Impact of Banner Implementation on Conversion Rates in GloBox Mobile App

By Lex Romo ***May 13th, 2023***

Introduction

The objective of the A/B test is to determine whether or not to launch the banner on the mobile app for all users based on its impact on the conversion rate. The test aims to evaluate whether the addition of the banner to the mobile app would increase the number of users who make purchases or conversions. The analysis of the A/B test results will help to determine if the banner should be implemented on the mobile app for all users or not.

The metric being measured is the conversion rate of users in the control group and the treatment group, as well as the difference in conversion rates between the two groups. Additionally, the average amount spent per user was also measured but was found to be statistically insignificant.

The hypothesis being tested was whether there is a statistically significant difference in the conversion rate between the control group and the treatment group.

Experiment Design

The experiment spanned from January 25th, 2023 to February 6th, 2023, totaling 13 days. The sample size included 48,943 unique users, with the Control Group consisting of 24,343 unique users and the Test Group consisting of 24,600 unique users. The participants were randomly assigned to either the control group or the test group. The control group was not able to see the new Food & Bev banner on the app, while the test group did see the banner on the homepage.

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Data Collection and Preparation

The data was collected from Bit.io in the link below:
https://bit.io/griffinmasterschool/ab_test_project?tab=Data

The datasets were separated into three tables, Users, Groups & Activity. The three datasets were merged into one using Sql and a new column called purchase status was created if a purchase had been made.

The merged dataset needed to be cleaned before analysing. First, the date column needed to be changed from a text object to date. I then dropped all duplicated columns such as uid, uid-2, device-2 and date columns that were text objects. Next, I needed to change the group's values from A & B to Control_Group & Test_Group. I did the same with the device column going from I & A to iOS and Android. Ending with a final dataset containing the following columns: 'id', 'joined_date', 'group', 'gender', 'country', 'device', 'purchase_date','spent'.

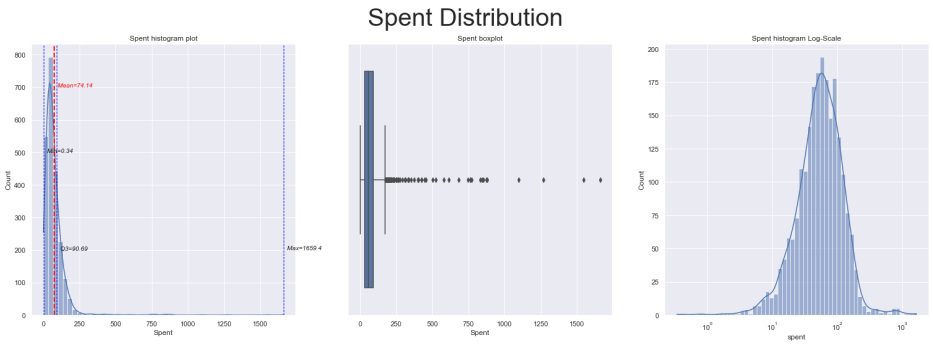
The final dataset was analysed using Pandas and & Tableau.

Key Findings

Full Data Spent Distribution:

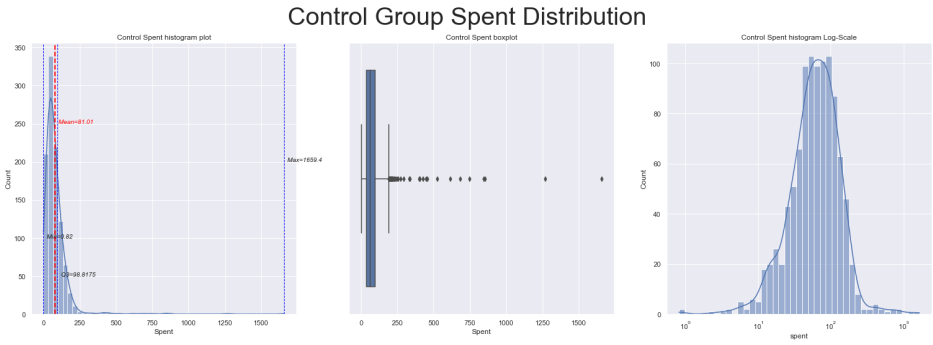
When analysing the spent distribution for the entire dataset it was found to be right skewed or positively skewed. It also showed there were 93 outliers as shown in the image below:

All Data Mean Spent: $74.14
All Data Median Spent: $56.01
All Data Max Spent: $1,659.4
All Data Mode Spent: $56.01
All Data Range of Spent: 1659.060
All Data Interquartile range: 56.79
All Data Standard deviation: 92.64
Number of outliers: 93



Control Group Spent Distribution:

Control Group Mean Spent: $81.01
Control Group Median Spent: $62.62
Control Group Max Spent: $1,659.4
Control Group Mode Spent: $31.0
Control Group Range of Spent: 1658.580
Control Group Interquartile range: 60.1325
Control Group Standard deviation: 95.94
Number of outliers: 37



Test Group Spent Distribution:

Test Group Mean Spent: 68.43
Test Group Median Spent: 51.16
Test Group Max Spent: 1546.3
Test Group Mode Spent: 42.82
Test Group Range of Spent: 1545.96
Test Group Interquartile range: 51.16741
Test Group Standard deviation: 89.44
Number of outliers: 56

Conversion Rates:

The Test Group had a conversion rate of 4.63% and the Control Group had a conversion rate of 3.92%. On a day by day analysis, the Test Group had a higher conversion rate vs. the Control Group over the test period for the exception of two days, January 28th & February 1st. The Test Group highest conversion rate happened on February 6th with a 5.97% cr, whereas the Control Group's highest conversion rate happened on January 28th with a 4.76% cr.

Average Spent:

The Test Group also beat the Control in avg. spent per person but only by $0.02. The Test Group's avg. spent per person was $3.39 vs. the Control Group's avg. spent per person of $3.37. However, the Control group had a significantly higher average spend with $81.01 compared to the Test Group of $68.43. Over the 13-day trial period the Control Group maintained a higher average spent for the exception of three days, Jan 29th, 30th & February 5th. It's also important to mention that the Test Group's purchase count was higher than the Control Group's purchase count every day of the trial period.

Same Day Join Purchases:

The Test Group had a higher Same Day Join & Purchase with 902 purchases totaling $54,292.45 vs. Control Group's purchase count of 746 for a total of $62,505.08. The Test Group also had a higher purchase count on purchases not made on Join Date with 317 purchases totaling $19,122.88 vs. Control Group of 268 purchases totaling $19,640.82

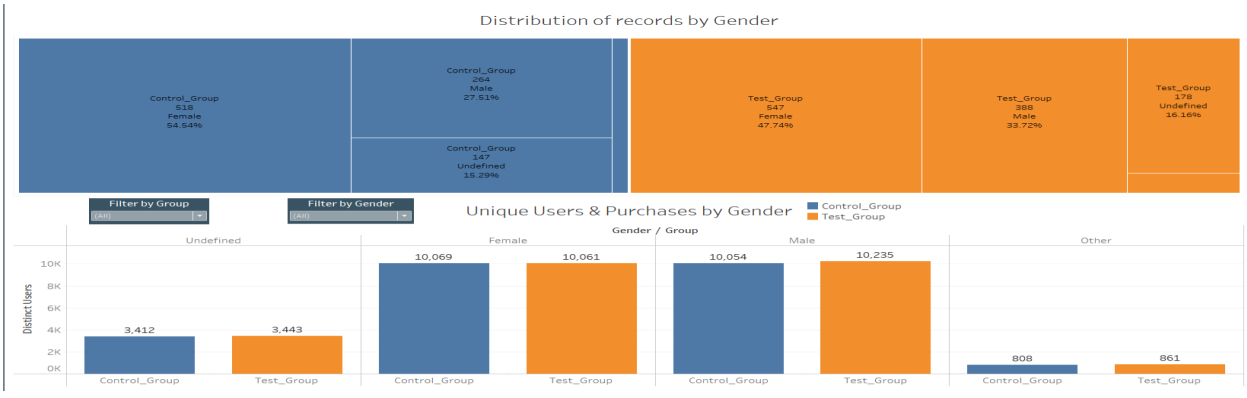
Countries:

Among the top 4 countries based on spend, the Control Group had higher values in three countries: USA, Brazil, and Germany (DEU), while the Test Group had higher spend in Mexico.

In terms of conversion rates, the Test Group showed higher rates in Canada with 6.48% and the USA with 5.75%. In contrast, the Control Group had the lowest conversion rate in Australia (AUS) with 2.14%.

Genders:

In the Control Group, there were 518 female users, accounting for 54.54% of the group, and 264 male users, making up 27.51% of the group. The Test Group consisted of 547 female users, representing 47.74% of the group, and 388 male users, accounting for 33.72% of the group. For a more detailed breakdown, please refer to the image below.

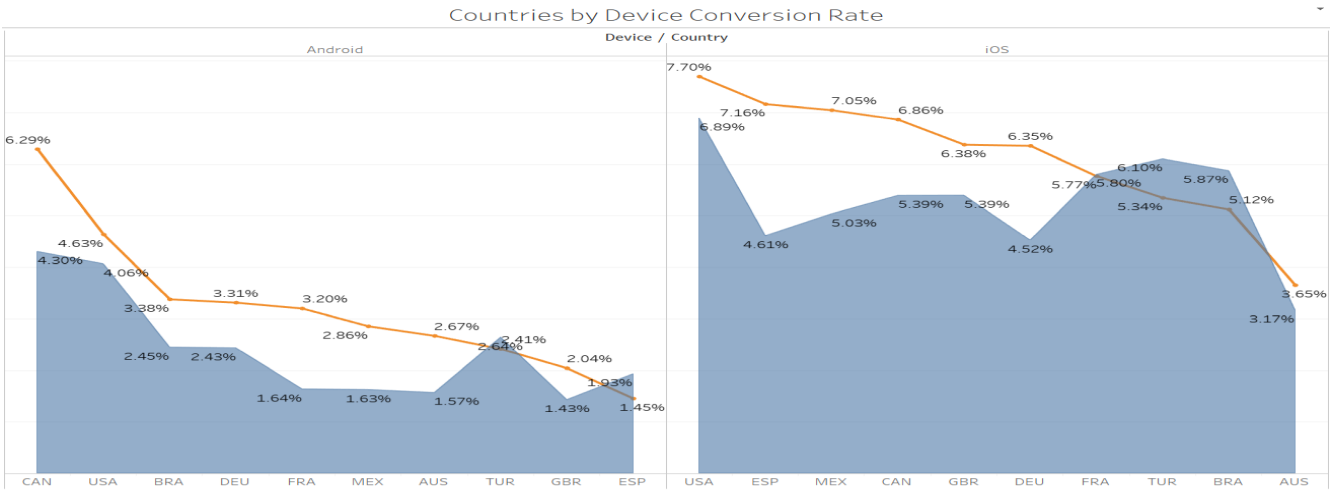


Genders cont.:

Further analysis revealed that female users had higher conversion rates in both the Test Group (5.75%) and the Control Group (5.24%). However, the highest conversion rate was observed among users categorized as "Undefined," with rates of 5.92% in the Test Group and 4.74% in the Control Group.

Devices:

For Devices we found iOS had the highest conversion rate with 7.70% in Test Group and 6.89% in Control Group. Top 4 Countries by Conversion Rate in Test Group with iOS devices were USA, ESP, MEX & CAN with 7.70%, 7.16%, 7.05%, & 6.86% respectively. Top 4 Countries by Conversion Rate in Control Group with iOS devices were USA, TUR, BRA & FRA with 6.89%, 6.10%, 5.87% & 5.80% respectively. For further detail please see image below.



The findings are presented in detail in the link below:
https://public.tableau.com/app/profile/lex.romo/viz/MasteryProject1_2_0/Story?publish=yes

Recommendations

Based on the results of my analysis, I recommend implementing the change made in the treatment group as it has resulted in a higher conversion rate. However, it is important to keep monitoring the average amount spent per user to ensure that it does not decrease due to the change. I believe that this recommendation is supported by the data collected during the experiment and aligns with the objectives of the experiment.

Summary for Control Group:

Conversion Rate: The conversion rate in the Control Group was estimated to be between 3.68 and 4.17 with a 95% confidence level. This means that, on average, approximately 3.68% to 4.17% of users in the Control Group made a purchase during the experiment.

Summary for Control Group Cont.:

Average Amount Spent: The average amount spent per user in the Control Group was estimated to be between $3.049 and $3.700 with a 95% confidence level. This indicates that, on average, users in the Control Group spent between $3.049 and $3.700 during the experiment.

Summary for Test Group:

Conversion Rate: The conversion rate in the Test Group was estimated to be between 4.37 and 4.89 with a 95% confidence level. This indicates that, on average, approximately 4.37% to 4.89% of users in the Test Group made a purchase during the experiment.

Average Amount Spent: The average amount spent per user in the Test Group was estimated to between 3.073 and 3.708 with a 95% confidence level. This indicates that, on average, approximately 3.073% to 3.708% of users in the Test Group made a purchase during the experiment.

Statistically Significant Difference in Conversion Rates:

After conducting a hypothesis test using the normal distribution and a 5% significance level, I obtained a p-value of 0.00012067991202461893. Based on this result, we reject the null hypothesis and conclude that there is a statistically significant difference in conversion rates between the two groups.

This implies that the presence of the banner highlighting food and drink products on the GloBox website had a significant impact on user behaviour. The test group, which was exposed to the banner, exhibited a different conversion rate compared to the control group, which did not see the banner.

The low p-value suggests strong evidence against the null hypothesis and supports the notion that the banner played a significant role in influencing user engagement and driving conversions. This finding indicates the potential effectiveness of the banner in increasing user interest and potentially boosting revenue for the food and drink product category on the GloBox website.

Conclusion

The 95% confidence interval for the conversion rate of users in the control is (0.0368, 0.0417), and the 95% confidence interval for the conversion rate of users in the treatment is (0.437, 0.489). Since these intervals do not overlap, it suggests that the treatment has a statistically significant effect on the conversion rate compared to the control group. Based on these findings, it is recommended to implement the change made in the treatment group as it has resulted in a higher conversion rate.

Appendix

Tableau Visualizations:
https://public.tableau.com/app/profile/lex.romo/viz/MasteryProject1_2_0/Story?publish=yes

Video Presentation:
https://clipchamp.com/watch/qeWVTFc99nP

Resources

Google
Udacity
Datacamp
ChatGPT