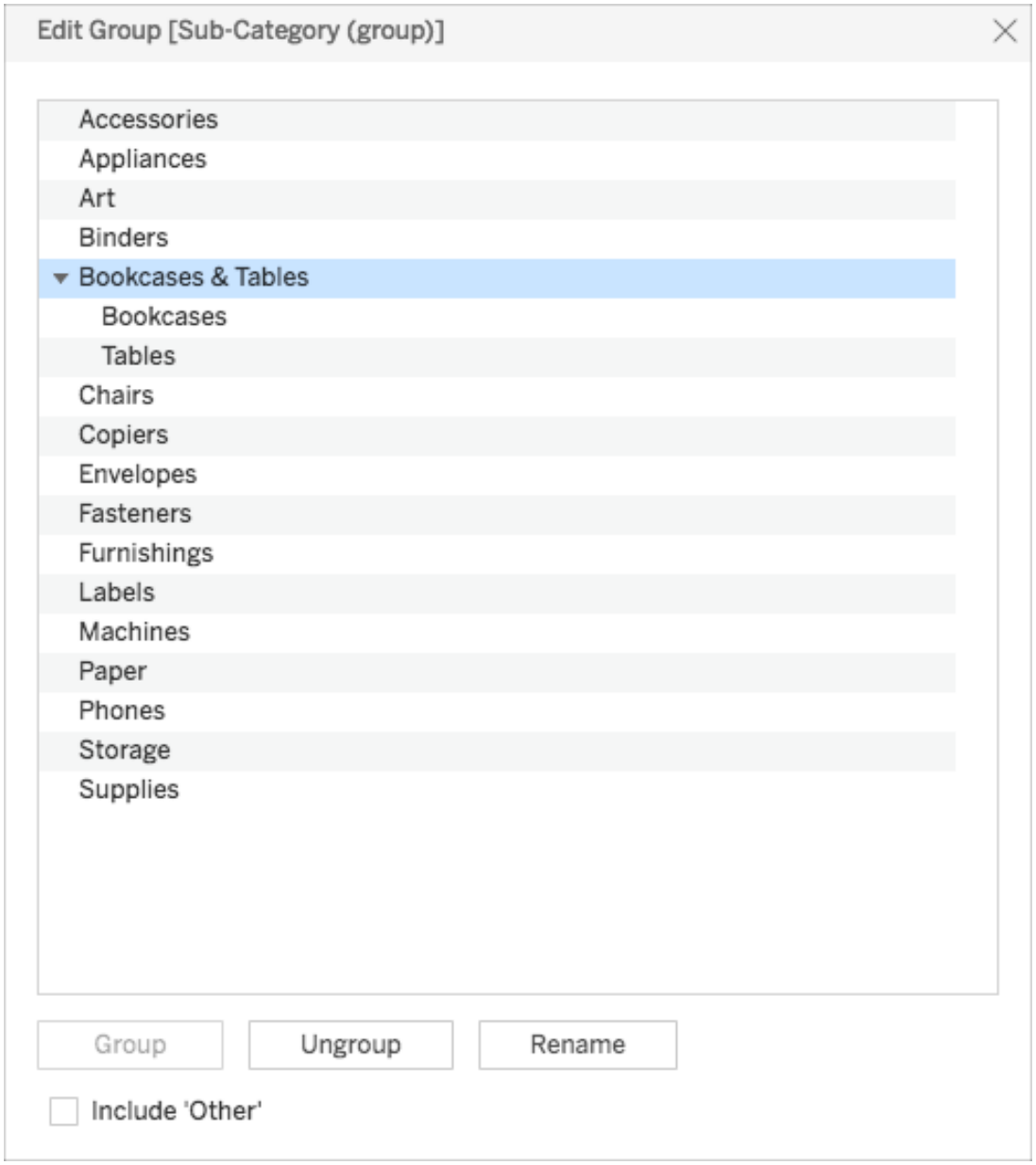
- Group from a field in the Data pane



Group your Data



Group your Data

Middlesex University London

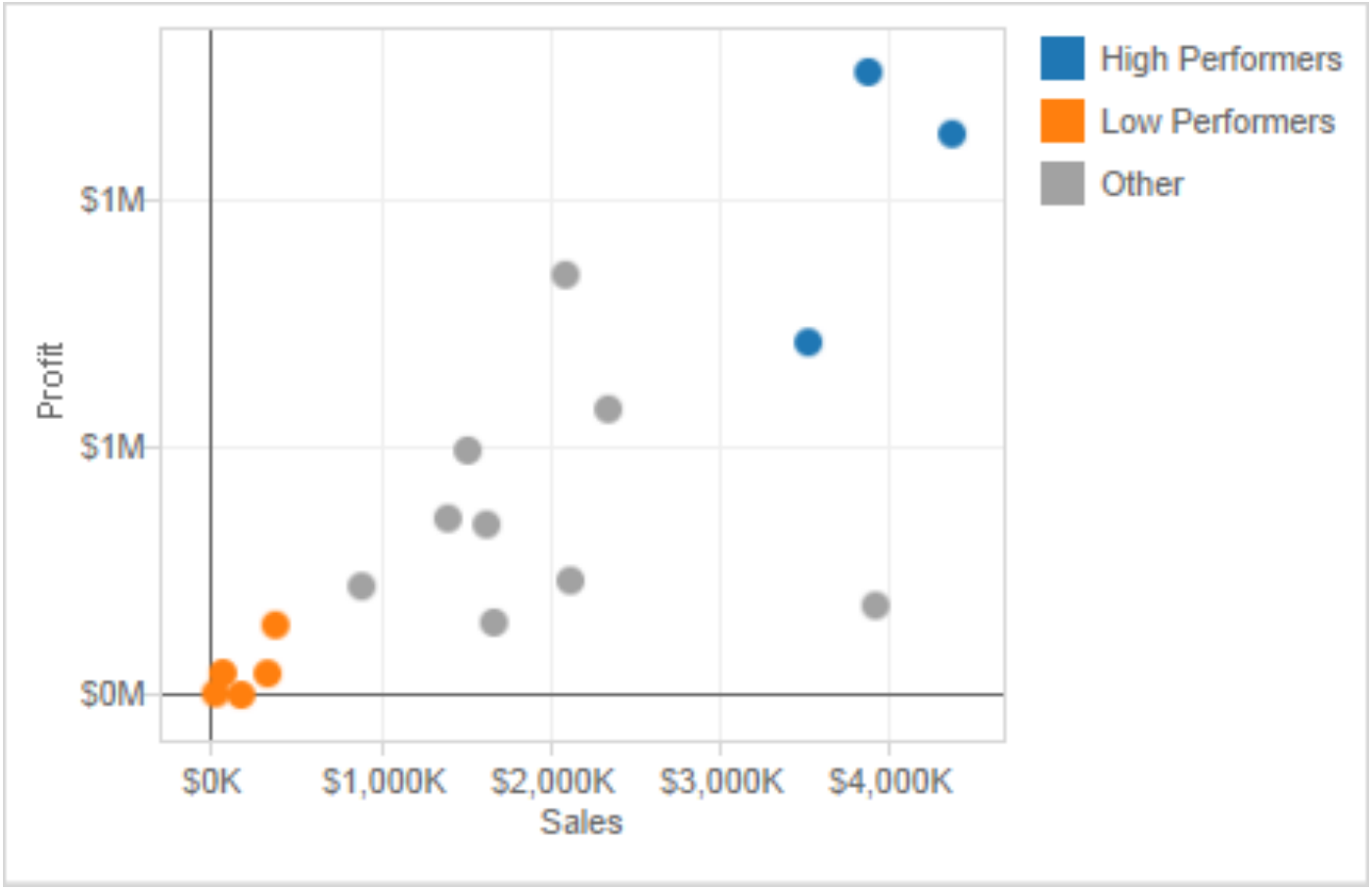
- Include an Other Group

The Include Other option is useful for

- highlighting certain groups
- comparing specific groups against everything else.

Group your Data

- Include others



Group your Data

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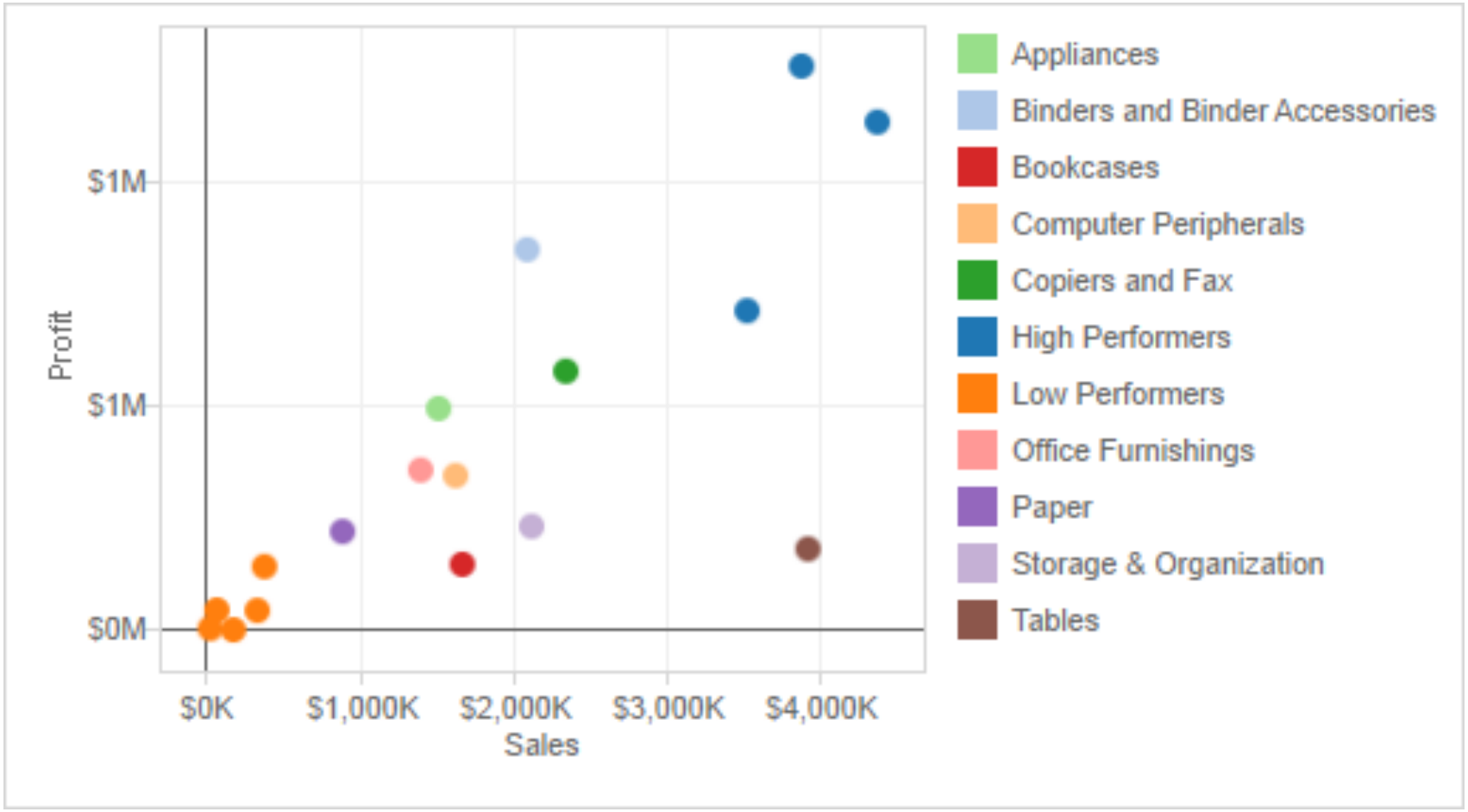
- Does not include others



Set your Data

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Set your Data

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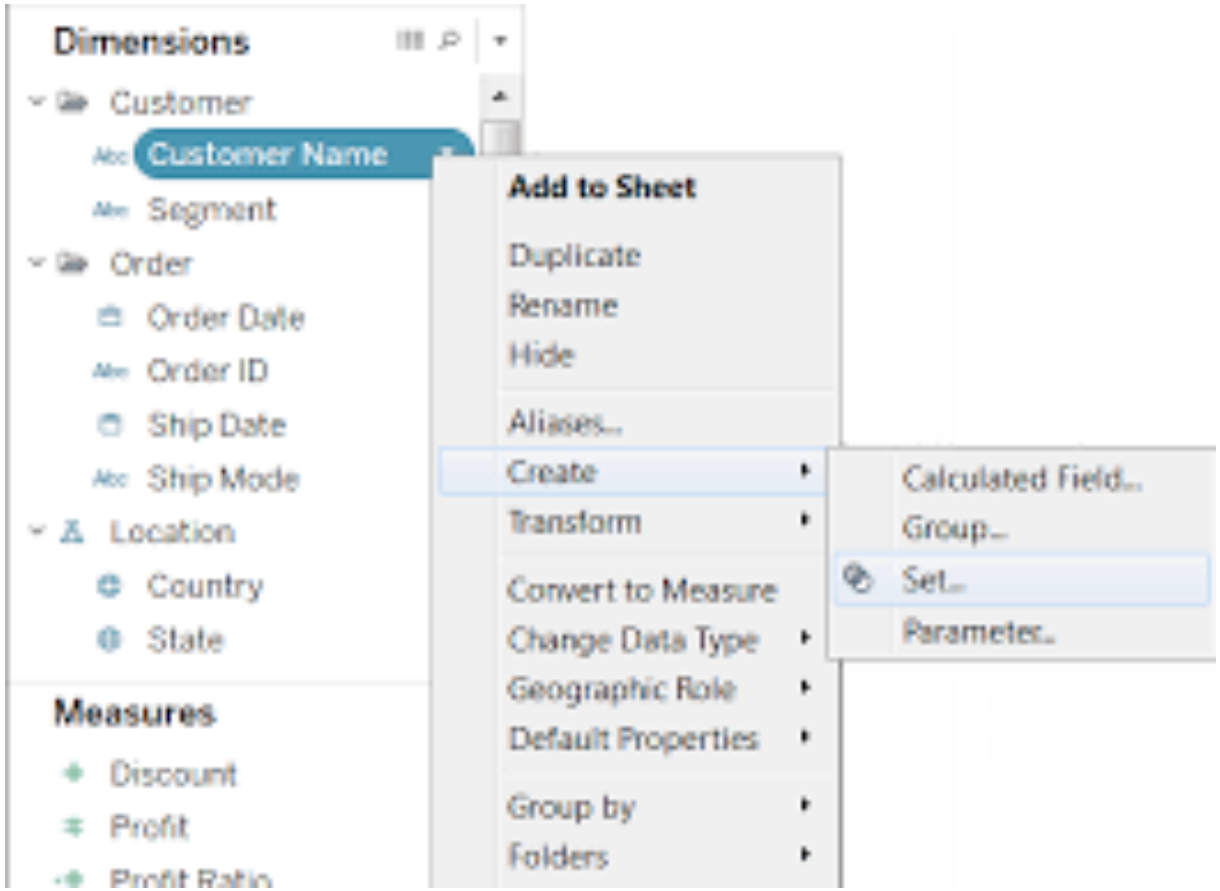
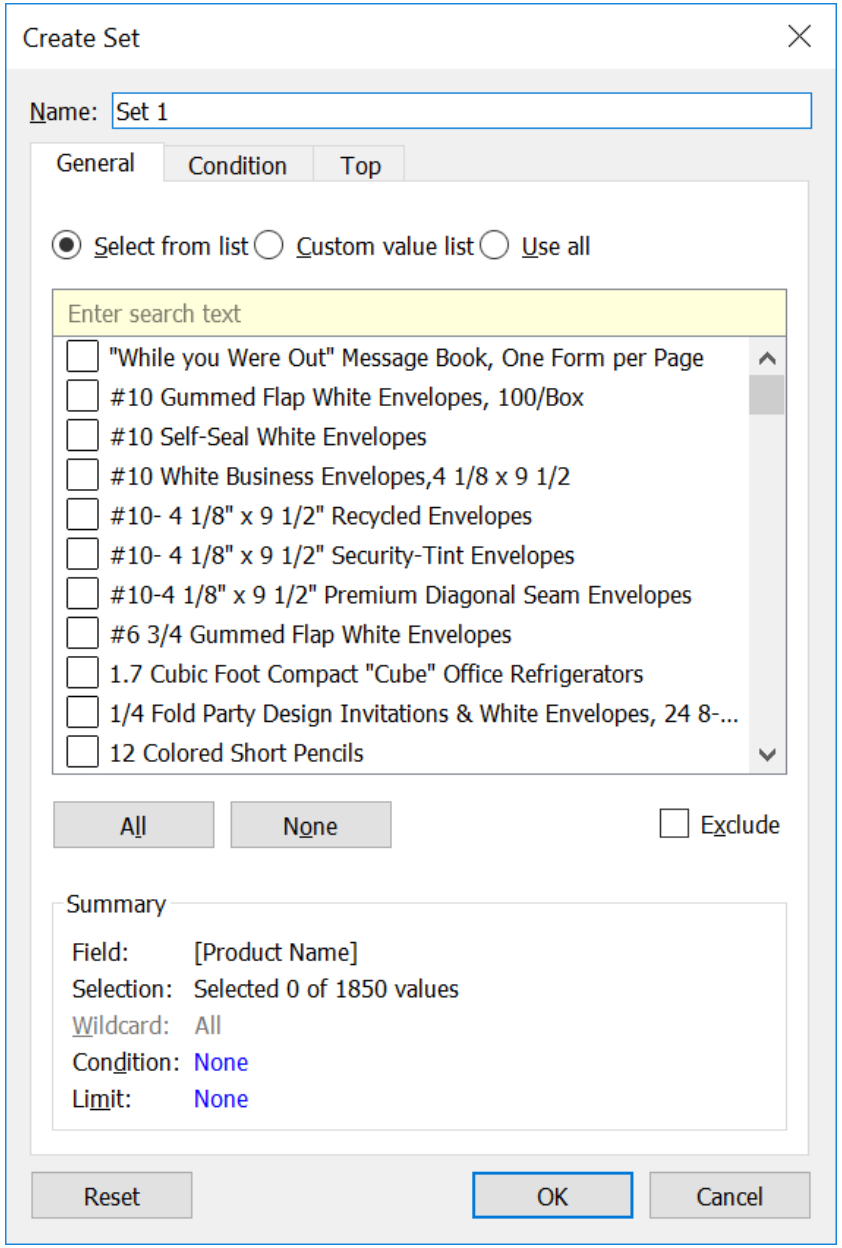
- Sets are used to compare and ask questions about a subset of data. Sets are custom fields that define a subset of data based on some conditions.
- Two types of sets:
  - Dynamic
  - Interactive

Set your Data

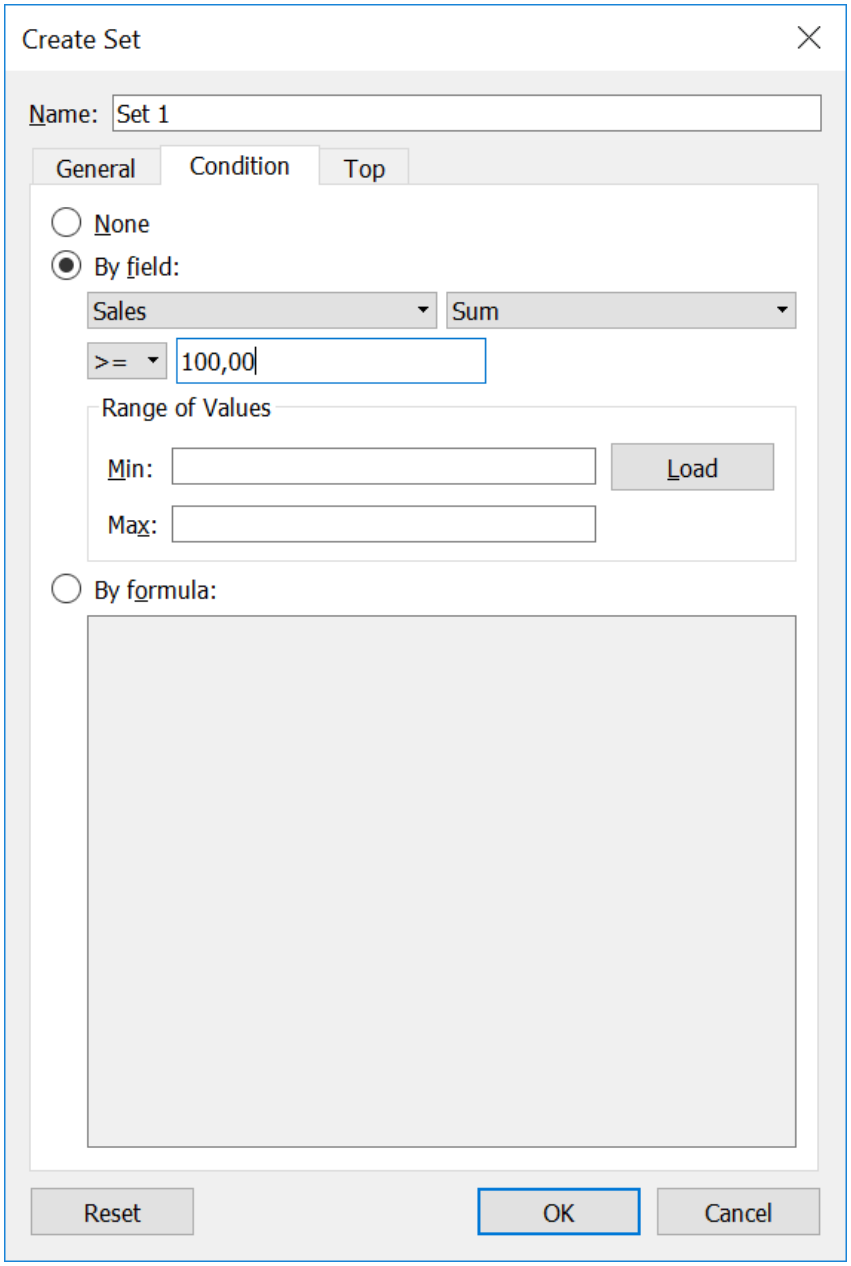
- Create a dynamic set



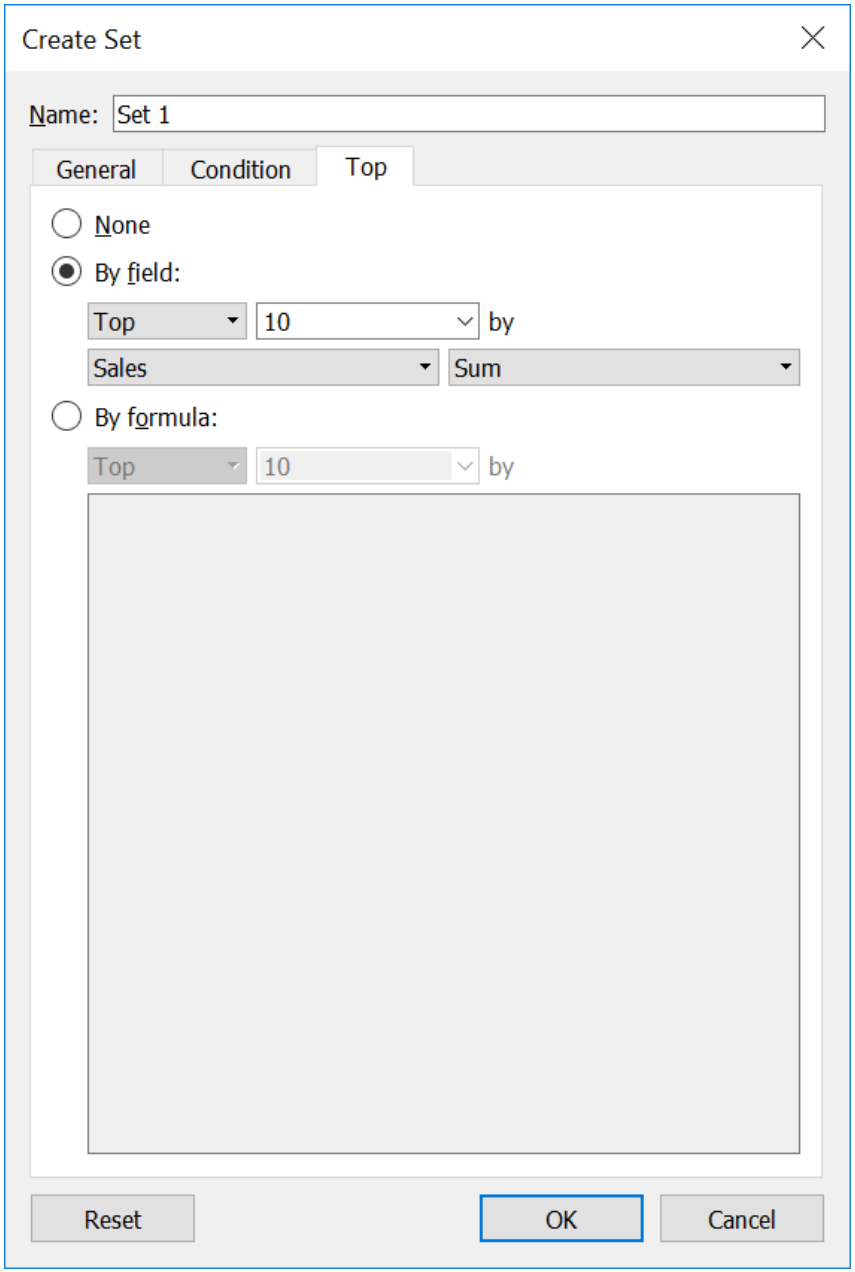
Set your Data



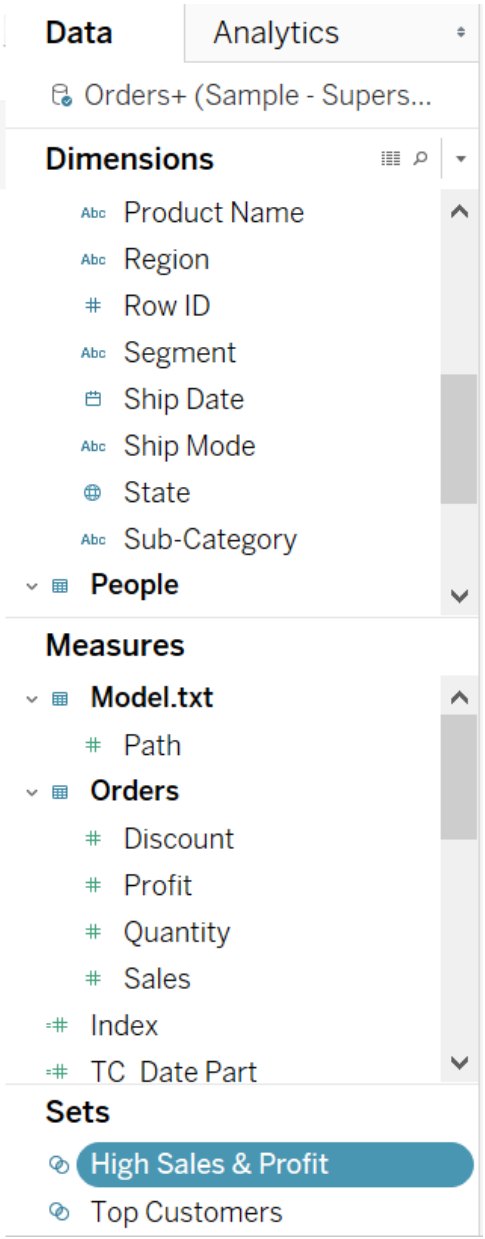
Set your Data

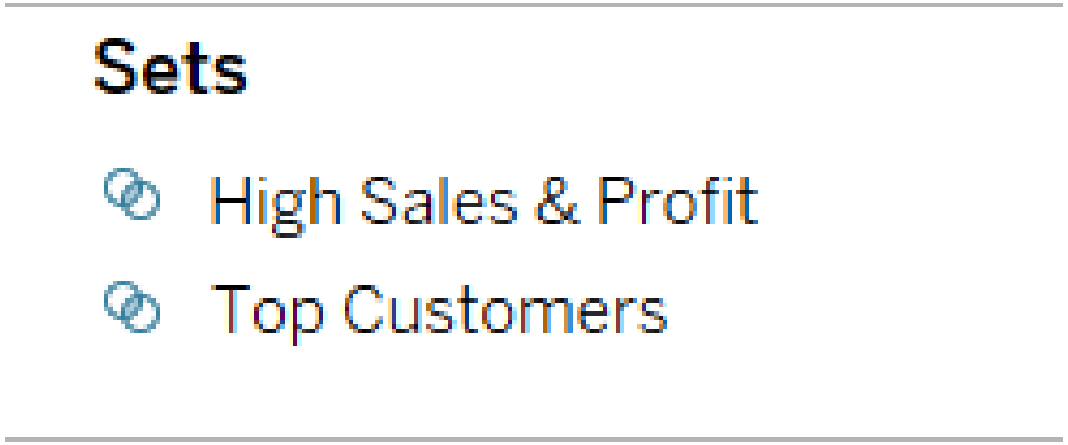


Set your Data



Set your Data





Set your Data

Middlesex University London

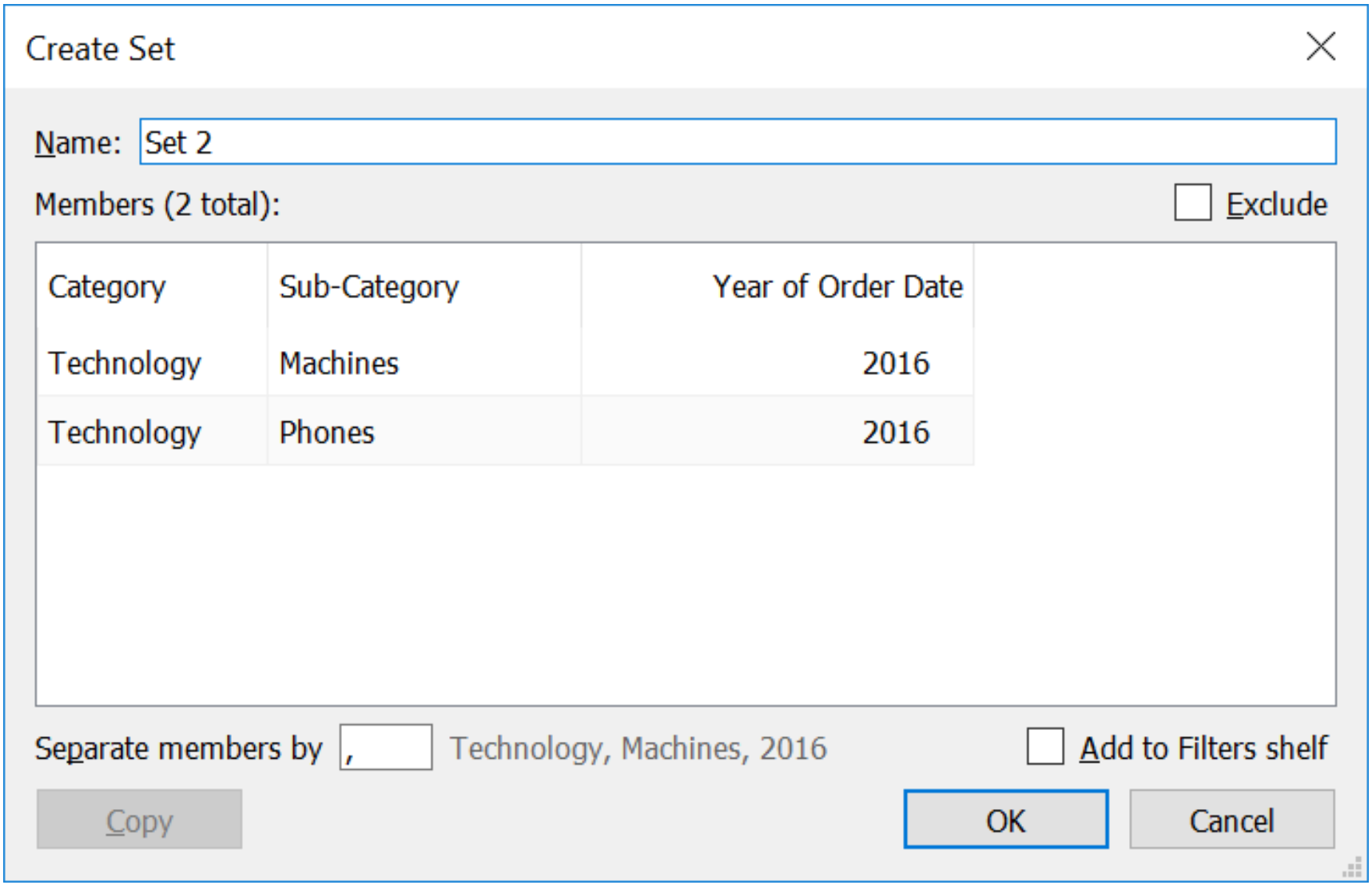
- Create a fixed set
- The members of a fixed set do not change.
- A fixed set can be based on
  - a Single Dimension or
  - Multiple Dimensions.

Set your Data

Middlesex University London

Set your Data

Middlesex University London



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- Show In/Out members in a set

In most cases, when you drag a set to the visualization, the set will be displayed using the In/Out mode.

This mode separates the set into two categories:

- **In** - The members in the set.
- **Out** - Any members that are not part of the set.

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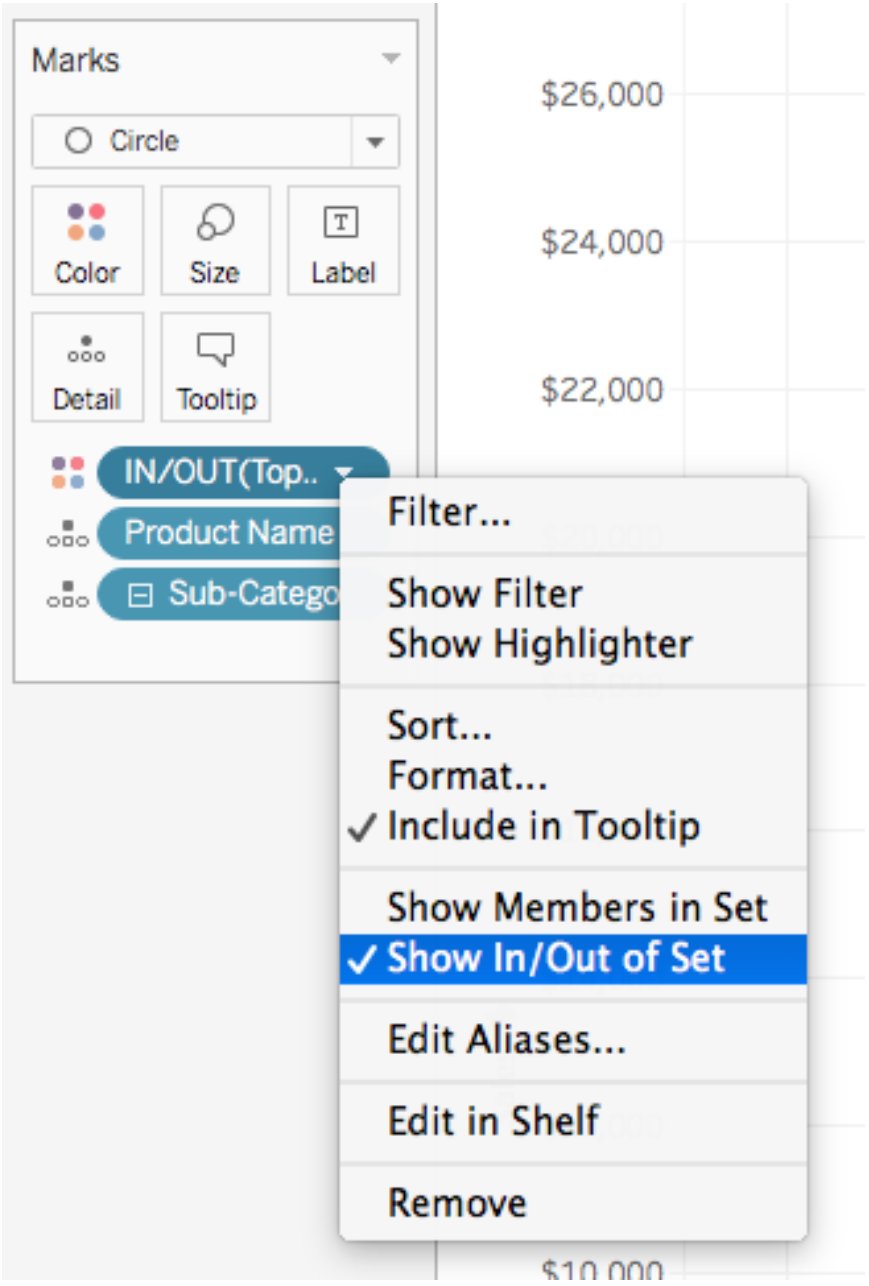
- Show Members in a set

Showing the members in the Set automatically adds a filter to the view that includes only the members of the set.

Set your Data



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- Combine Sets

  You can combine two sets to compare the members.

  When you combine sets you create a new set containing:

  - either the combination of all members, just the members that exist in both,
  - or members that exist in one set but not the other.

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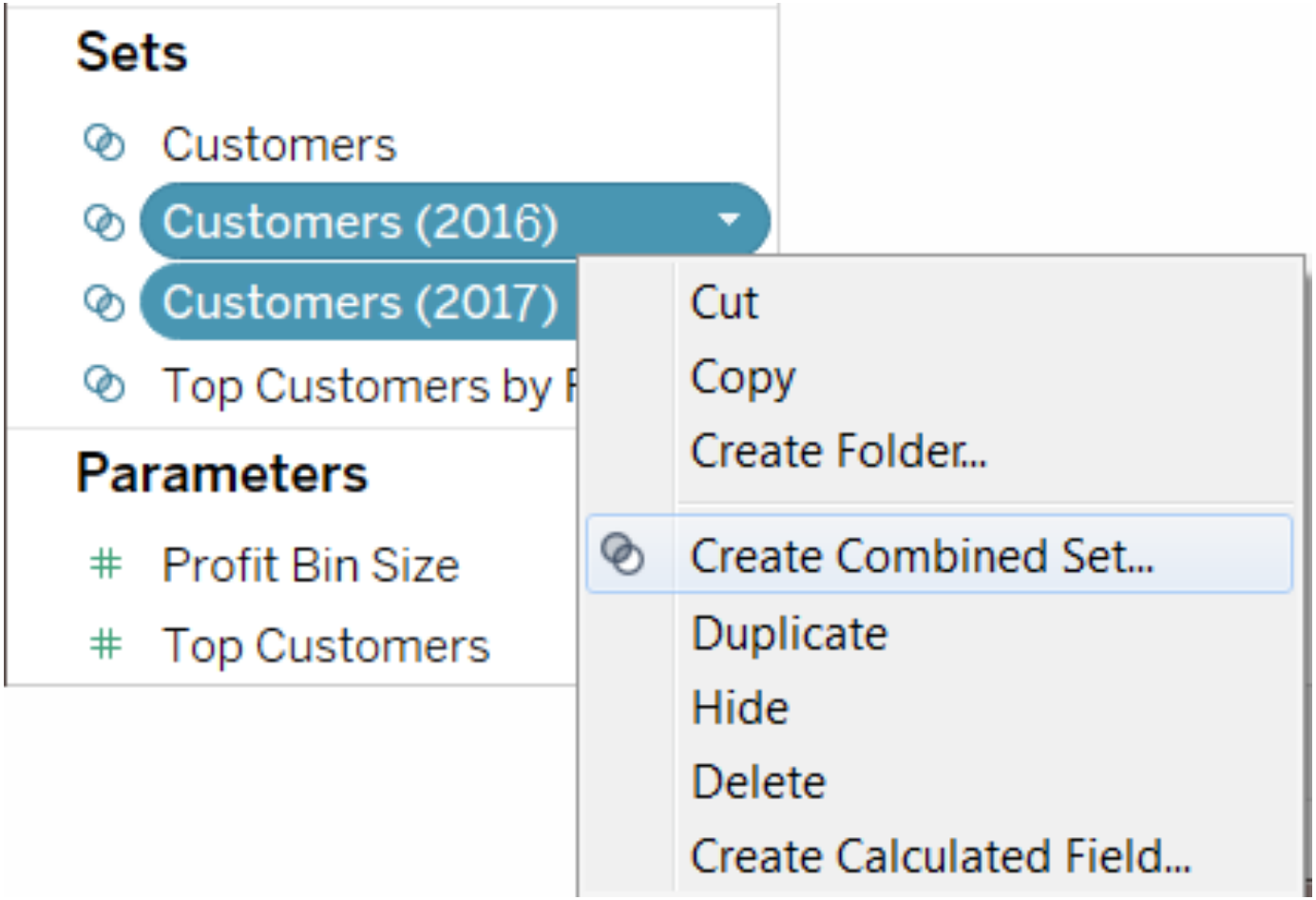
- Combine Sets



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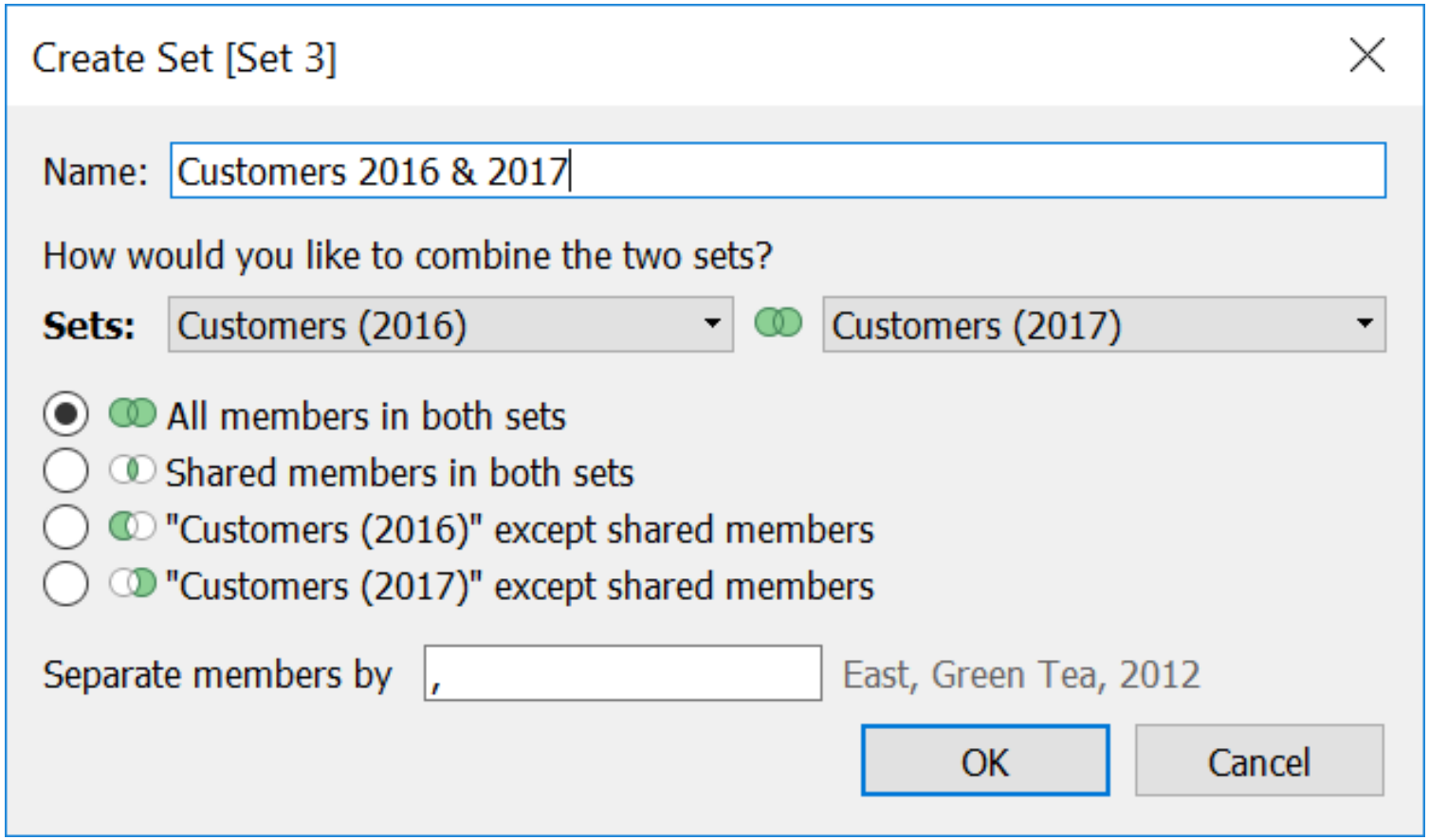
- Combine Sets



Group vs Set

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VS

Group vs Set

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- The differences between Groups & Sets
  - The most significant difference is that sets are dynamic while groups are not.
  - Sets offer greater flexibility as they are linked to a condition.
  - Groups have only one dimension while with sets you can group across multiple dimensions
  - Sets can be combined

Group vs Set

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- The differences between Groups & Sets
  - Sets are more complex but offer greater flexibility.

    VS
  - However, many times **a group will do the job** if the flexibility offered by the set **is not really necessary** for what you are doing.

Group vs Set

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- The differences between Groups & Sets
  - A great advantage of sets is that the data within can be exported very easily and used from the business.

    vs
  - Groups do not offer this advantage.

Group vs Set

Middlesex University London

- The differences between Groups & Sets
  - With sets you can choose "**IN/OUT**" or "**Show Members in Set**".

    VS
  - Groups the only option is **group/ungroup**.

Group vs Set

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- Sets are extremely useful when comparing one group of things against another because of their flexibility.

- For example: A dimension member can only belong to a single category in a group. Using sets, that same dimension value (“Cats") could exist in many sets like: "Mammals", "Furry Things", “Pets".

Group vs Set

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- Sets can be referenced directly in a calculation, and since they imply a filter, they can be quite useful in a hierarchy.

- For example: You might drop a set into a hierarchy so that when someone opens that level of the hierarchy up, the values are pre-filtered by what the set does.

Parameters

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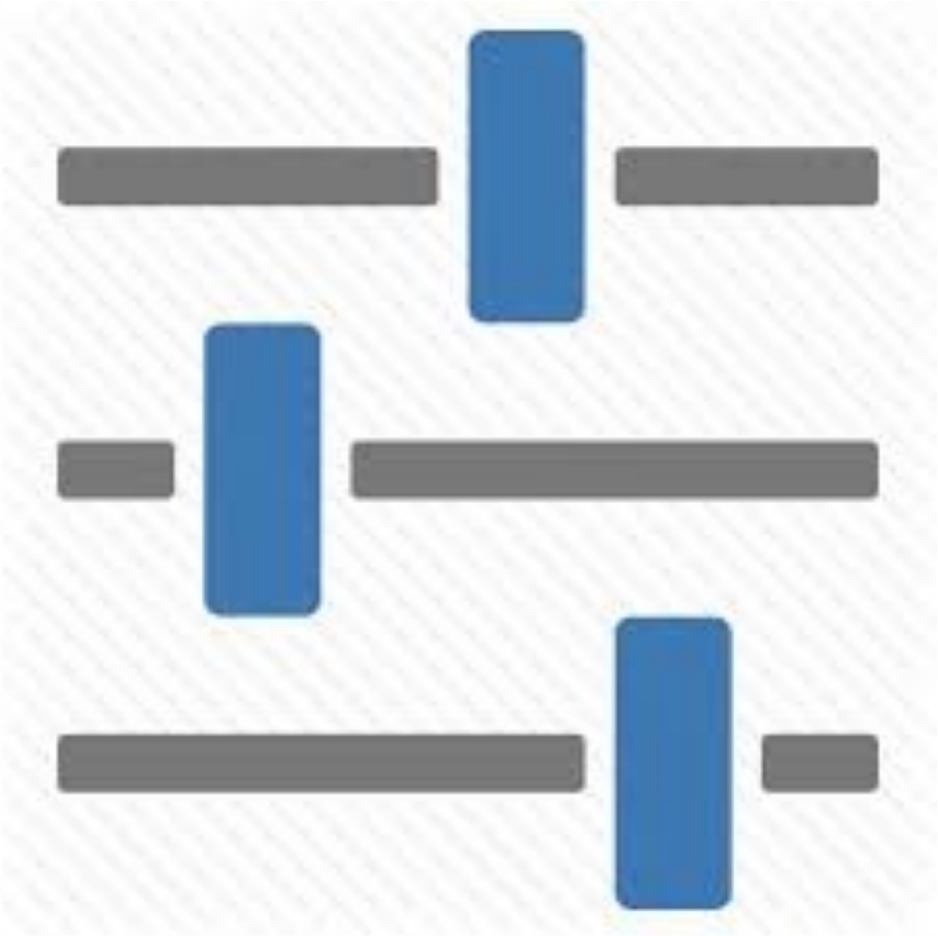

Parameters

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- What Parameters are?
- Parameters are dynamic values that can replace constant values in Calculations, Filters, and Reference Lines.
- Parameters can be more dynamic and interactive by using them in Parameter Actions.

Parameters

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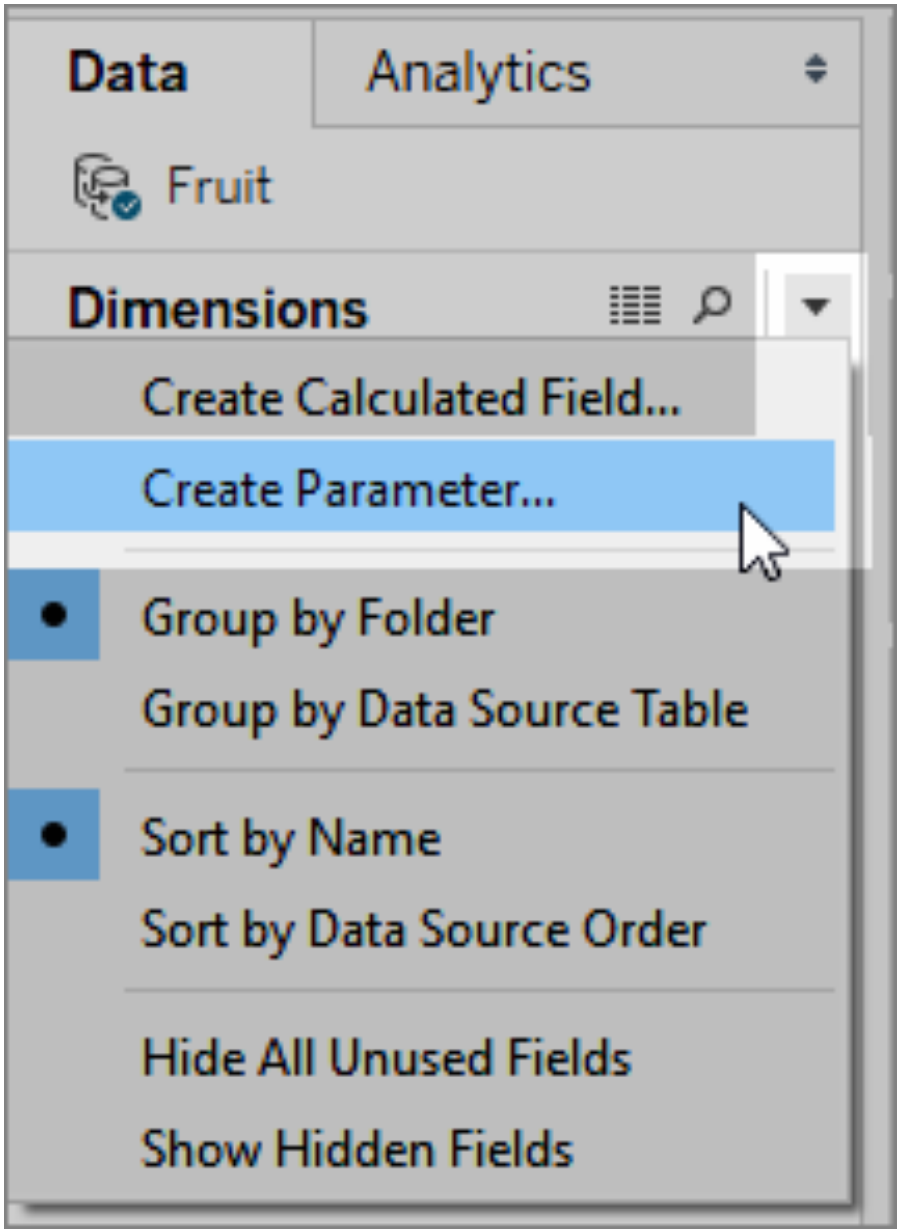
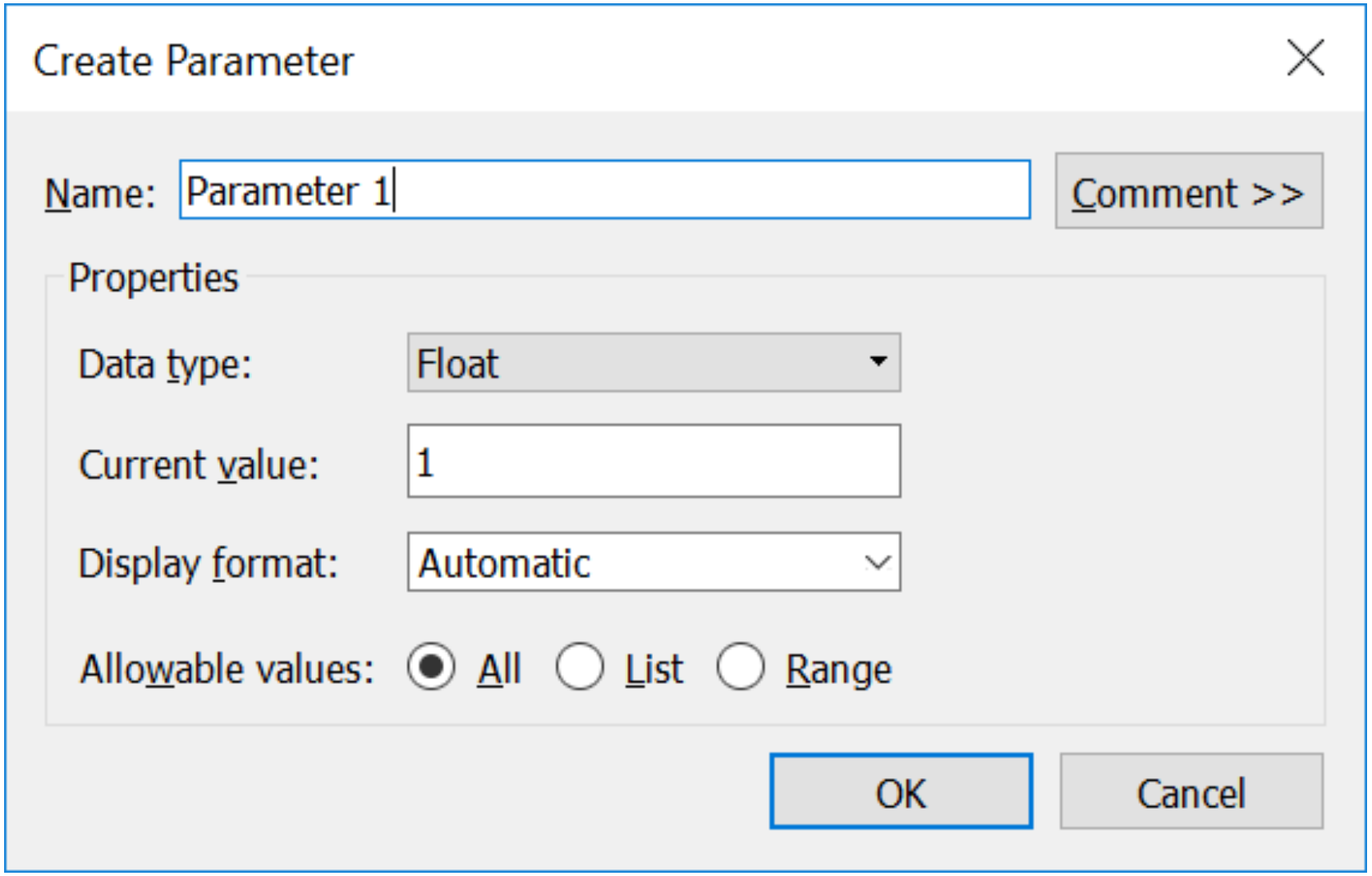
- Parameters are used:
  - In Filters
  - In Reference lines
  - in a Calculation

Parameters

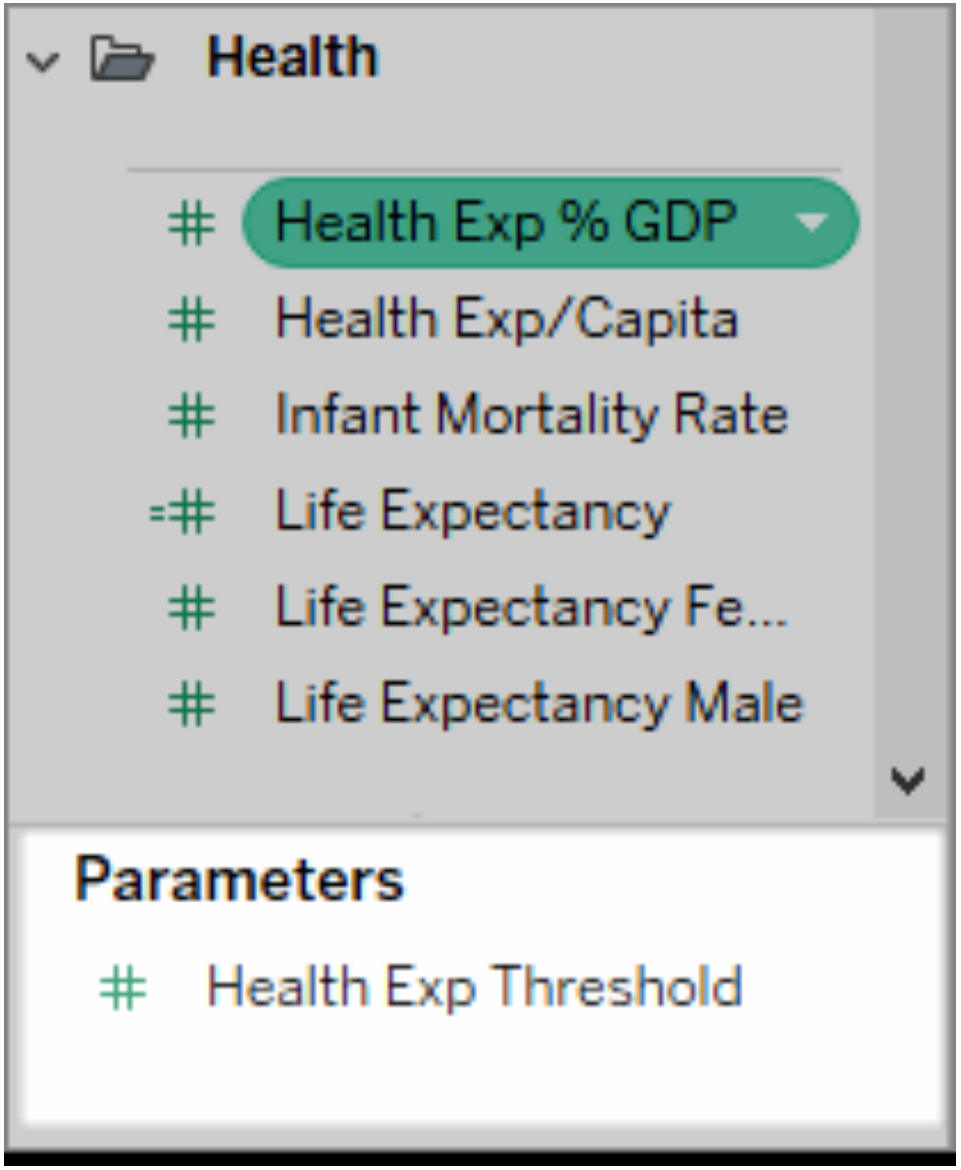

Data
Analytics
Fruit
Dimensions
Create Calculated Field...
Create Parameter...
Group by Folder
Group by Data Source Table
Sort by Name
Sort by Data Source Order
Hide All Unused Fields
Show Hidden Fields

Parameters

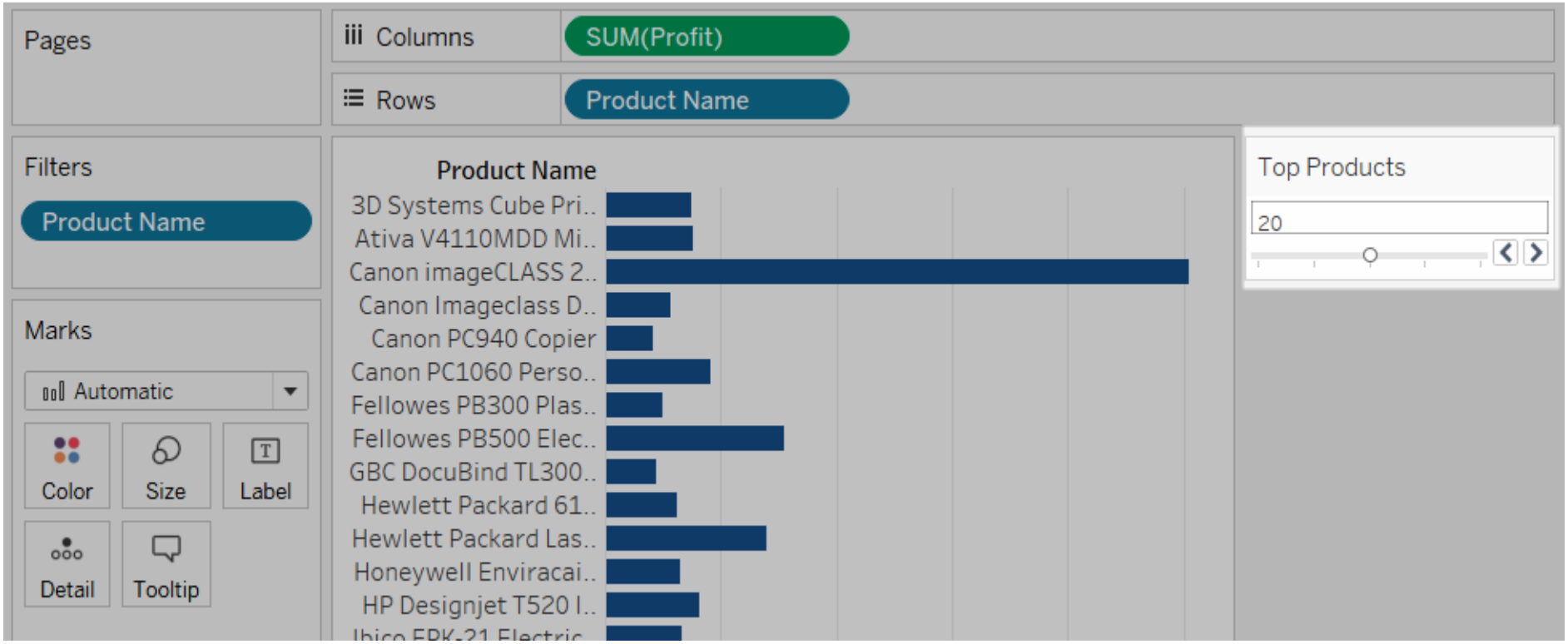
Middlesex University London



Parameters

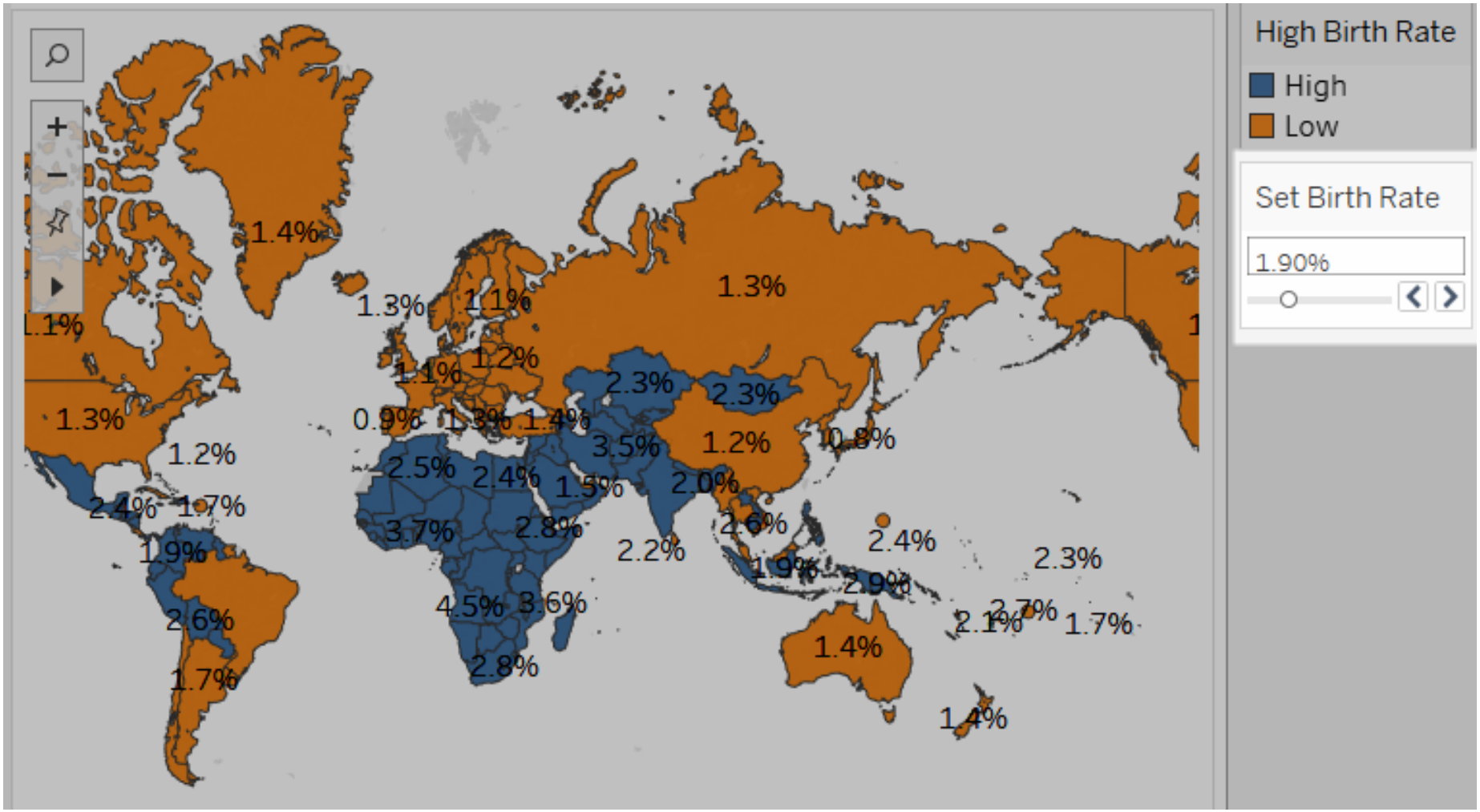

Health
Health Exp % GDP
Health Exp/Capita
Infant Mortality Rate
Life Expectancy
Life Expectancy Fe...
Life Expectancy Male
Parameters
Health Exp Threshold

Parameters


Pages
Columns
SUM(Profit)
Rows
Product Name
Filters
Product Name
Marks
Automatic
Color
Size
Label
Detail
Tooltip
Product Name
3D Systems Cube Pri..
Ativa V4110MDD Mi..
Canon imageCLASS 2..
Canon Imageclass D..
Canon PC940 Copier
Canon PC1060 Perso..
Fellowes PB300 Plas..
Fellowes PB500 Elec..
GBC DocuBind TL300..
Hewlett Packard 61..
Hewlett Packard Las..
Honeywell Enviracai..
HP Designjet T520 I..
Top Products
20

Parameters

Middlesex University London



Calculations

Middlesex University London

Calculations

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- When a calculated field is created, a new field (or column) in the data source is created, the values or members of which are determined by a calculation that you control.
- This new calculated field is saved to the data source in Tableau, and can be used to create more robust visualizations.

Calculations

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- Calculations are used:
  - To Segment data
  - To Convert the data type of a field, such as converting a string to a date.
  - To Aggregate data
  - To Filter results
  - To Calculate Ratios

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- Types of Calculations

There are three main types of calculations:

- Basic calculations
- Table calculations
- Level of Detail (LoD) expressions

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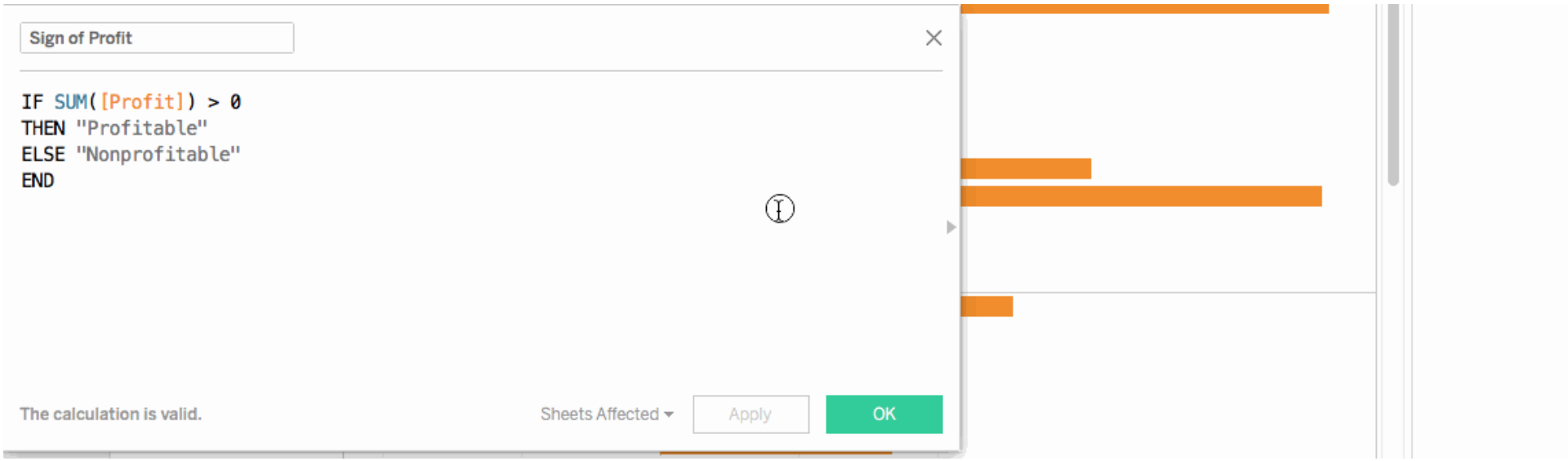
- Basic Calculations

Basic calculations allow you to transform values or members at the data source level of detail (a row-level calculation) or at the visualization level of detail (an aggregate calculation).

Calculations

- Basic Calculations



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- Basic Calculations

Calculations

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Pages

Columns: SUM(Profit) | SUM(Cost)

Rows: Segment | Sub-Category

Filters

Segment

Marks

All

Automatic

Colour | Size | Label | Detail | Tooltip

SUM(Profit)

SUM(Profit)

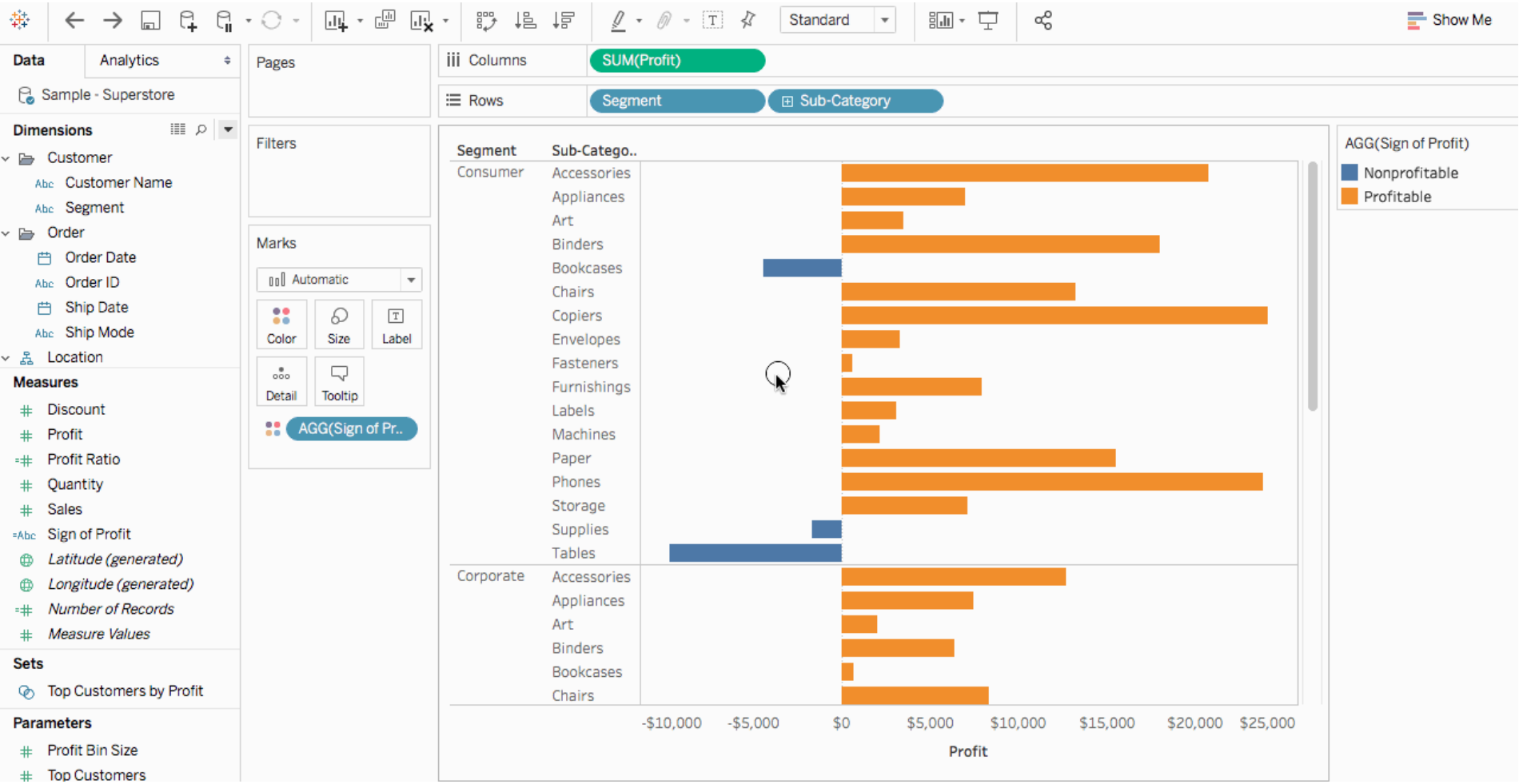
SUM(Cost)

SUM(Profit)

-19,456 48,167

Calculations

Middlesex University London



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- Table Calculations

Table calculations allow you to transform values at the level of detail of the visualization only.

Table calculations are a special type of calculated field that computes on the local data in Tableau. They are calculated based on what is currently in the visualization and do not consider any measures or dimensions that are filtered out of the visualization.

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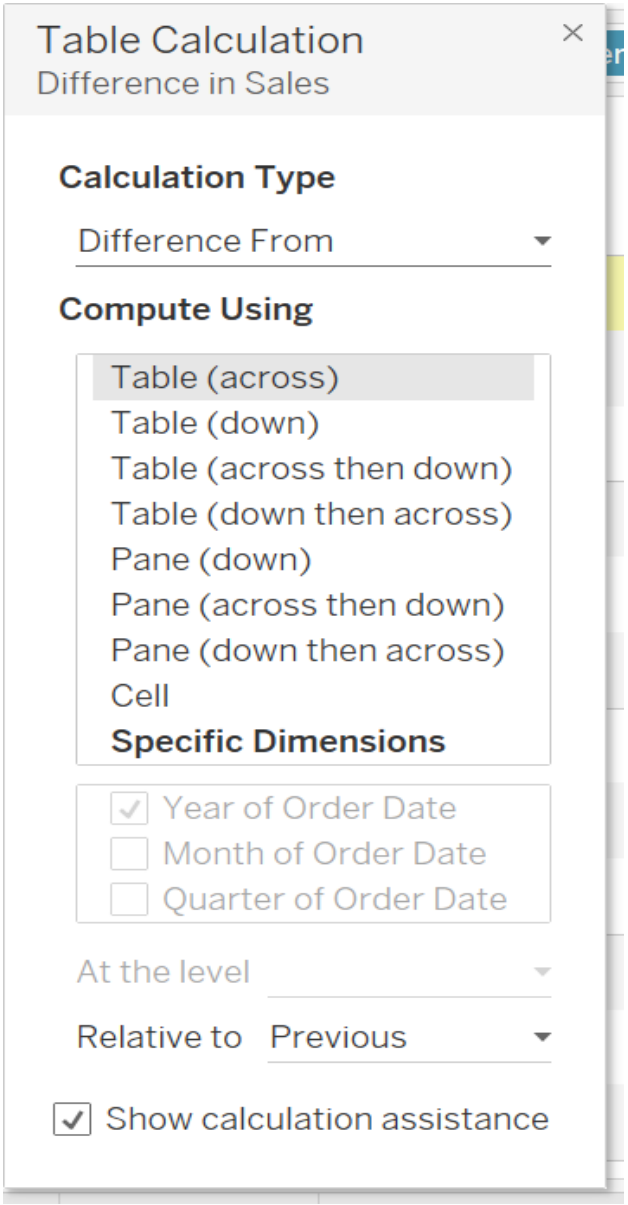
- Table Calculations

Table calculations are used for a variety of purposes, including:

- Transforming values to rankings
- Transforming values to show running totals
- Transforming values to show percent of total
- Addressing and Partitioning

Calculations



Calculations

Middlesex University London

Pages

Filters

Marks

Automatic

Color | Size | Text | Detail | Tooltip

SUM(Sales)

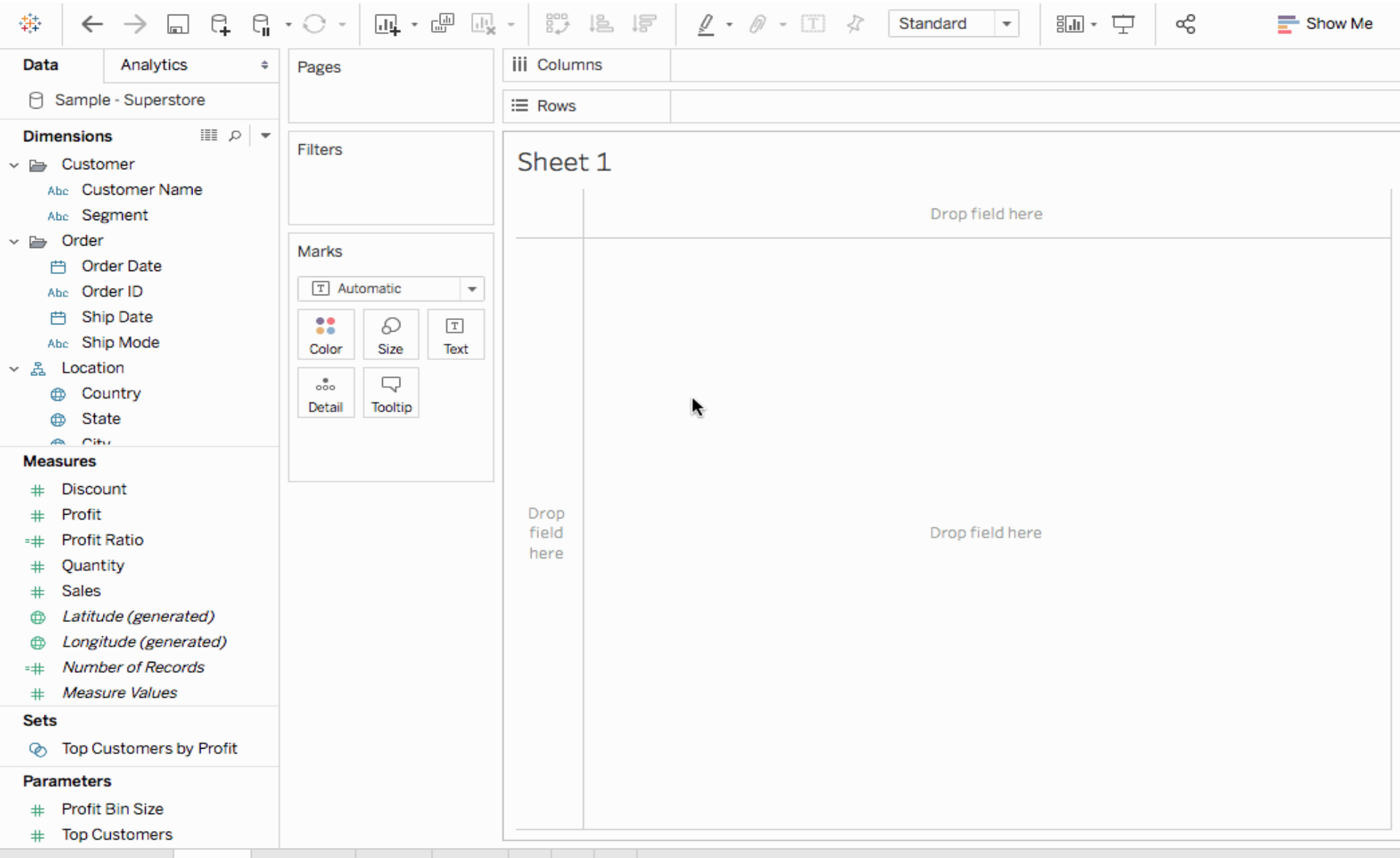
Columns: YEAR(Order Date)

Rows: QUARTER(Order D.. | MONTH(Order Dat..

		Order Date			
Quarter of Orde..	Month of Order ..	2011	2012	2013	2014
Q1	January				
	February		$7,400	$10,657	-$2,584
	March		-$17,224	$12,719	$2,723
Q2	April		$5,900	$5,053	$864
	May		$6,483	$26,559	-$11,040
	June		-$9,798	$14,633	$8,829
Q3	July		-$5,181	$9,675	$9,988
	August		$8,989	-$3,633	$28,251
	September		-$17,181	$8,312	$17,581
Q4	October		-$48	$25,058	$21,331
	November		-$2,656	$6,220	$30,134
	December		$5,374	$22,318	-$6,763

Calculations

Middlesex University London



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Basic Calculations vs Table Calculations

Calculations

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- Table Calculations and Calculated Fields are similar in the sense that they both use functions to compute the results.
- The difference is how and where the computing takes place, where the result is saved and if it can be reused in more worksheets.

Calculations

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- Table Calculations are simpler and their scope is more limited compared to Calculated Fields.
- Calculated fields are much more diverse enabling deeper analysis.

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- Level of Detail (LoD) expressions

  LOD Calculations allows to compute values at the data source level and the visualization level (like basic calculations).

  However, LOD calculations give more control on the level of granularity.

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- Level of Detail (LoD) expressions

  They can be performed at:

  – a more granular level (**INCLUDE**),
  – a less granular level (**EXCLUDE**),
  – or an entirely independent level (**FIXED**)

  with respect to the granularity of the visualization.

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- INCLUDE

INCLUDE level of detail expressions compute values using the specified dimensions in addition to whatever dimensions are in the view.

INCLUDE can be useful when you want to calculate at a fine level of detail in the database and then re-aggregate and show at a coarser level of detail in your view.

Calculations

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- INCLUDE

Calculations

Middlesex University London

Pages

Columns: Category, Segment

Rows: AVG(Sales by State), SUM(Sales)

Filters: State

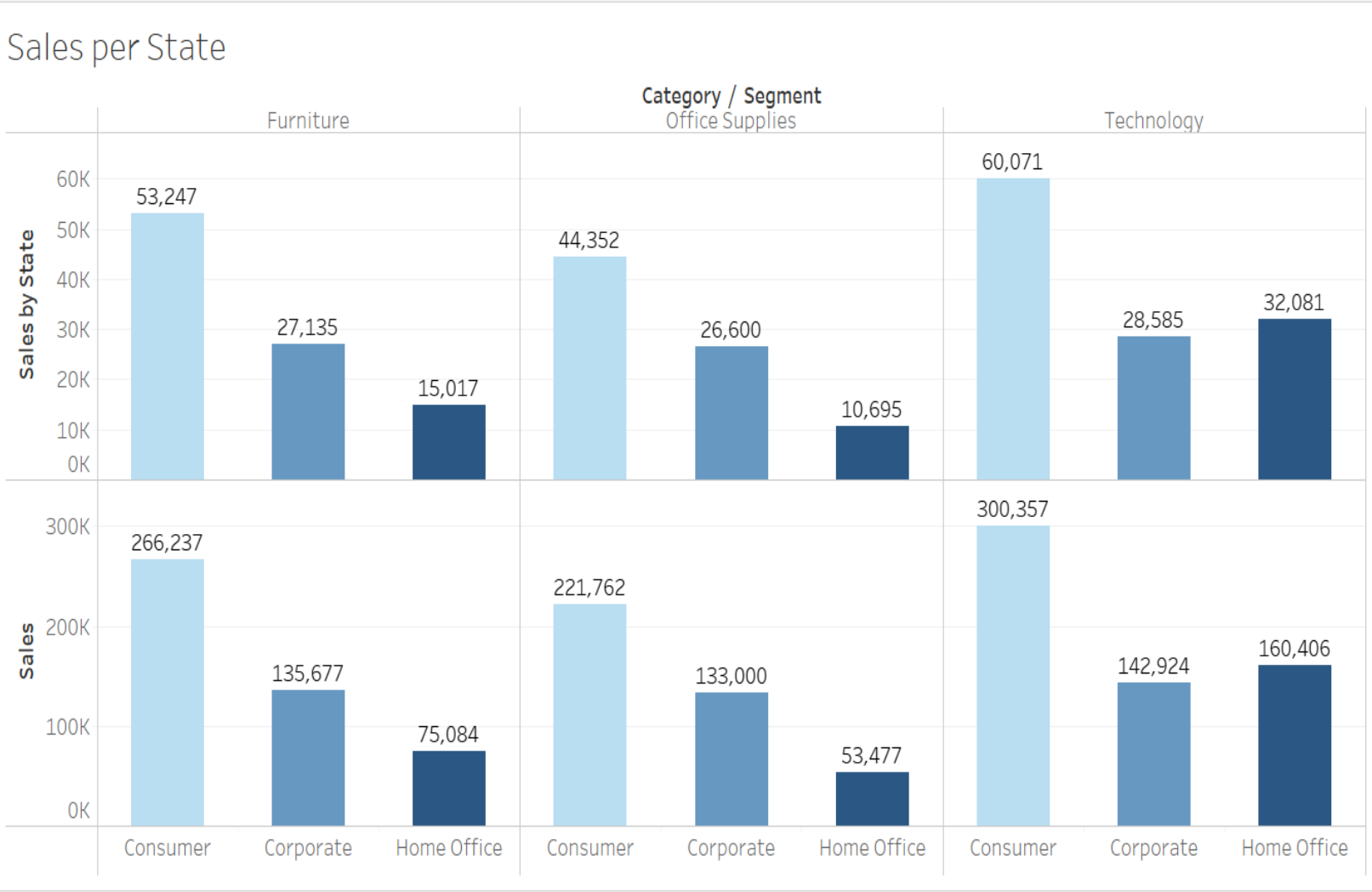
Marks: All, Automatic

Colour, Size, Label, Detail, Tooltip

Segment, SUM(Sales)

AVG(Sales by...

SUM(Sales)



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- EXCLUDE

EXCLUDE level of detail expressions declare dimensions to ignore from the view level of detail.

EXCLUDE can be useful for ‘percent of total’ or ‘difference from overall average’ scenarios. They are comparable to such features as Totals and Reference Lines.

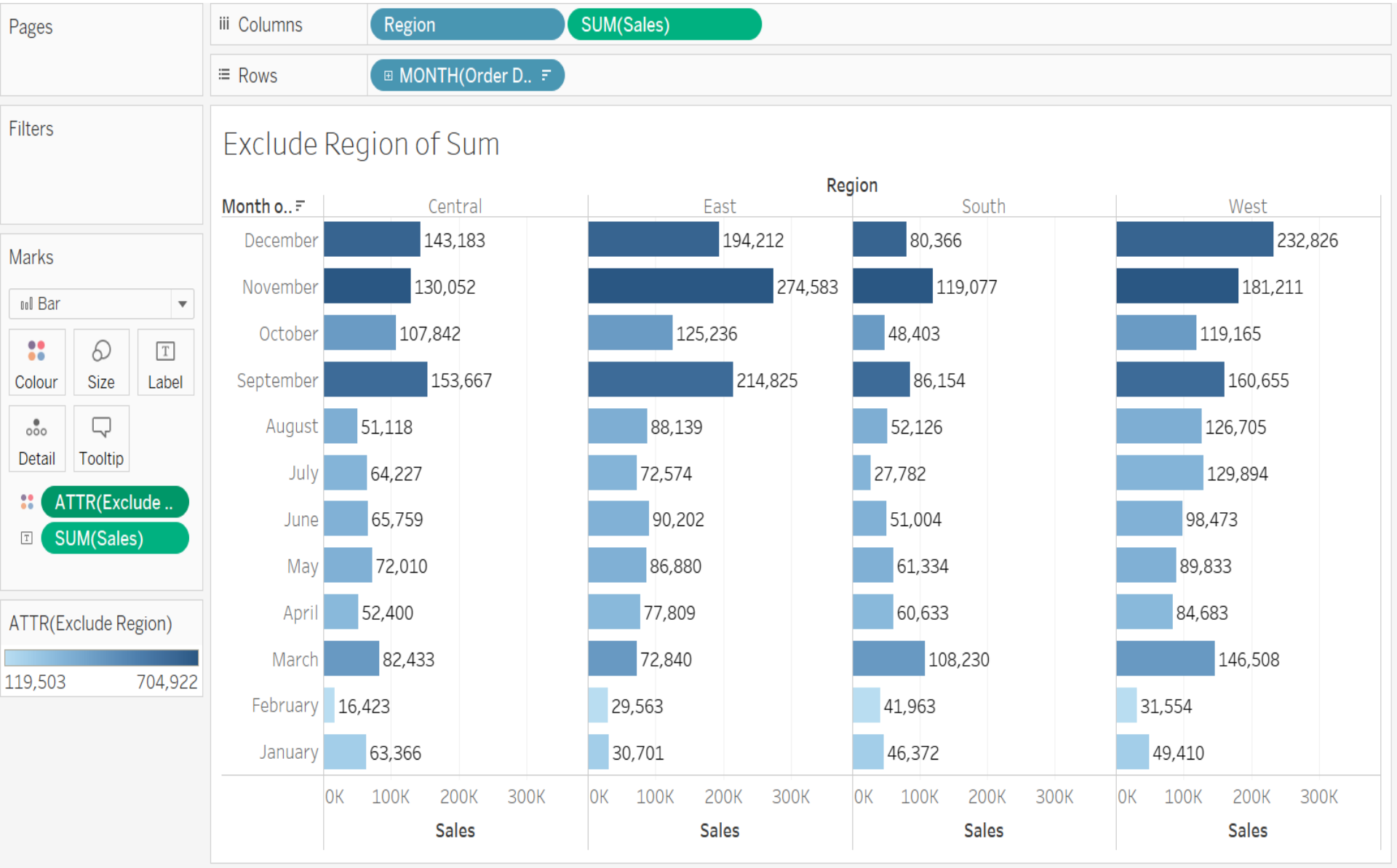
Calculations

Middlesex University London

- EXCLUDE

Calculations

Middlesex University London



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- FIXED

FIXED level of detail expressions compute a value using the specified dimensions, without reference to the dimensions in the view.

FIXED level of detail expressions do not consider the view level of detail, the calculation only uses the dimension referenced in the calculation.

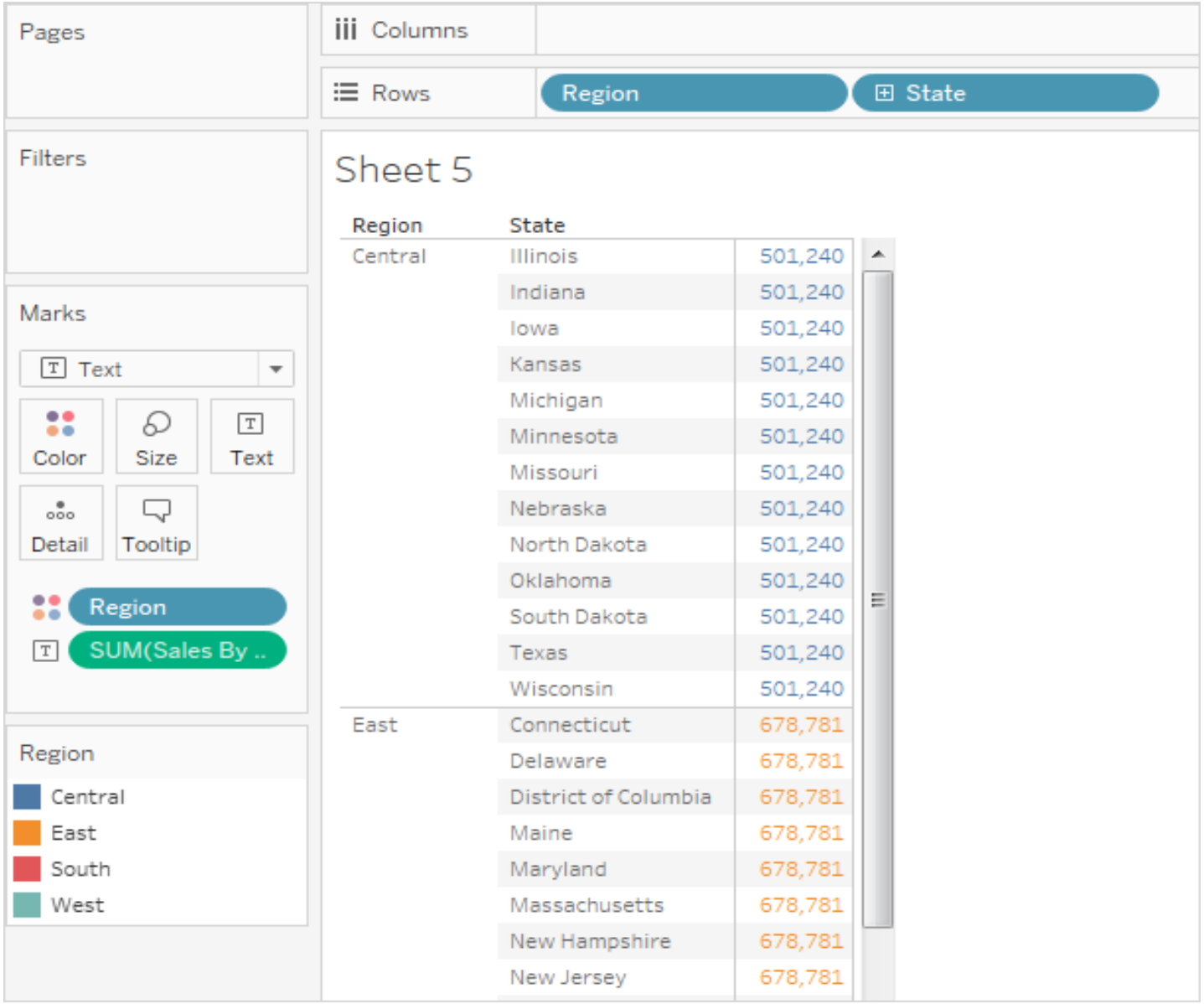
Calculations

Middlesex University London

- FIXED

Calculations

Middlesex University London



Region	State	
Central	Illinois	501,240
	Indiana	501,240
	Iowa	501,240
	Kansas	501,240
	Michigan	501,240
	Minnesota	501,240
	Missouri	501,240
	Nebraska	501,240
	North Dakota	501,240
	Oklahoma	501,240
	South Dakota	501,240
	Texas	501,240
	Wisconsin	501,240
East	Connecticut	678,781
	Delaware	678,781
	District of Columbia	678,781
	Maine	678,781
	Maryland	678,781
	Massachusetts	678,781
	New Hampshire	678,781
	New Jersey	678,781

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- LOD expression syntax

A level of detail expression has the following structure:

{[FIXED | INCLUDE | EXCLUDE] <*dimension declaration* > : <*aggregate expression*>}

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- Ad-Hoc Calculations

Ad-hoc calculations are calculations that you can create and update as you work with a field on a shelf in the view.

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- Ad-Hoc Calculations
  - Ad-hoc calculations are supported on the **Rows**, **Columns**, **Marks**, and **Measure Values** shelves;
  - they are not supported on the **Filters** or **Pages** shelves.

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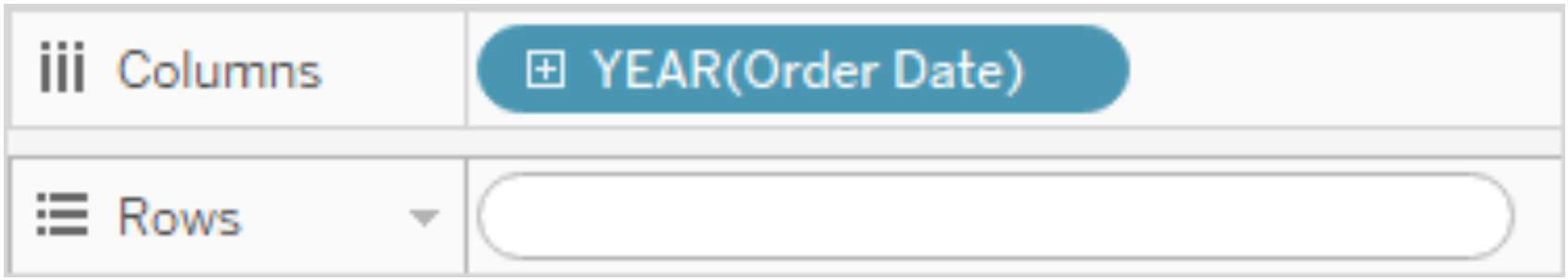
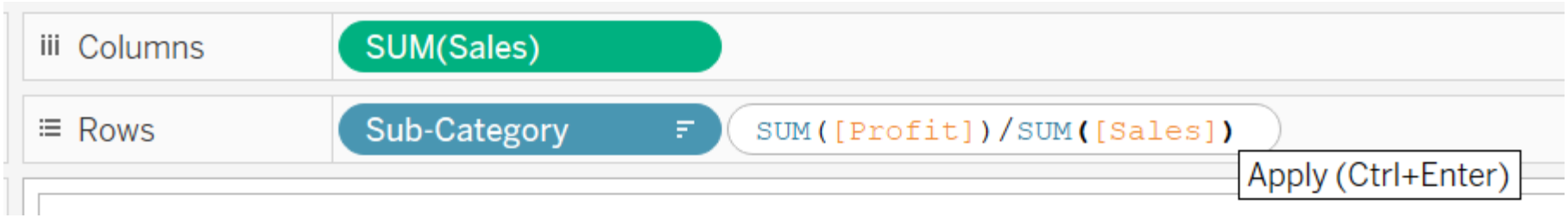
- Ad-Hoc Calculations



Calculations

- Ad-Hoc Calculations



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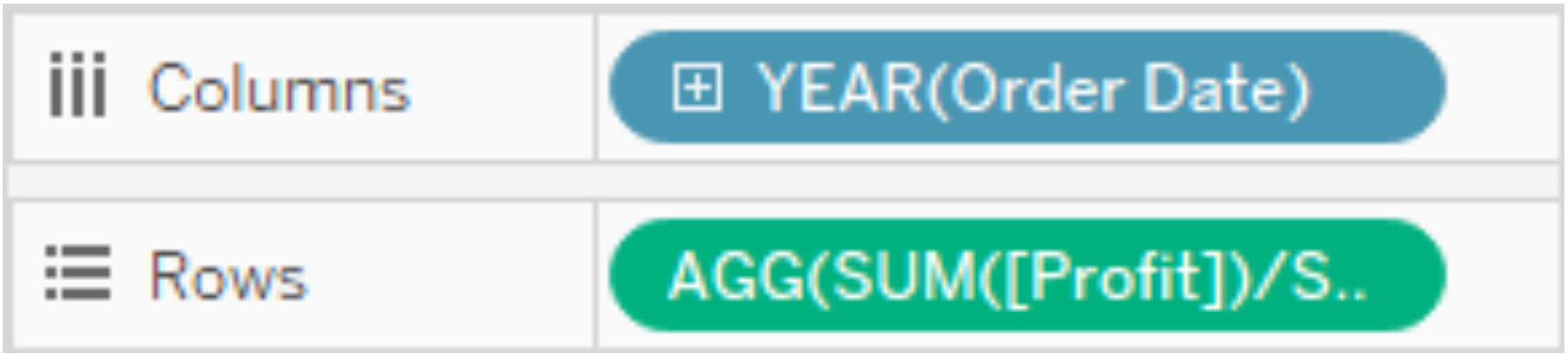
- Ad-Hoc Calculations



Tips for Calculations

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Tips

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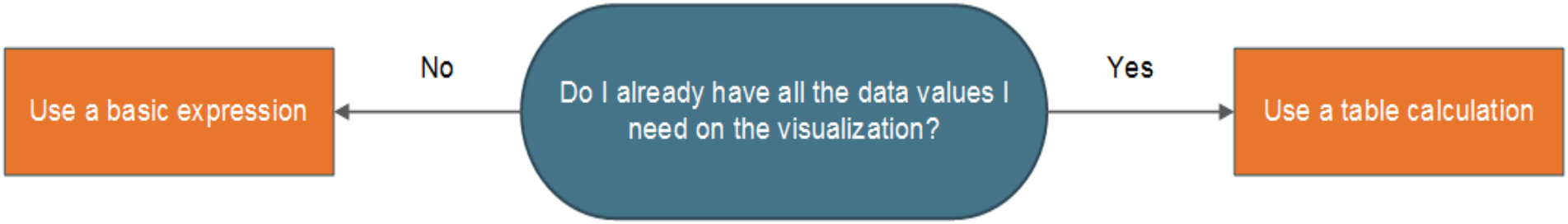
- Which calculation is right for my analysis?
  - Depends on the needs of your analysis and the question you need to answer.
  - When trying to decide, consider the following questions

Tips

- Q1: Do you already have all the data values you need on the visualization?



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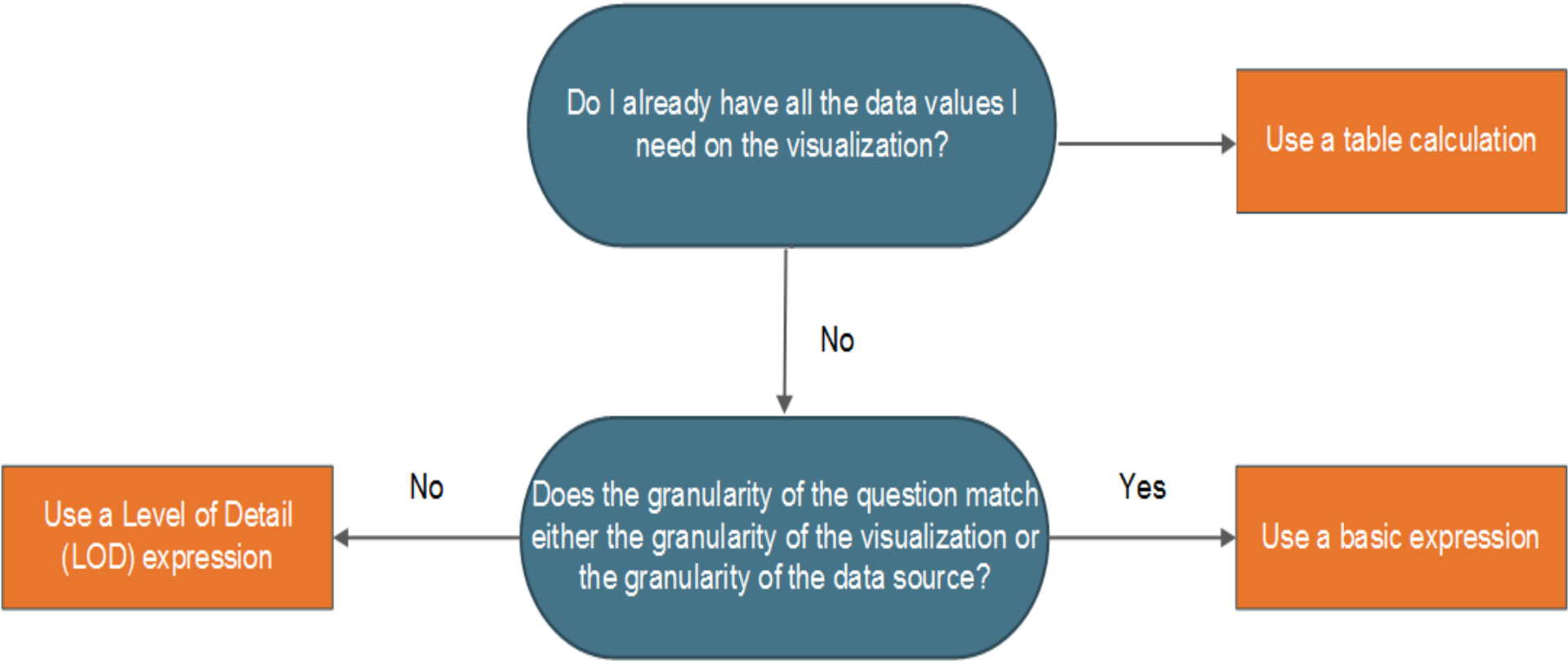
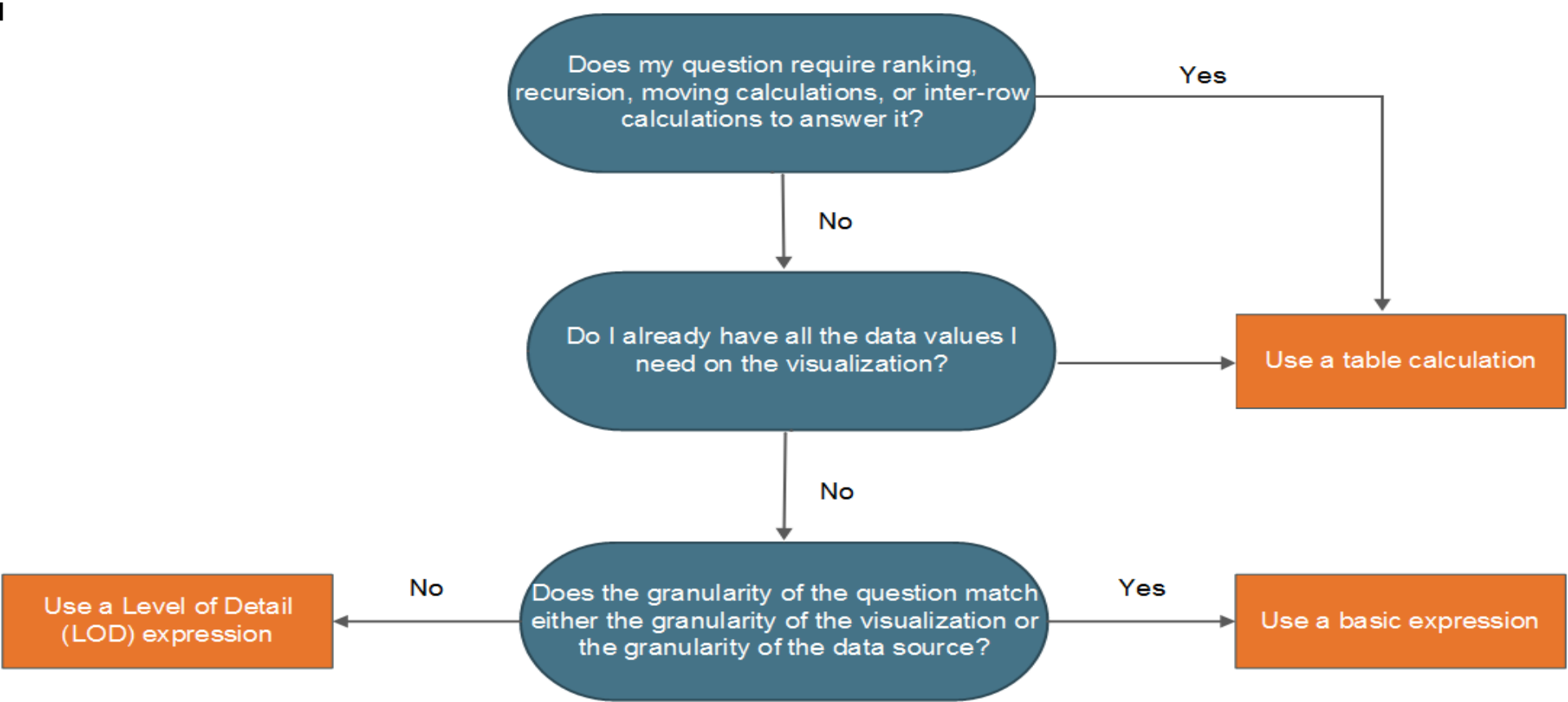
- Q2: Does the granularity of the question match the granularity of the visualization or the granularity of the data source?



Tips

- Q3: Do I need Ranking, Inter-row calculations, Moving calculations or Recursion?



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- Tips for Learning How to Create Calculations

There is no easy way to know exactly how to create the perfect formula; it takes **practice and research**.

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- Tips for Learning How to Create Calculations
  - **Know your question or purpose**. If you know the type of data you need, this can help you choose the correct function, as well as format your formula properly.
  - **Learn Tableau functions**. There are many different functions available. Each type serves a different purpose.

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- Tips for Learning How to Create Calculations

  - **Learn how to format calculations**. Once you are familiar with the different types of Tableau functions and their purpose, make sure to learn how to format calculations using the proper syntax.
  - **Learn from other examples**.

Examples of data analytics in Intelligent Environments

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- Smart sensor data
- Augmented reality (Google Glass) data
- Personalised assessment data
- Student presentation data

Smart Sensors

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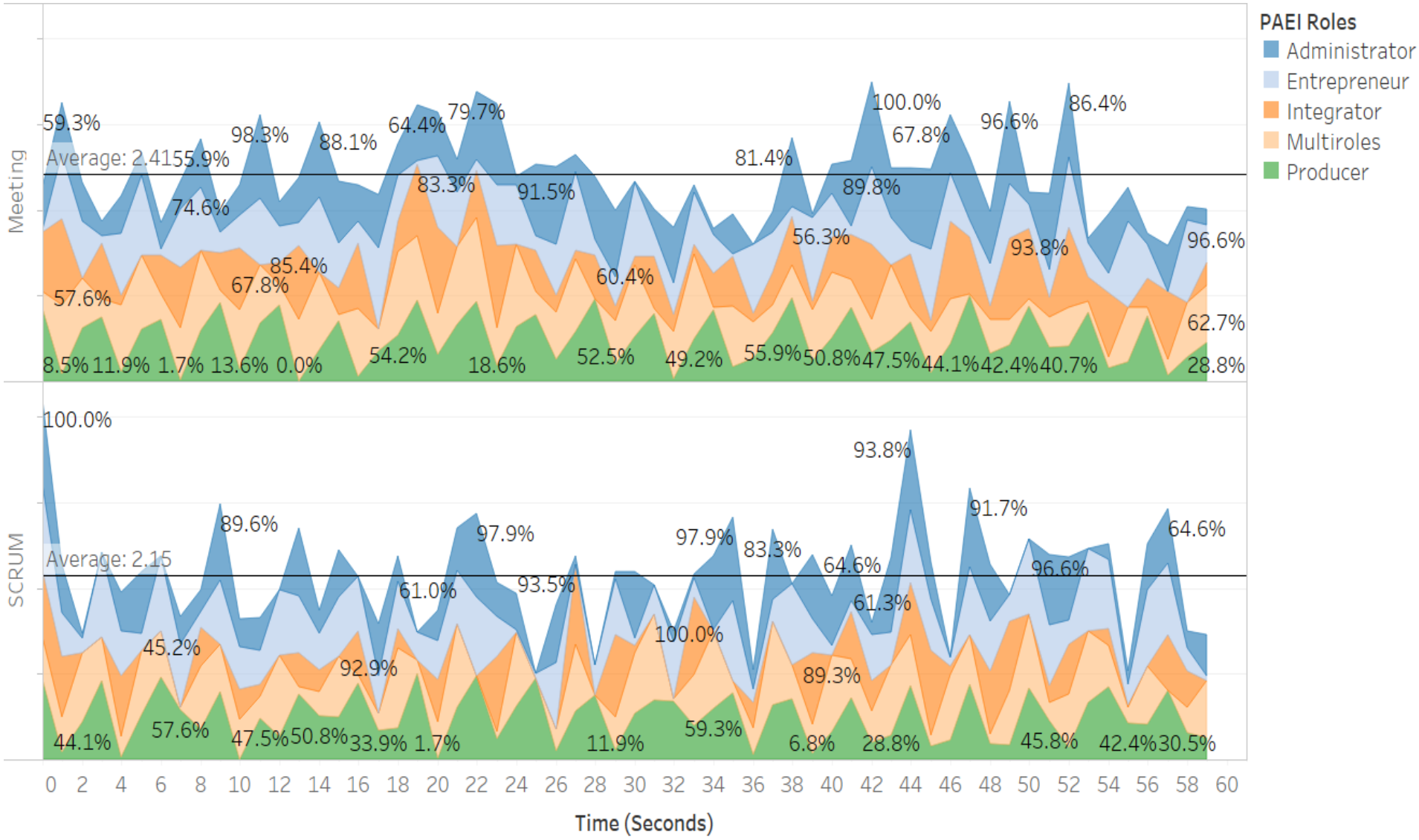

Smart Sensors

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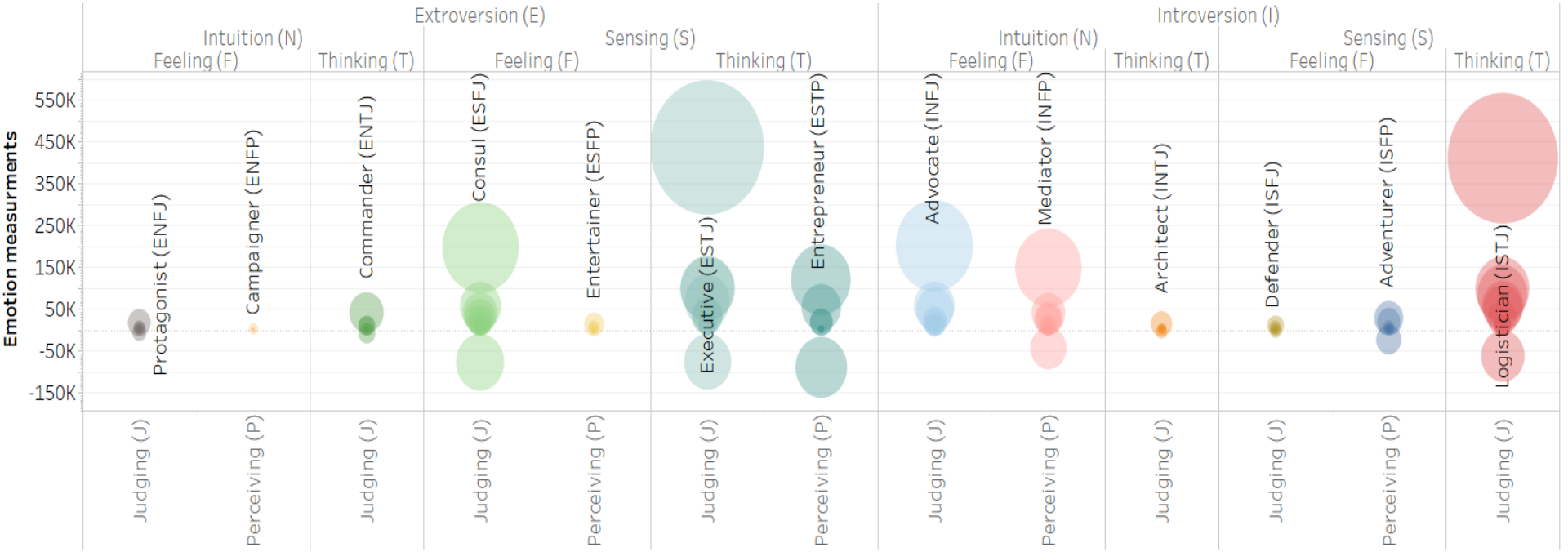

Smart Sensors

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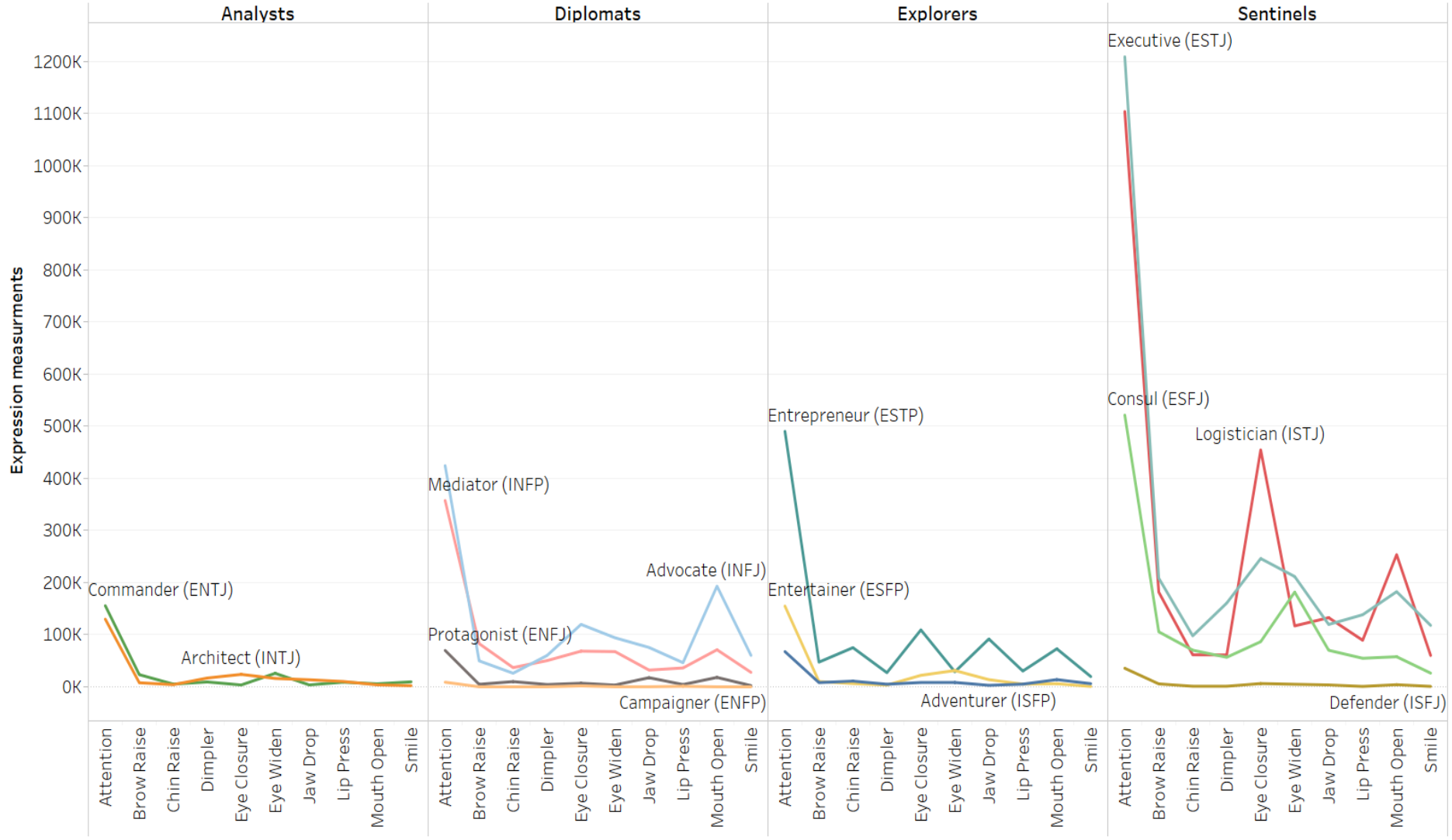

Google Glass Smart Lab

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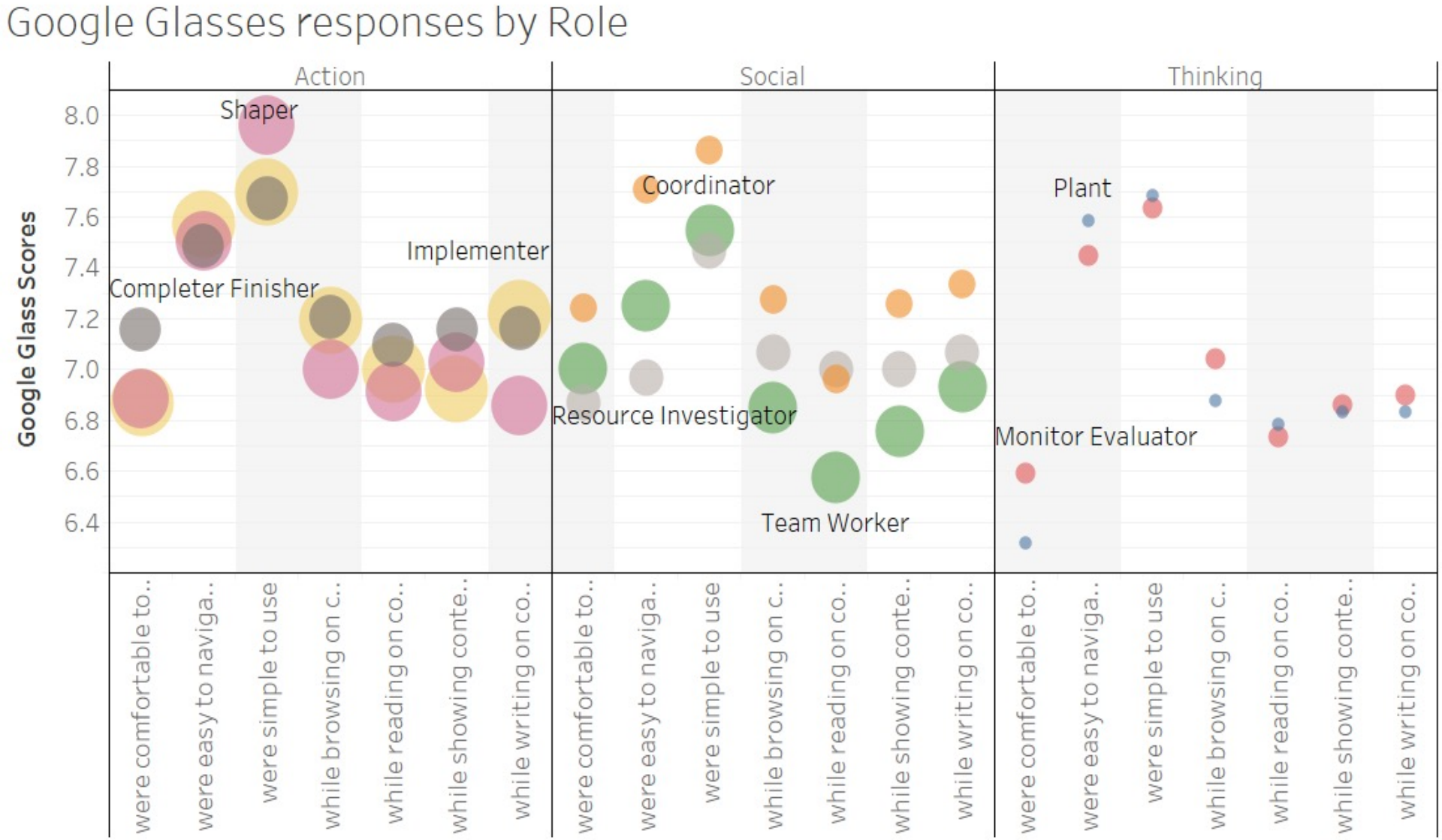

SOBs

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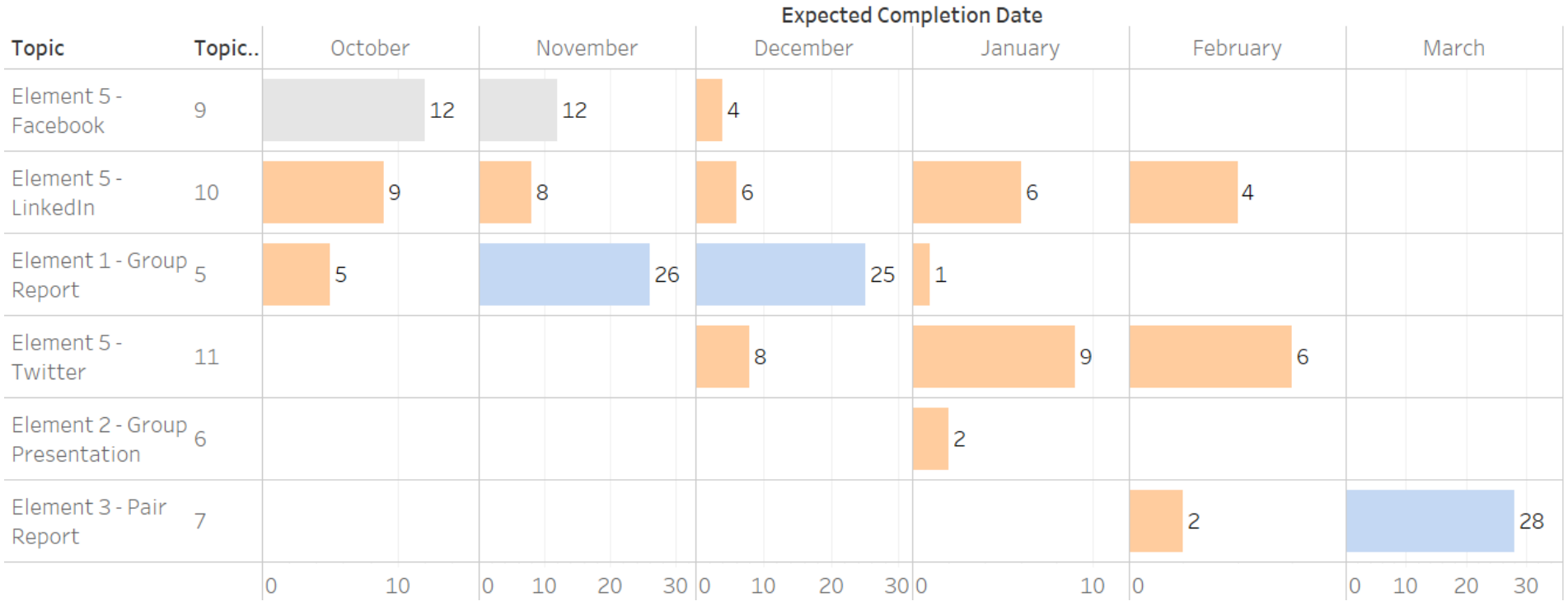
SOBs per Topic



GOALs

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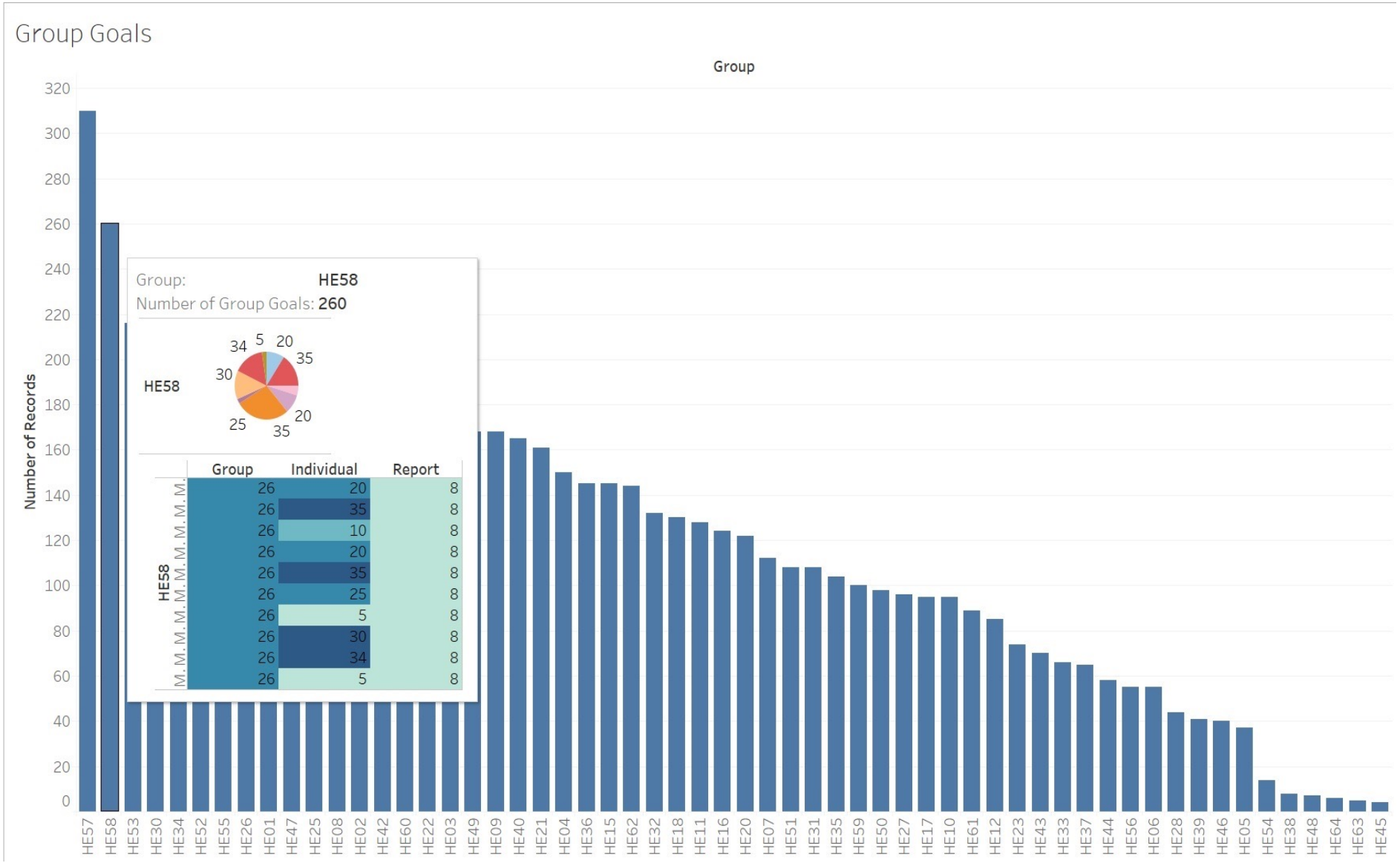

SOBs per VARK

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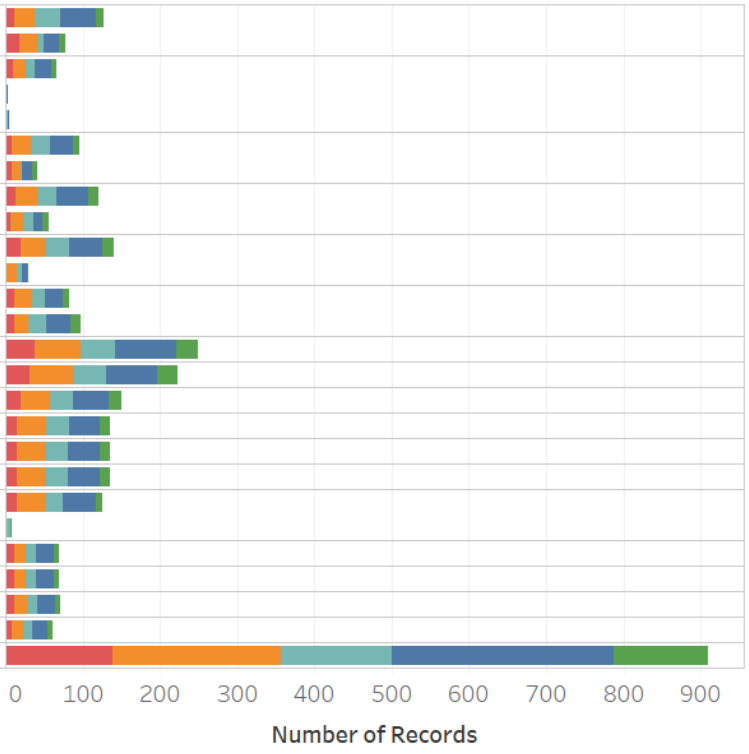
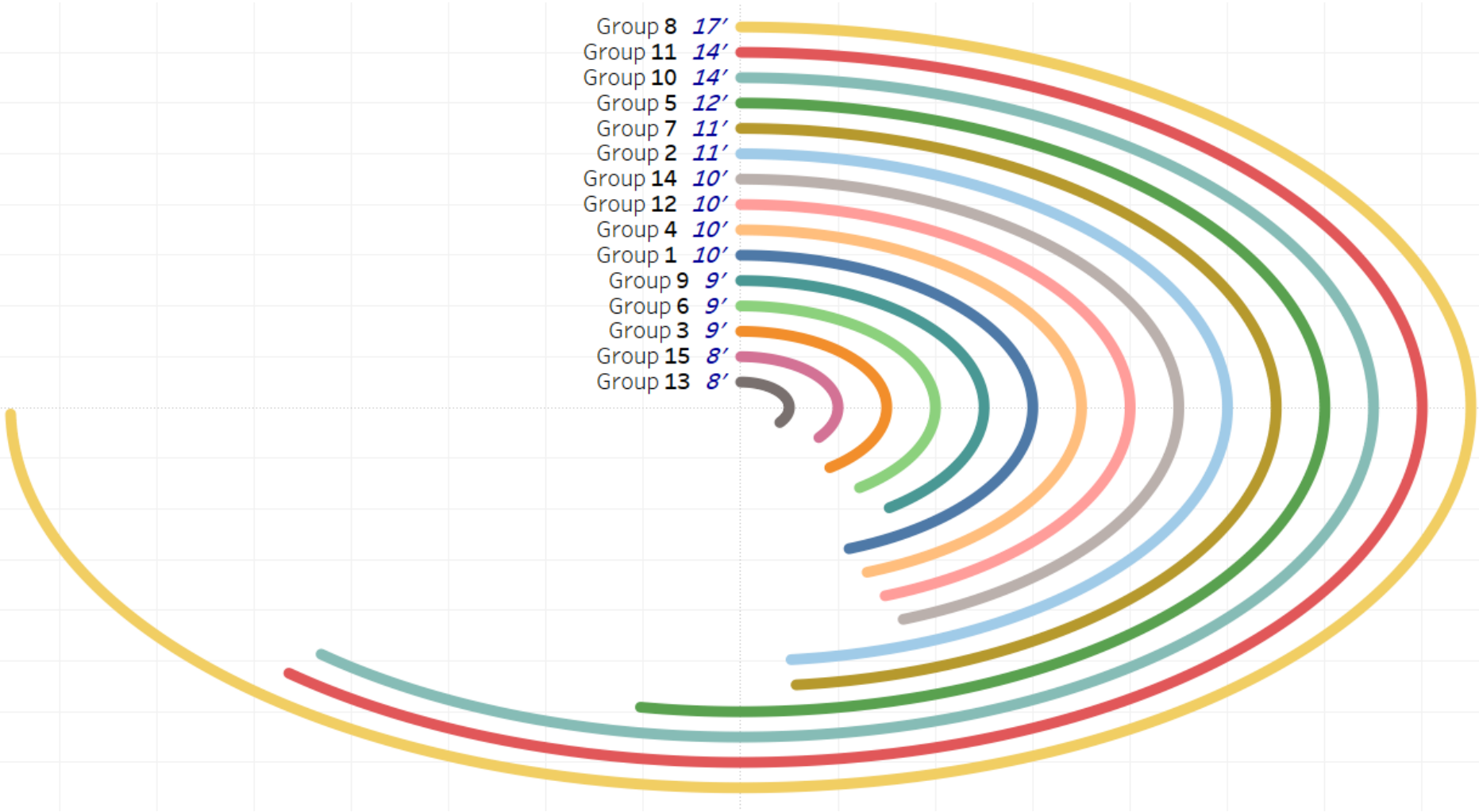
Observetions per Topic & VARK

Topic	Date	Completion Date	Dead Line
Element 5 - Facebook	2 October 2017	6 October 2017	Late
			On-Time
		20 October 2017	Early
			Late
			On-Time
	9 October 2017	13 October 2017	Late
			On-Time
	16 October 2017	20 October 2017	Late
			On-Time
	23 October 2017	27 October 2017	Late
			On-Time
	30 October 2017	3 November 2017	Late
			On-Time
Element 5 - Twitter	4 December 2017	8 December 2017	Late
	12 December 2017	15 December 2017	Late
	8 January 2018	12 January 2018	Late
	15 January 2018	19 January 2018	Late
	22 January 2018	26 January 2018	Late
	29 January 2018	2 February 2018	Late
	5 February 2018	9 February 2018	Late
			On-Time
Element 2 - Group Presentation	15 January 2018	19 January 2018	On-Time
	22 January 2018	26 January 2018	Early
Element 3 - Pair Report	29 January 2018	2 February 2018	On-Time
	11 February 2018	17 February 2018	Late
	12 March 2018	18 March 2018	On-Time



VARK Modalities
- Visual
- Aural
- Read\Write
- Kinaesthetic
- Multimodal

Group Presentations



Questions

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