

## Bank Customers financial Loan dataset Analysis

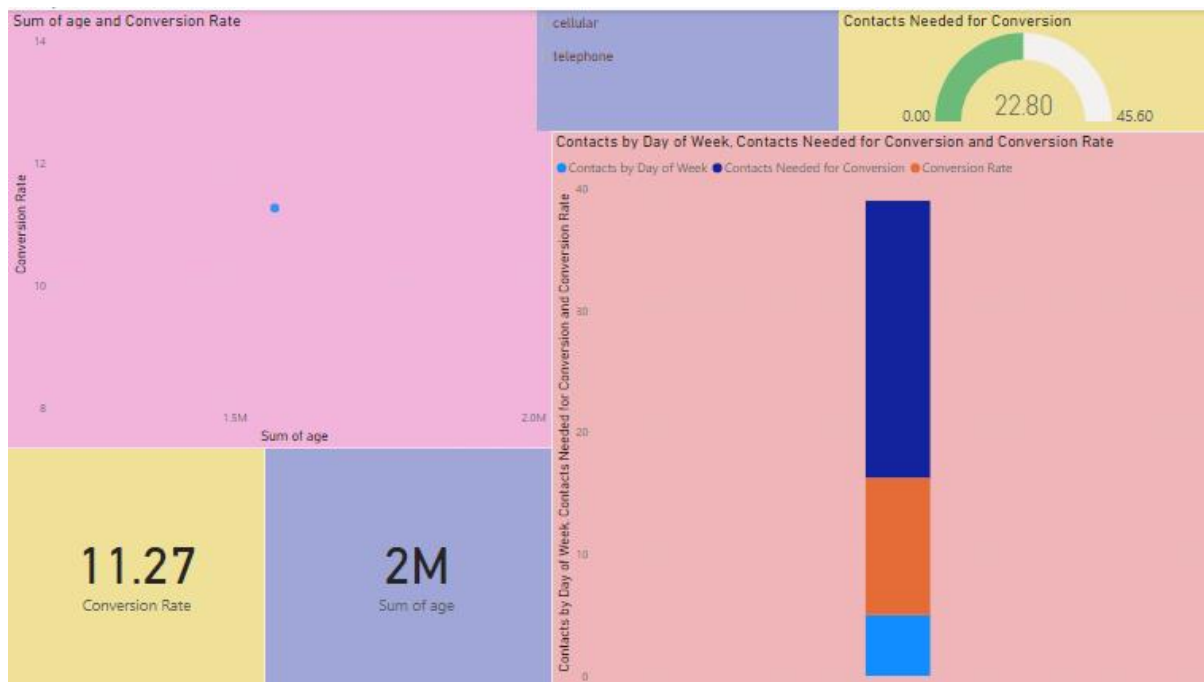
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The dataset contains the following columns:

1. age: Age of the customer.
2. job: Type of job the customer holds (e.g., admin, technician).
3. marital: Marital status of the customer (e.g., single, married, divorced).
4. education: Educational qualification of the customer.
5. default: Whether the customer has credit in default (yes/no).
6. housing: Indicates if the customer has a housing loan (yes/no).
7. loan: Indicates if the customer has a personal loan (yes/no).
8. contact: Type of communication used to contact the customer (e.g., cellular, telephone).
9. month: Last month of the year the customer was contacted.
10. day\_of\_week: Day of the week the customer was contacted.
11. duration: Duration of the last call with the customer (in seconds).
12. campaign: Number of contacts performed during this campaign for this customer.
13. pdays: Number of days since the customer was last contacted (999 means the customer was not previously contacted).
14. previous: Number of contacts performed before this campaign for this customer.
15. poutcome: Outcome of the previous marketing campaign (e.g., success, failure).
16. emp.var.rate: Employment variation rate (quarterly indicator).
17. cons.price.idx: Consumer price index (monthly indicator).
18. cons.conf.idx: Consumer confidence index (monthly indicator).
19. euribor3m: Euribor 3-month rate.
20. nr.employed: Number of employees (quarterly indicator).
21. y: Target variable indicating if the customer subscribed to a term deposit (yes/no).



## 1. Scatter Plot

**Title:** *Sum of Age and Conversion Rate*

- **X-Axis:** *Sum of Age*
  - DAX Function:
  - $\text{Sum of Age} = \text{SUM}(\text{'Table'}[\text{age}])$
- **Y-Axis:** *Conversion Rate*
  - DAX Function:
  - $\text{Conversion Rate} =$
  - $\text{DIVIDE}(\text{COUNTROWS}(\text{FILTER}(\text{'Table'}, \text{'Table'}[\text{y}] = \text{"yes"})), \text{COUNTROWS}(\text{'Table'})) * 100$

**Insight:** The plot likely shows how the total sum of customer age correlates with the conversion rate of the marketing campaign.

## 2. KPI/Metric Card

**Metric 1:** *Conversion Rate*

- **Value:** 11.27%
- **DAX Function:** Same as above for *Conversion Rate*.

## Metric 2: *Sum of Age*

- **Value:** 2M
- **DAX Function:** Same as above for *Sum of Age*.

**Insight:** These cards summarize the key metrics of the dataset.

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## 3. Gauge Chart

**Title:** *Contacts Needed for Conversion*

- **Value:** 22.80
- **DAX Function:**
  - Contacts Needed for Conversion =
  - DIVIDE(
  - SUM('Table'[campaign]),
  - COUNTROWS(FILTER('Table', 'Table'[y] = "yes"))
  - )

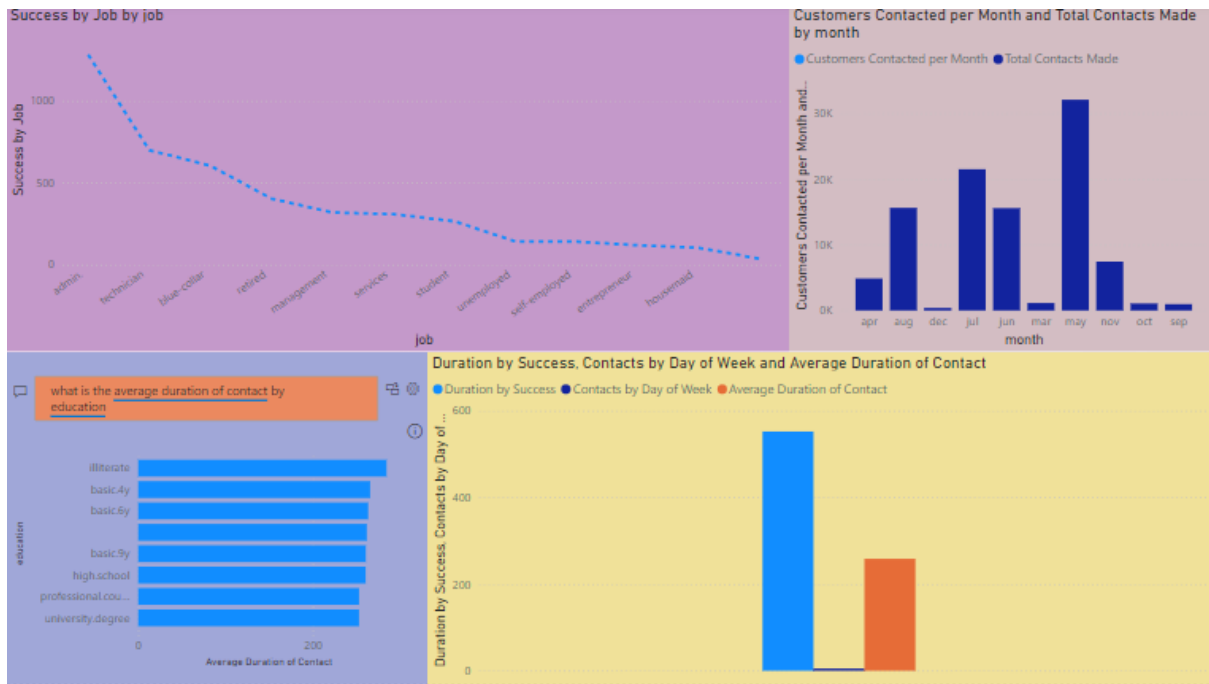
**Insight:** The gauge chart visualizes the average number of contacts needed to achieve one successful campaign conversion.

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## 4. Stacked Column Chart

**Title:** *Contacts by Day of Week, Contacts Needed for Conversion, and Conversion Rate*

- **X-Axis:** *Day of Week*
  - Column: 'Table'[day\_of\_week]
- **Y-Axis (Stacked Values):**
  - *Contacts by Day of Week:*
  - Contacts by Day of Week =
  - COUNTAX(SUMMARIZE('Table', 'Table'[day\_of\_week]), 'Table'[day\_of\_week])
  - *Contacts Needed for Conversion:* Same as above.
  - *Conversion Rate:* Same as above.



## 1. Line Chart

**Title:** *Success by Job*

- **X-Axis:** *Job*
  - Column: 'Table'[job]
- **Y-Axis:** *Success by Job*
  - DAX Function:
  - Success by Job =
  - CALCULATE(
  - COUNT('Table'[y]),
  - 'Table'[y] = "yes"
  - )

**Purpose:** This graph shows the number of successful campaigns grouped by different job types. It helps identify which occupations contribute most to successful marketing campaigns.

## 2. Clustered Column Chart

**Title:** *Customers Contacted per Month and Total Contacts Made by Month*

- **X-Axis:** *Month*
  - Column: 'Table'[month]
- **Y-Axis:**
  - *Customers Contacted per Month:*

- Customers Contacted per Month =
- COUNTROWS(SUMMARIZE('Table', 'Table'[month]))
- *Total Contacts Made:*
- Total Contacts Made = SUM('Table'[campaign])

**Purpose:** This chart compares the total number of customers contacted during the campaign and the total number of contacts made, grouped by month. It provides insights into the campaign's seasonality and effectiveness.

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### 3. Bar Chart

**Title:** *What is the Average Duration of Contact by Education*

- **X-Axis:** *Average Duration of Contact*
  - DAX Function:
  - Average Duration of Contact =
  - AVERAGE('Table'[duration])
- **Y-Axis:** *Education*
  - Column: 'Table'[education]

**Purpose:** This chart visualizes the average contact duration for customers based on their education level. It can highlight how engagement differs across educational backgrounds.

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### 4. Stacked Column Chart

**Title:** *Duration by Success, Contacts by Day of Week, and Average Duration of Contact*

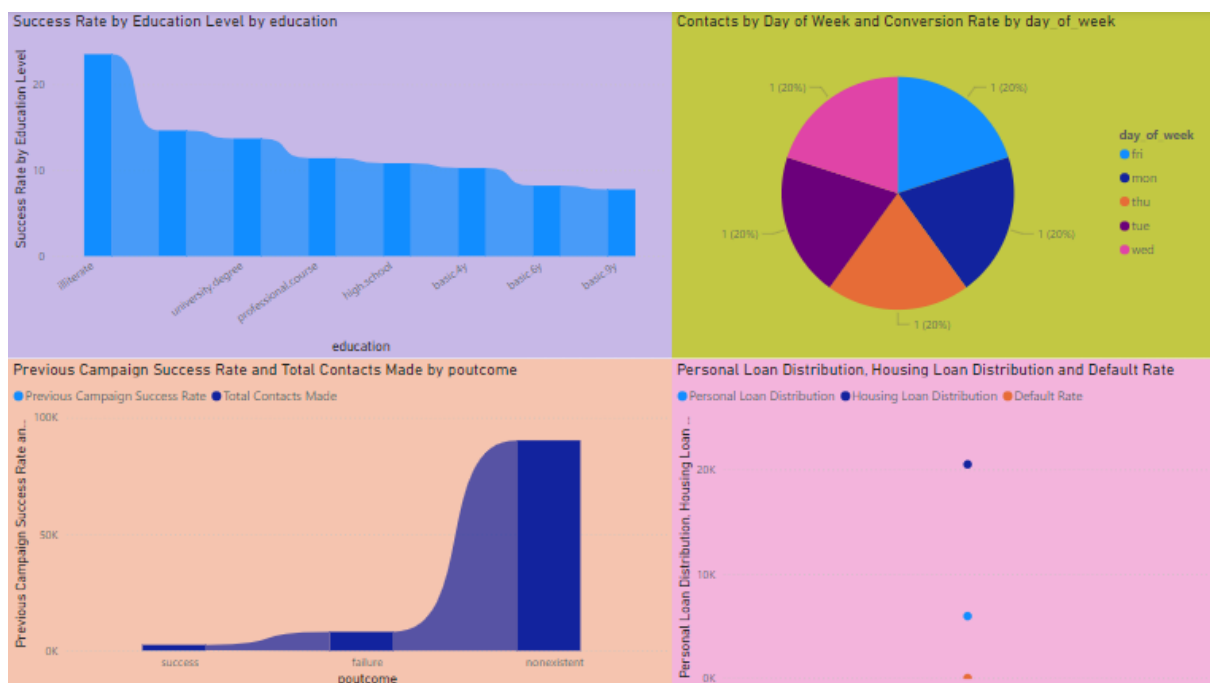
- **X-Axis:** *Day of Week*
  - Column: 'Table'[day\_of\_week]
- **Y-Axis (Stacked Values):**
  - *Duration by Success:*
  - Duration by Success =
  - AVERAGEX(
  - FILTER('Table', 'Table'[y] = "yes"),
  - 'Table'[duration]
  - )
  - *Contacts by Day of Week:*
  - Contacts by Day of Week =

- COUNTAX(SUMMARIZE('Table', 'Table'[day\_of\_week]), 'Table'[day\_of\_week])
- *Average Duration of Contact:*
- Average Duration of Contact =
- AVERAGE('Table'[duration])

**Purpose:** This visualization combines three metrics to analyze how contact duration and success rate vary across different days of the week. It gives insights into the best days for contacting customers.

## Documentation Summary

- **Objective:** These visualizations analyze the bank marketing campaign dataset to identify trends in customer demographics, campaign performance, and engagement metrics.
- **Key Insights:**
  - **Job Analysis:** Certain occupations (e.g., admin and technicians) have higher success rates.
  - **Seasonality:** Campaign activity is higher during specific months (e.g., March and May).
  - **Education Impact:** Contact duration varies significantly across education levels.
  - **Day-of-Week Insights:** Certain days show higher success and engagement levels



## 1. Clustered Bar Chart

**Title:** *Success Rate by Education Level*

- **X-Axis:** *Education*
  - Column: 'Table'[education]
- **Y-Axis:** *Success Rate by Education Level*
  - DAX Function:
  - Success Rate by Education Level =
  - DIVIDE(
  - COUNTROWS(FILTER('Table', 'Table'[y] = "yes")),
  - CALCULATE(COUNTROWS('Table'), ALLEXCEPT('Table', 'Table'[education]))
  - ) \* 100

**Purpose:** This visualization illustrates how success rates vary across different levels of education. It identifies which educational groups are more likely to result in successful marketing outcomes.

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## 2. Pie Chart

**Title:** *Contacts by Day of Week and Conversion Rate*

- **Legend:** *Day of Week*
  - Column: 'Table'[day\_of\_week]
- **Values:**
  - *Contacts by Day of Week:*
  - Contacts by Day of Week =
  - COUNTAX(SUMMARIZE('Table', 'Table'[day\_of\_week]), 'Table'[day\_of\_week])
  - *Conversion Rate:*
  - Conversion Rate =
  - DIVIDE(
  - COUNTROWS(FILTER('Table', 'Table'[y] = "yes")),
  - COUNTROWS('Table')
  - ) \* 100

**Purpose:** This pie chart shows the distribution of contacts made on different days of the week while overlaying conversion rate data to highlight the effectiveness of outreach on each day.

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## 3. Area Chart

**Title:** *Previous Campaign Success Rate and Total Contacts Made by Poutcome*

- **X-Axis:** *Poutcome* (Outcome of the Previous Campaign)

- Column: 'Table'[poutcome]
- **Y-Axis:**
  - *Previous Campaign Success Rate:*
  - Previous Campaign Success Rate =
  - DIVIDE(
  - COUNTROWS(FILTER('Table', 'Table'[poutcome] = "success")),
  - COUNTROWS('Table')
  - ) \* 100
  - *Total Contacts Made:*
  - Total Contacts Made = SUM('Table'[campaign])

**Purpose:** This area chart compares the success rate of previous campaigns with the total number of contacts made for different outcomes of the previous marketing efforts.

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#### 4. Scatter Chart

**Title:** *Personal Loan Distribution, Housing Loan Distribution, and Default Rate*

- **X-Axis:** *Personal Loan Distribution*
  - DAX Function:
  - Personal Loan Distribution =
  - COUNTAX(FILTER('Table', 'Table'[loan] = "yes"), 'Table'[loan])
- **Y-Axis:** *Housing Loan Distribution*
  - DAX Function:
  - Housing Loan Distribution =
  - COUNTAX(FILTER('Table', 'Table'[housing] = "yes"), 'Table'[housing])
- **Size of Points:** *Default Rate*
  - DAX Function:
  - Default Rate =
  - DIVIDE(
  - COUNTROWS(FILTER('Table', 'Table'[default] = "yes")),
  - COUNTROWS('Table')
  - ) \* 100

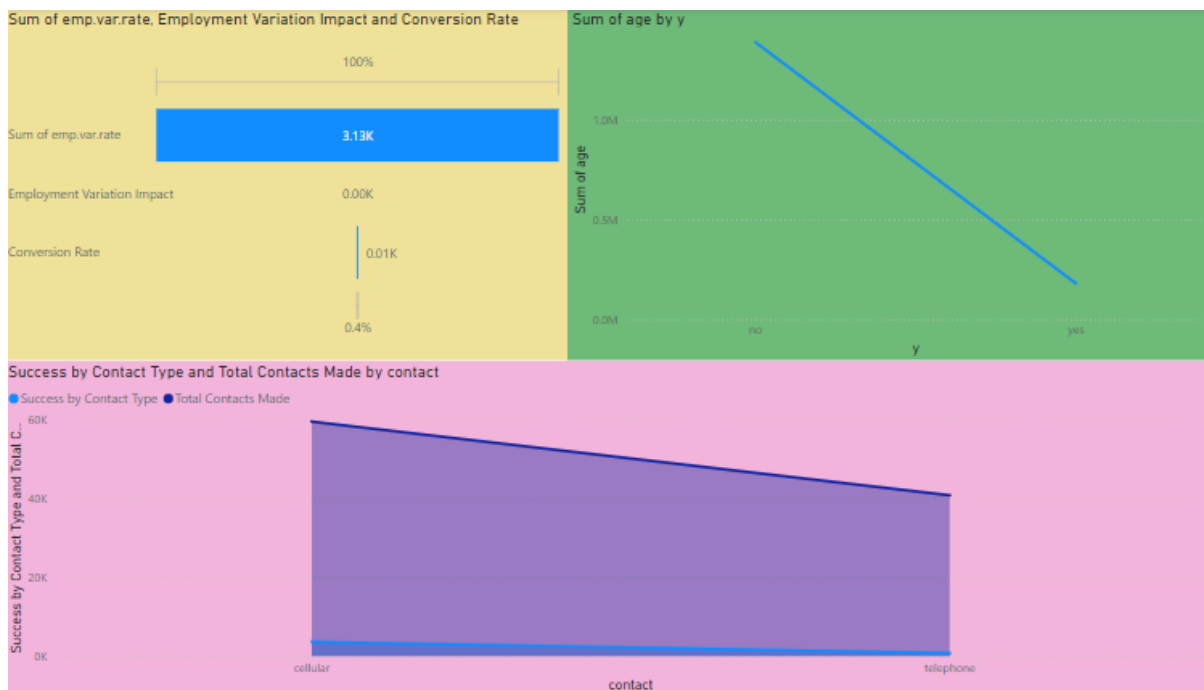
**Purpose:** This scatter plot compares the number of customers with personal loans, housing loans, and their default rates. It helps identify correlations between these variables and customer behavior.



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## Documentation Summary

- **Insights and Goals:**
  - **Education Success Rates:** Determine which educational groups have higher campaign success rates.
  - **Day-of-Week Insights:** Analyze contact distribution and conversion effectiveness for each day of the week.
  - **Poutcome Analysis:** Evaluate the performance of previous campaigns and their relationship with the number of contacts made.
  - **Loan and Default Relationship:** Understand the interplay between housing loans, personal loans, and default risks.



### 1. Top Left: Sum of emp.var.rate, Employment Variation Impact, and Conversion Rate

- **Visualization Type:** A bar chart or card visualization showcasing the sum of emp.var.rate and possibly related metrics like employment variation impact and conversion rate.
- **Possible Metrics/DAX:**
  - $SUM(emp.var.rate)$
  - $Conversion\ Rate = DIVIDE([Successful\ Outcomes], [Total\ Outcomes], 0)$
  - $Employment\ Variation\ Impact = [Current\ Employment\ Rate] - [Previous\ Employment\ Rate]$
- The visual aggregates numeric fields, possibly using measures.

### 2. Top Right: Sum of age by y

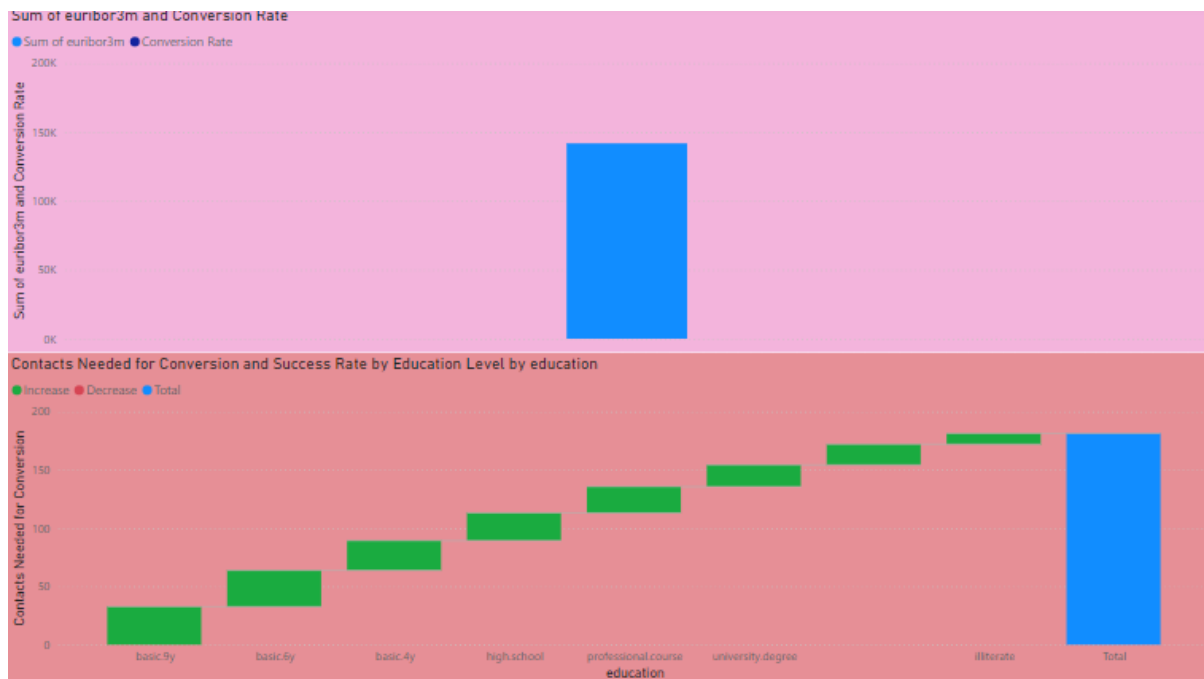
- **Visualization Type:** A line chart displaying the sum of age values grouped by a binary variable (y), likely representing "yes" or "no" for a category like success.
- **Possible DAX Functions:**
  - SUM(Age)
  - If y is a binary column, a calculated measure might be used:  
Sum of Age by Y = CALCULATE(SUM(Table[Age]), FILTER(Table, Table[Y] = "yes"))
- This graph likely aggregates age data based on the value of y.

### 3. Bottom: Success by Contact Type and Total Contacts Made

- **Visualization Type:** A line or area chart comparing the number of successes and total contacts made for each contact type (cellular or telephone).
- **Possible DAX Functions:**
  - Total Contacts Made = COUNT(ContactType)
  - Success by Contact Type = CALCULATE(COUNT(Success), FILTER(Contact, Contact[Success] = "Yes"))
- These measures might use filters to distinguish between success rates for different contact methods.

### General Insights:

- **Filters:** Slicers or filters might have been applied to adjust the results by date, region, or other dimensions.
- **Calculated Columns or Measures:** Each visual likely relies on calculated measures for aggregation and comparisons.



### 1. Top Graph: Sum of euribor3m and Conversion Rate

- **Visualization Type:** Bar chart showing the sum of euribor3m and conversion rate, possibly grouped by a category.
- **Possible Metrics/DAX:**
  - **Sum of euribor3m:**  

$$\text{Total Euribor3m} = \text{SUM}(\text{Table}[\text{euribor3m}])$$
  - **Conversion Rate:**  

$$\text{Conversion Rate} = \text{DIVIDE}([\text{Successful Outcomes}], [\text{Total Contacts}], 0)$$
- The chart likely uses two measures plotted side-by-side to compare the total value of euribor3m (a financial indicator) with conversion rates.

### 2. Bottom Graph: Contacts Needed for Conversion and Success Rate by Education Level

- **Visualization Type:** Waterfall chart showing the increase or decrease in "Contacts Needed for Conversion" by different education levels (e.g., basic, high school, university degree) and total contacts.
- **Possible Metrics/DAX:**
  - **Contacts Needed for Conversion:**  

$$\text{Contacts Needed for Conversion} = \text{DIVIDE}([\text{Total Contacts}], [\text{Conversions}], 0)$$
  - **Increase/Decrease Calculation:**  
This could be calculated using a DAX formula to compute the difference between education levels:  

$$\text{Difference} = \text{Table}[\text{Contacts Needed}] - \text{EARLIER}(\text{Table}[\text{Contacts Needed}])$$

- **Total Contacts for All Education Levels:**

Total = SUM(Table[Contacts])

- The waterfall visualization is used to illustrate how different education levels contribute to the overall contacts required for conversion.