

# Customer Segmentation and Marketing Campaign Analysis

## Problem Statement and Motivation

The goal of this project is to analyze customer behavior from a marketing campaign dataset to support segmentation and improve targeting strategies. A key decision was made to retain outliers, as unusual customer behavior can carry significant insights, especially in marketing where high spenders or rare patterns may indicate valuable segments. Removing these would result in biased analysis.

## Dataset Description

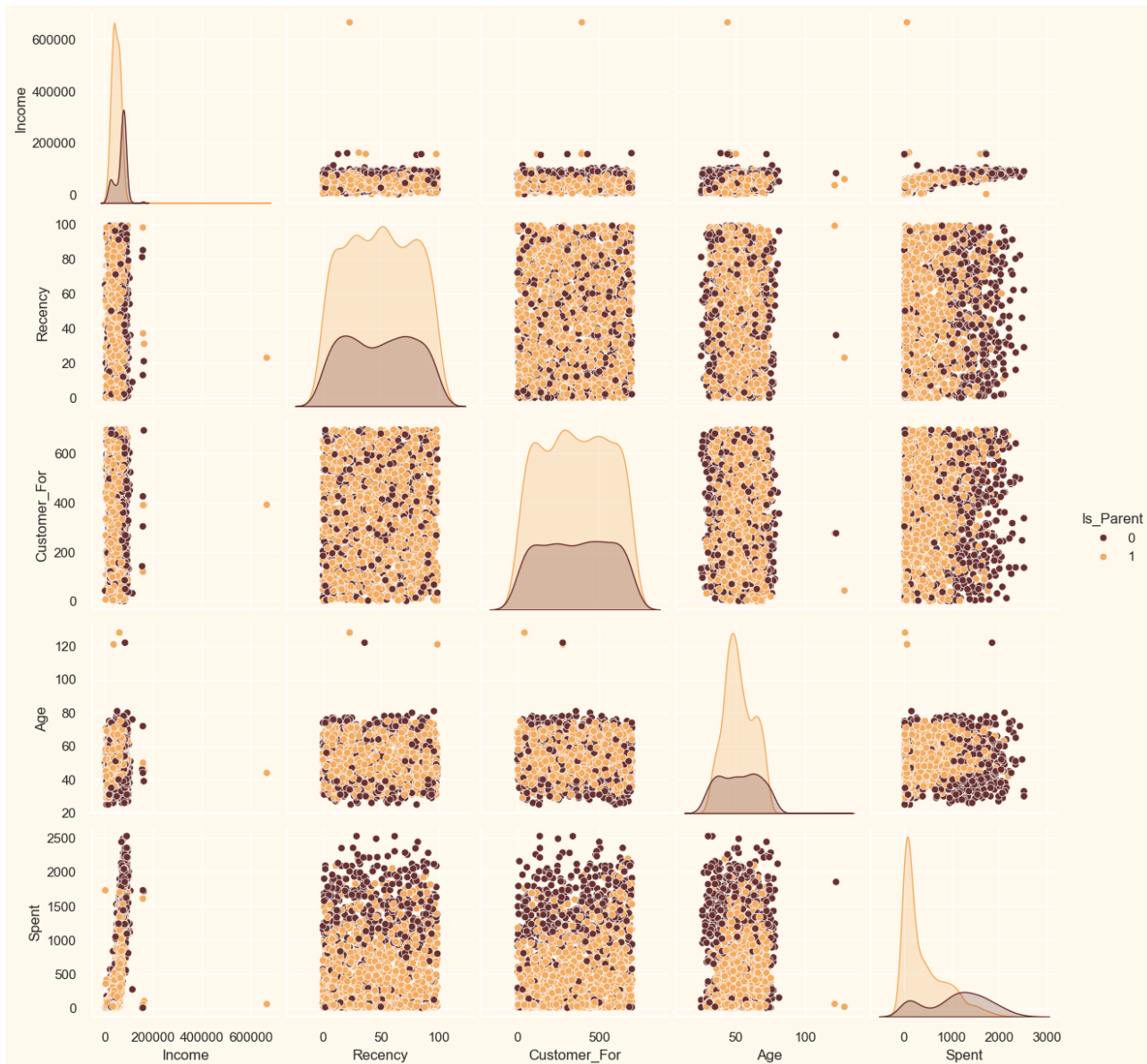
The dataset contains 2240 entries and 29 features, including customer demographics, product purchases, campaign responses, and online activity. Key fields include Income, Age, Marital Status, and spending on different product categories such as Wine, Meat, and Gold.

## Technique Explanation

This project utilizes Agglomerative Clustering to segment customers into three distinct groups. Prior to clustering, Principal Component Analysis (PCA) was used for dimensionality reduction to better visualize the data and enhance performance. The model's effectiveness was evaluated using the Silhouette Score, which helps assess the quality and separation of clusters.

## Exploratory Data Analysis

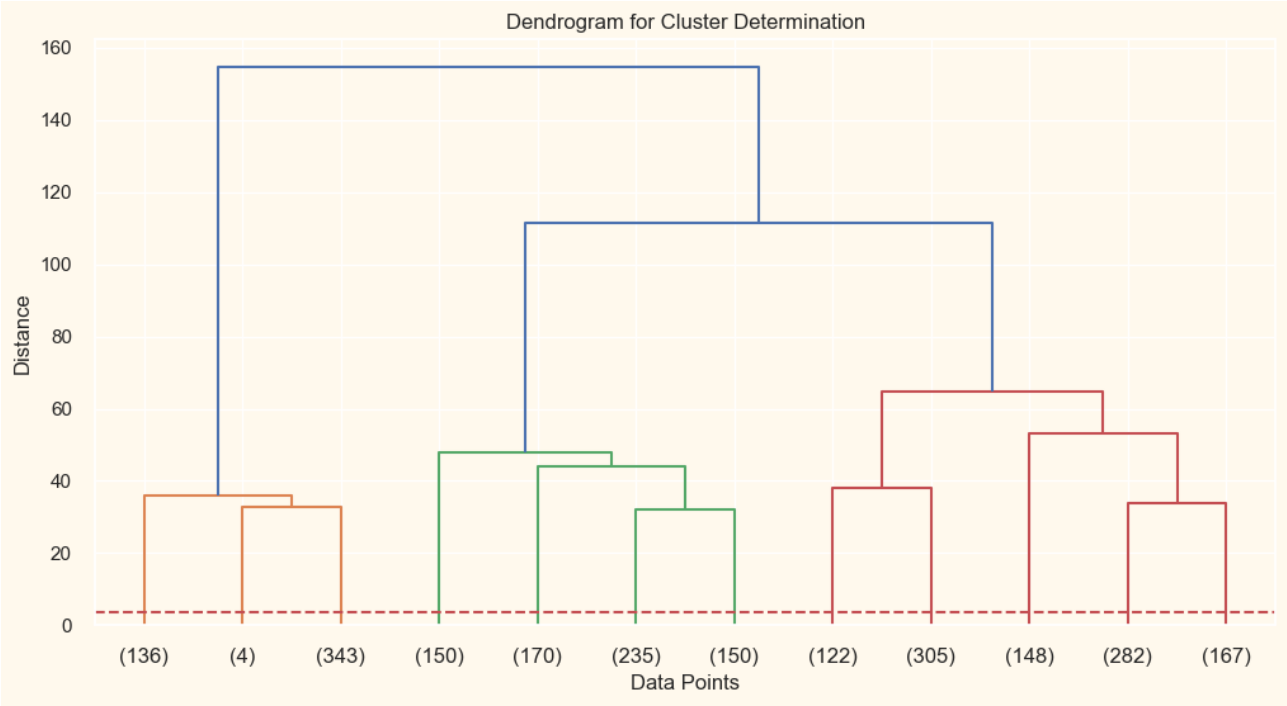
# Customer Segmentation and Marketing Campaign Analysis



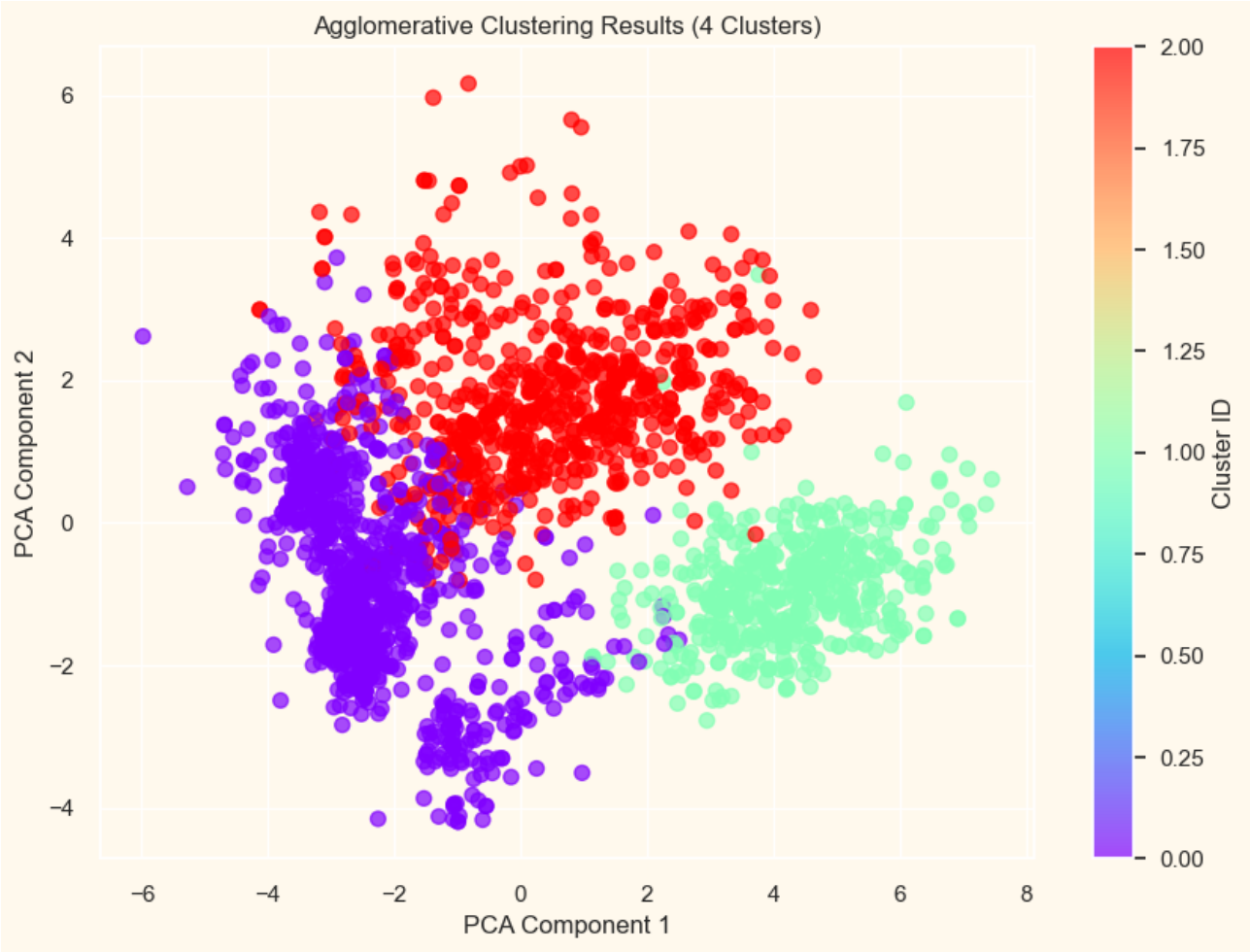
This initial plot is part of the exploratory data analysis and helps visualize the relationships between variables.

## Clustering and PCA

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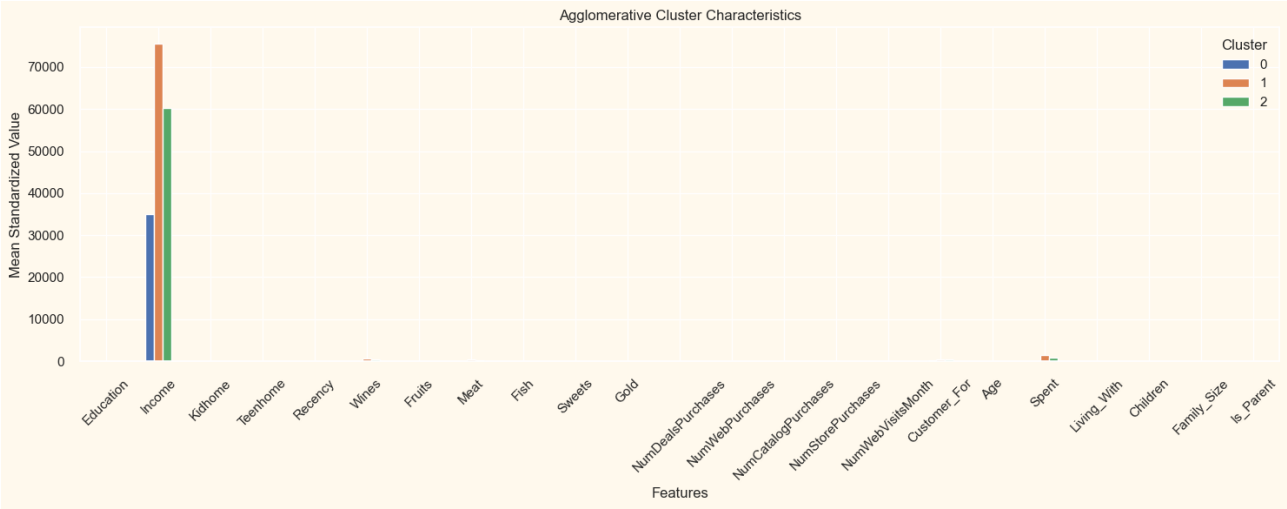


This plot was generated during the clustering step using Agglomerative Clustering.



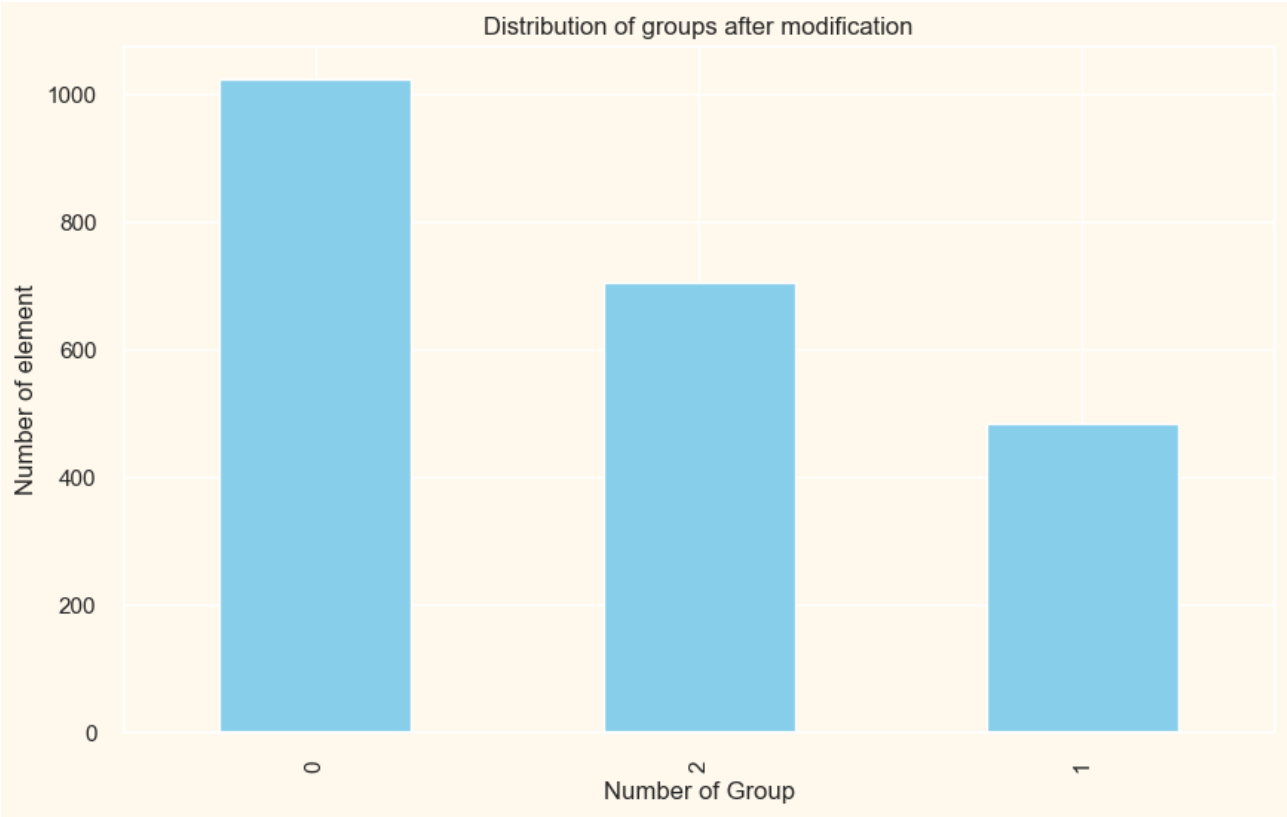
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This plot was generated during the clustering step using Agglomerative Clustering.



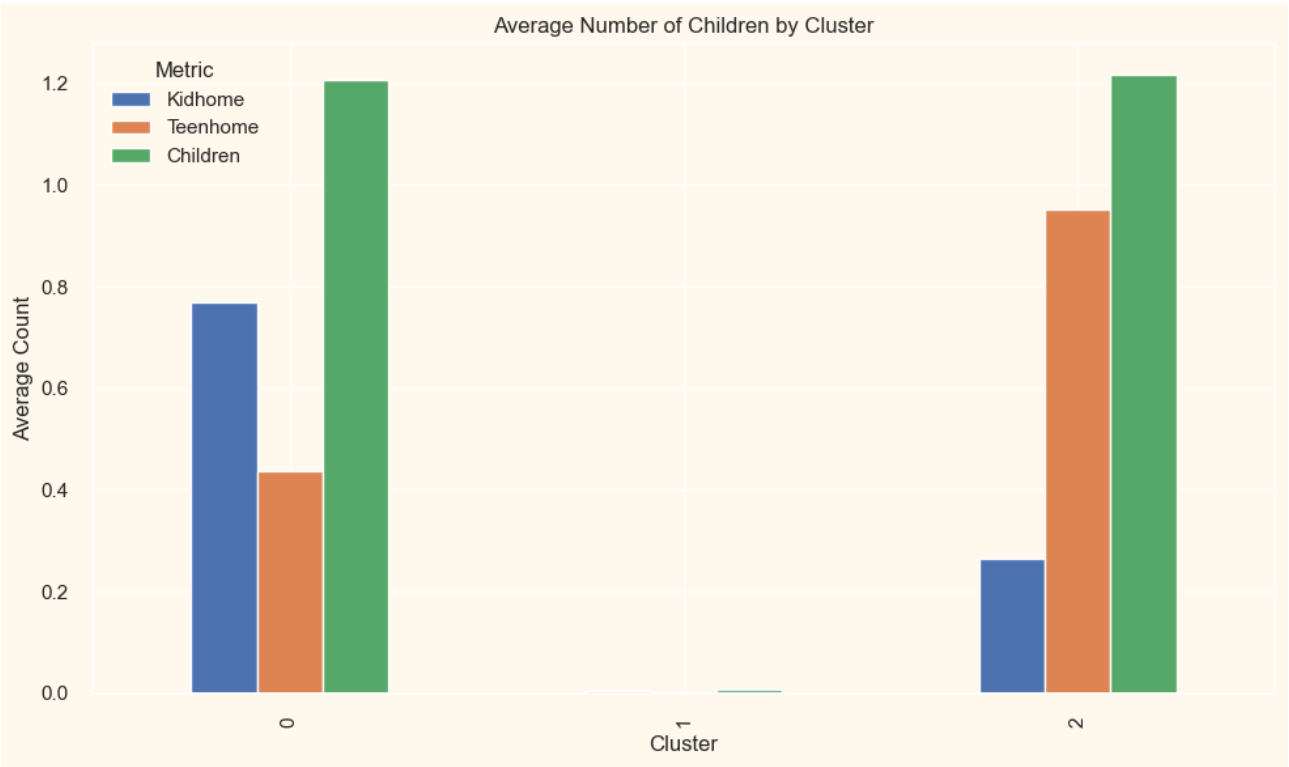
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## Results and Insights



The largest number of customers were from group number 0, which is characterized by low income and low spending. We recommend increasing attractive promotional offers to collect more purchases from this segment.

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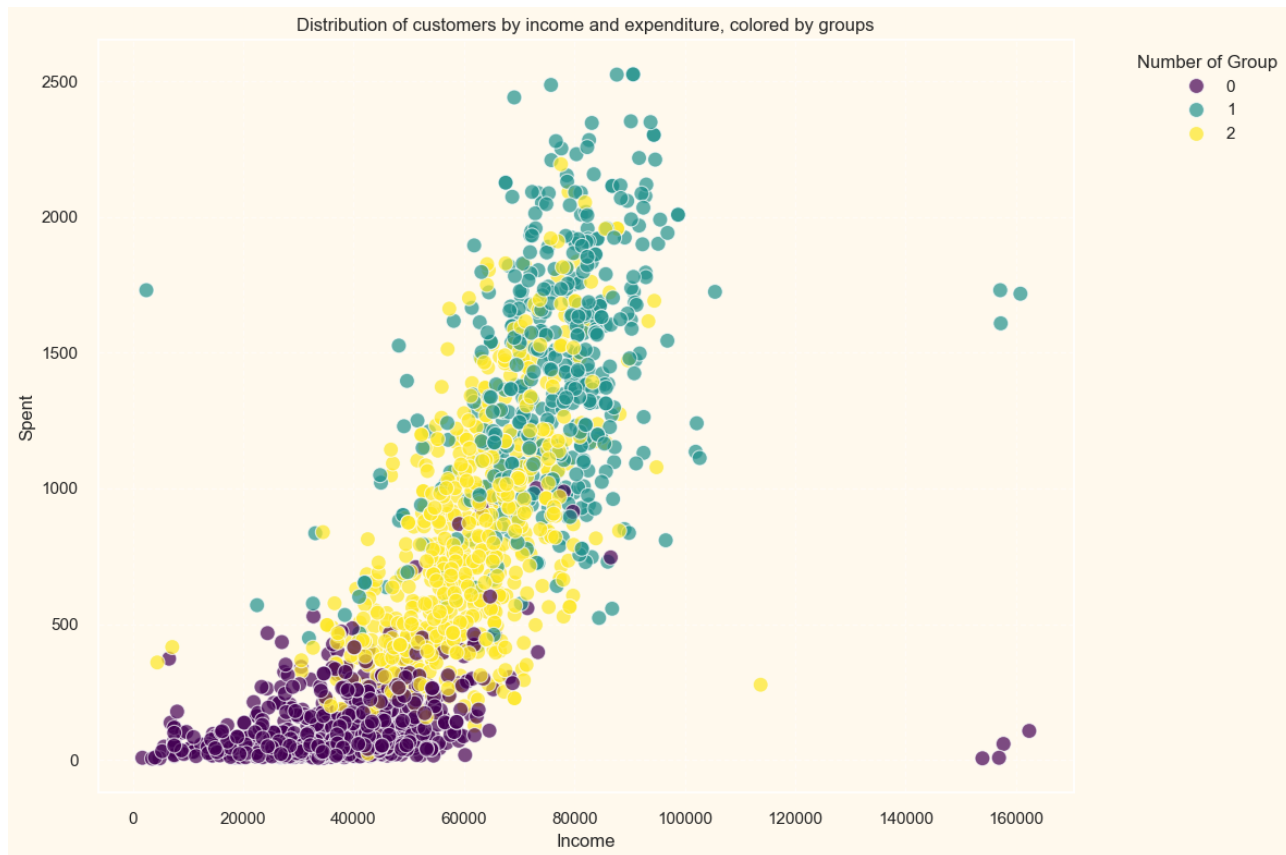


Through this visualization, it is clear that there are a good number of families with children, such as Group 0 and Group 2. We recommend providing toys and products for children, which increases sales.



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The most purchased products are meat and grape juice. It is recommended to pay attention to these two products.



Group No. 1 are the people with the highest income and the people who spend the most on purchases, so you must pay attention to maintaining them as customers.

## Conclusion

The analysis helped uncover distinct customer segments and patterns in campaign responsiveness. Key takeaways include the importance of income and product preferences in predicting responses. Retaining outliers proved beneficial in highlighting high-value clients. This type of segmentation allows for more targeted and cost-effective marketing strategies.