

Marketing Campaign Analysis Report

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Executive Summary

This report presents an exploratory data analysis (EDA) of a marketing campaign dataset to uncover patterns in customer behavior, spending habits, and campaign responsiveness. The primary objective is to identify which customer segments are more likely to engage with marketing efforts and how demographic and financial factors influence response rates.

Key findings indicate that customers aged **25–34** and those with a **high education level** demonstrate the highest campaign acceptance rates. A strong positive correlation ($r = 0.82$) was observed between **income and total spending**, suggesting that higher-income individuals tend to spend more. Additionally, customers **without children** and those in the **very high spending group** showed significantly greater engagement with campaigns.

These insights suggest that marketing efforts may be most effective when targeted toward high-income, educated, and younger customer segments. The report concludes with actionable recommendations to guide future campaign targeting and segmentation strategies.

Background of the Dataset

The dataset used in this project contains detailed customer information collected during a series of marketing campaigns conducted by a retail company. It includes demographic attributes, purchasing behavior across various product categories, and indicators of customer responses to five distinct marketing campaigns. The data spans multiple years of interaction and is suitable for analyzing consumer trends and engagement patterns.

Business Objective

The primary objective of this analysis is to explore customer characteristics and identify patterns in **campaign responsiveness and spending behavior**. By understanding which customer groups are more likely to respond to campaigns and spend more, the company can optimize **targeting strategies**, improve **marketing ROI**, and enhance **customer segmentation** efforts.

Brief Description of Columns

- **Demographics:**
 - **Age:** Derived from year of birth
 - **Education:** Customer's education level
 - **Marital_Status:** Relationship status
 - **Income:** Yearly household income
 - **Kidhome, Teenhome:** Number of children and teenagers at home
 - **Living_with_others:** Flag created from marital status
- **Purchases:**
 - **MntWines, MntFruits, MntMeatProducts, MntFishProducts, MntSweetProducts, MntGoldProds:** Amounts spent on each product category
 - **Total_Spent:** Sum of all product spending (feature engineered)
- **Campaign Response:**
 - **AcceptedCmp1 to AcceptedCmp5:** Whether customer accepted each specific campaign
 - **Response:** Whether the customer accepted any campaign
 - **Total_Campaigns_Accepted:** Total number of campaigns accepted
- **Other:**
 - **DtCustomer:** Date of customer enrollment
 - **Complain:** Whether the customer filed a complaint

Source and Size of the Dataset

The dataset was obtained from [Kaggle](#). It originates from the book *Business Analytics Using SAS Enterprise Guide and SAS Enterprise Miner* by O. Parr-Rud (SAS Institute, 2014).

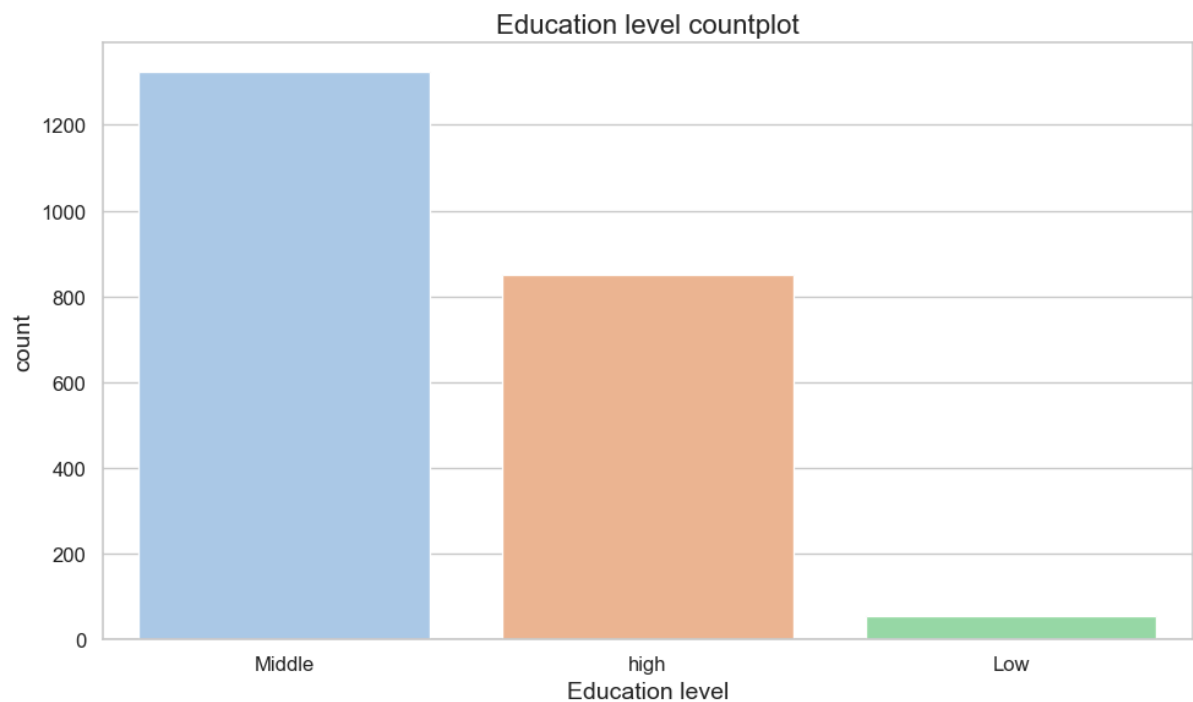
The dataset includes **2,240 customer records** with **29 columns**, covering demographics, campaign responses, purchase history, and behavioral indicators. The data spans **two years** of customer interactions.

Missing Data Handling and Preprocessing

Several preprocessing steps were applied to prepare the dataset for analysis:

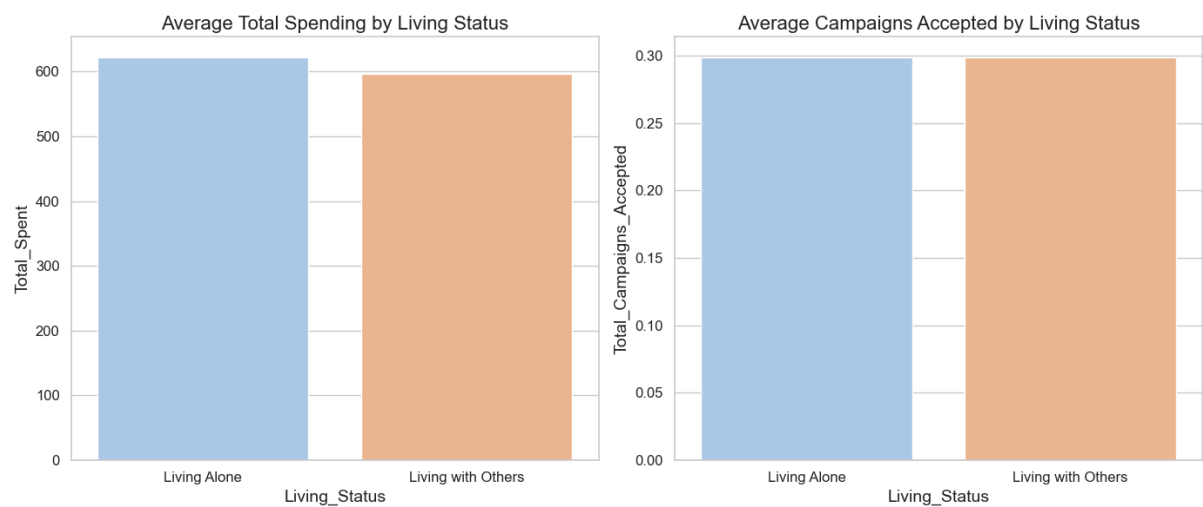
- **Missing Values:**
 - The **Income** column had missing values which were handled by removing affected rows (or imputation if you chose that).
- **Feature Engineering:**
 - **Age** was derived from year of birth (if **Year_Birth** existed).
Total_Spent was calculated as the sum of spending across all product categories.
 - **Total_Campaigns_Accepted** was created as the sum of individual campaign responses.
 - A binary feature **Living_with_others** was derived from marital status.
- **Data Type Conversion:**
 - The **DtCustomer** column was converted to datetime format for further time-based analysis.
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1. Customer Education Profile



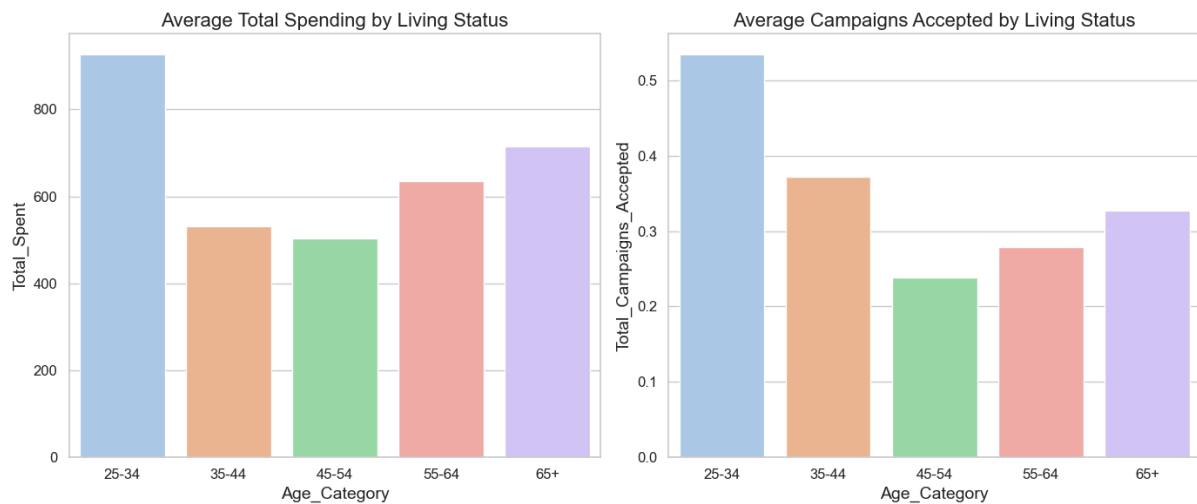
The education level distribution indicates that the majority of customers are from the mid-education segment, followed by the highly educated, while the low-education group is the smallest. This demographic structure suggests that marketing efforts may be more effective when tailored to the preferences and communication styles of mid to high-educated customers.

2. Living-status-Based Insights



The analysis shows that individuals living alone tend to spend slightly more on average compared to those living with others. However, there is no significant difference in the number of marketing campaigns accepted between the two groups. This suggests that while spending behavior may vary slightly by living situation, campaign responsiveness remains consistent regardless of household status.

3. Age-Based Insights

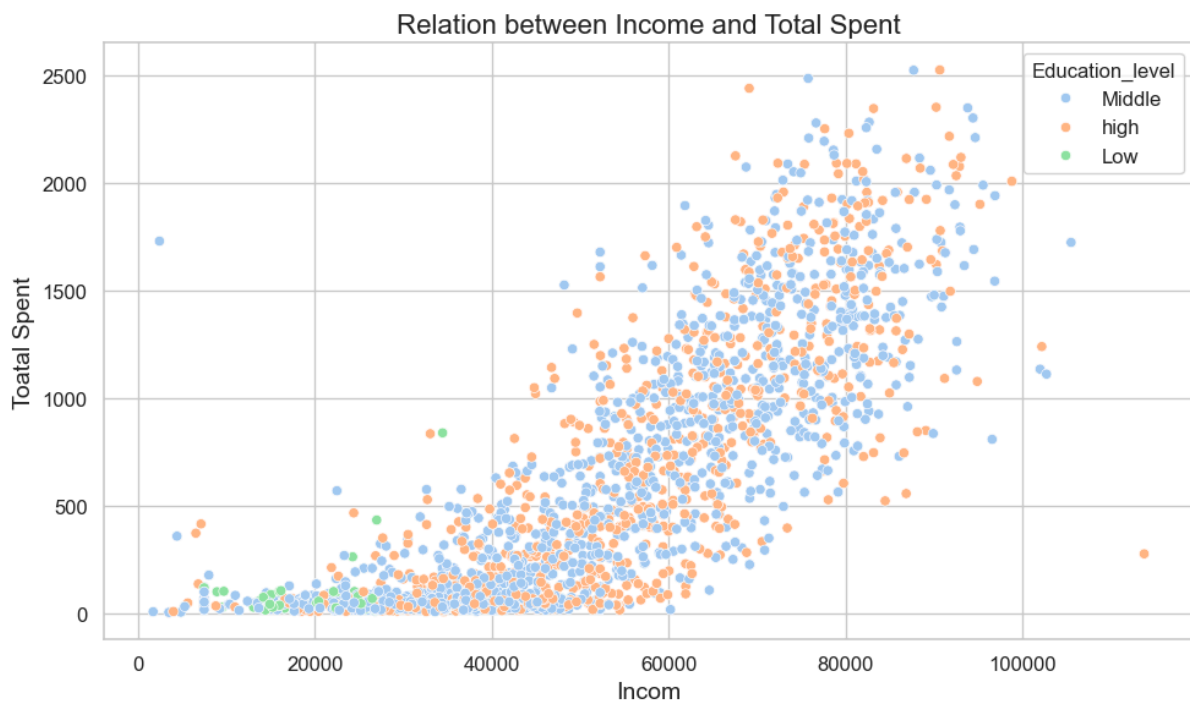


The analysis reveals that customers aged 25–34 exhibit the highest average spending, followed by the 65+ and 55–64 age groups. Those aged 35–44 spend moderately, while the 45–54 group records the lowest average total spend.

Similarly, the 25–34 group also has the highest average number of accepted campaigns, followed by customers aged 35–44 and 65+. The 55–64 group shows moderate campaign engagement, while again, the 45–54 group has the lowest acceptance rate.

This consistent pattern suggests that younger adults (25–34) and older customers (65+) are more responsive and engaged with marketing efforts, both in terms of spending and campaign interaction. In contrast, the mid-aged 45–54 segment appears less responsive and may require tailored strategies to boost engagement.

4. Spending Patterns by Income Level

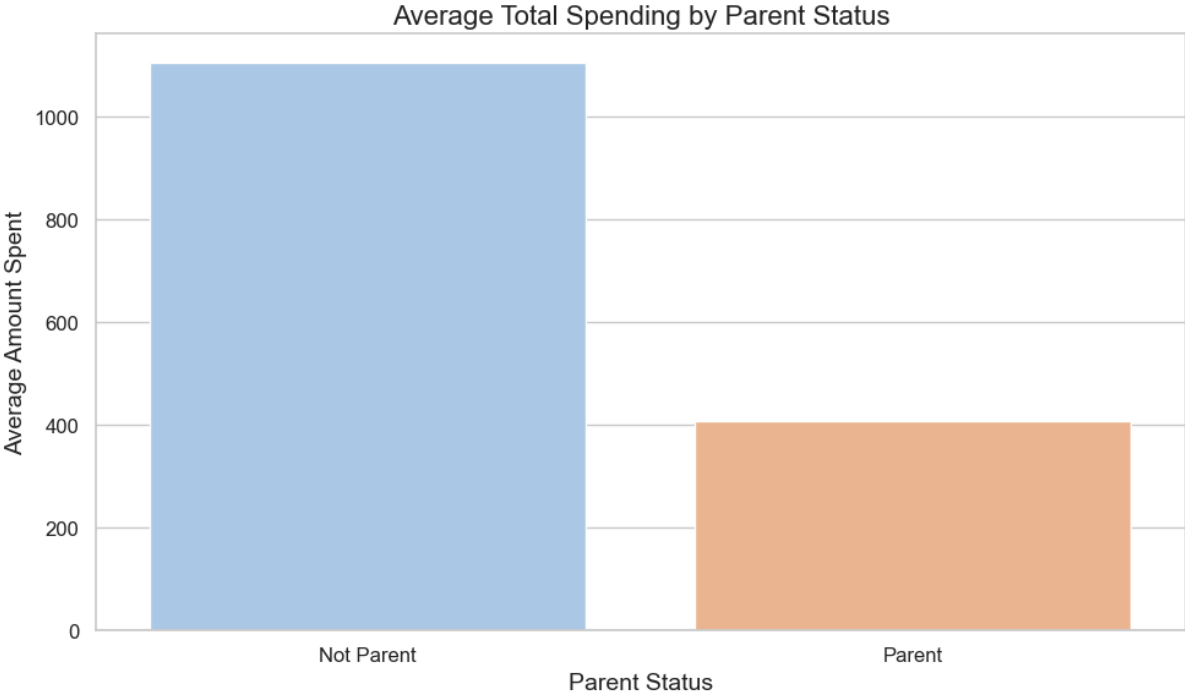


The scatter plot between Income and Total Spent reveals a strong positive relationship, supported by a correlation coefficient of 0.82.

This indicates that higher-income customers are significantly more likely to spend more.

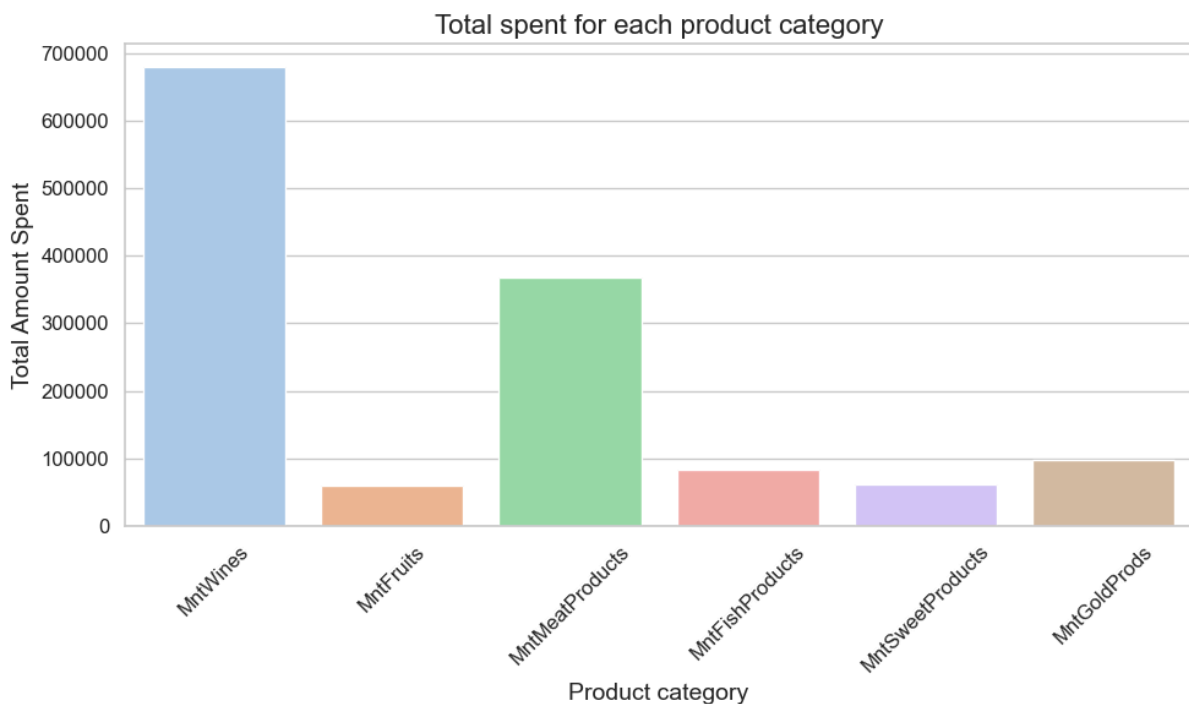
The strong linear trend suggests income is a key driver of customer spending behavior and could be an effective feature for segmentation or targeting in future campaigns.

5. Spending Behavior by Parental Status



The analysis shows that customers without children spend significantly more on average compared to those with children. This suggests that non-parents may have more disposable income or flexibility in spending, making them a potentially more lucrative target group for marketing campaigns.

6. Spending Distribution Across Product Lines

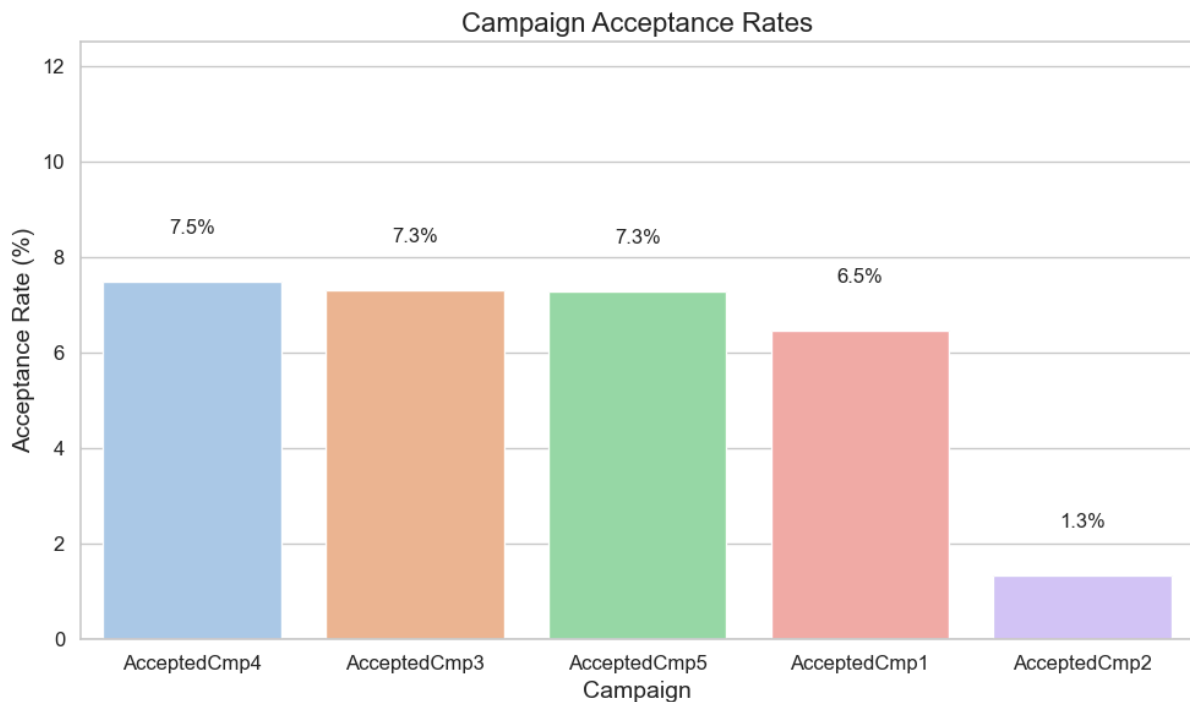


The barplot illustrates total spending by product category over the last two years.

Wine products represent the highest expenditure, with over 679,000 units in spending, followed by meat products at 368,000. Gold, fish, and sweet products fall in the mid-range, while fruits account for the lowest total spending.

This suggests a strong customer preference for wine and meat products, which could guide inventory, promotions, or cross-selling strategies.

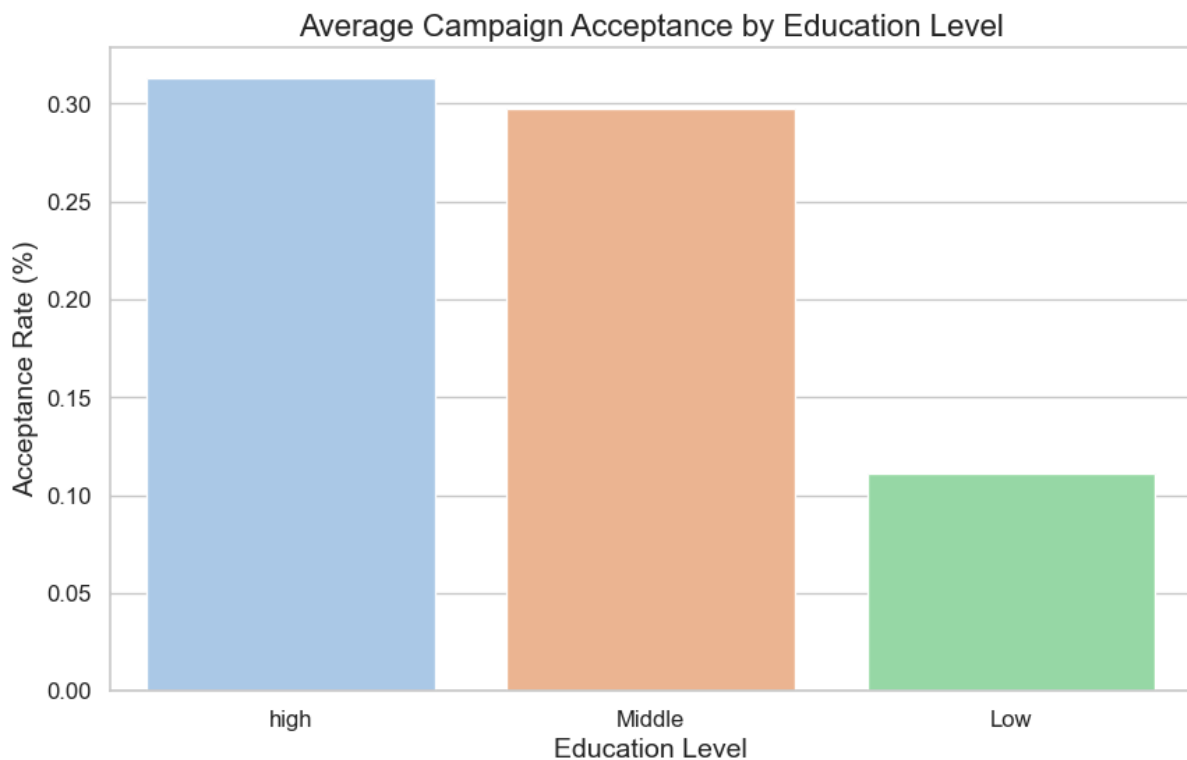
7. Campaign Performance Comparison



Campaign 4 had the highest average spending among responders (7.49), followed closely by Campaigns 3 and 5.

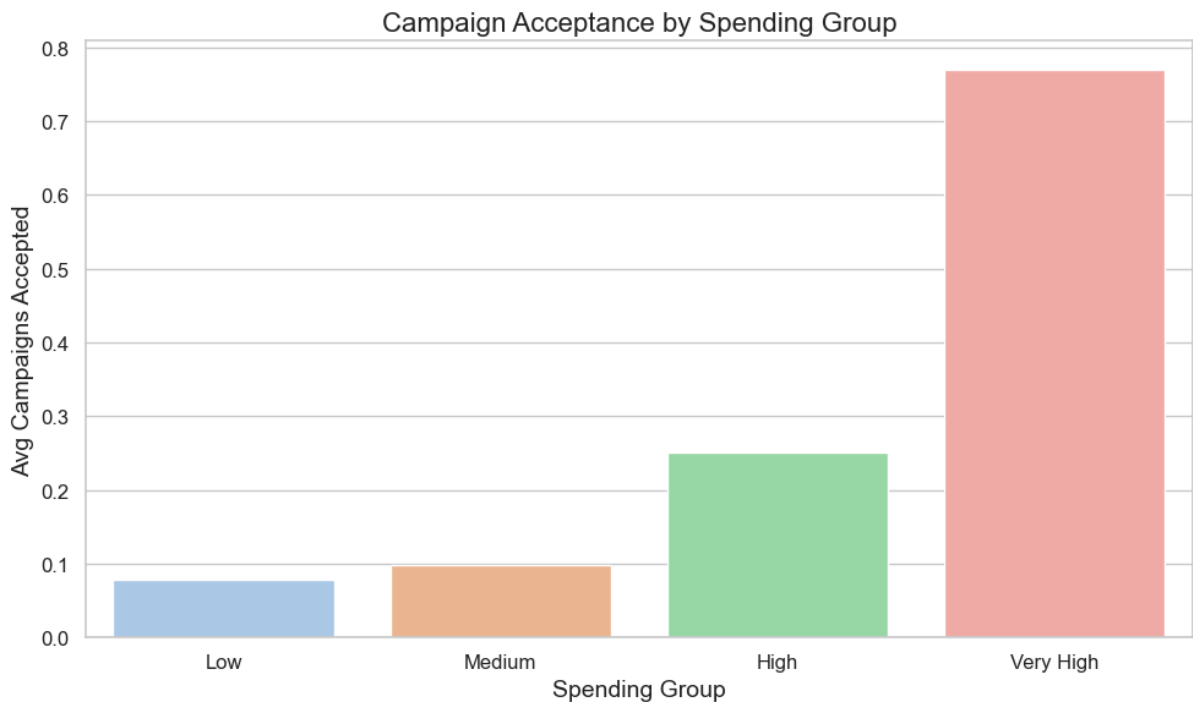
Campaign 1 showed moderate performance, while Campaign 2 had the lowest impact (1.35). This suggests that Campaigns 3–5 were more effective at engaging high-spending customers

8. Education-Based Campaign Response



The campaign acceptance rate is highest among customers with a high education level, followed closely by those with a medium education level. Customers with a low education level have the lowest acceptance rate, which is less than half that of the medium group. This suggests that educational background may significantly influence responsiveness to marketing campaigns.

9. Campaign Response by Spending Tier



The barplot shows that customers in the very high spending group have the highest campaign acceptance rate by a significant margin. The high spending group follows, while the medium group accepts about half as many campaigns as the high group. The low spending group has the lowest acceptance rate, slightly below that of the medium group. This indicates a strong positive relationship between spending level and campaign engagement.

Key Findings

- **Customers aged 25–34** spend the most and accept the highest number of campaigns, making them a key target segment.
- There is a **strong positive correlation ($r = 0.82$)** between **income and total spending**, indicating income is a major driver of purchasing behavior.
- Customers **without children** spend significantly more on average than those with children, suggesting they may have more disposable income.
- **Highly educated customers** show the highest campaign acceptance rates, followed closely by those with medium education. Customers with low education respond at less than half the rate of medium-educated customers.
- The **very high spending group** has the highest campaign engagement, with a clear drop-off across high, medium, and low spending groups.
- **Living alone** is associated with slightly higher average spending, though campaign acceptance is similar across living statuses.
- **Campaigns 3, 4, and 5** performed better than Campaigns 1 and 2 in terms of attracting high-spending customers.
- Spending is highest on **wine and meat products**, while **fruits and sweets** account for the lowest total spending.

Business Recommendations

Target Segments to Prioritize

- Focus on **customers aged 25–34**, as they exhibit the highest spending and campaign acceptance rates.
 - Target **high-income** and **very high spending** groups who are more responsive to marketing efforts.
 - Give priority to **non-parents** and **customers living alone**, who tend to have more disposable income and spend more.
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Campaign Messaging & Timing Suggestions

- Tailor messaging to **highly educated customers** using more informative and data-driven language.
 - Design campaigns around **premium product categories** like wine and meat, which receive the highest spending.
 - Schedule promotions and personalized offers around **high-spending periods** (if known), or test segmented timing by age group.
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Segments Requiring Alternative Strategies

- **Mid-aged customers (45–54)** show the lowest campaign engagement and spending; test alternative channels (e.g., SMS, in-store offers).
- **Low-income and low-education segments** respond less to campaigns; consider loyalty programs, discounts, or awareness-focused messaging.
- **Customers with children** may respond better to family-oriented offers or bundle discounts.

