App subscribe page A/B test

Test hypothesis

- **Hypothesis 0 (Null Hypothesis):**

There is no significant difference in the conversion rate between the original onboarding screen offering a weekly subscription at $4.99 and the alternative design offering the same subscription at a 50% discount. The percentage of users purchasing the subscription remains the same for both designs.

- **Hypothesis 1 (Alternative Hypothesis):**

The alternative design with a 50% discount on the weekly subscription at $4.99 will result in a higher conversion rate compared to the original onboarding screen. Users presented with the discounted offer will be more likely to purchase the subscription than those presented with the original offer, indicating that the discount has a positive impact on user engagement and conversion.

Test description

We are going to test the impact of an alternative design on the conversion rate for the weekly subscription offer in our mobile application. The current onboarding screen presents users with a $4.99 weekly subscription, and 17% of users who receive this offer make a purchase.

The alternative design introduces a discounted offer, presenting the same $4.99 weekly subscription but with a 50% discount. We want to assess whether this discounted offer influences user behavior positively, leading to a higher CR compared to the original design. Daily user app installation is 2000 users

Scenarios for Testing:

Control Group A: The original onboarding screen is shown to users with the $4.99 weekly subscription price

Experimental Group B: The alternative onboarding screen is shown to users with the $4.99 weekly subscription offer and a 50% discount.

Data Collection:

- Collect data on the number of users in each group.
- Track the number of users who make a purchase in each group.
- Record additional metrics, such as user engagement, time spent on the screen, and any interactions with the subscription options.

Expected Outcomes:

1. If the null hypothesis is true, there will be no significant difference in conversion rates between the two groups.
2. If the alternative hypothesis is true, the experimental group with the discounted offer will show a higher conversion rate than the control group.

Confidence and potential risks

Confidence: 75%

- **Daily User Installations:** The fact that the application is installed by approximately 2,000 users daily provides a consistent flow of users for the test.

- **User Reach to Subscription Screen:** With 34% of users reaching the subscription screen daily, there is a significant portion of the user base exposed to the A/B test. This contributes to a larger sample size and strengthens the statistical power of the test.

- **Consistent User Flow:** The combination of daily installations and a high percentage reaching the subscription screen suggests a stable user flow, which can contribute to more reliable results.

Potential impact on key metrics: Medium/High

- **Positive Impact**: The discounted offer has the potential to positively impact the conversion rate for the weekly subscription, leading to increased revenue and user engagement.

- **Negative Impact:** There's a possibility that the discounted offer might devalue the product in the eyes of users, causing a negative impact on revenue if the increased conversion rate doesn't offset the reduced subscription revenue per user.

Risks: Medium

- **User Perception Risk**: Offering a discount may influence users to expect discounts regularly, potentially affecting long-term revenue if users delay purchases anticipating future discounts.

- **Risk of User Misperception:** There is a potential risk that users may discover that the actual subscription price remains the same despite the advertised discount. This discovery could lead to a perception of deception or feeling misled, resulting in negative user sentiment and potential harm to the app's reputation.

Affected metrics

Primary metrics:
- **Metric 1:** Conversion Rate (installation to subscription) - current value 5.78%

    CR = 0.34 (CR installation to visit) * 0.17 (CR visit to subscription) * 100% = 5.78%
- **Metric 2:** Revenue (daily revenue from subscriptions) - current value $574

Secondary metrics:
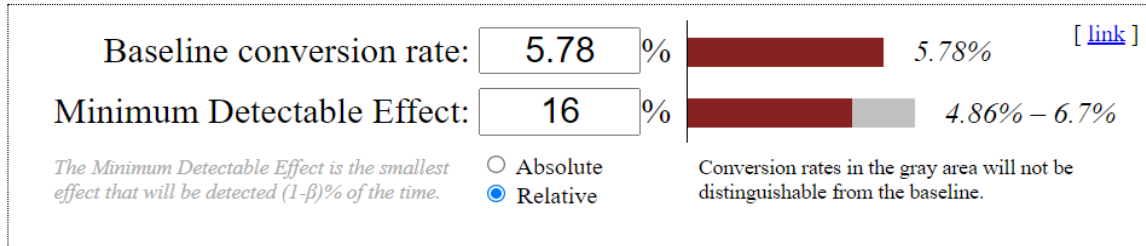- Metric 3: daily Paid Users number - current value 115

    CR = 2000 (daily installations) * 0.34 (CR installation to visit) * 0.17 (CR visit to subscription)= 115

Statistical significance

To be 95% sure in 16% (relative) boost we need:

- **Sample size** - 10216 users for each test group (20432 total)

Question: How many subjects are needed for an A/B test?

			[link]
Baseline conversion rate:	5.78 %	▆▆▆ 5.78%	
Minimum Detectable Effect:	16 %	▆▆▆ 4.86% – 6.7%	

The Minimum Detectable Effect is the smallest effect that will be detected (1-β)% of the time.

○ Absolute
● Relative

Conversion rates in the gray area will not be distinguishable from the baseline.

Sample size:

10,216

per variation

Statistical power 1−β:	▭	80%	*Percent of the time the minimum effect size will be detected, assuming it exists*
Significance level α:	▭	5%	*Percent of the time a difference will be detected, assuming one does NOT exist*

Audience and Duration

To minimize potential risks, we plan to use 50% of daily users for this A/B test, evenly divided into two groups. Only new users will be used for this test.

Total days = 20432/500 = 21 days

The A/B test will last 21 days

Group names:

- **Group A.** Control group with an old Subscription screen - 10 000 users
- **Group B.** Test group with 50% discount subscription screen - 10 000 users

Potential outcomes

If at least one primary metric is up and others aren't down, we're implementing the new screen version.

If at least one primary metric is down and others aren't up, we're not rolling out the new screen version.

If there are no statistically significant outcomes from the test in terms of metrics, we are not implementing the new screen version.

A/B Test Results

The A/B test shows that Test Group B (Experimental) leads to a higher conversion rate
- Control **Group A** - CR = 6.1%
- Experimental **Group B** - CR = 8.9%
- A/B Test duration: 22 days
  - Start date - 03.07.2023
  - End date - 25.07.2023

A/B Test Summary

	Total Users	Subscribed	CR	UPLIFT
Group A (control)	10013	611	6.1%	
Group B (test)	9985	889	8.9%	⬆ **68.5%**

To assess whether the distribution of our test groups **A** and **B** is similar to a normal distribution and whether its properties can be approximated by a normal distribution, we built binomial histograms with vertical line representing the mean value.
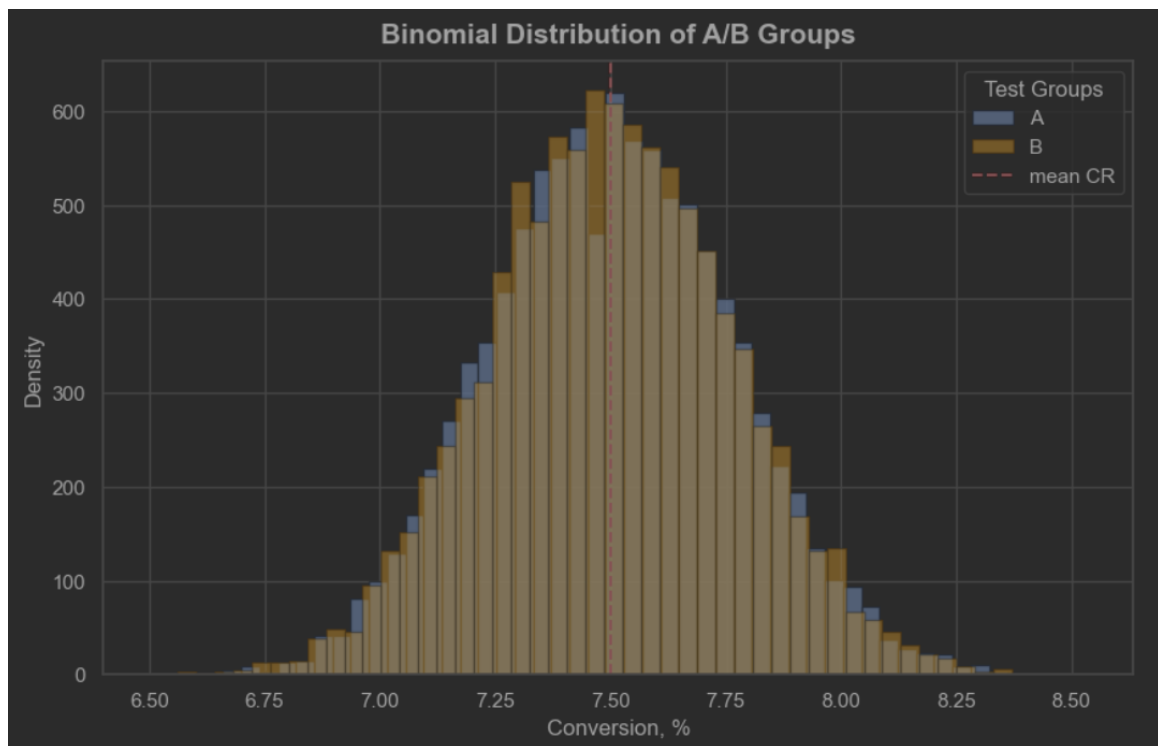

We used the Chi-squared method and Permutation Test for hypothesis testing, which showed that the difference between our two groups was **statistically significant** so Null Hypothesis is rejected.

Hypothesis testing results

	Chi-squared	Permutation test
alpha (α)	5%	5%
p-value	0.0	0.0
t-statistic	56.14	-7.53

As we can see from the chart below, there is a significant difference between CR (mean) of the two groups
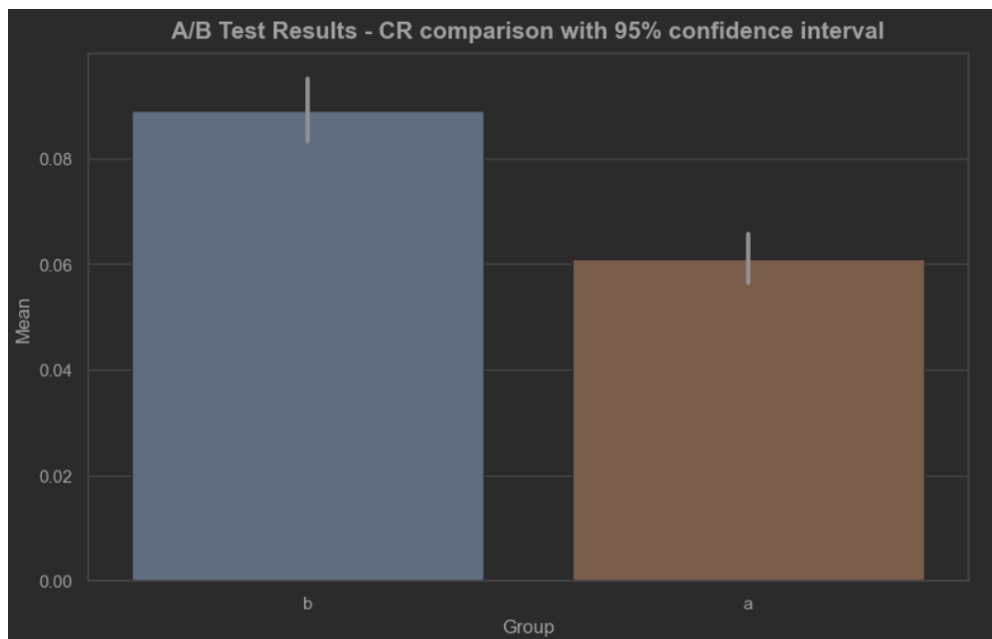
We can assume, with a 95% confidence level, that the Alternative hypothesis is True. The onboarding screen with the $4.99 weekly subscription offer and a 50% discount increases conversions

Additionally, the chart below shows the dynamic of CR change over time
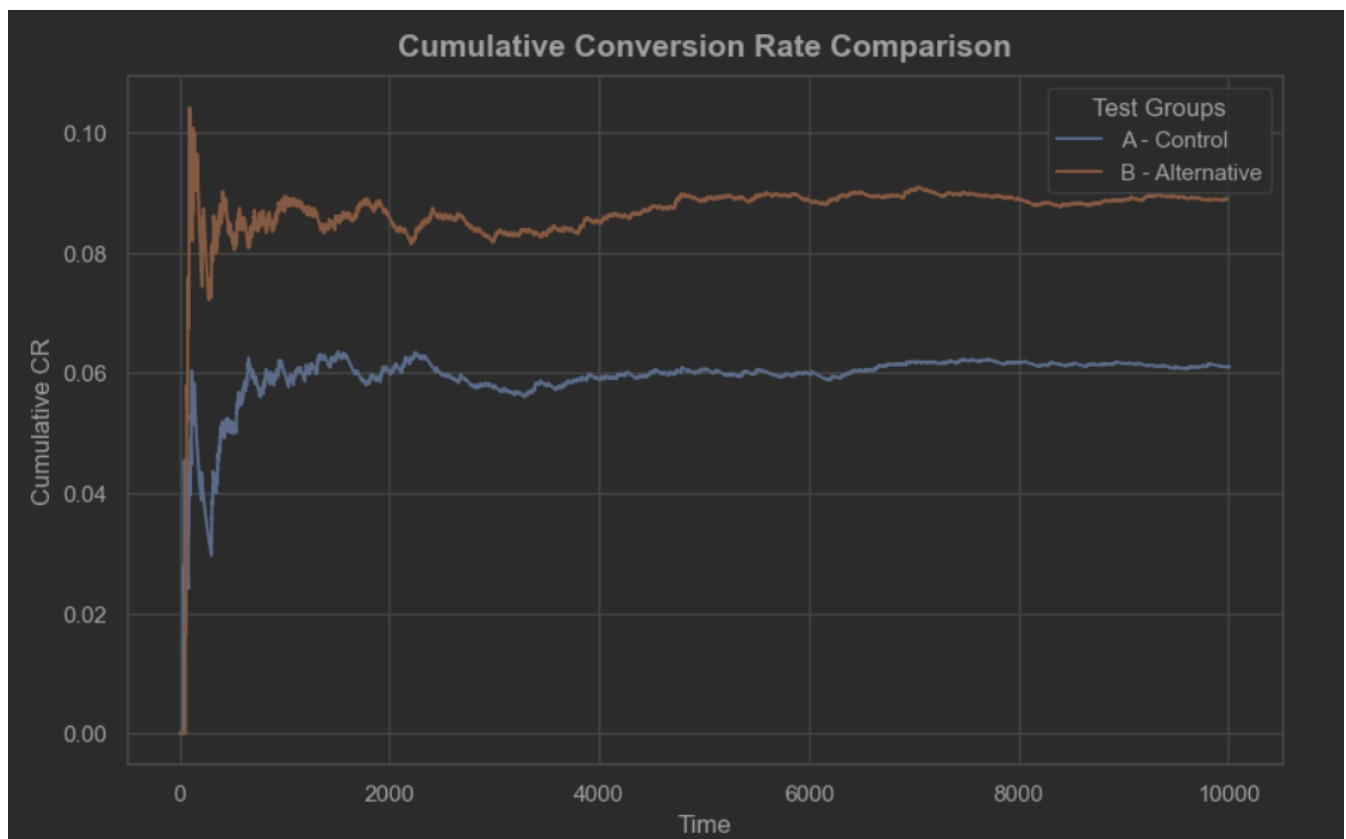
Considering that the primary metric is up and others aren't down, we are rolling out the new screen version with a 50% discount.