Data Duel: Navigating Choices with A/B Testing

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Project 3

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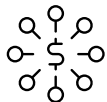
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Summary

Data Overview

A/B testing helps businesses optimize customer acquisition, product marketing, and reach. This dataset includes features such as campaign name, date, spend, impressions, reach, website clicks, searches, content views, add-to-cart actions, and purchases. It tracks two campaigns: the Control and the Test Campaign.

Control Group

Test Group

Data: Control Group

```
In [3]:    control_data.head()
```

Out[3]:

	Campaign Name	Date	Spend [USD]	# of Impressions	Reach	# of Website Clicks	# of Searches	# of View Content	# of Add to Cart	# of Purchase
0	Control Campaign	1.08.2019	2280	82702.0	56930.0	7016.0	2290.0	2159.0	1819.0	618.0
1	Control Campaign	2.08.2019	1757	121040.0	102513.0	8110.0	2033.0	1841.0	1219.0	511.0
2	Control Campaign	3.08.2019	2343	131711.0	110862.0	6508.0	1737.0	1549.0	1134.0	372.0

Data : Test Group

In [4]: `test_data.head()`

Out[4]:

	Campaign Name	Date	Spend [USD]	# of Impressions	Reach	# of Website Clicks	# of Searches	# of View Content	# of Add to Cart	# of Purchase
0	Test Campaign	1.08.2019	3008	39550	35820	3038	1946	1069	894	255
1	Test Campaign	2.08.2019	2542	100719	91236	4657	2359	1548	879	677
2	Test Campaign	3.08.2019	2365	70263	45198	7885	2572	2367	1268	578

Data Analysis

Control Group Conversion Funnel

Impressions (3,250,111.0 - 100.00%)

Reach (2,637,738.0 - 81.16%)

Website Clicks (157,368.0 - 5.97%)
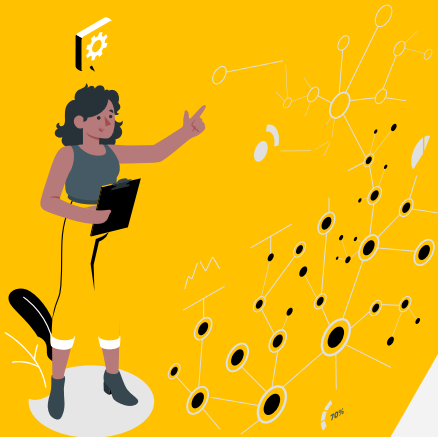
Searches (65,460.0 - 41.60%)

View Content (57,352.0 - 87.61%)

Add to Cart (38,883.0 - 67.80%)

Purchase (15,501.0 - 39.87%)

Data Analysis

Test Group Conversion Funnel

Impressions (2,237,544 - 100.00%)

Reach (1,604,747 - 71.72%)
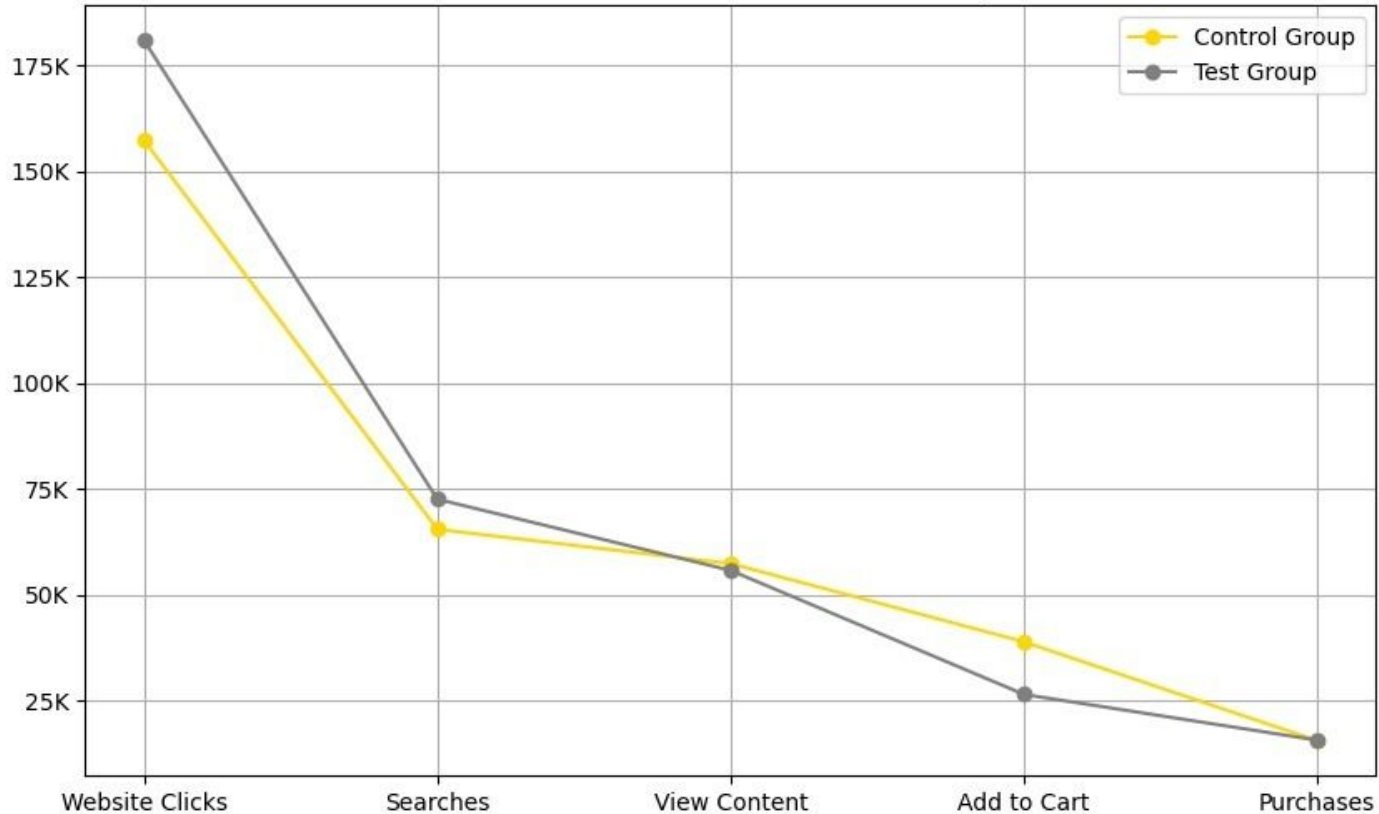
Website Clicks (180,970 - 11.28%)

Searches (72,569 - 40.10%)

View Content (55,740 - 76.81%)

Add to Cart (26,446 - 47.45%)

Purchase (15,637 - 59.13%)

User Conversion Funnel: Control vs. Test Group

T-test results

```python
metrics = ['# of Impressions', 'Reach', '# of Website Clicks',
           '# of Searches', '# of View Content', '# of Add to Cart', '# of Purchase']

for metric in metrics:
    t_stat, p_val = stats.ttest_ind(control_group_df[metric], test_group_df[metric])
    print(f'{metric}: t-statistic = {t_stat:.2f}, p-value = {p_val:.2f}')
```

```
# of Impressions: t-statistic = 4.72, p-value = 0.00
Reach: t-statistic = 5.20, p-value = 0.00
# of Website Clicks: t-statistic = -1.75, p-value = 0.09
# of Searches: t-statistic = -1.35, p-value = 0.18
# of View Content: t-statistic = 0.30, p-value = 0.77
# of Add to Cart: t-statistic = 4.28, p-value = 0.00
# of Purchase: t-statistic = -0.09, p-value = 0.93
```

Data Analysis: Ratios

CPA

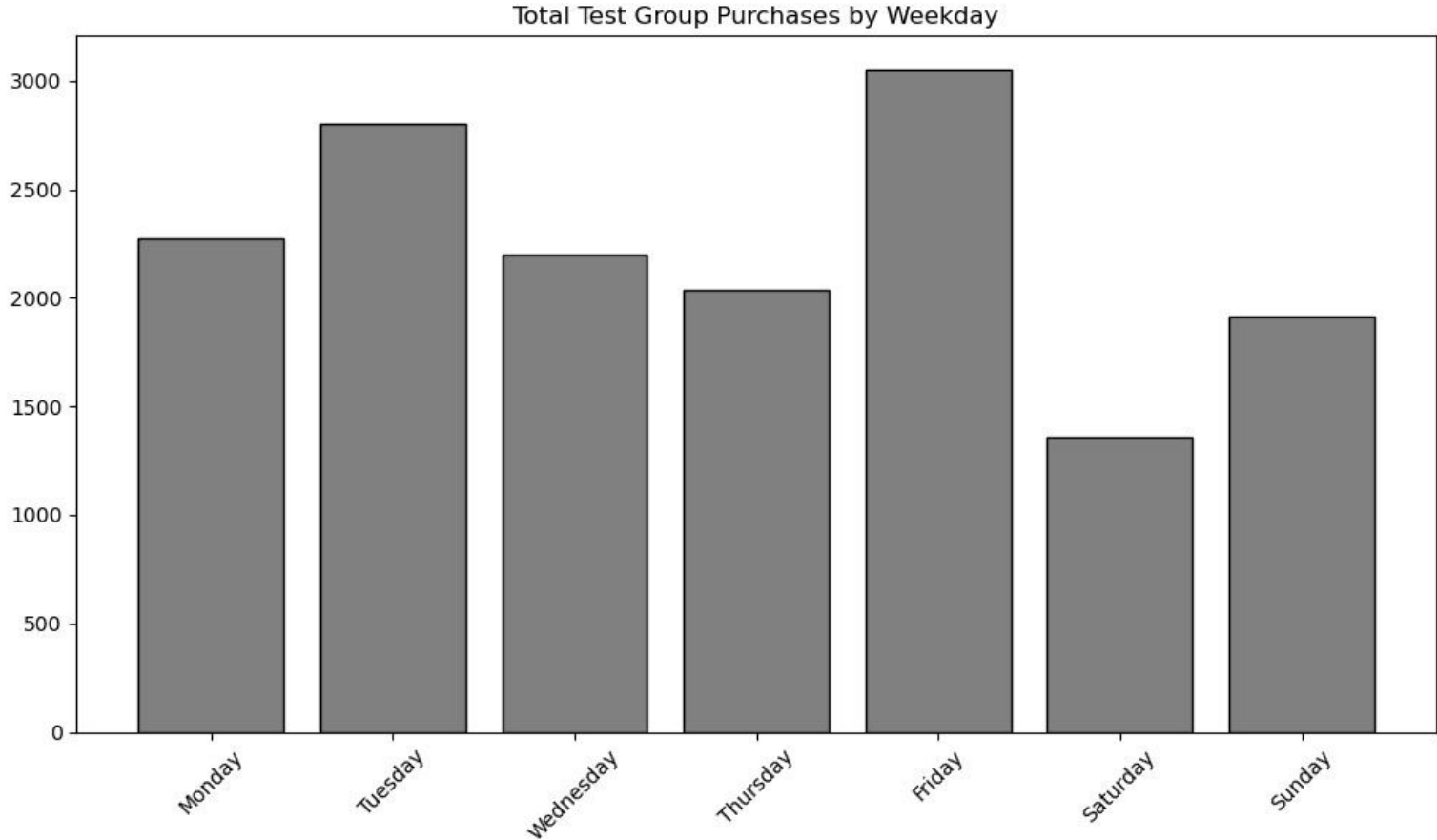Cost Per Acquisition (CPA): Costs to acquire one customer.
Number of Purchases/Total Advertising Spend

Seasonality

Weekday Analysis. The total number of purchases made each day.

Conversion Rate

Number of Purchases (Conversions)/Total Users Exposed (Reach)

Weekday Analysis

Total Control Group Purchases by Weekday
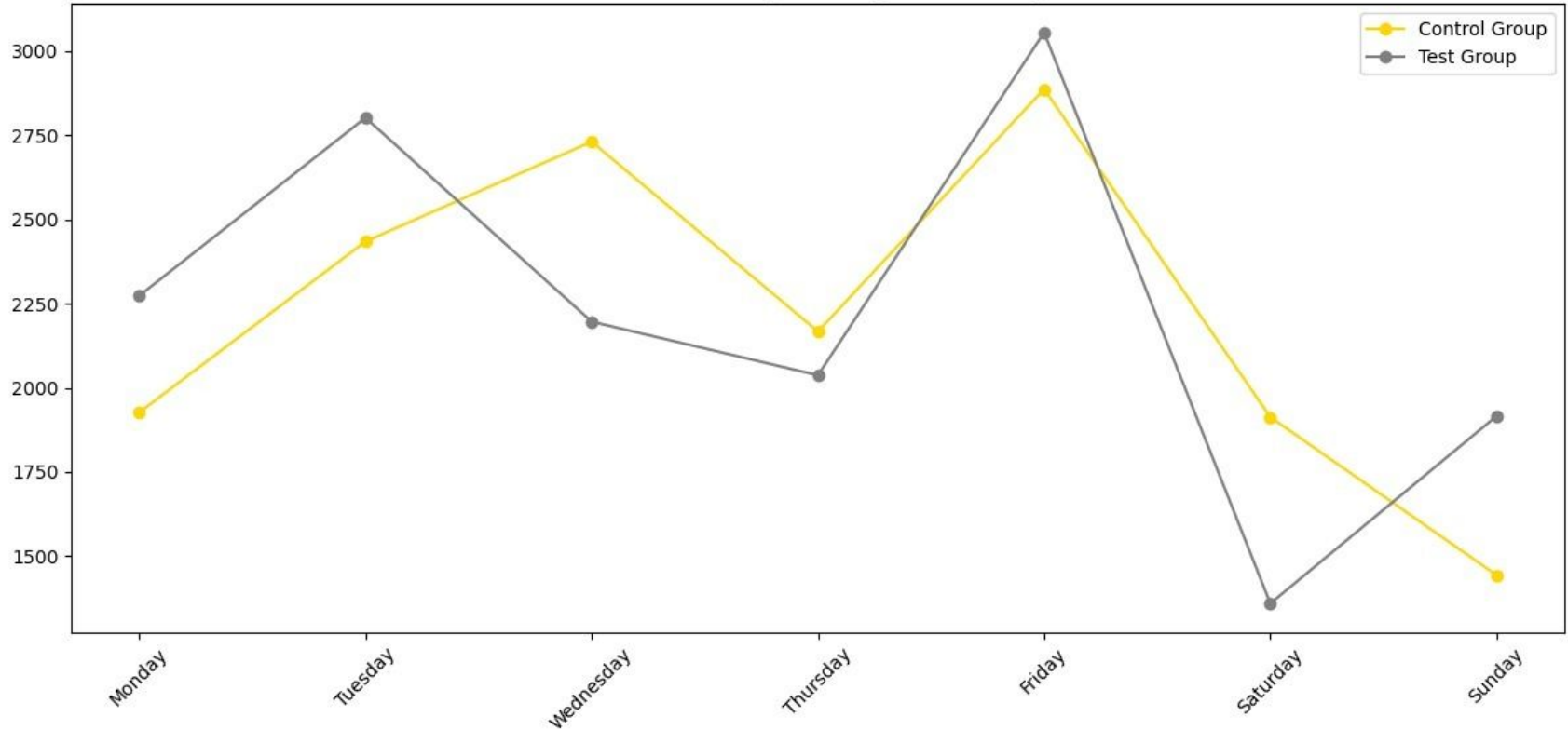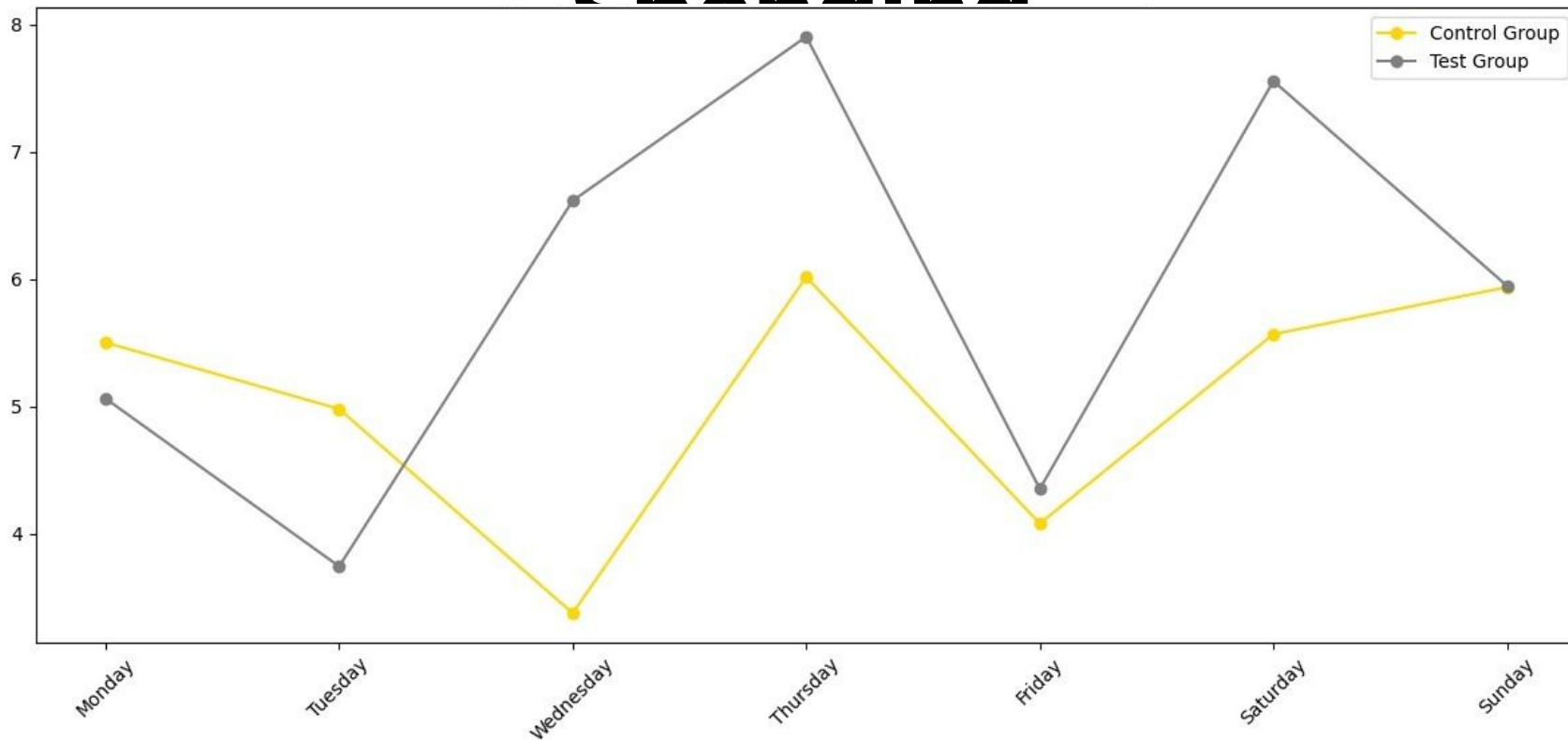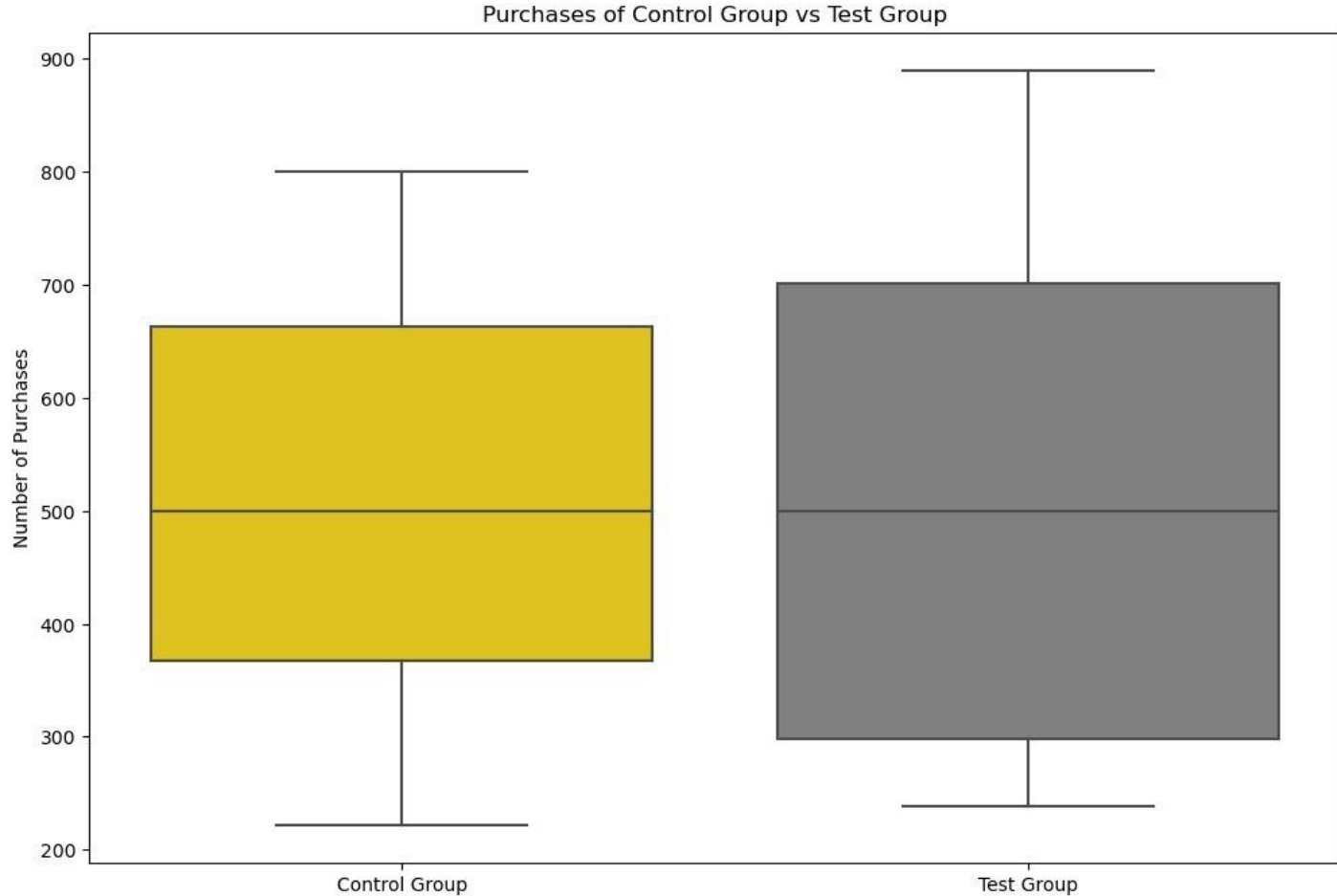
Weekday Analysis

Total Test Group Purchases by Weekday

Weekday Analysis
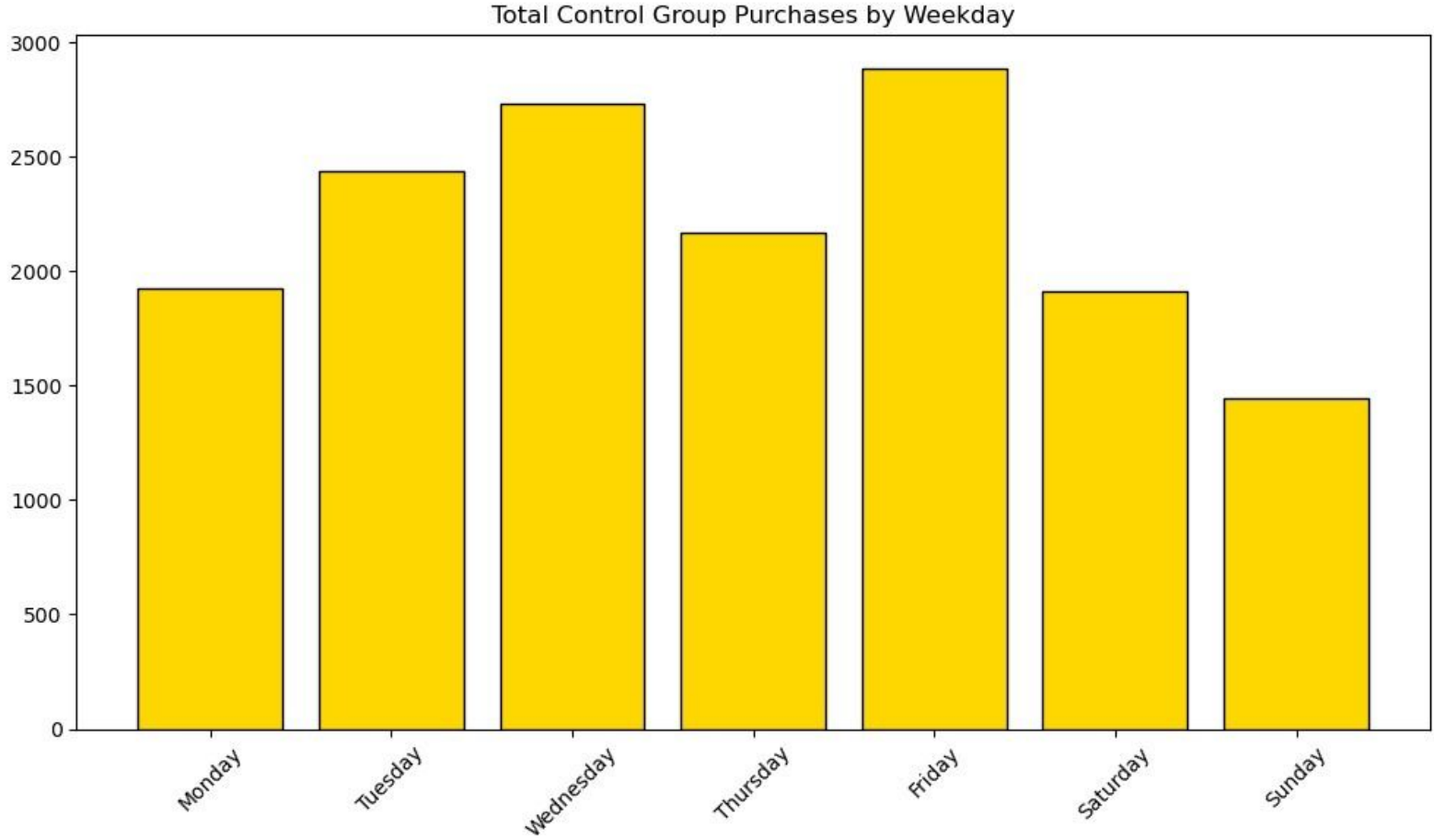
Total Purchases by Weekday for Two Groups

Weekday Analysis by Spending
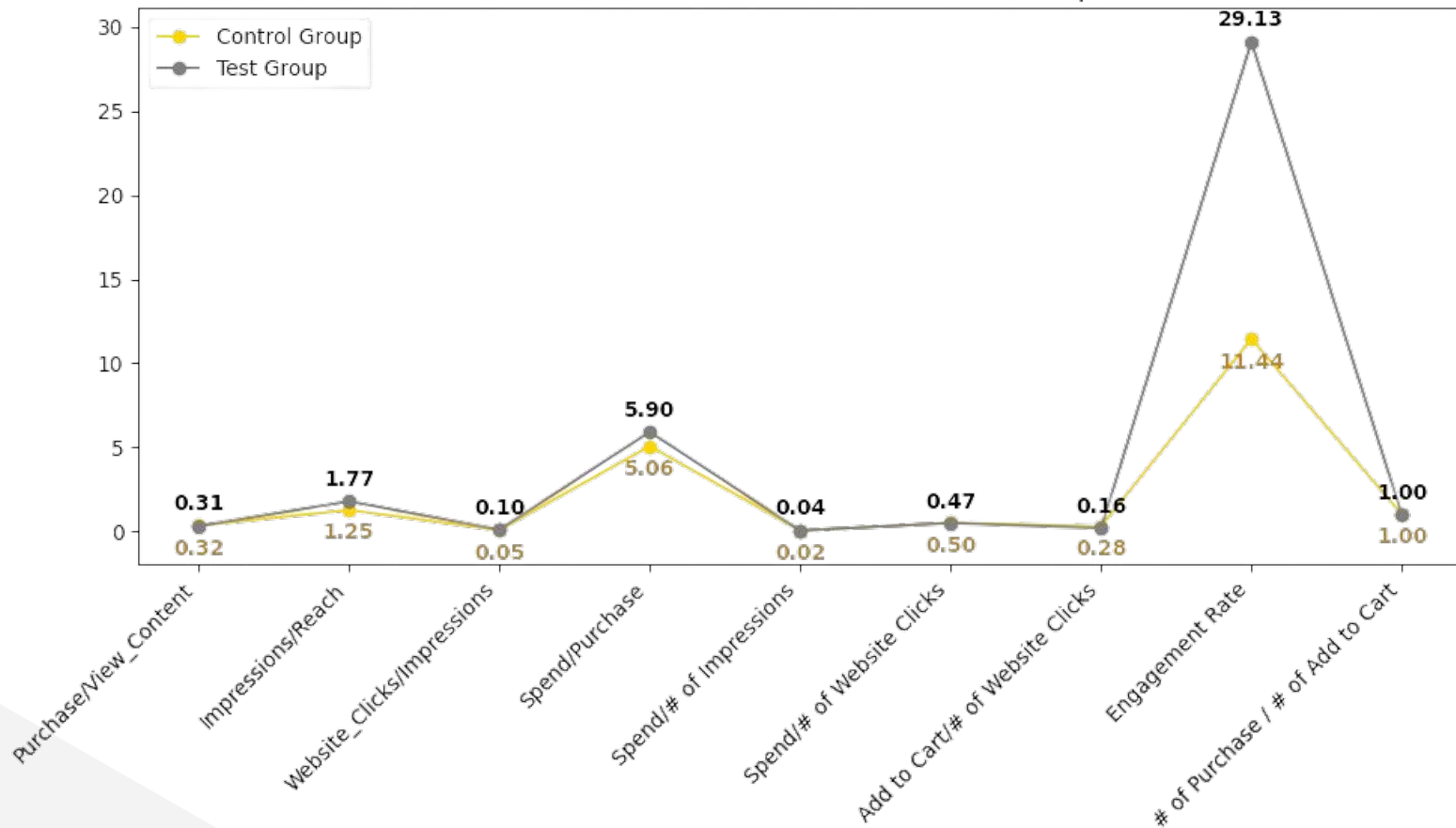
Purchase Distribution

Purchases of Control Group vs Test Group

Compariso n

Combined Line Chart for Control and Test Groups

Summary

- Higher Click-through Rate
- Higher Conversion rates
- More Purchases and Average Spending per Purchases

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C

- More purchases on Wednesday and Saturday
- More View Content in Conversion
- More Add to Cart in Conversion

Overall, the data showed that Test Group performed better than the Control Group.

Thanks!

Do you have
any questions?