Analyzing Credit Card Customer Attrition

NG PUI SAN

Problem Statement

With growing competition and the high cost of acquiring new customers, it is essential to understand why customers leave and to develop strategies to retain customers.

The purpose of this analysis is to identify key factors that led to credit card customer churn.

This analysis aims to reveal spending and behavioural patterns associated with churn, analysing customers who attrition, and recommend targeted retention strategies.

Understanding Customer Attrition

What is Customer Attrition?

Customer attrition is the loss of customers over time. It is a measure of how many customers leave a business during a given period and is often expressed as a percentage of the total customer base.

Main Reasons for Customer Attrition

The main reasons for customer attrition include poor customer service, high prices, lack of product or service quality, and a lack of personalized attention and engagement from the business.
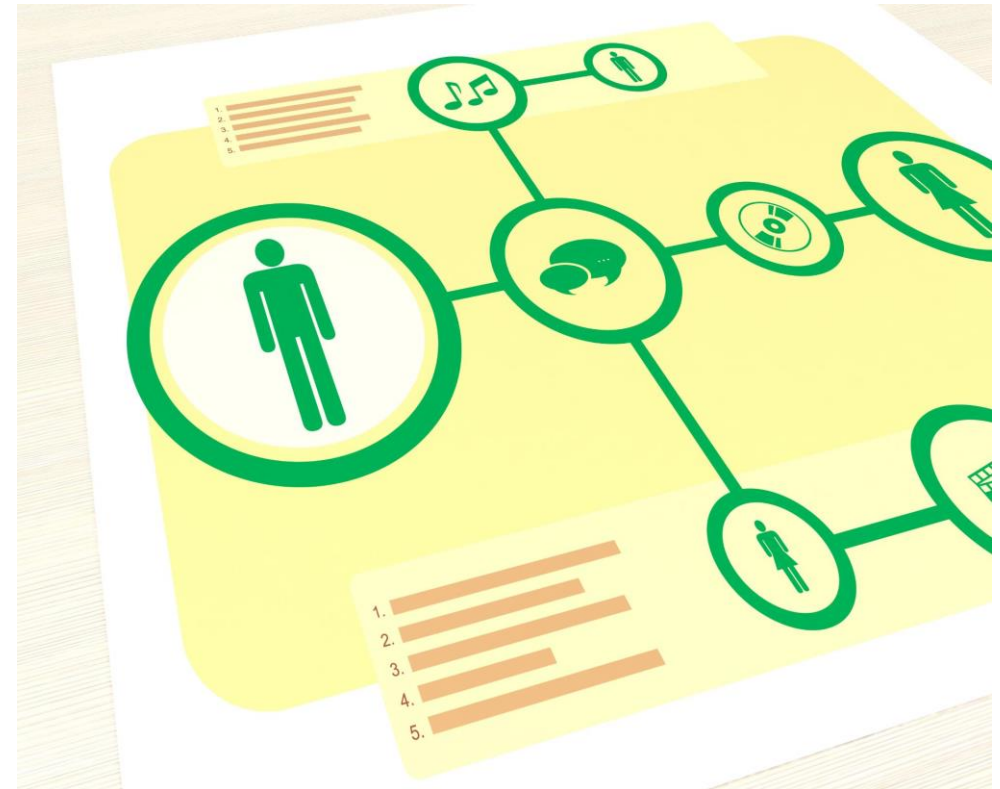
Dataset Details

This dataset contains a wealth of customer information collected from within a consumer credit card portfolio, with the aim of helping analysts predict customer attrition.

It includes comprehensive demographic details such as age, gender, marital status and income category, as well as insight into each customer's relationship with the credit card provider such as the card type, number of months on book and inactive periods.

Dataset from Kaggle - Predicting Credit Card Customer Segmentation

Dataset Preparation

Metadata Description (1)

Column	Description	Data Type
Clientnum	Unique identifier for each customer.	Integer
Attrition_Flag	Flag indicating whether or not the customer has churned out.	Boolean
Customer_Age	Age of customer.	Integer
Gender	Gender of customer.	String
Dependent_count	Number of dependents that customer has.	Integer
Education_Level	Education level of customer.	String
Marital_Status	Marital status of customer.	String
Income_Category	Income category of customer.	String
Card_Category	Type of card held by customer.	String
Months_on_book	How long customer has been on the books.	Integer

Dataset Preparation

Metadata description (2)

Column	Description	Data Type
Total_Relationship_Count	Total number of relationships customer has with the credit card provider.	Integer
Months_Inactive_12_mon	Number of months customer has been inactive in the last twelve months.	Integer
Contacts_Count_12_mon	Number of contacts customer has had in the last twelve months.	Integer
Credit_Limit	Credit limit of customer.	Integer
Total_Revolving_Bal	Total revolving balance of customer.	Integer
Avg_Open_To_Buy	Average open to buy ratio of customer.	Integer
Total_Amt_Chng_Q4_Q1	Total amount changed from quarter 4 to quarter 1.	Integer
Total_Trans_Amt	Total transaction amount.	Integer
Total_Trans_Ct	Total transaction count.	Integer

Dataset Preparation

Metadata Description (3)

Column	Description	Data Type
Total_Ct_Chng_Q4_Q1	Total count changed from quarter 4 to quarter 1.	Integer
Avg_Utilization_Ratio	Average utilization ratio of customer.	Integer
Naive_Bayes_Classifier_Attrition_Flag_Card_Category_Contacts_Count_12_mon_Dependent_count_Education_Level_Months_Inactive_12_mon_1	Naive Bayes classifier for predicting whether or not someone will churn based on characteristics	

Dataset Preparation

Cleaning of Dataset

Assumptions

- **Data Cleaning**
  - *Clientnum* data field, a 9-digit integer, was updated to start from 1 while maintaining its unique key to facilitate easier data analysis.
  - Assumptions
    - Credit card categories criteria not stated clearly. Used ChatGPT to check.
    - Applied assumptions to the following categories:
      - Blue – Basic level
      - Silver – Upgraded from Blue
      - Gold – Premium level
      - Platinum – Elite level

Data Preparation

Grouping of Data

- **Grouping of data**
  - Education Level
    - Grouping of Graduate, Doctorate and Post-Graduate data into the same **Post-Graduate** group as it is broadly refers to education pursued after a bachelor's degree, including master and doctorate

  - Classification of data
    - High-school – Typically age group: 14 – 18 years
    - College (Undergraduate) – Typically age group: 18 – 22 years. Comprises of Undergraduate data.
    - Post-Graduate: Age group varies. Comprises of Graduate, Doctorate and Post-Graduate data

Data Preparation

Grouping of Data

- **Grouping of data**
  - Age Group
    - Age column has been grouped into the following categories:
      - 20+
      - 30+
      - 40+
      - 50+
      - 60+
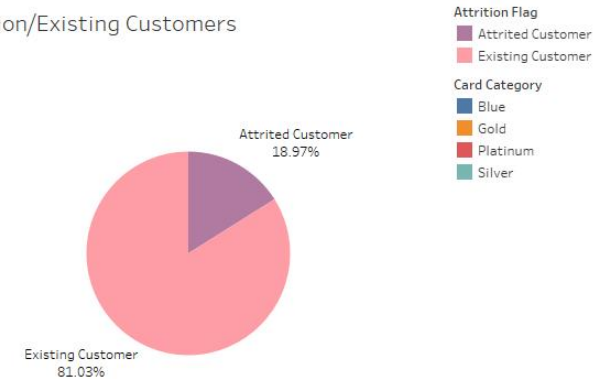   - >=70

Analysis of Dataset

Customer attrition of the bank is close to 20%.

About 93% of all the customers hold the Blue credit card. This is about the same for attrited customers.
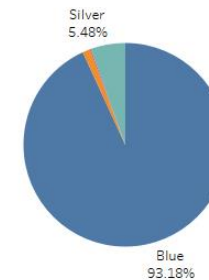
Subsequent analysis will mainly focus on the 20% attrited customers.

Project link - Tableau Public

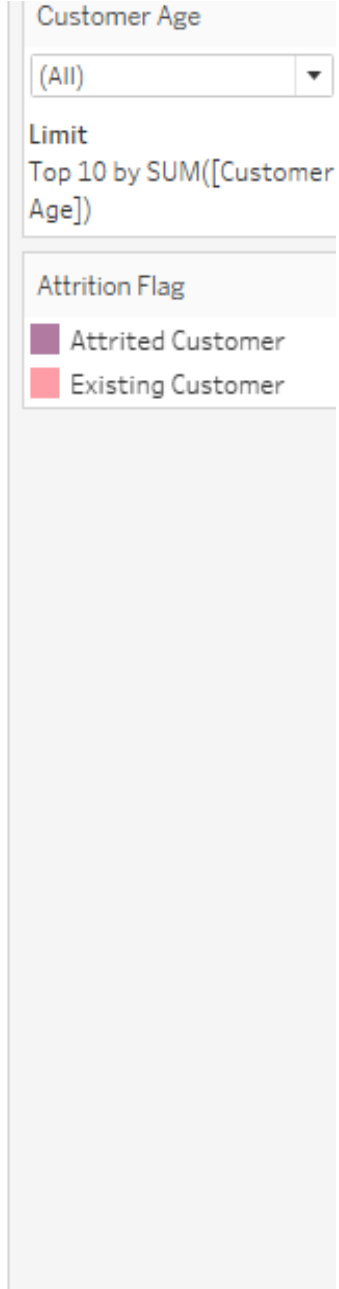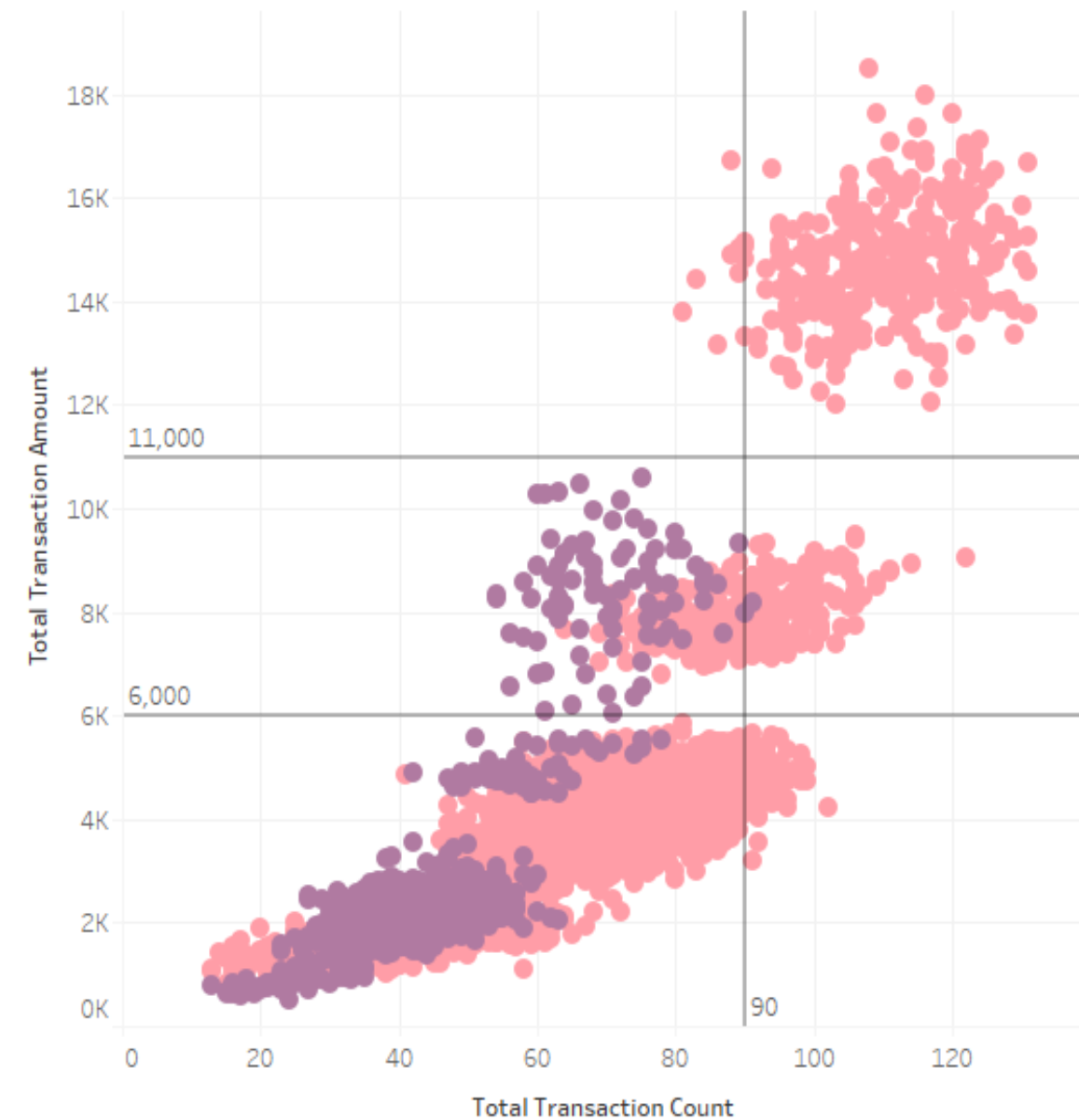Attrition/Existing Customers

Attrition Flag
Attrited Customer
Existing Customer

Card Category
Blue
Gold
Platinum
Silver

Attrited Customer
18.97%

Existing Customer
81.03%

Number of Customers by Card Categories

Silver
5.48%

Blue
93.18%

Total Transaction Amount/Count by Attrition Flag

Customer Age

(All) ▼

Limit
Top 10 by SUM([Customer Age])

Attrition Flag

■ Attrited Customer
■ Existing Customer

- Findings
  - From the scatterplot, spending can be clustered into 3 clusters.
  - In general, attrited customers does not spend beyond $12k.
  - Most the attrited customers spent below $6k with less than 100 transaction counts

- Recommendation
  - Engage with customers early to understand the reasons behind the low transaction amounts and counts.
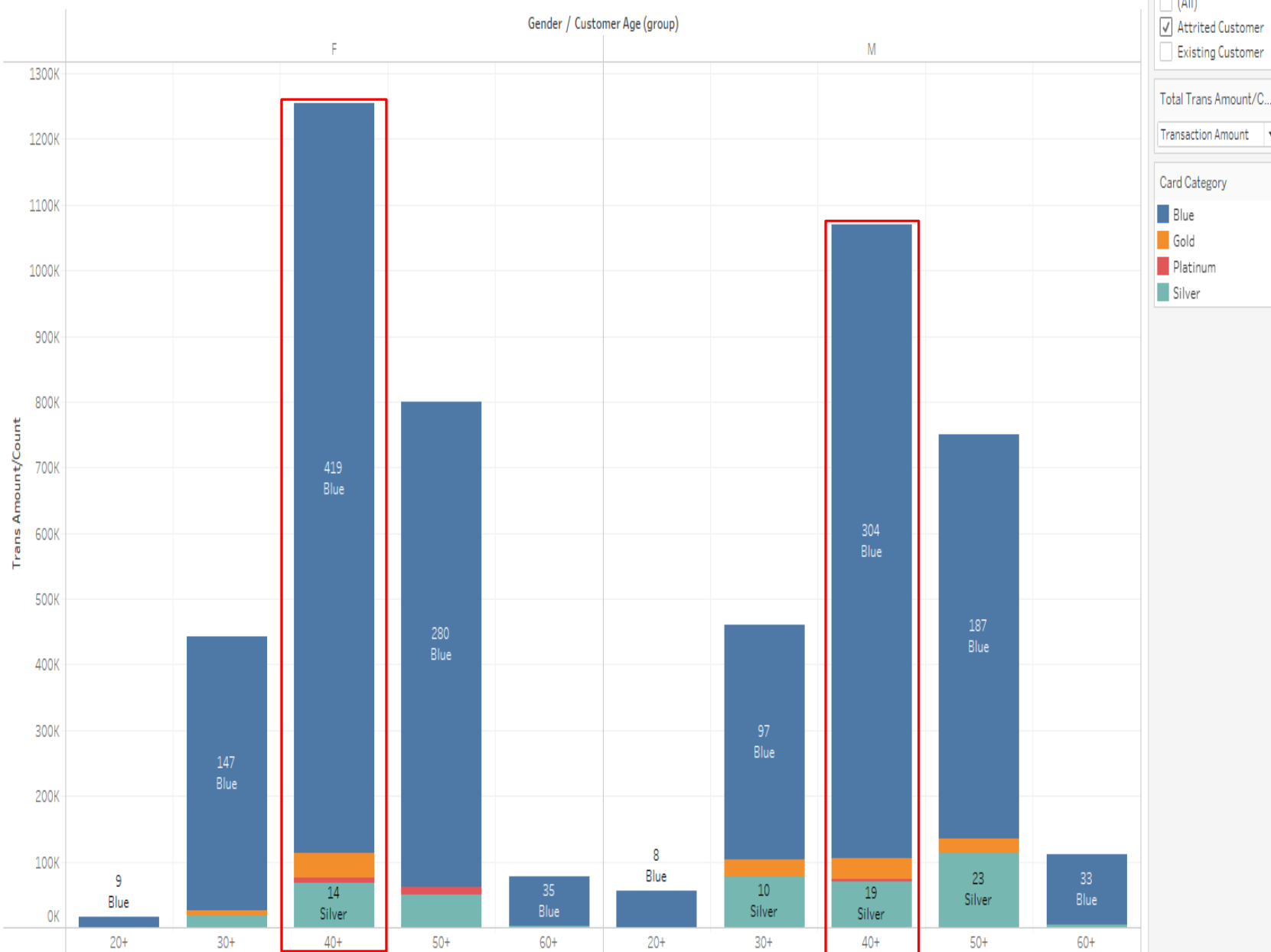
- Findings
  - Of the attrited customers:
    - From the graph, majority of the attrited customers were holding blue cards.
    - Female customers at 40s holding blue card had the most total transaction count and amount.
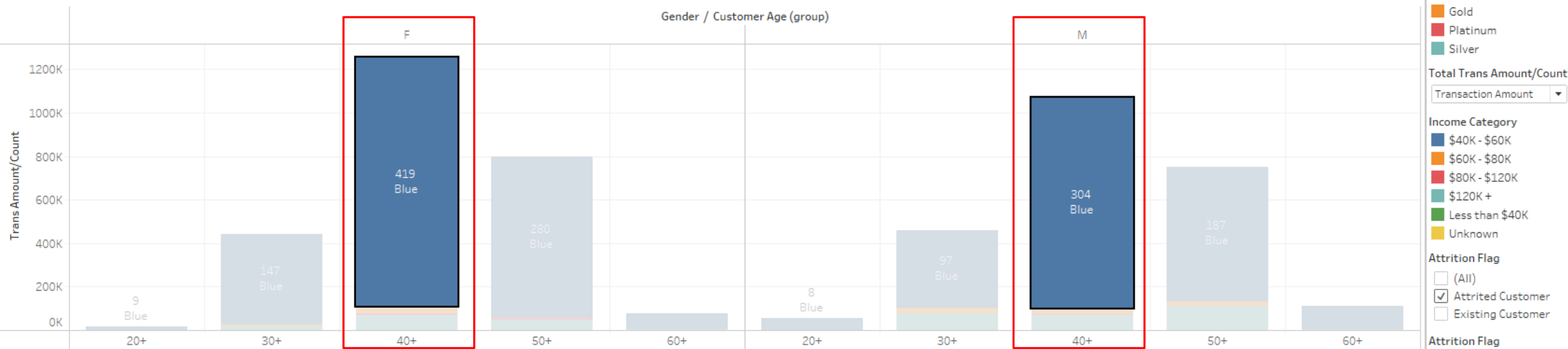   - Followed by male customers at 40+ holding blue card had the most total transaction count and amount.

- Insights
  - Most customers who attrited hold a blue card which is the lowest level of the card category.
  - Age group 40+ who hold blue cards had highest transaction amount and counts.
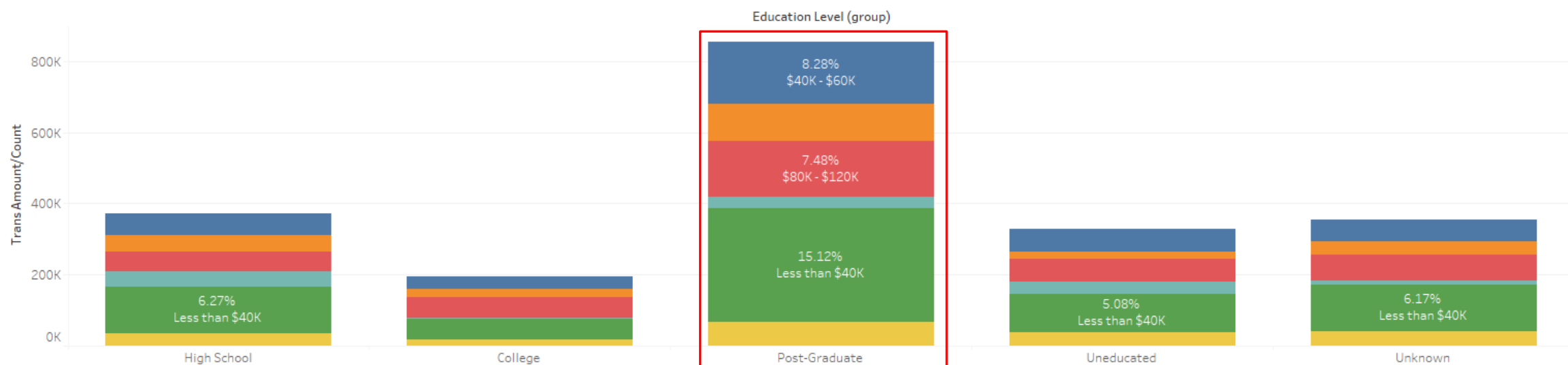
- Recommendation
  - Focus on retention strategies 40+ age group with blue card customers.

Total Transaction Amount & Count by Gender & Age

Gender / Customer Age (group)

Card Category
- Blue
- Gold
- Platinum
- Silver

Total Trans Amount/Count

Transaction Amount ▼

Income Category
- $40K - $60K
- $60K - $80K
- $80K - $120K
- $120K +
- Less than $40K
- Unknown

Attrition Flag
- ☐ (All)
- ☑ Attrited Customer
- ☐ Existing Customer

Attrition Flag
- ☐ (All)
- ☑ Attrited Customer
- ☐ Existing Customer

F

M

Trans Amount/Count

- 1200K
- 1000K
- 800K
- 600K
- 400K
- 200K
- 0K

9 Blue | 147 Blue | **419 Blue** | 280 Blue | | 8 Blue | 97 Blue | **304 Blue** | 187 Blue

20+ | 30+ | 40+ | 50+ | 60+ | 20+ | 30+ | 40+ | 50+ | 60+

Total Transaction Amount & Count by Education

Education Level (group)

Trans Amount/Count

- 800K
- 600K
- 400K
- 200K
- 0K

High School: 6.27% Less than $40K

Post-Graduate:
- 8.28% $40K - $60K
- 7.48% $80K - $120K
- 15.12% Less than $40K

Uneducated: 5.08% Less than $40K

Unknown: 6.17% Less than $40K

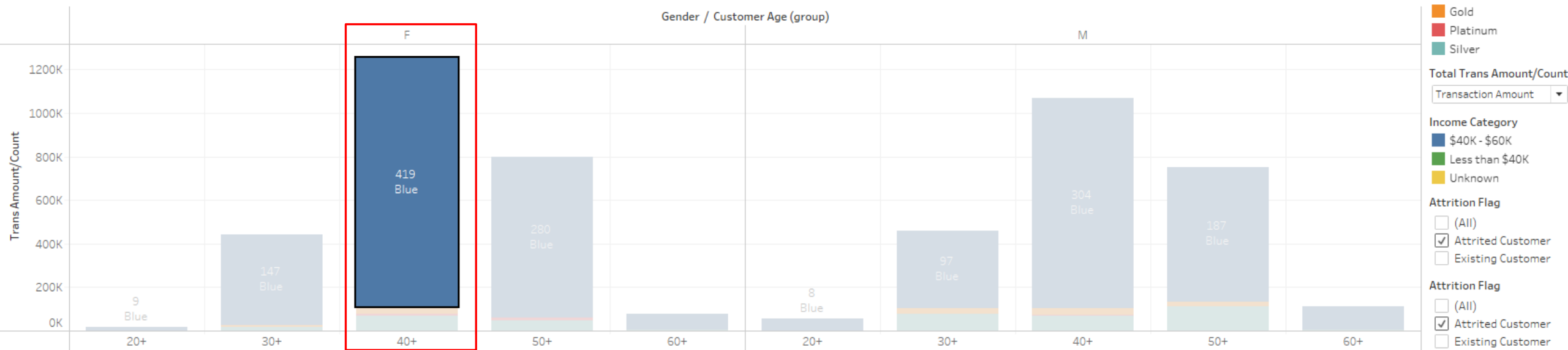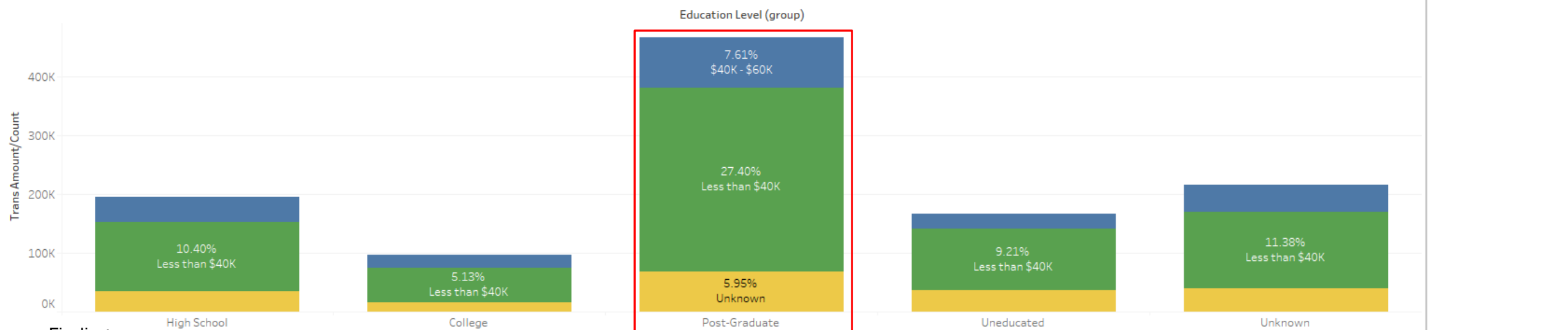High School | College | Post-Graduate | Uneducated | Unknown

- Findings
  - Of the attrited customers:
    - Age group of 40+ customers with Post-graduate qualification spent the most amount and have the most count.
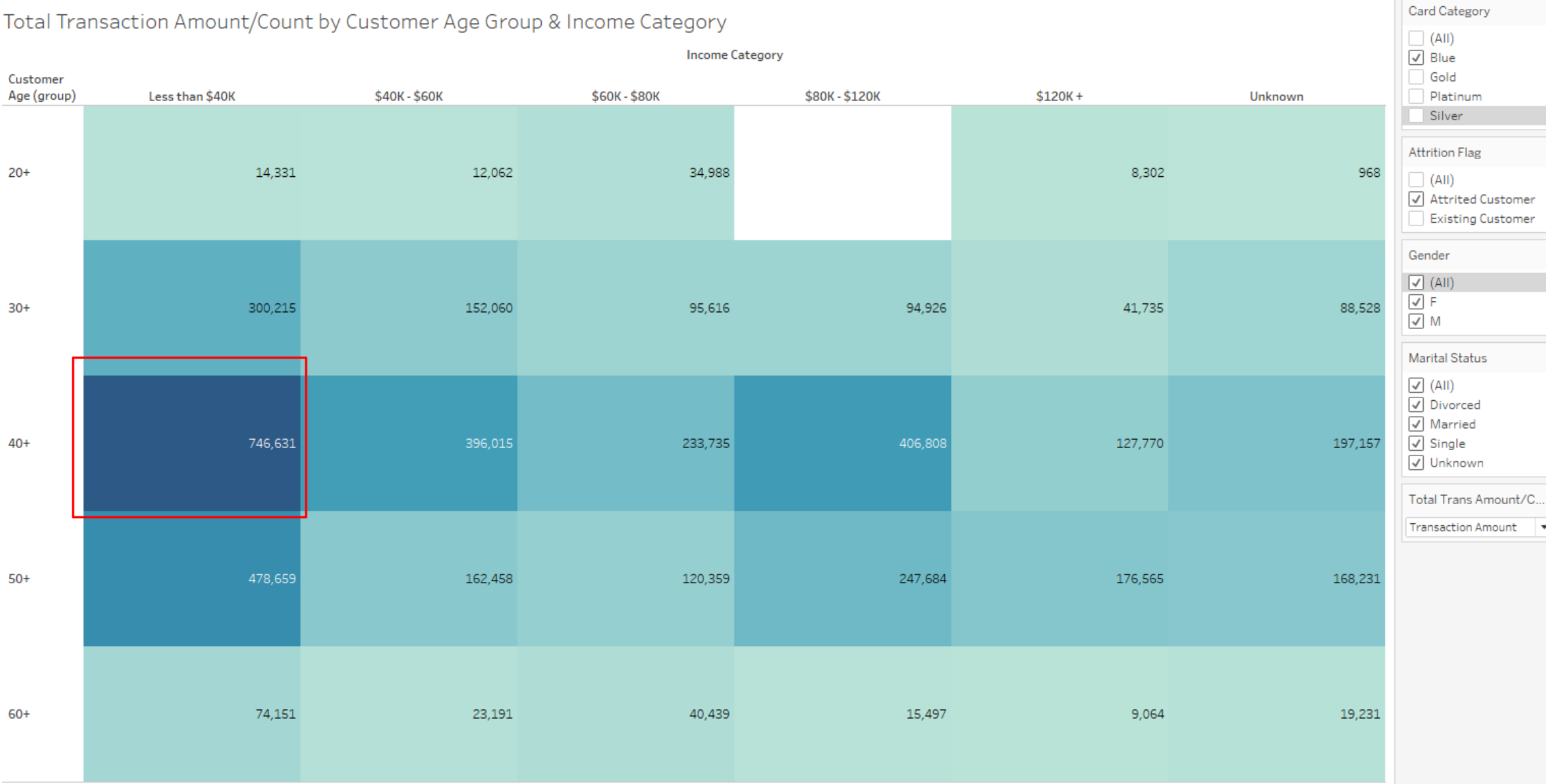
Total Transaction Amount & Count by Gender & Age

Total Transaction Amount & Count by Education

- Findings
  - Of the attrited customers from previous slide:
    - Age group of 40+ female customers with Post-graduate qualification spent the most amount and have the most count.
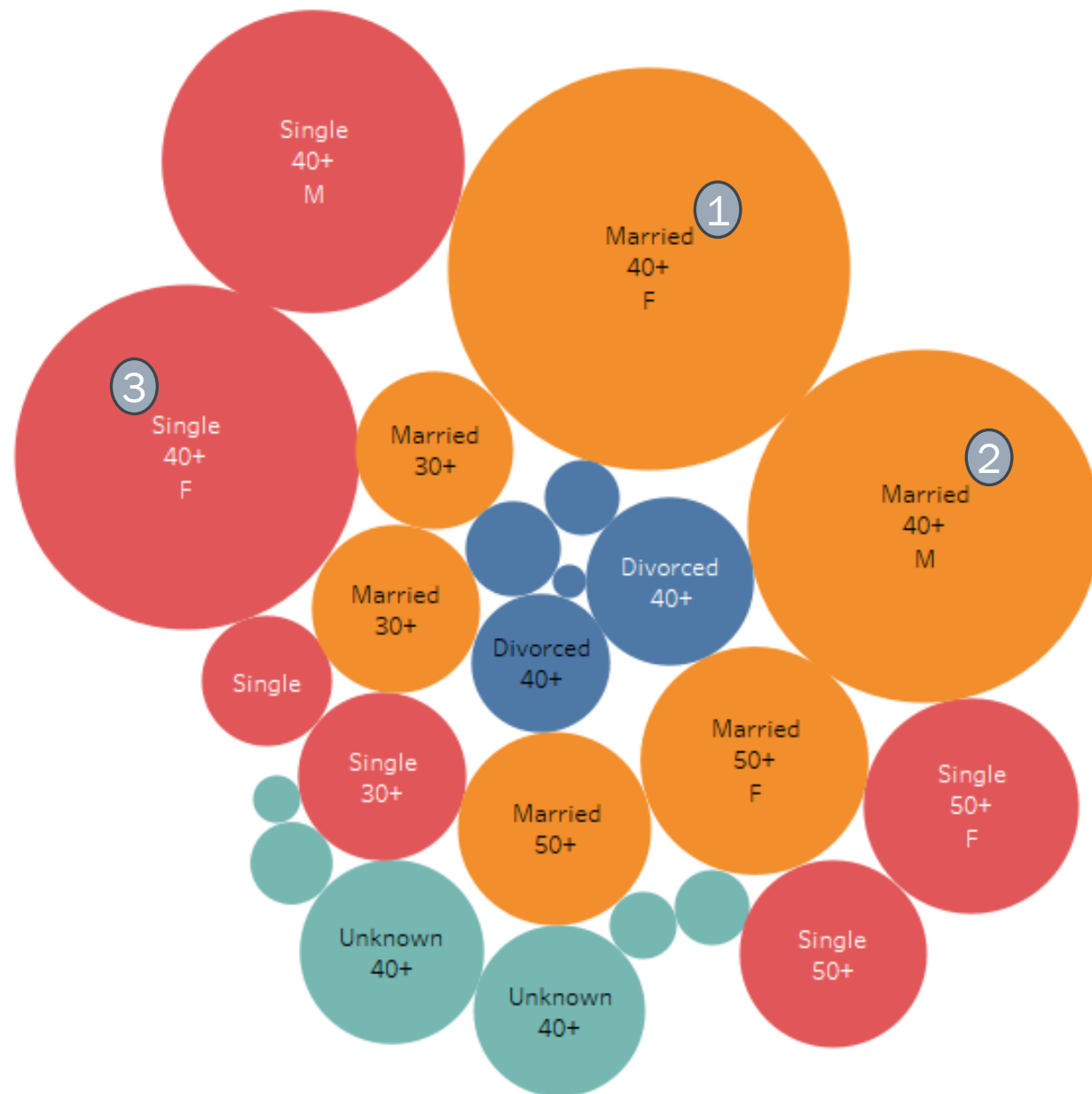
Total Transaction Amount/Count by Customer Age Group & Income Category

Customer Age (group)	Income Category					
	Less than $40K	$40K - $60K	$60K - $80K	$80K - $120K	$120K +	Unknown
20+	14,331	12,062	34,988		8,302	968
30+	300,215	152,060	95,616	94,926	41,735	88,528
40+	746,631	396,015	233,735	406,808	127,770	197,157
50+	478,659	162,458	120,359	247,684	176,565	168,231
60+	74,151	23,191	40,439	15,497	9,064	19,231

Card Category
- ☐ (All)
- ☑ Blue
- ☐ Gold
- ☐ Platinum
- ☐ Silver

Attrition Flag
- ☐ (All)
- ☑ Attrited Customer
- ☐ Existing Customer

Gender
- ☑ (All)
- ☑ F
- ☑ M

Marital Status
- ☑ (All)
- ☑ Divorced
- ☑ Married
- ☑ Single
- ☑ Unknown

Total Trans Amount/C...
- Transaction Amount ▼

- Findings
  - Of the attrited customers:
    - Customer age group at 40+ with income category less than $40k income has the greatest sum of transactions and count.

Total Transaction Amount/Count by Customer Age Group & Income Category
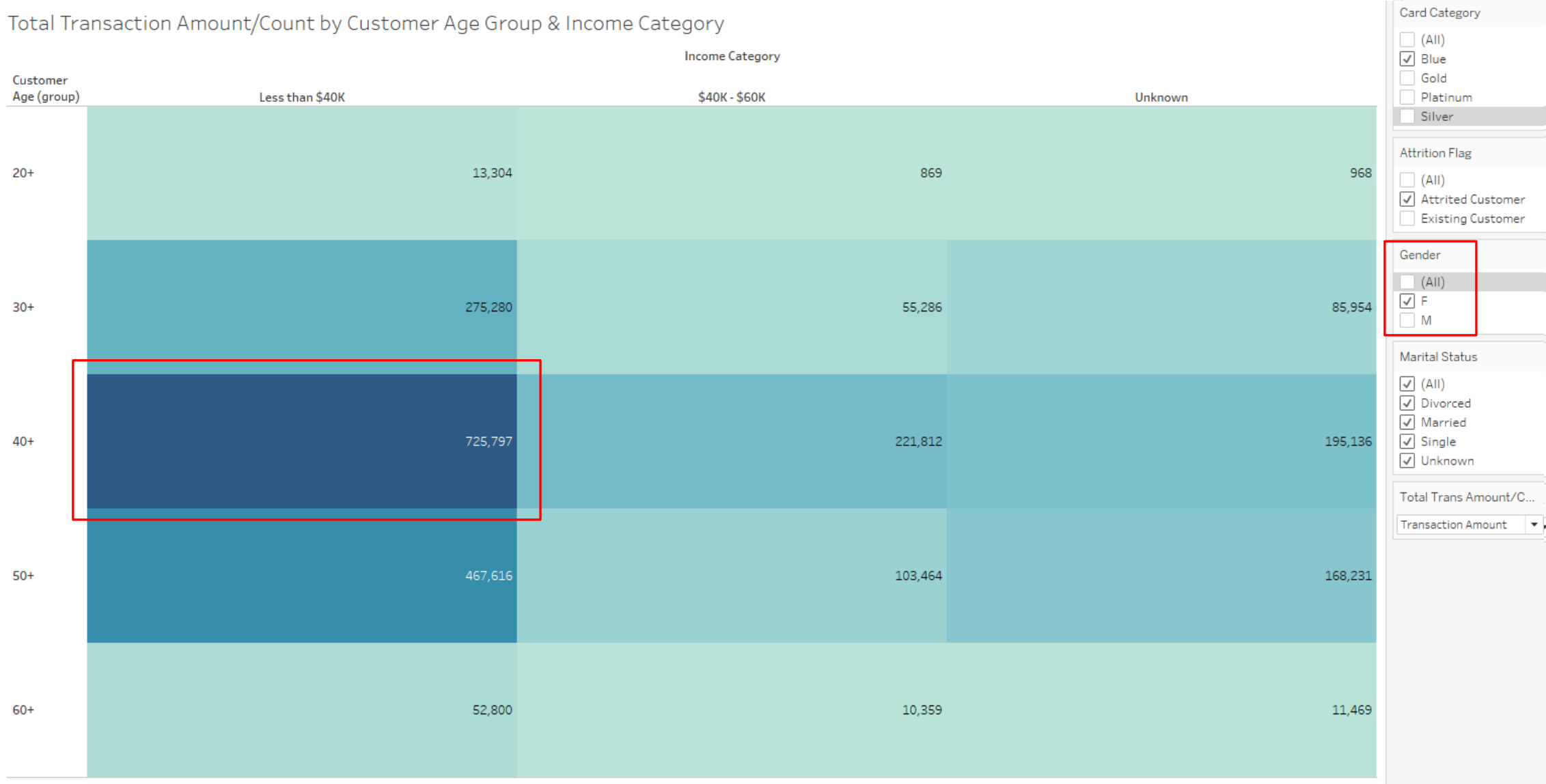
- Findings
  - Of the attrited customers, continuing from previous slide:
    - This is due to a big group of Female customers who are in their 40s with less than $40k of income.
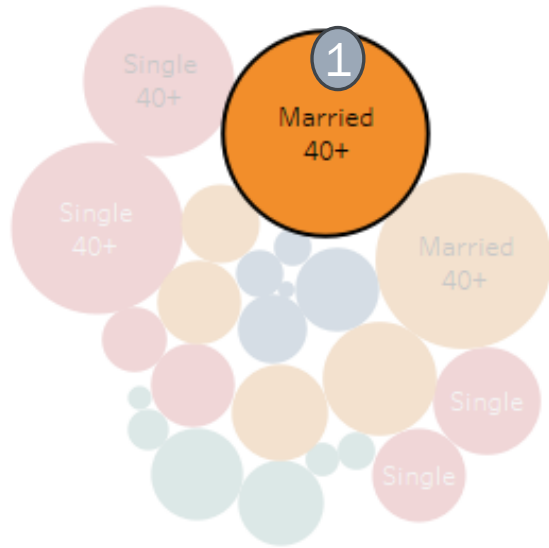
Marital Status with Dependent Count

- Findings
  - Of the attrited customers:
    1. Married female customers in their 40s have the highest dependent count, with three or more dependents.
    2. Followed by male customers at 40s who are married, with three or more dependents
    3. Single female customers in their 40s have dependent count nearly as high as married male customers in the same age group.

- Insights
  - It is expected that married customers would have a higher dependent count.
  - An unexpected observation is that single female customers in their 40s also have a relatively high number of dependents.

- Recommendations
  - Develop retention strategies targeting married customers in their 40s, as they represent the group with the highest dependent count.
  - Strategies for the next group can be targeted at single female customers at their 40s.

Marital Status with Dependent Count

Dependent count

(Multiple values) ▾

Attrition Flag

- ☐ (All)
- ☑ Attrited Customer
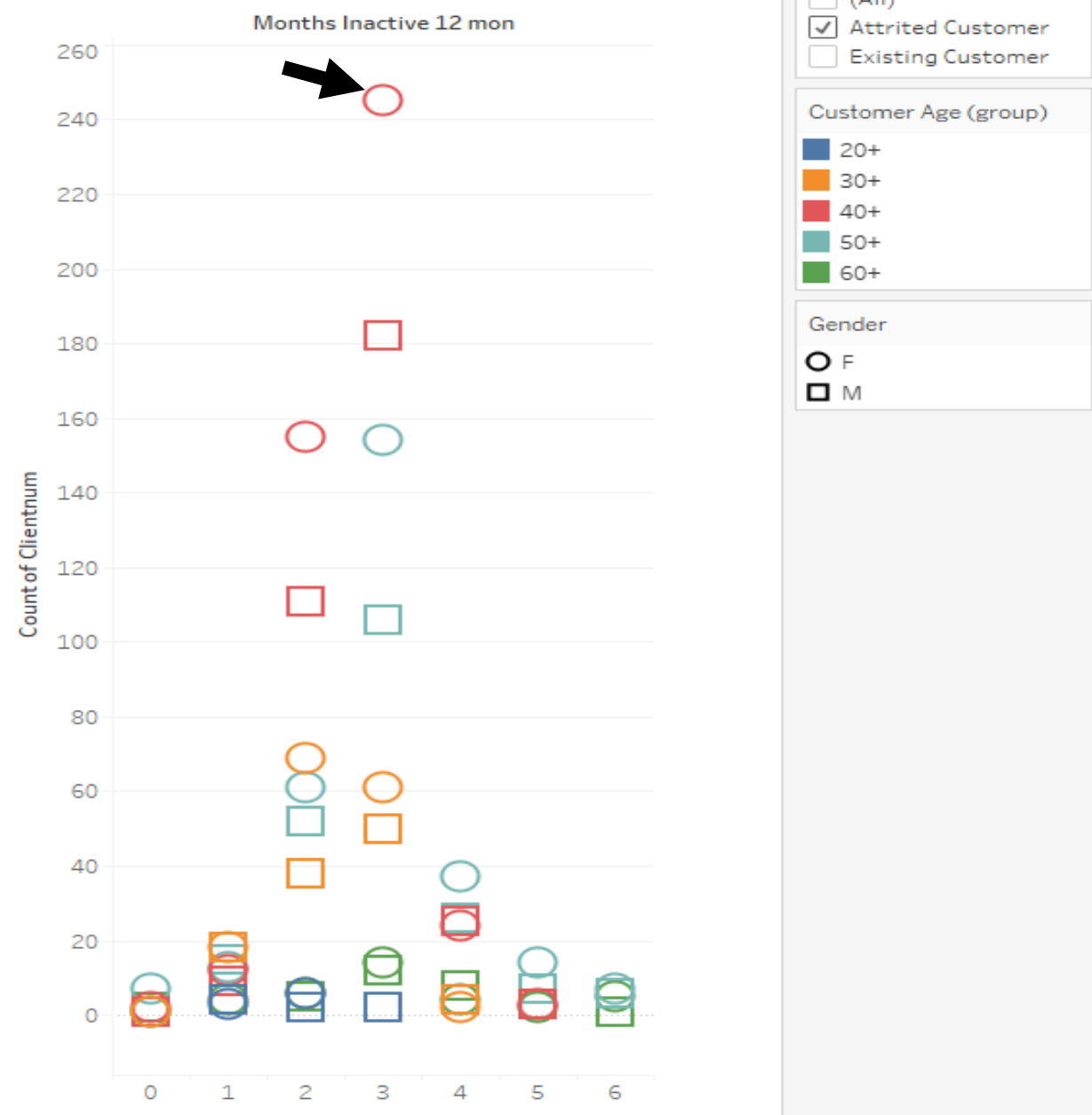- ☐ Existing Customer

Marital Status

- ■ Divorced
- ■ Married
- ■ Single
- ■ Unknown

- Insights
  - Of the attrited customers, continuing from previous slide:
    - To get the client details, click on the bubble that is of interest to see more details about the clients in the table below.
    - This will help to draw more insights of the particular bubble that is selected.

Client Details

Clientnum	Gender	Dependent ..	Customer A..	Education L..	Card Categ..
141	F	5	40+	High School	Blue
146	F	4	40+	Uneducated	Blue
421	F	3	40+	Post-Gradu..	Blue
594	F	4	40+	Uneducated	Blue
595	F	3	40+	Post-Gradu..	Blue
735	F	4	40+	College	Blue
1345	F	3	40+	High School	Blue
1466	F	5	40+	High School	Blue

Inactivity on book by Age Group

Months Inactive 12 mon

Attrition Flag
- ☐ (All)
- ☑ Attrited Customer
- ☐ Existing Customer

Customer Age (group)
- ■ 20+
- ■ 30+
- ■ 40+
- ■ 50+
- ■ 60+

Gender
- ○ F
- ☐ M

- Findings
  - Of the attrited customers:
    - A significant number of female customers in their 40s remained inactive on the books for 3 months within the last 12 months before ultimately attriting.

- Recommendation
  - Proactively engage with this group of customers during their second month of inactivity to encourage re-engagement and reduce the likelihood of attrition.

Summary of Insights

Retention strategies can initially be developed to target this group with the combined demographics:

Gender – **Female**

Marital Status - **Married**

Age group - **40s**

Card category - **Blue card holder**

Education qualification – **Post-graduate**

Income group – **Less than $40k**

Recommendation - Retention Strategies

- Rewards and Cashback for family and individuals:
  - Enhanced rewards for everyday purchases such as groceries, fuel, and utilities.
  - Cashback or discounts on tuition fee payments and child activities like enrichment programmes.

- Health Focus:
  - Partner with healthcare providers to offer discounts on health checkups and insurance premiums as this group often balances caregiving responsibilities while managing own well-being

- Financial Flexibility Features:
  - 0% interest instalment plans for big purchases
  - Option to defer payment options during emergencies

- Referral and Networking Incentives
  - Referral rewards
  - Organise events or webinars on topics like career advancement, parenting and wellness.

Execution Plan of the Strategies
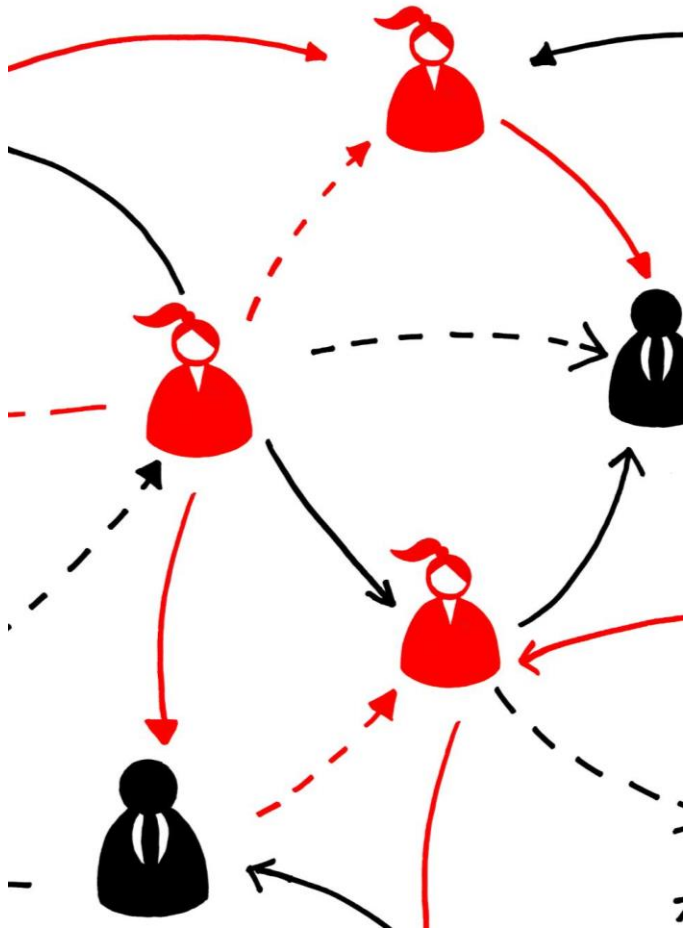
- To execute plan on the second month of inactivity on book:
  - Personalised communication via SMS or app notifications on offers, rewards or programmes.
  - Conduct surveys with this group to understand evolving needs and incorporate them into future offerings.
  - Branding
    - Special card for this group in achieving financial goals and managing family responsibilities.

Thank you.