



Module 2 Project

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IronHack Data Analytics –
Week 5–6





Introduction

- Vanguard, a US investment management company, developed a new User Interface.
- It will be deemed a success if it increases the process completion rate by 5% and/or reduces process duration.

We have analysed this test to see:

- 01** What the data shows
- 02** Was the test appropriate
- 03** Is the new platform more effective



Test Structure

Start

Step 1

Step 2

Step 3

Confirmation

The process went from a start page, three subsequent steps, and a confirmation page for both the Control group (the original process) and Test group (New UI).

At each step users will either proceed successfully to the next step, go back to a previous step, or leave the process altogether.

We have data from each visit for both groups, broken down by step and the time each step was initiated, as well as client data for each visitor.

A step is deemed successful if it is followed by the subsequent step. A visit is deemed successful if it includes all steps from start to confirmation (even if some steps are visited multiple times).

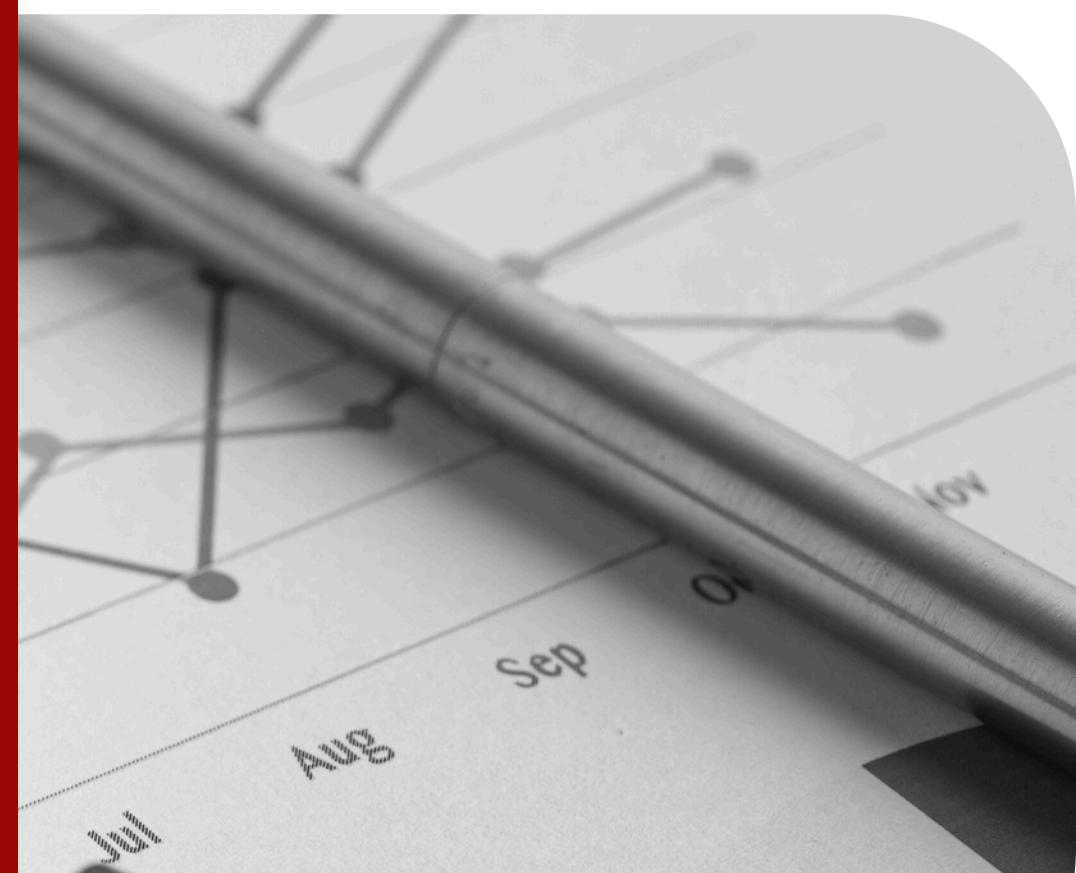
Data Structure

The dataset consisted of multiple related files, linked through `client_id` as a common field.

Files and Content:

- Client Information: Included fields such as age, gender, tenure, and account balance.
- Variation Information: Identified clients as part of either the Test or Control group.
- Log Data (2 Files): Contained details about:
 - Visit ID
 - Process Step
 - Date and Time of each log entry

This relational setup enabled seamless integration and analysis across different dimensions of the experiment.



step
01

Data Cleaning

Data Integration and Filtering

Combined the log data and merged with Variation info, removed duplicated 'start' and 'confirm' steps (keeping last only), and standardized date and time formats to enable accurate log calculations.

Data Enrichment

Sorted the data by visits, with visit steps in time order. Created new columns to identify step completions, final visit steps, step durations, and track client navigation patterns (e.g., moving forward or backward in steps).

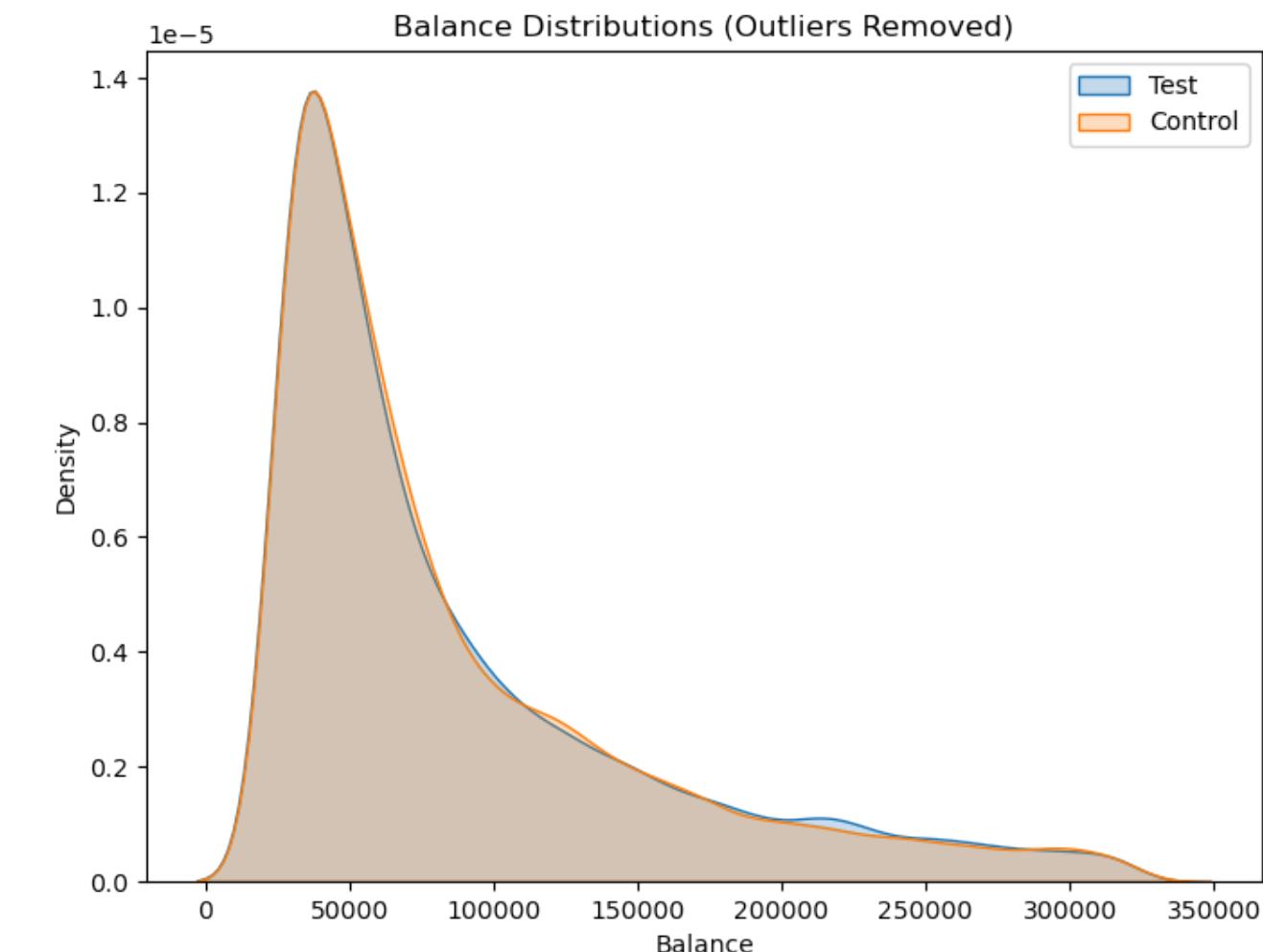
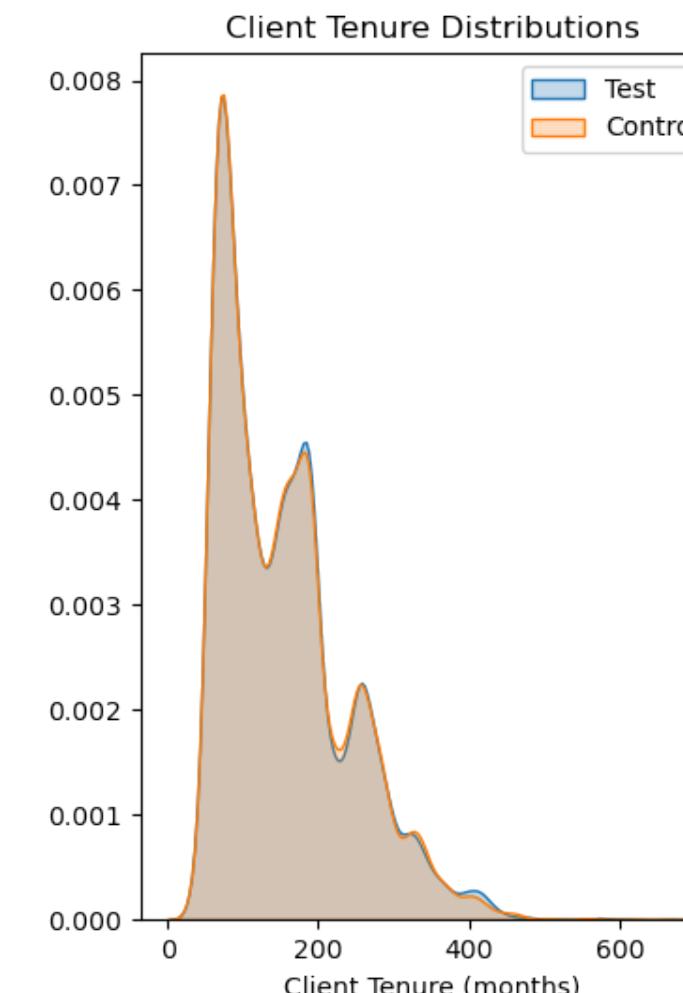
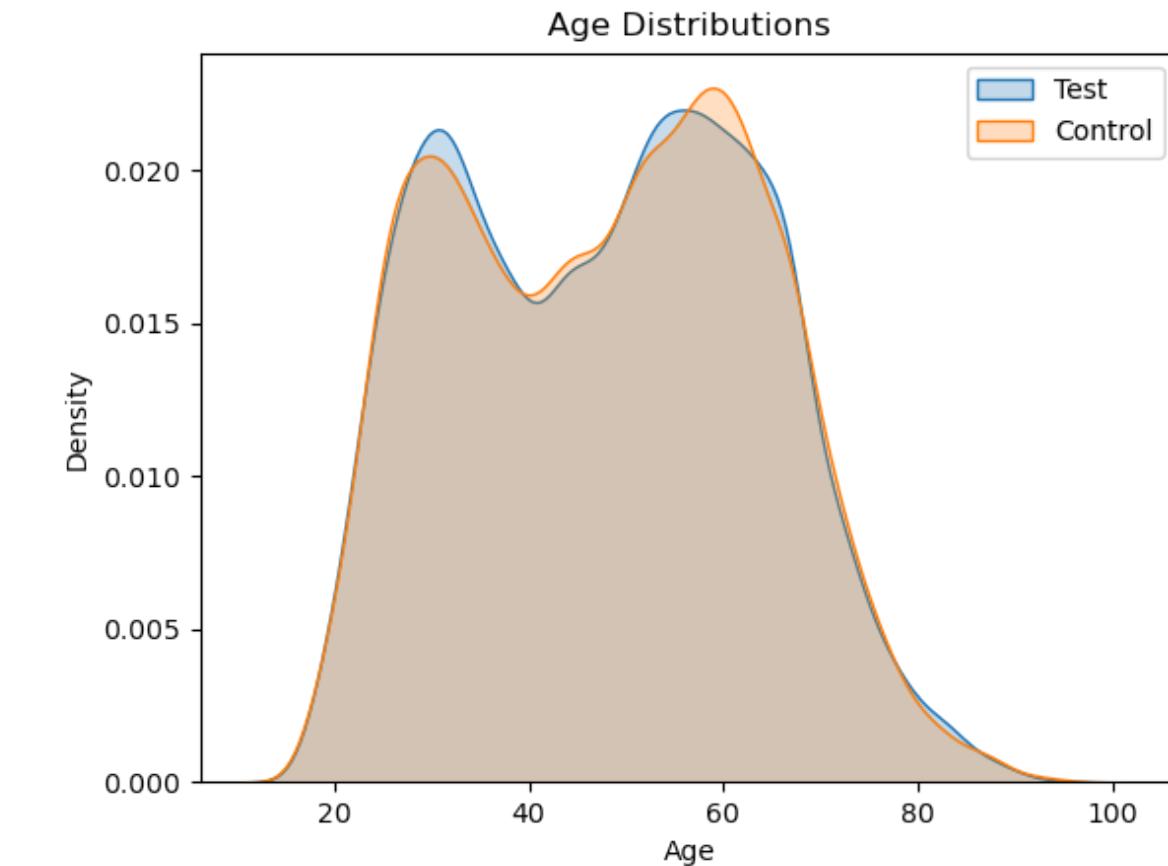
Outlier Handling & Output

Removed visits that contained any steps with outlier durations ($1.5 * \text{IQR}$ below Q1 or above Q3) and saved the cleaned dataset in new files for streamlined analysis.

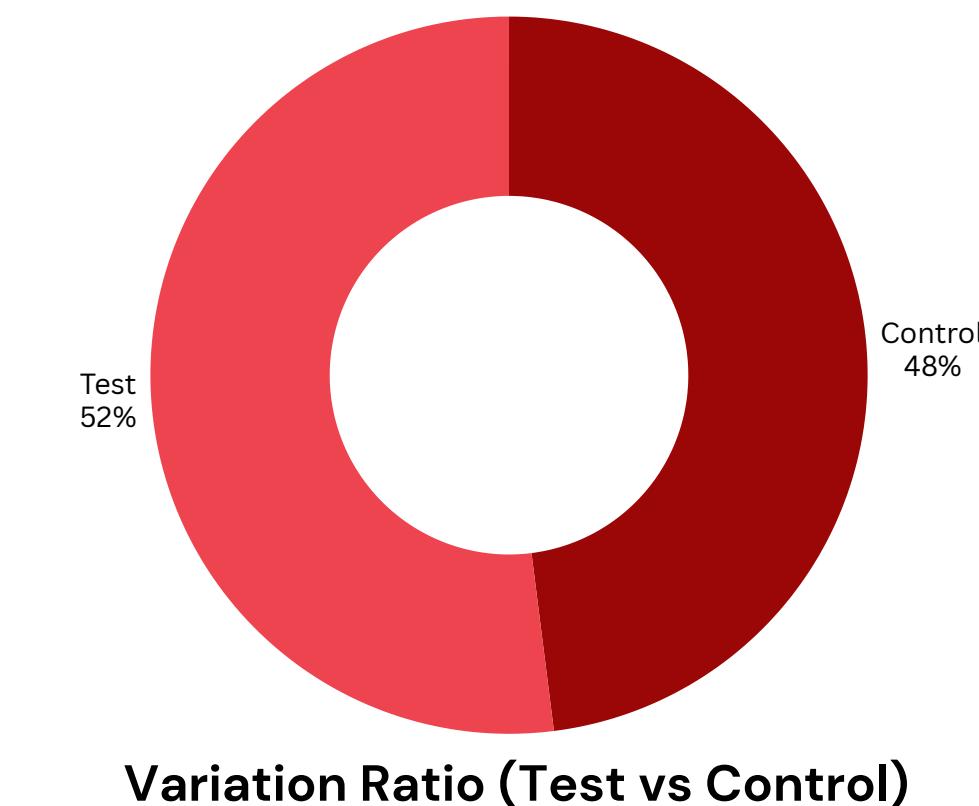
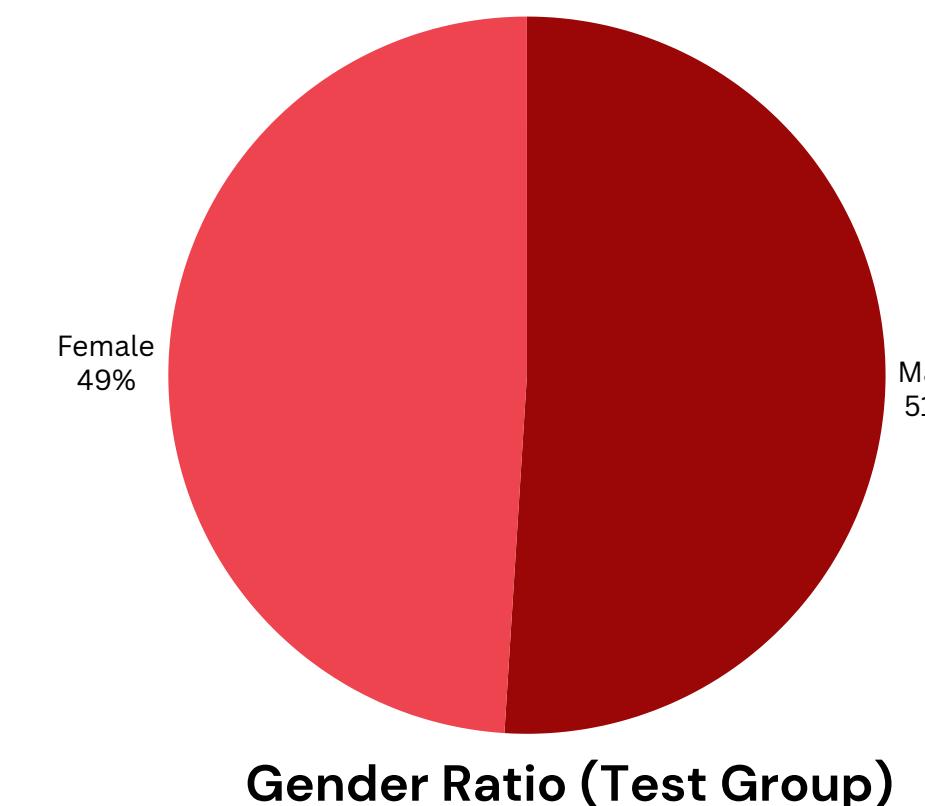
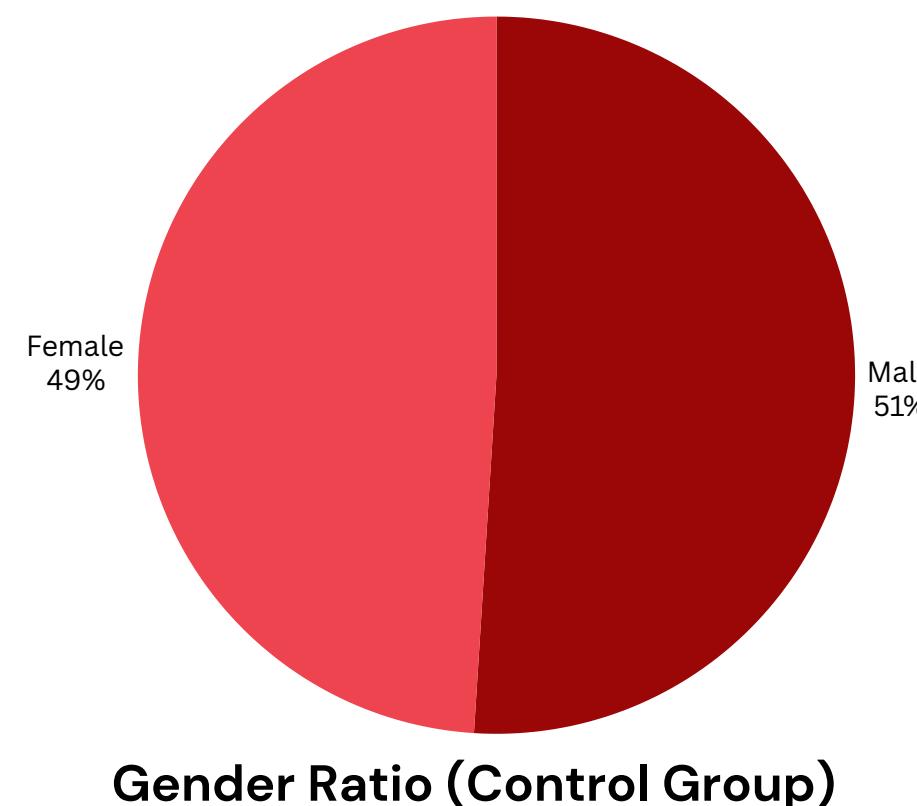
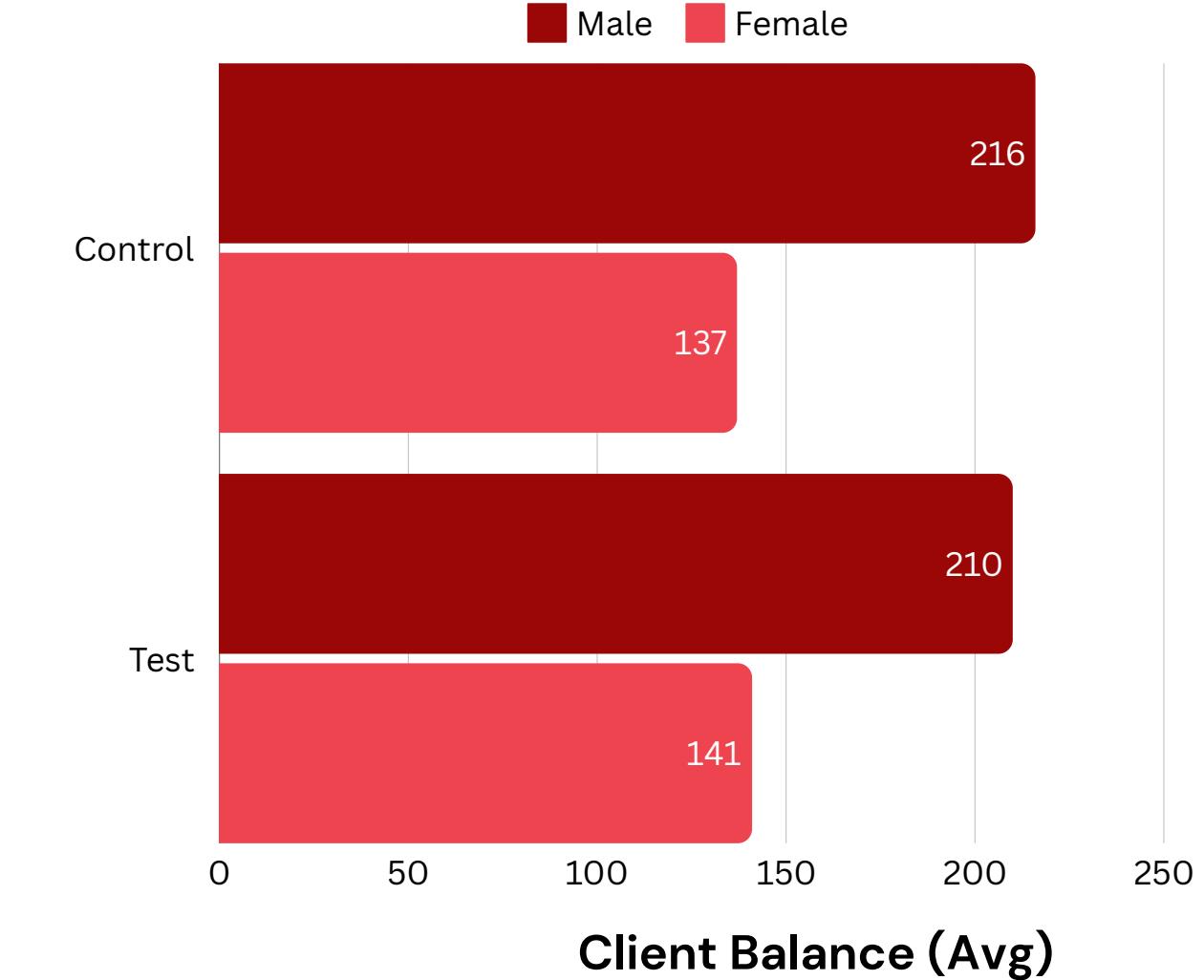
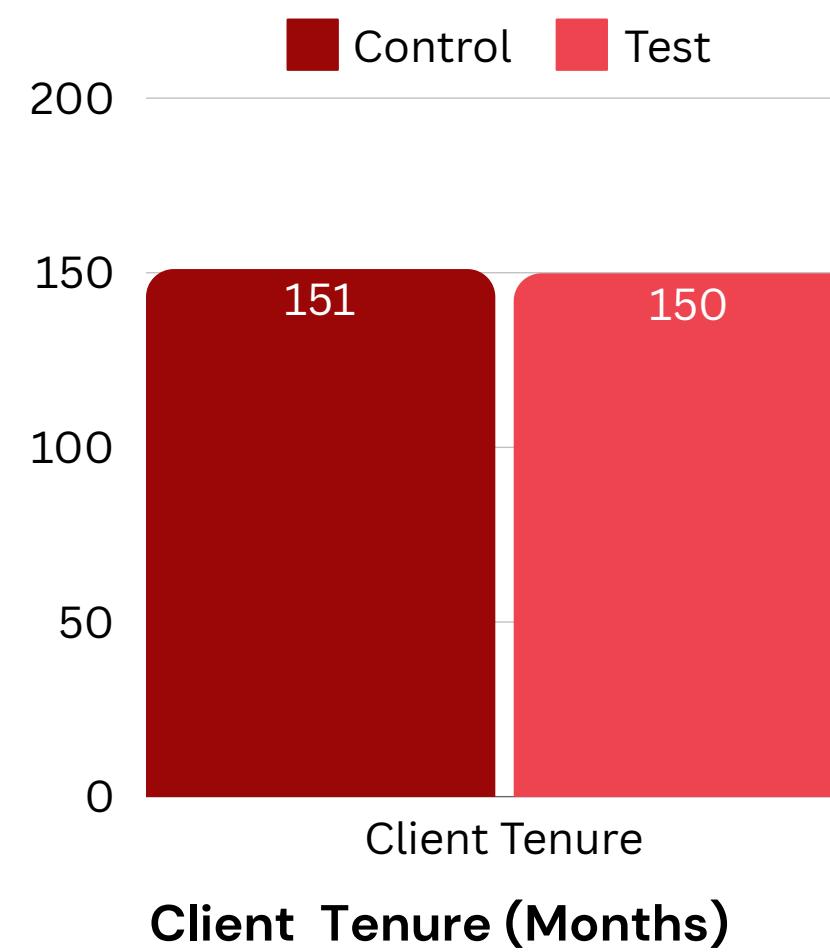
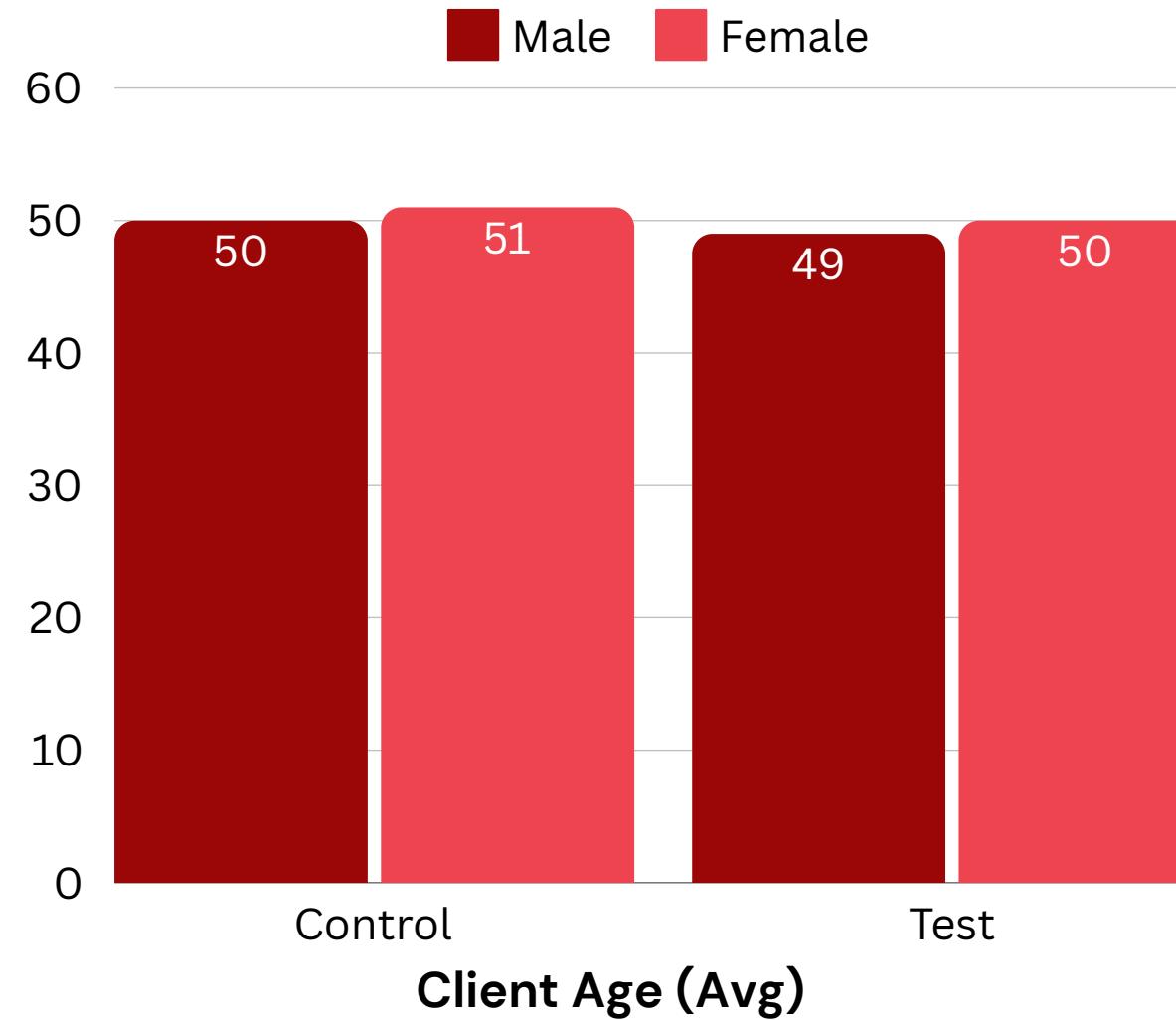
Experiment Evaluation

step
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- Were the clients split appropriately between the old and new design?
 - **Gender** chi-squared p-value of 0.5, is above alpha (0.05), therefore statistically similar between the groups
 - **Age**, and **Client Tenure** distributions were statistically similar between the groups, with t-test p-values > 0.05
 - **Balance** distribution was also similar, with a p-value of 0.1761, although this was only the case after removing the the high outliers.
- What additional data could be added?
 - Further client data. For example: location, education level, family status
 - More visit data: device type, time the visit was ended, time since last login, etc.



Bias in the Experiment?



Hypothesis Testing

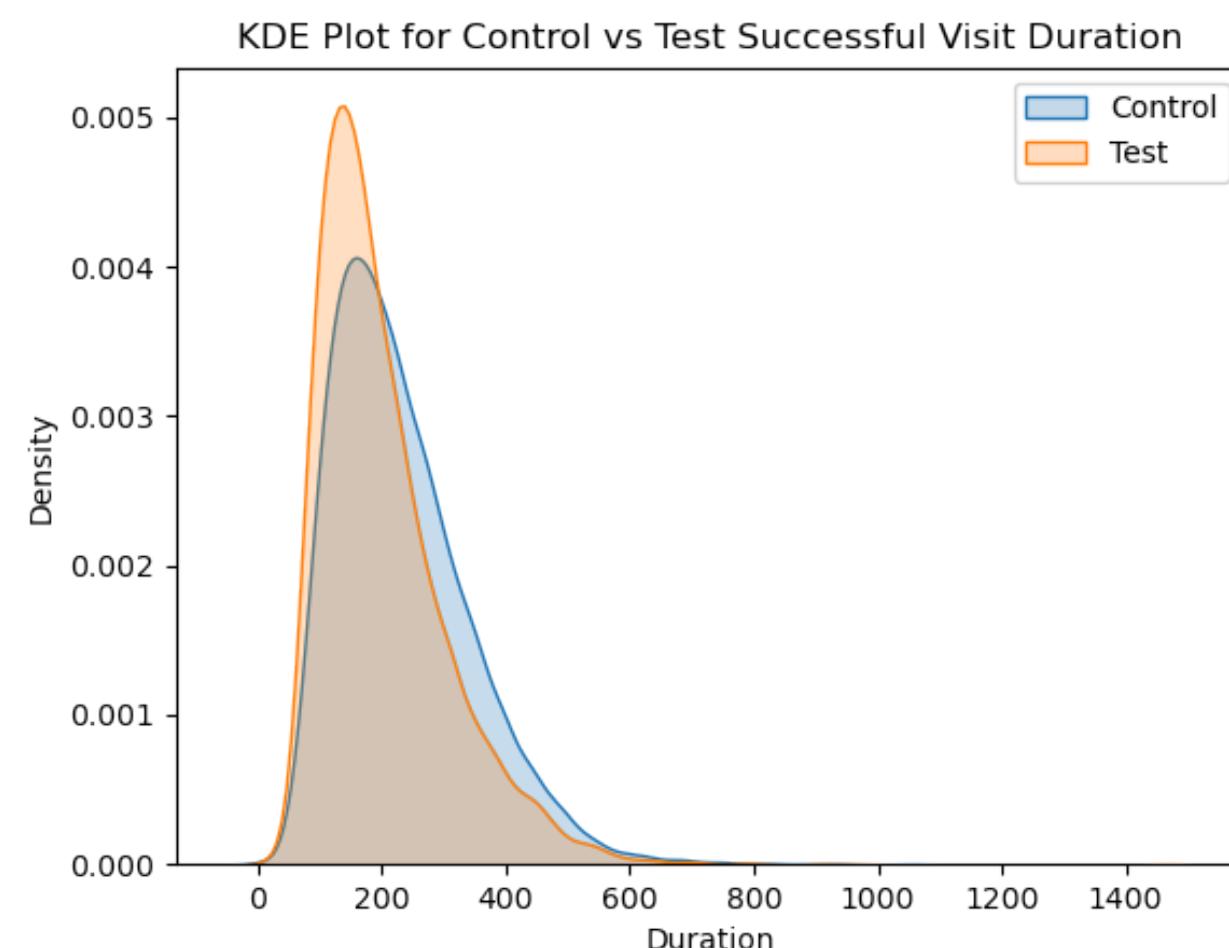
Hypothesis 1: Success Duration

- Null Hypothesis (H_0): The mean success duration for the test group is equal to that of the control group
 - Test Conducted: Independent t-test (two-sided) with unequal variances.
 - **Result:** P-Value (5.6e-100) < 0.05, there is strong evidence to reject the null hypothesis.

Hypothesis 2: Completion Rate

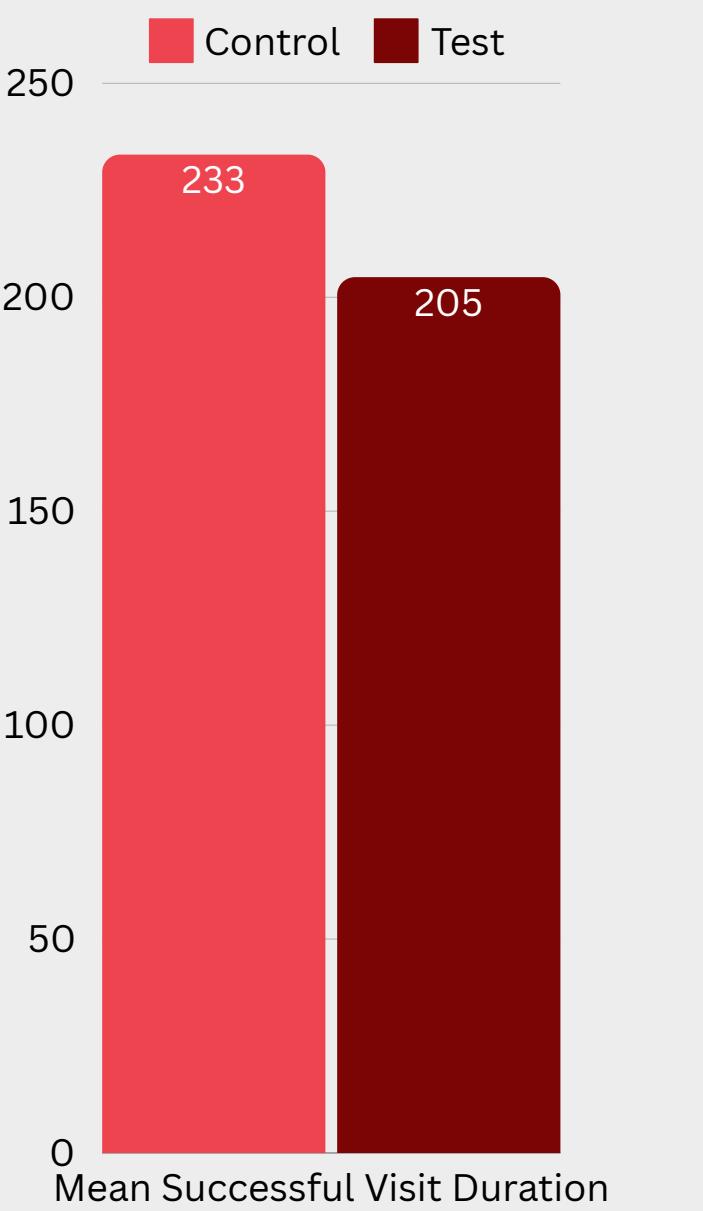
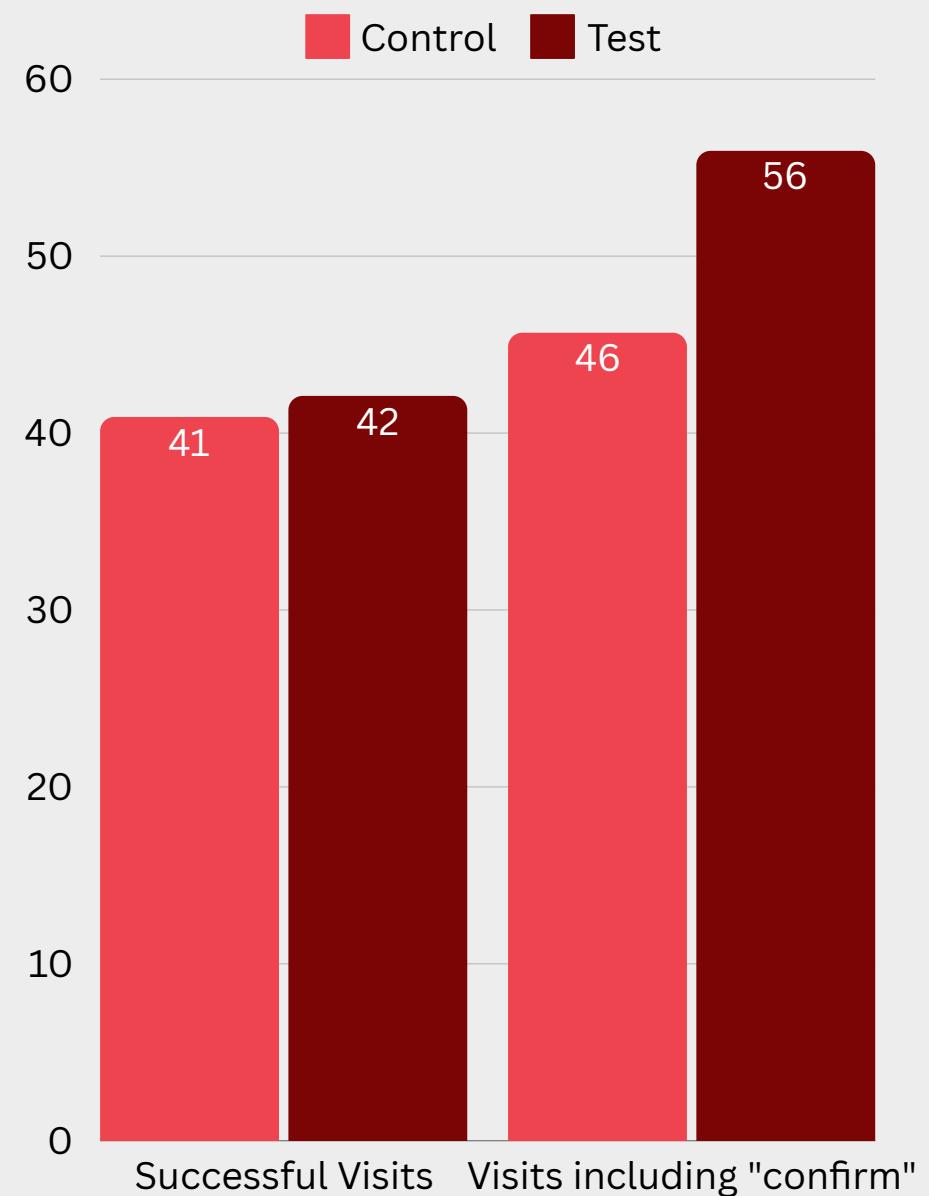
- Null Hypothesis (H_0): The completion rate for the test group is equal to that of the control group. We got normally distributed of success rate using Central Limit Theorem with 500 groups of 100 data points for the test and control group.
 - Test Conducted: Independent t-test (two-sided) with unequal variances.
 - **Result:** P-Value (0.01) < 0.05, there is strong evidence to reject the null hypothesis.

From this analysis we know that there was an impact of the new interface on the overall durations and success rate.



step
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Test Results

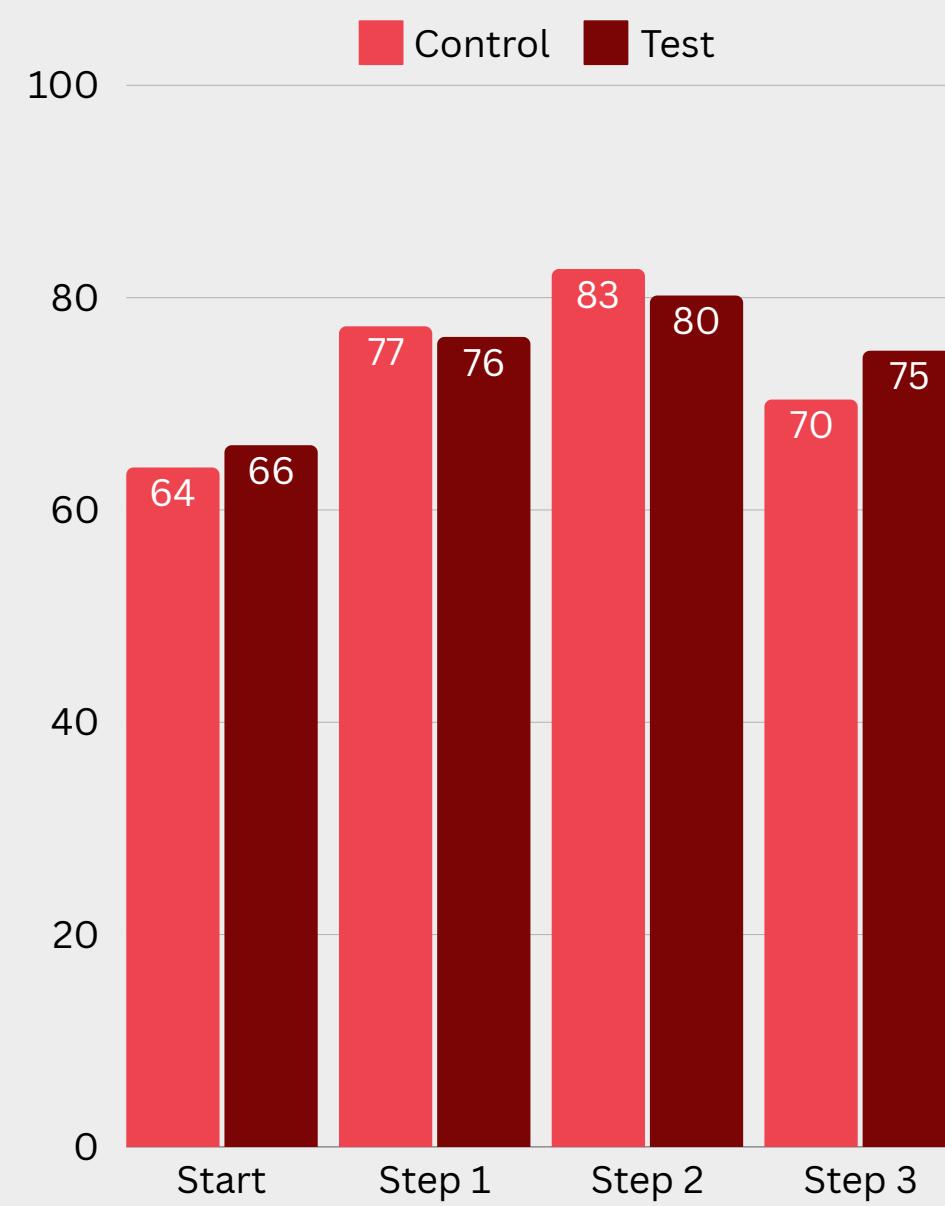


- The average duration for a successful visit was shortened by 13%
- Share of fully successful visits increased by 3%, and visits containing a confirmation page increased by 23%

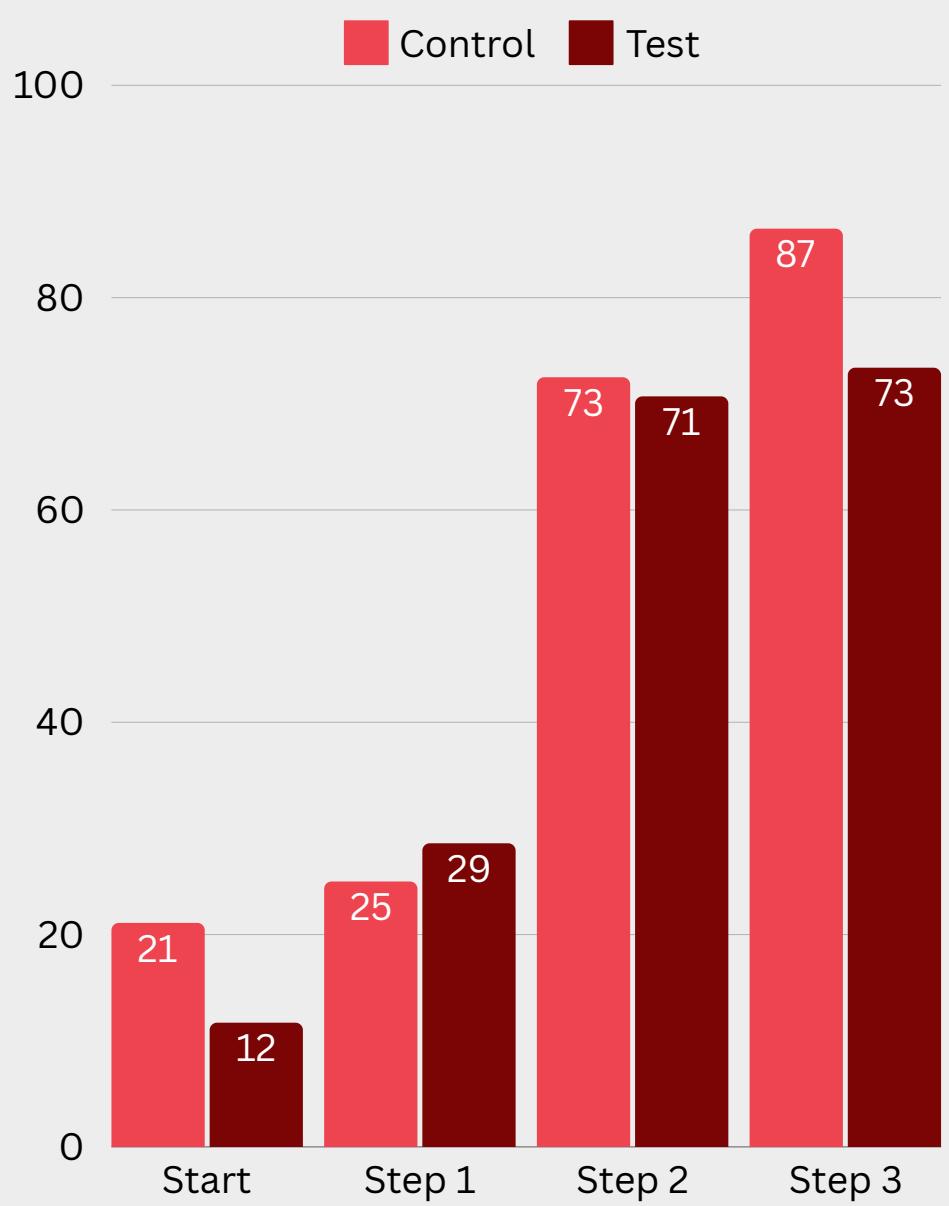
Full Visit Results

Results by Step

Success Rate by Step



Avg. Step Duration



- Success rates increased for start step and step 3, however there were slight decreases for step 1 and step 2
- All steps other than step 1 took less time on average in the new UI.

Step Results

A successful visit was defined as progressing every step from start to finish (can contain multiple incidents of each step)

Experiment Timeframe

- Was the timeframe appropriate?
 - The experiment visits by day followed an unusual pattern. Highest activity in Week 3 and peaking on Wednesdays, then decreasing gradually. We do not know if this pattern is due to system traffic or experiment set-up.
 - Both the Control and Test group were showing increasing trends in success rate by step over the test period and decreasing visit durations.

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**step
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Conclusions

01

The visit success rate increased by 2.9%

- This is defined as the share of visits that contain every step from start to confirm. From 40.9% for the Control to 42.1% for the Test
- However, the share of visits that contain a confirm step increased by 22.5%. From 45.7% for the Control to 56.0% for the Test
 - Improvement was seen in success rates for start and step 3, although step 1 and step 2 saw slight decreases

02

The duration of successful visits reduced by 13%

- The new UI improved visit duration across all client age groups, for all steps other than Step 1



step 05

Recommendations

01

Depending on the definition of “success rate” the improvement may be below the 5% threshold. However, we would still advise changing to the new interface as there is a clear increase in overall successes by step, a reduction in clients leaving the process mid-way, and shorter durations to complete the process.

02

Whilst the new interface saw an overall improvement in the process, we would advise reviewing the new “step 1”, as this was the only step to show an increase in average duration **and** a lower success rate. Improving this would likely boost the overall improvement to over 5%.



Project Management

Trello & GitHub

- We utilized Trello as our primary tool for task management, creating a structured workflow with boards, lists, and cards to track progress. Tasks were categorized into phases such as "To Do," "In Progress," and "Completed," enabling us to visualize and prioritize work effectively.
- We used GitHub for version control and collaboration, enabling us to share code and track changes.

Thank You



https://github.com/owen-george/wk5_to_6_project