Product Analyst - Assignment

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Executive Summary

In early 2025, we launched a randomized A/B experiment to evaluate a new onboarding experience for new users. Approximately 50 percent of users who initiated the onboarding flow were randomly assigned to the variant, with the primary objective of increasing conversion to paid subscriptions.

The experiment shows that the new onboarding experience **increased the paid conversion rate by 5 percent** relative to the control group. In other words, among users who started onboarding, those exposed to the variant were 5 percent more likely to become paying subscribers.

However, week-4 engagement declined. Paid users who experienced the variant onboarding were approximately **9 percent less likely to report at least one temperature during week four** after payment. Since adding a temperature in week four is associated with a 70 percent probability of annual subscription renewal, this behavioral change implies an estimated **4.5 percent a reduction** in next year renewal(+9% - 5% = 4.5%).

Taken together, the new onboarding experience improves acquisition while reducing early post-payment engagement. Under the assumptions used in this analysis, the higher conversion rate slightly outweighs the engagement decline, resulting in a **marginally higher expected LTV** (lifetime value) per visitor compared to the current onboarding flow ($76.30 vs. $74.07).

Based on these findings, a full rollout of the new onboarding experience could be justified, but should be approached with caution. We recommend closely monitoring renewal behavior after rollout and iterating on the onboarding experience to strengthen early engagement, particularly behaviors linked to long-term retention, such as consistent temperature logging in the first month.

1. Test Setup and Approach

In this report, we will explain the A/B test setup, explore the provided datasets, compute conversion metrics, and analyze the results to draw actionable insights.

The A/B test compared a new onboarding experience (variant) against the current onboarding flow (control), with the primary goal of increasing the conversion of users who start the onboarding process into paid subscribers. Users were randomly assigned to either the control or variant group, as recorded in the assignment table, and their activities were tracked in the events table. Key events included starting the sign-up flow, completing the onboarding questionnaire, making a payment, and adding a temperature.

The analysis will focus on understanding user behavior, comparing conversion metrics across groups, revenue analysis, and providing recommendations based on the experiment outcomes.

2. Data Overview

The analysis uses two datasets from 2025: an event log and an experiment assignment table. The events dataset contains 323,187 rows from 58,491 unique users and records key user actions such as starting the signup flow, finishing onboarding, making a payment, and adding a temperature. Each record includes a timestamp, experiment group (control or variant), and whether the user converted.

The assignments dataset contains 56,128 unique users and records their randomized assignment to the control or variant group. Together, these datasets allow us to track user behavior through the onboarding funnel and evaluate the impact of the new onboarding experience on conversion and engagement.

The dataset contains 58,491 unique users in the events table and 56,128 users in the assignments table. Among these, 11,367 users (≈19%) appeared only in events and were not part of the experiment, while 9,004 users (≈16%) appeared only in assignments but did not generate any events.

To define the analysis sample, we kept all users who were assigned to a group and had at least one event, ensuring they were actively involved in the experiment. This resulted **in a total of 47,124 users**, with 23,221 in the control group (≈49%) and 23,903 in the variant group (≈51%), providing a balanced sample composition for evaluating AB testing outcomes.

3. User-Level Aggregation and Conversion Metrics

To better understand user behavior, we aggregated the event-level data to the **user level**, ensuring each user is represented once with summary metrics for key actions:

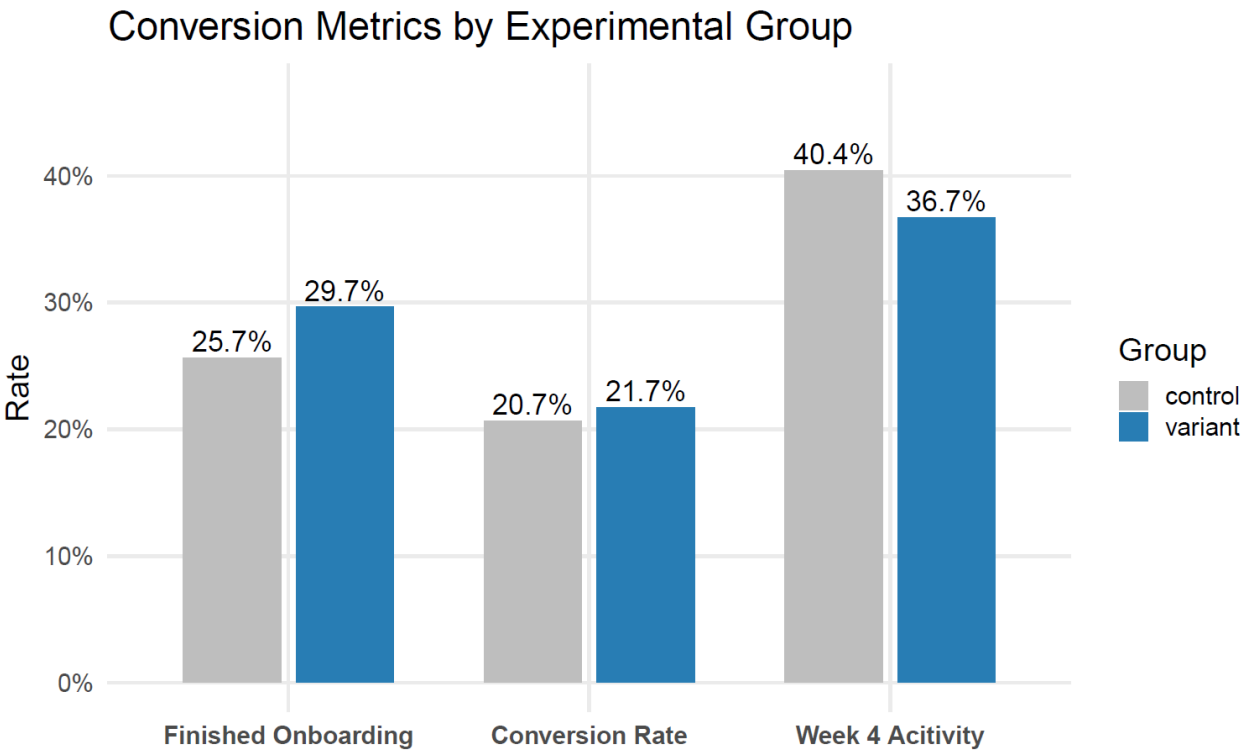
- **Finished onboarding**: whether the user completed the onboarding questionnaire after starting the signup flow.

- **Paid user**: whether the user completed payment for the annual subscription after starting the onboarding flow.
- **Week 4 engagement**: whether the user added at least one temperature during week 4 (days 22–28 after payment).

Conversion Rates by Experiment Group

We compared key funnel metrics between the control and variant groups at the user level. Figure 1 shows the results for each stage of the onboarding and subscription lifecycle. Since all users in the sample started the onboarding flow, we did not report sign-up rate.

Figure 1: Business Metrics in the Variant and Control Group



Metrics and Key Findings:

- **Onboarding completion** is higher in the variant (29.7% vs 25.7%), suggesting the new onboarding flow is easier or more motivating and improves the early part of the funnel.
- **Paid conversion** is slightly higher in the variant (21.7% vs 20.7%), meaning more users move from onboarding to payment, which aligns with the experiment goal.
- **Week-4 engagement** It is lower in the variant (36.7% vs 40.4%), indicating weaker early retention and habit formation, which can negatively impact long-term renewal and lifetime value.

4. Estimating the Average Effect of the Treatment (ATT)

To measure the effect of the new onboarding, we compared the metrics of users in the control and variant groups. Since users were randomly assigned, the observed differences can be attributed to the onboarding change rather than other factors.

We used simple regression models to estimate the impact of the new onboarding flow on key metrics and the significance of the results. This method allows us to quantify the change in percentage points and determine whether the difference is statistically significant. Table 1 reports the estimated impact on two key outcomes, Paid conversion and Week-4 engagement.

4.1 Effect on Conversion to Paid Subscription(First Column)

The regression results show that users exposed to the variant onboarding were **1 percentage point more likely** to convert to a paid subscription (0.010), compared to a control-group mean of **0.207**. This corresponds to a **4.95% increase** in paid conversion.

The effect is **statistically significant**, with a 95% confidence interval ranging from **1.39% to 8.52%** relative to the control group. This confirms that the new onboarding experience achieves its primary goal of improving short-term conversion to paid users.

Table 1: Effect of New Onboarding on User Metrics

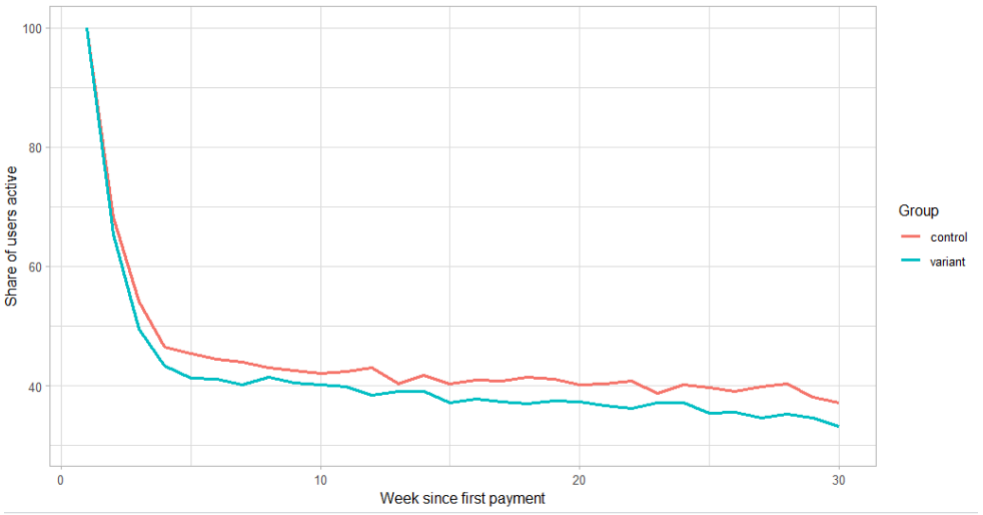
	Conversion Rate	Active in Week 4 Conditional of subscription
Treatment	0.010***	-0.037***
	(0.004)	(0.010)
Constant	0.207***	0.404***
	(0.003)	(0.007)
Num.Obs.	47124	9994
Control mean	0.207	0.404
Percent change vs control	4.95	-9.25
95% CI (percent change)	[1.39, 8.52]	[-13.97, -4.53]

4.2 Effect on Week 4 Activity Engagement (Second Column)

Among paid users, the variant onboarding **reduces week-4 engagement by 3.7 percentage points** (−0.037), relative to a control-group mean of **0.404**. This corresponds to a **9.25% decrease** in the likelihood of being active during week four. The effect is **statistically significant**, with a 95% confidence interval ranging from **−13.97% to −4.53%** relative to the control group.

This pattern is also visible in **Figure 2**, which shows user engagement over time after subscription. While engagement declines for both groups immediately after payment, the variant group consistently shows **lower engagement** than the control group. By week four, the gap between the two groups closely matches the estimated treatment effect.

Figure 2: User Engagement in the App After Subscription in Both Groups



4.3 Interpretation

Taken together, the results indicate a clear trade-off. The new onboarding increases paid conversion, but paid users are less engaged in adding temperatures in the weeks following subscription. Because week-four activity is a strong predictor of renewal, this decline in engagement presents a meaningful risk to long-term retention and next year's expected revenue.

In the next section, we use these estimated effects to assess the broader business implications of the experiment and to inform recommendations on whether and how the new onboarding experience should be rolled out.

5. Business Impact and Recommendation

To assess whether the new onboarding experience should be rolled out, we translate the estimated treatment effects into expected implications for subscription renewal and revenue.

5.1 Implications for Renewal Behavior

The experiment shows that the variant onboarding increases paid conversion by **4.95%**, but reduces the probability that a paid user is active during week four by **9.25%**. Since adding at least one temperature during week four is associated with a **70% probability of renewal**, this decline in engagement has meaningful downstream consequences.

Combined, these effects imply that the variant group has an **approximately 4.5% lower renewal probability** in subsequent years compared to the control group. This reduction is driven entirely by weaker post-payment engagement, not by lower initial conversion.

5.2 Expected Revenue Implications

The annual subscription price is **$150**. The variant increases paid conversion by **4.95%**, meaning more users buy the subscription initially. However, week-four engagement drops by **9.25%**, which implies a **4.5% lower renewal probability** for the variant group. This suggests the variant onboarding flow is good for acquisition but not necessarily good for LTV (life time value).

This analysis assumes constant renewal behavior over time, no discounting, 70% renewal probability for active users in week 4, and a 50% renewal probability for users inactive in week 4, which is not directly observed in the data. Assuming renewal behavior follows the same pattern each year, the expected revenue per each visitor that starts onboarding step can be approximated as:

$$Life\ Time\ Value\ Per\ Visitor\ =\ Conversion\ Rate \times Price \times 1\ /\ (1\ -\ Renew\ Rate\ )$$

$$Renew\ Rate\ \ =\ week\ 4\ engagement \times p_1\ +\ (1\ -\ week\ 4\ engagement) \times p_2$$

$$p_1\ =\ probability\ of\ renewal\ for\ active\ users\ at\ week\ 4\ \ =\ \ 0.70\ (given)$$

$$p_2\ =\ probability\ of\ renewal\ for\ inactive\ users\ at\ week\ 4\ \ =\ 0.50\ (assumption)$$

In practical terms, the higher conversion rate of the variant increases short-term revenue, while the decline in post-payment engagement introduces risk to long-term retention. Under the stated assumptions, the conversion uplift slightly outweighs the engagement decline, resulting in a **marginally higher expected lifetime value per visitor** for the variant onboarding flow. The estimated lifetime value per visitor for each onboarding flow is as follows:

$$Variant\ =\ 0.217 \times 150 \times 1\ /\ (1\ -\ \ (0.367 \times 0.7\ +\ (1\ -\ 0.367) \times 0.5\ )\ =\ 76.30$$
$$Control\ \ =\ 0.207 \times 150 \times 1\ /\ (1\ -\ \ (0.404 \times 0.7\ +\ (1\ -\ 0.404) \times 0.5\ )\ =\ 74.07$$

5.3 Recommendation

Based on the results and the assumptions used in our analysis, the variant onboarding achieves its primary goal of increasing conversion. Although the variant reduces week-4 engagement (a key predictor of renewal), the higher conversion rate is large enough that the **overall estimated lifetime value per visitor remains slightly higher** for the variant ($76.30 vs. $74.07).

However, week-4 engagement is a strong predictor of renewal, and the observed decline introduces uncertainty about long-term retention. If the renewal rate for users inactive at week 4 is lower than assumed, the LTV advantage could disappear.

However, because week-4 engagement is a key predictor of renewal, we recommend monitoring actual renewal rates closely after rollout. If renewal behavior deviates from our assumptions, we should be prepared to iterate on the onboarding flow to strengthen early engagement.