

# Report GloBox – A/B test for the new landing page with the “food & drink” banner

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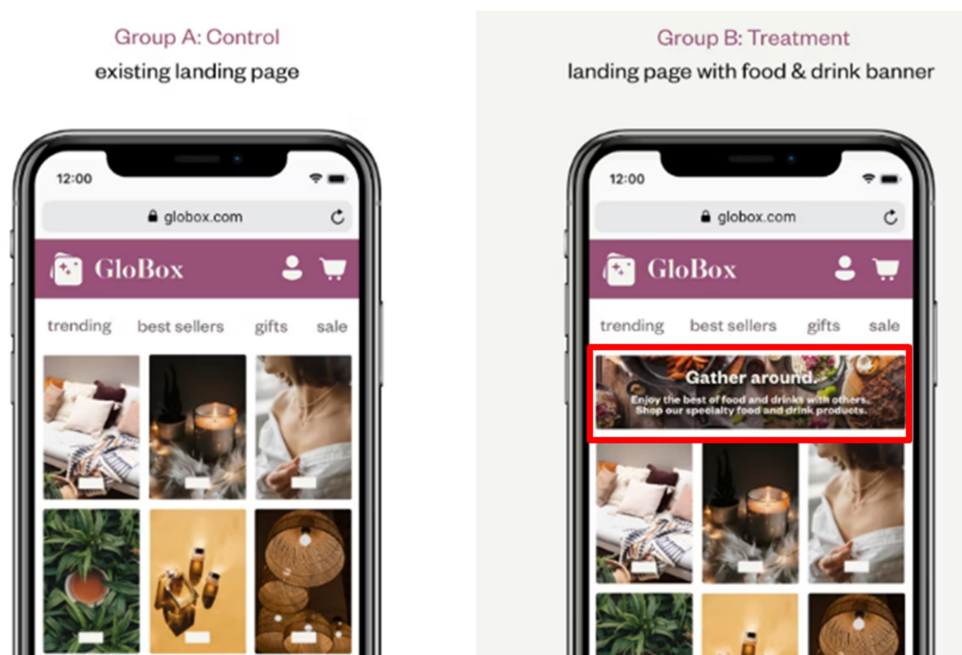
03/08/2023

## Summary

I suggest that GloBox incorporate the new "food & drink" banner on their landing page due to its potential to significantly boost the conversion rate.

## Context

The Growth team and our team collaborated on conducting an A/B test for a new landing page. The test involved two groups: control (A) and treatment (B). Users from the control group are shown the old landing page when they enter the mobile website, while users from the treatment group are presented with the new landing page featuring the "food & drink" banner.



During the two-week experiment, a total of 48,943 users participated from various locations worldwide, representing different genders and using diverse devices. Out of these users, 24,343 were in group A (control) and 24,600 were in group B (treatment). The experiment was conducted from January 25, 2023, to February 6, 2023.

## Data

I worked with three tables:

- Users: user\_id, gender (male, female, other), country

- Groups: user\_id, group (A or B), device (Android or iPhone), date (first date the user joined the page)
- Activity (purchase): user\_id, date of the purchase, device (Android or iPhone) and amount spent. Each purchase is represented as a row, and if a user didn't buy, they won't appear in the table. However, if a user made multiple purchases, they will appear multiple times in the table.

Some genders, countries, and devices have NULL values, but they don't impact our analysis.

I combined the tables, calculated the sum of amount spent for each user, filled the NULL values with zero, and introduced a new column with TRUE (1) or FALSE (0) to indicate whether a user made a purchase or not.

## Results

I compared the control and treatment groups using two main metrics: the conversion rate and the average amount spent in each group. Here are the results:

	Conversion rate	Average amount spent
Total	4.28%	\$3.38
Group A	3.92%	\$3.37
Group B	4.63%	\$3.39

To determine the statistical significance of the results, I conducted a hypotheses test for both metrics using a 95% confidence level. For the conversion rate, a two-tailed Z-test was employed as it involves proportions and compares two different samples from the same population. Here are the findings:

Sample statistic	0.0071
Critical value ( $Z_{0.975}$ )	1.96
Standard error	0.0018
Test statistic	3.8837
p-value	0.0001
Significance level	0.05

The results indicate a statistically significant difference. We can reject the null hypothesis, which suggests no difference between the conversion rates of the control and treatment groups, as our p-value is less than 0.05.

The margin of error is 0.0036, providing 95% confidence that the difference between other samples from these groups will fall within the range of 0.0035 and 0.0107 (Confidence interval).

Regarding the average amount spent, a two-tailed t-test was used as it involves means and compares two different samples from the same population. Here are the findings:

Sample statistic	0.0163
Critical value ( $t_{0.975,24342}$ )	1.96
Standard error	0.2321
t test (p-value)	0.9439

Significance level	0.05
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The results indicate a statistically insignificant difference. We fail to reject the null hypothesis, which suggests no difference between the average amount spent in the control and treatment groups, as our p-value is greater than 0.05.

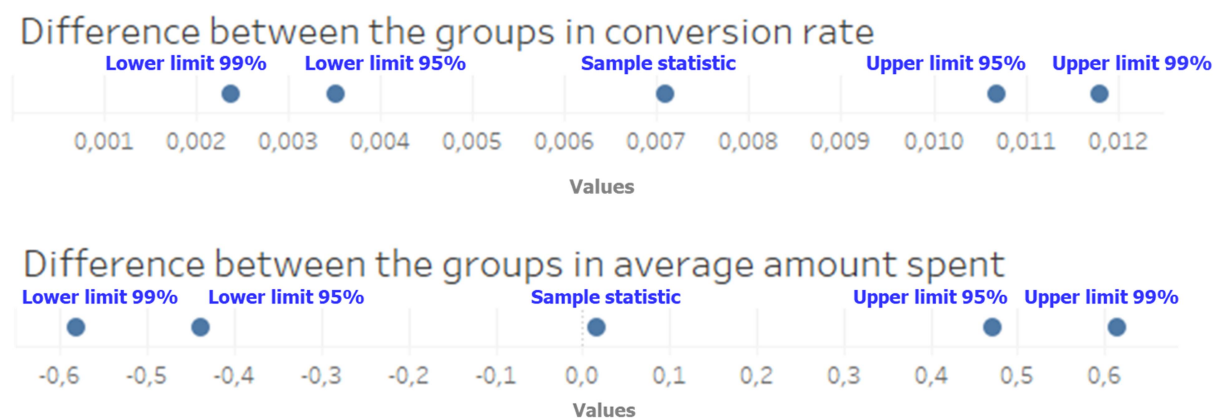
The margin of error is 0.455, providing 95% confidence that the difference between other samples from these groups will fall within the range of -0.4387 and 0.4713 (Confidence interval)."

If you have any specific questions or need further assistance, feel free to let me know!

#### Confidence interval

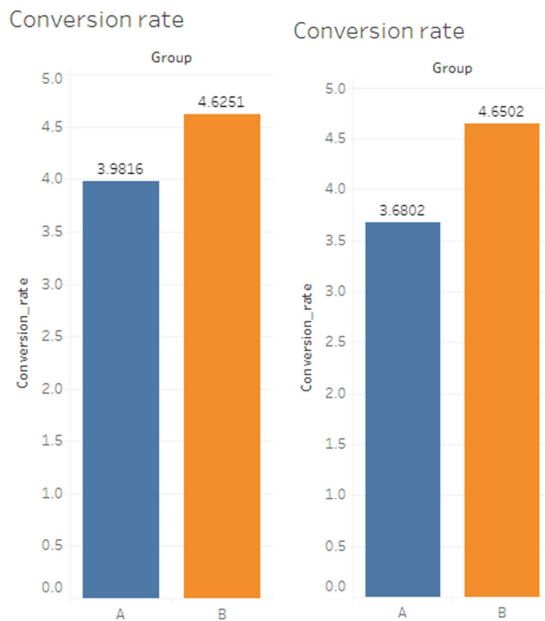
As observed earlier, we can assert with 95% confidence that the difference in conversion rates will fall within the range of 0.0035 to 0.0107, and for the average amount spent, it will be between -0.4387 and 0.4713.

For increased result reliability, we can opt for 99% confidence, yielding intervals of 0.0024 to 0.0118 for the conversion rate and -0.5816 to 0.6143 for the average amount spent.



#### Novelty effects

To ensure the statistical significance of the difference in conversion rates and rule out any seasonal effects, we examined these graphs. The first graph covers the period from 25/01/2023 to 31/01/2023 (first week of the test), while the second one is for the period from 01/02/2023 (second week of the test). Both graphs indicate that the conversion rate for the treatment group remains almost the same. It is 4.63% in the first week and 4.66% in the second week. This observation leads us to conclude that the banner indeed increases the conversion rate consistently and is not subject to seasonal fluctuations.



### Power analysis

To ensure the robustness of our findings, I conducted a power analysis to assess the adequacy of our sample sizes.

For the conversion rate analysis, I used a Baseline Conversion Rate of 3.92% and a Minimum Detectable Effect of 0.71%. With a split rate A/B of 50-50, a Statistical Power ( $1 - \beta$ ) of 0.8, and Significance ( $\alpha$ ) set at 0.05, the recommended sample size for each group is at least 3 million. To obtain a more accurate result regarding the difference in conversion rates between the groups, a significantly larger sample size would be needed.

On the other hand, for the average amount spent analysis, the control group's mean is \$3.37, and the treatment group's mean is \$3.39, with a standard deviation of 0.2321. With a split rate A/B of 50-50, a Statistical Power ( $1 - \beta$ ) of 0.8, and Significance ( $\alpha$ ) of 0.05, the required sample size for each group is 2115. For the average amount spent, our sample size is sufficient.

In summary, for a more reliable assessment of the conversion rate difference, a much larger sample size is necessary; while the current sample size for the average amount spent analysis is adequate.

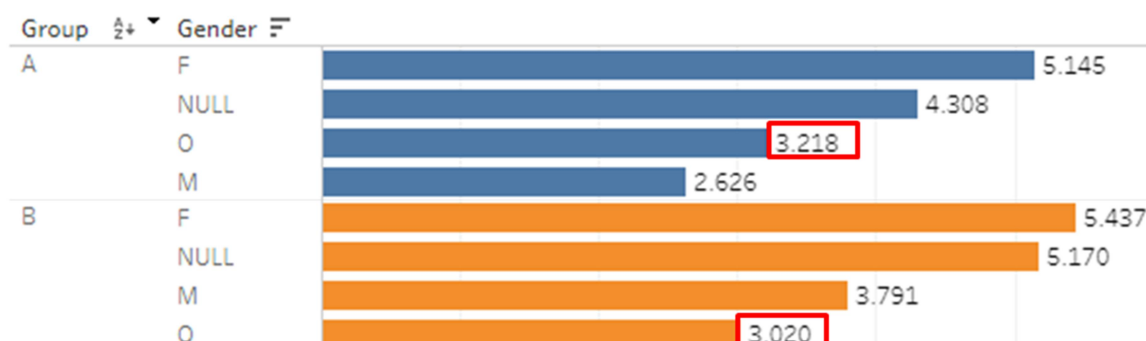
### Advanced Analysis

To gain deeper insights, I conducted a breakdown analysis focusing on the conversion rate, which showed a statistically significant difference between the groups.

#### Gender

The analysis reveals that the conversion rate increased for almost all genders, except for the "others" category, where there was a 6.15% decrease from the control group to the treatment group. However, it's worth noting that this category represented only 1669 users out of the total

sample of 48,493 (3.44%). While this might not be a significant concern for future considerations, it is essential to take note of this finding for further analysis in future reports.



### Country

The A/B test involved users from 10 different countries. On average, the conversion rate increased by 18% from the control group to the treatment group. Notably, 70% of the countries experienced an increase larger than the average, with only three countries showing a smaller increase (Turkey, Brazil, and USA). Among these, only Turkey had a decrease in the conversion rate with the new "food & drink" banner.

Considering Turkey's status as the only Muslim country, there is a possibility that cultural factors may be influencing the outcome. However, with the current information available, it is not possible to confirm this relationship definitively.

Country	Group A(%)	Group B(%)	Percentage
<b>TUR</b>	<b>4.002</b>	<b>3.558</b>	<b>-11.09%</b>
BRA	3.725	4.061	9.02%
USA	5.117	5.748	12.33%
ESP	2.909	3.614	24.24%
GRB	2.887	3.681	27.50%
FRA	3.125	4.183	33.86%
CAN	4.694	6.476	37.96%
DEU	3.2	4.415	37.97%
AUS	2.138	3.036	42.00%
MEX	2.948	4.447	50.85%

### Recommendation

I recommend implementing the new "food & drink" banner on the landing page for GloBox. The data shows that the conversion rate of purchases increased by a statistically significant 18%, from 3.92% to 4.63%. This means that the company will see improved revenue, as the average amount spent per client remains unchanged, but more customers will make purchases through the app.

For instance, if 100,000 clients visit the landing page per day, without the "food & drink" banner, approximately 3,920 will make purchases. However, with the banner, around 4,630 clients will make purchases. Assuming the average amount spent per client remains at \$3.37, the total

average daily revenue will increase by approximately \$2,392.70. Considering a 95% confidence level, it can be inferred that the revenue growth will fall between \$1,179.50 and \$3,605.90.

While power analysis suggests a larger sample might be needed, there are no statistically significant negative outcomes that would prevent us from launching the banner. Additionally, the low cost and ease of launching and maintaining the banner make it a worthwhile investment.

In conclusion, I strongly recommend the launch of the "food & drink" banner on the landing page, given the potential for increased revenue and the absence of significant negative effects.

## Appendix

More details (charts):

[https://public.tableau.com/views/TesteAB\\_Screen/ConversionRate?:language=pt-BR&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/TesteAB_Screen/ConversionRate?:language=pt-BR&publish=yes&:display_count=n&:origin=viz_share_link)

[https://public.tableau.com/views/TesteAB\\_Screen/AverageAmount?:language=pt-BR&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/TesteAB_Screen/AverageAmount?:language=pt-BR&publish=yes&:display_count=n&:origin=viz_share_link)

Confidence interval

[https://public.tableau.com/views/Livro1\\_16910106800890/Painel1?:language=pt-BR&publish=yes&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Livro1_16910106800890/Painel1?:language=pt-BR&publish=yes&:display_count=n&:origin=viz_share_link)

Novelty effect:

[https://public.tableau.com/views/Novelty\\_Effects/NoveltyEffects?:language=en-US&:display\\_count=n&:origin=viz\\_share\\_link](https://public.tableau.com/views/Novelty_Effects/NoveltyEffects?:language=en-US&:display_count=n&:origin=viz_share_link)

Power analysis:

<https://www.statsig.com/calculator>

<https://statulator.com/SampleSize/ss2M.html#>

Presentation video:

<https://www.loom.com/share/2379520fb2c841ffa86e5b2031656227?sid=fc001aee-e799-4b3c-b588-047176dc822a>