VANGUARD INVESTMENT MANAGEMENT COMPANY

Baratheons:

Alexandra, Charul, Chiara, Pati

INTRODUCTION

Vanguard is a US-based investment management company founded in 1975.

Vanguard offers a broad selection of investments, advice, retirement services, and insights to individual investors, institutions, and financial professionals

CHALLENGE

Would the changes in the User Interface (UI), coupled with timely in-context prompts, make the online process smoother and encourage more clients to complete the process of A/B testing?

AGENDA OVERVIEW

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DATA OVERVIEW

Client Profiles

demographic information about our clients, such as age, location, and socioeconomic status

DATASET 1

Digital Footprints

customer interactions with capture of visit ID, time, date, and process steps.

DATASET 2

Experiment Roster

which clients were part of the grand experiment.

DATASET 3

DATA CLEANING AND MERGING PROCESS:

Data Cleaning Steps

- Handled Data Types
- Removed Duplicates
- Managed Missing Values
- Bins Creation

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PROBLEM STATEMENT

01

Did the new UI lead to higher completion rates?

02

How do the Test & Control differ?

03

Based on a data-driven approach, do we recommend implementing the app's UI changes?

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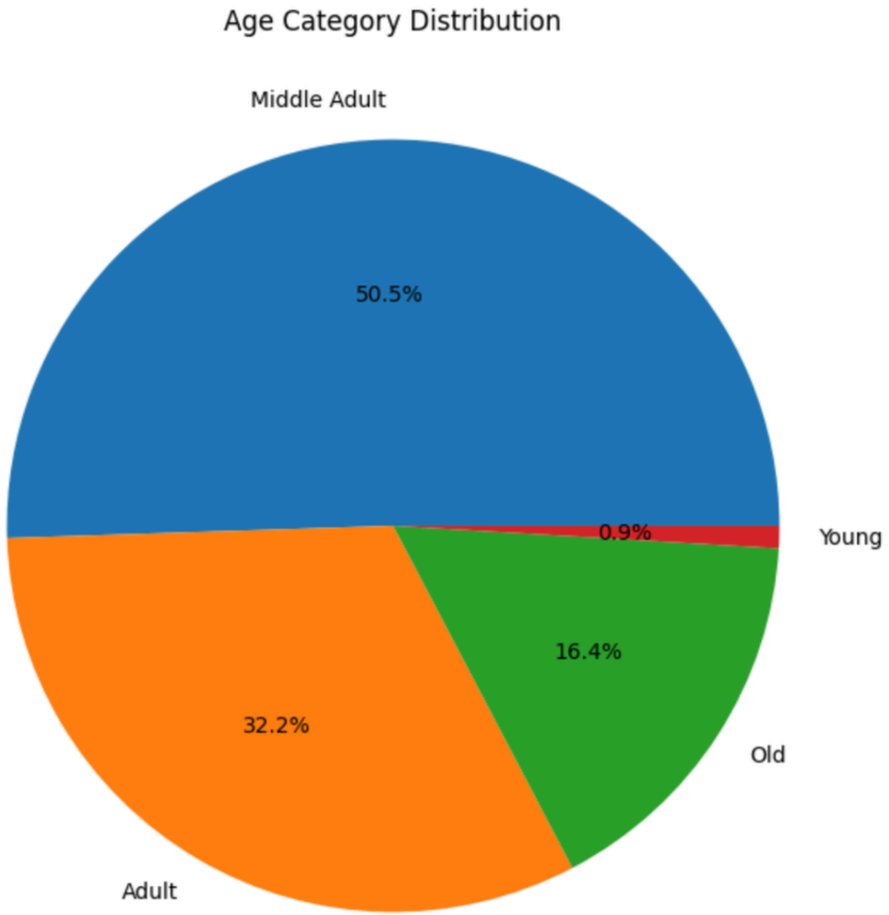
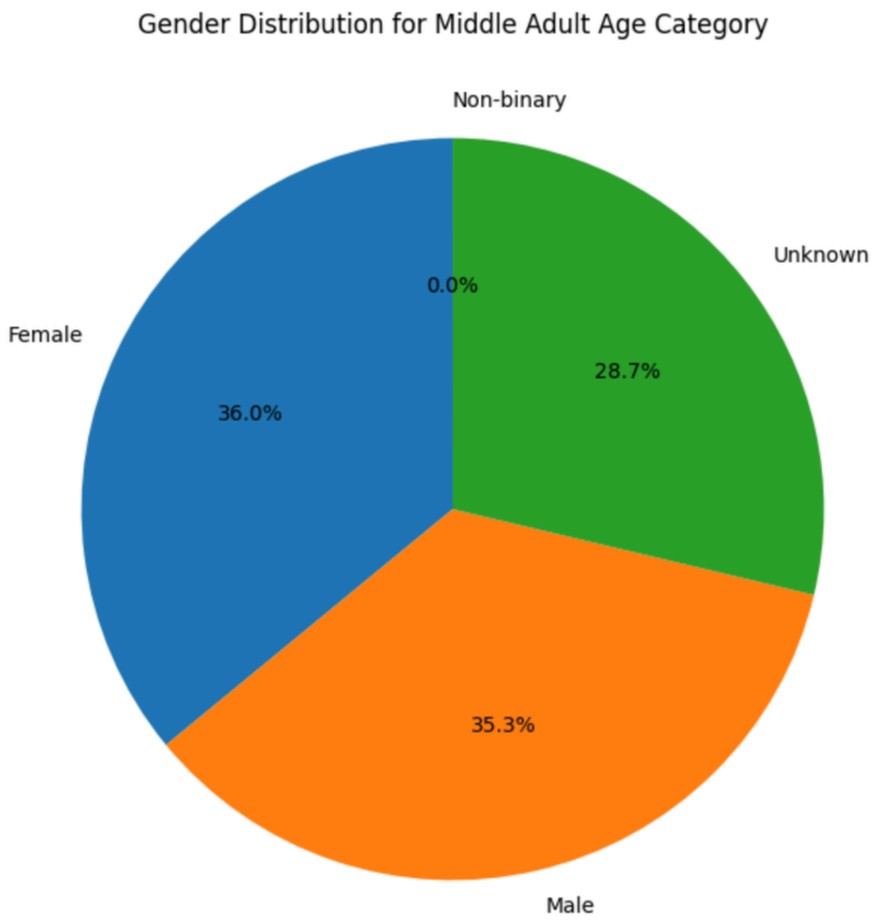
EXPLORATORY DATA ANALYSIS

Who are the primary clients using this online process?



Within the Middle Adult group, what is the gender breakdown?



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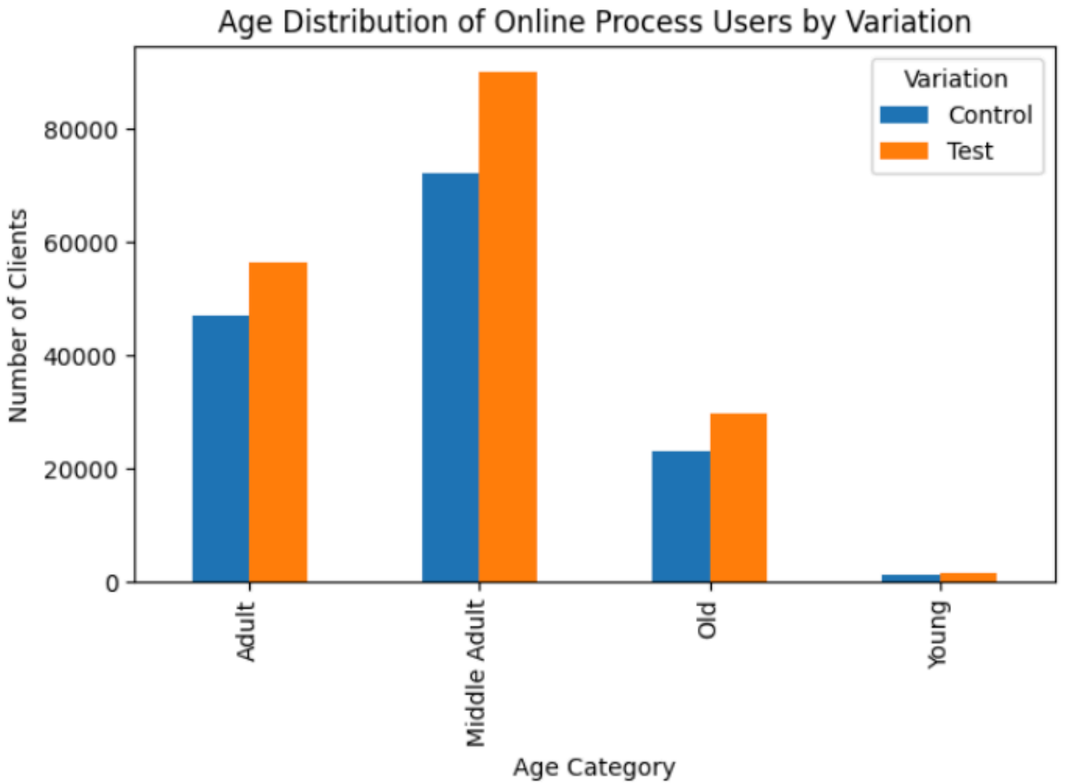
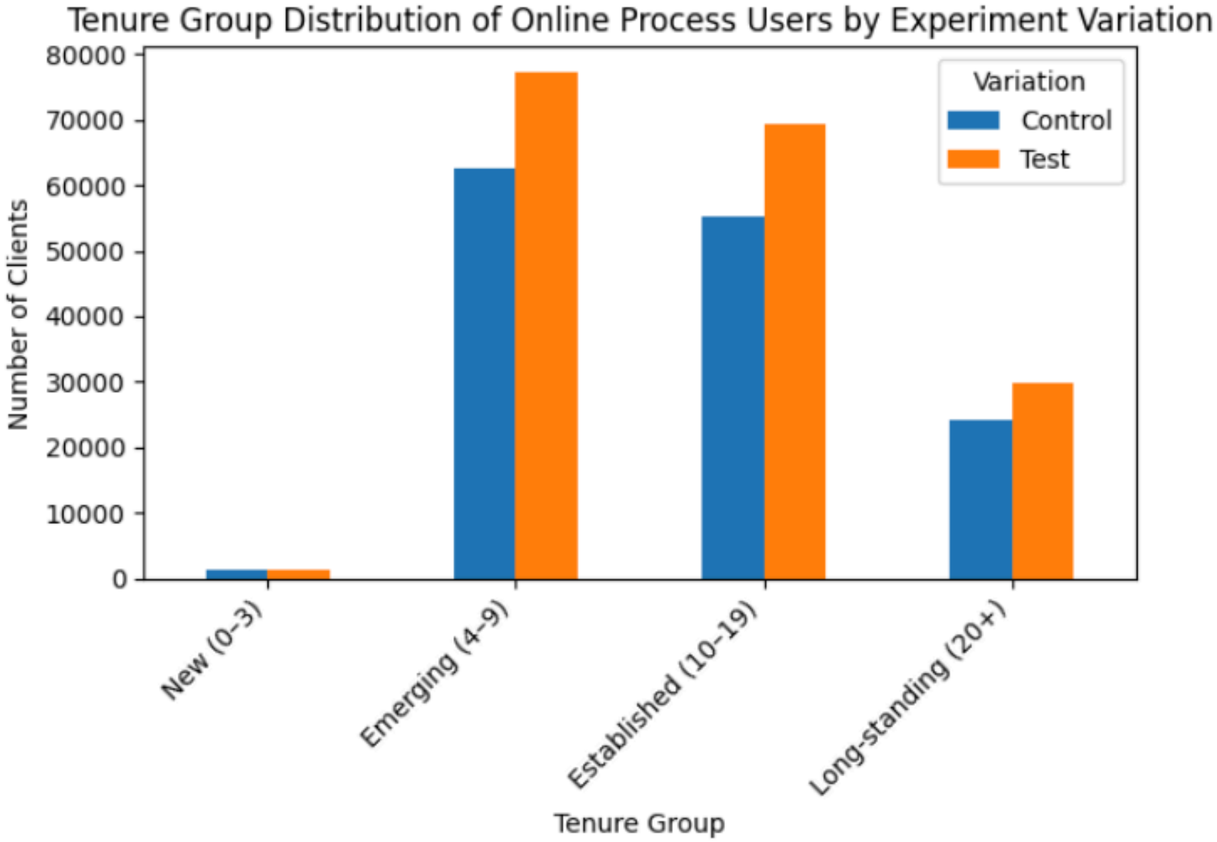
Are the primary clients younger or older?



Are the primary clients new or long-standing?



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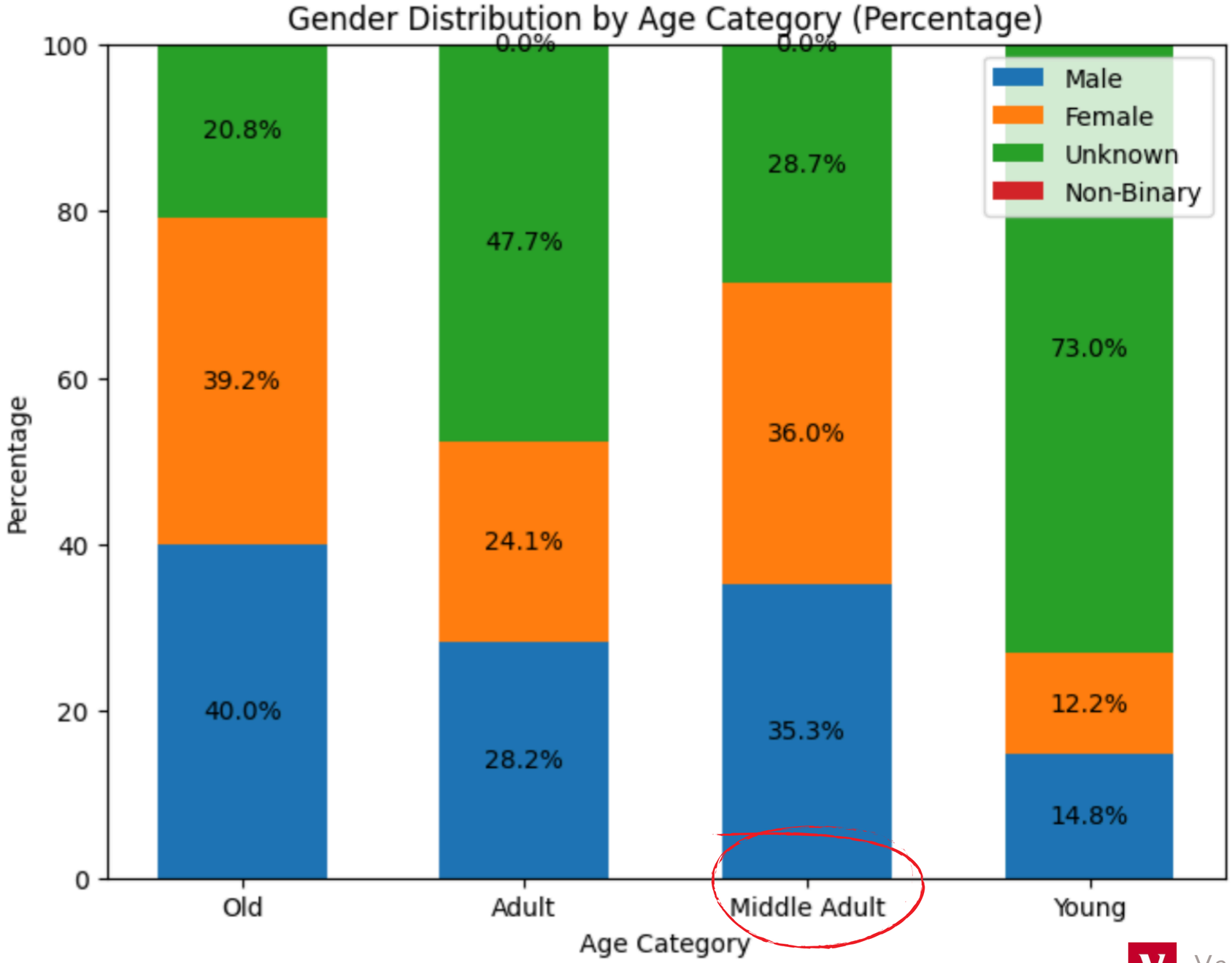
Gender distribution by age breakdown:



EXPLORATORY DATA ANALYSIS - CLIENT BEHAVIOUR

Time spam
3 months

Tot. clients
50k

Primary client
Middle Adult (40y-64y)

Tenure ratio
43% Emerging (4y-9y)

Age ratio
Female 36%

Frequency of usage
Male users have a higher average logon rate (6.6) compared to Female users (6).

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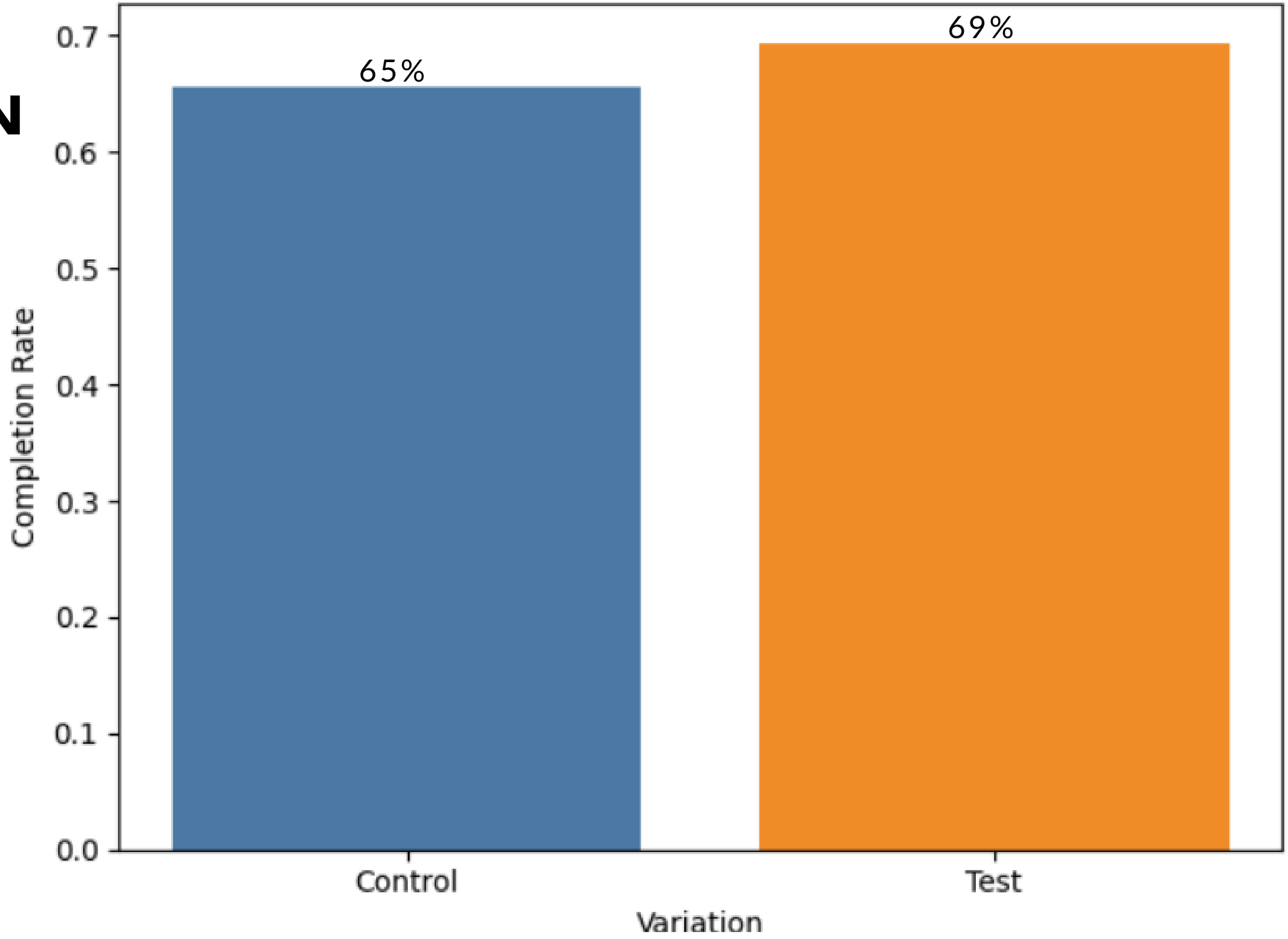
PERFORMANCE METRICS

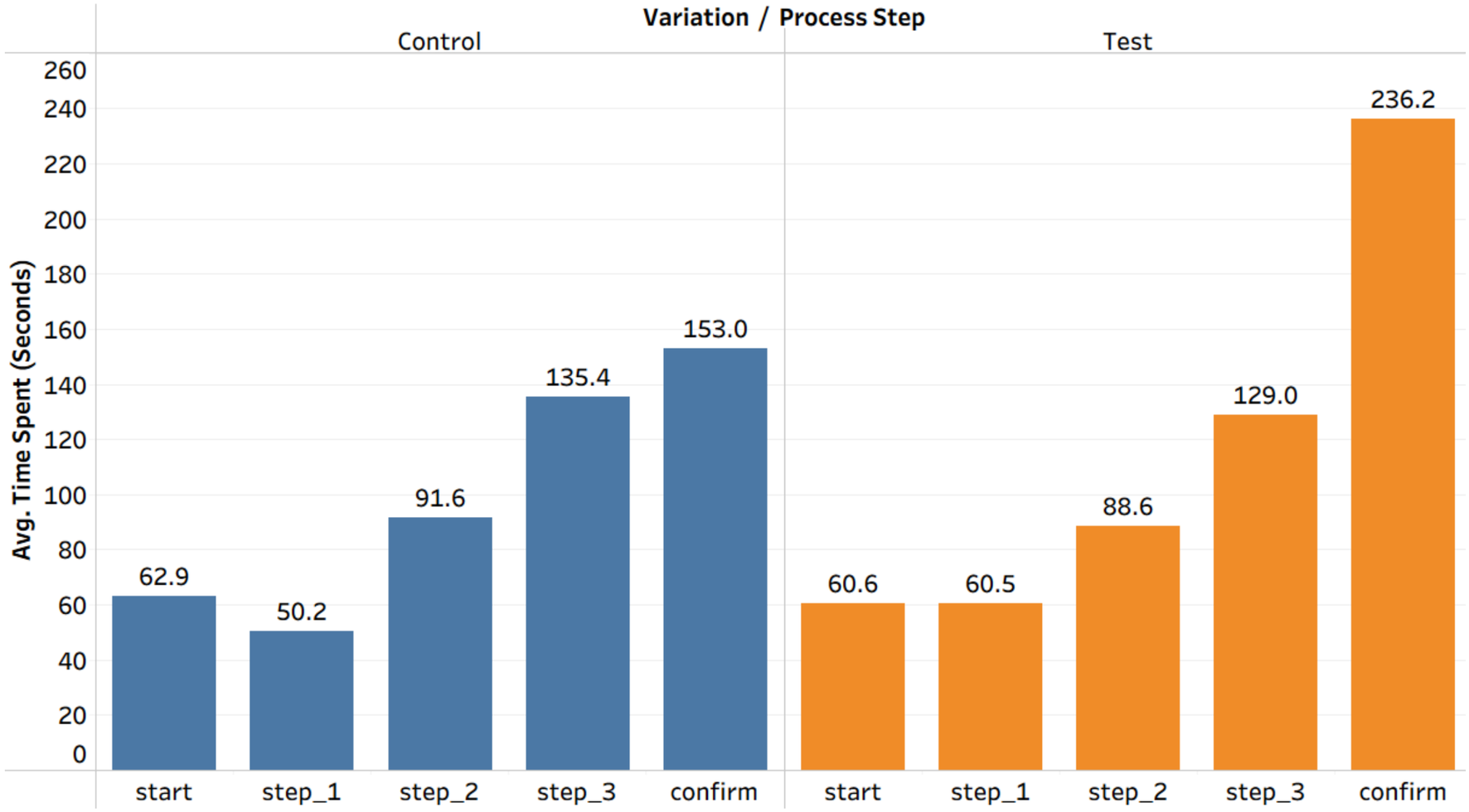
COMPLETION RATE

Percentage of users who start the online process and successfully complete it.

The test group achieves a higher completion rate than the control group, confirming that the new UI improves process completion.



TIME SPENT ON EACH STEP



This chart compares the average time users spend on each step of the process between the control and test groups.

Steps where the test bars are consistently lower indicate improved efficiency and reduced friction in the new UI.

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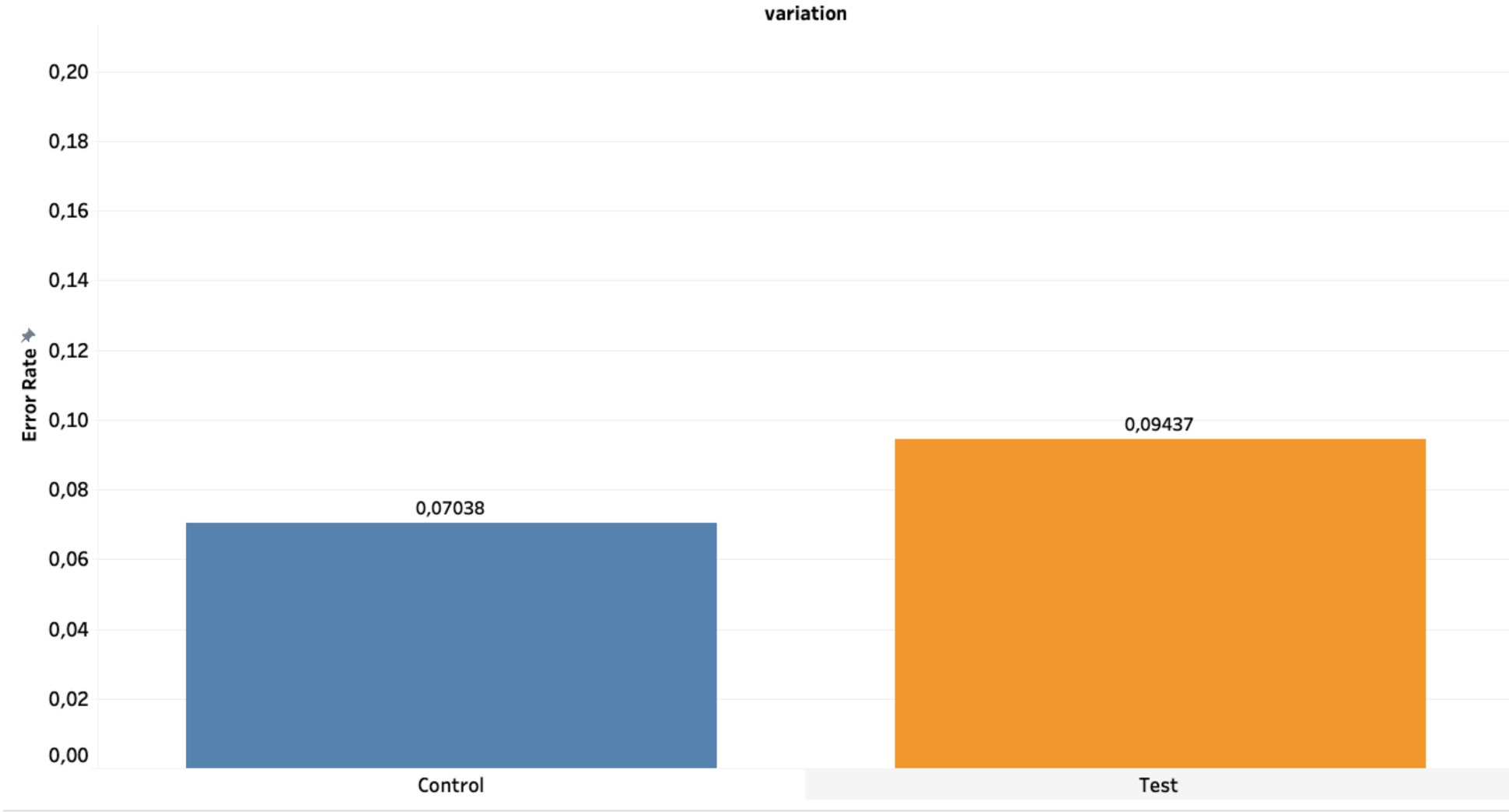
ERROR RATE

Measures how often users go backward in a process or revisit previous steps.

Frequent backward navigation may indicate user confusion, unclear instructions, or usability issues within the flow.

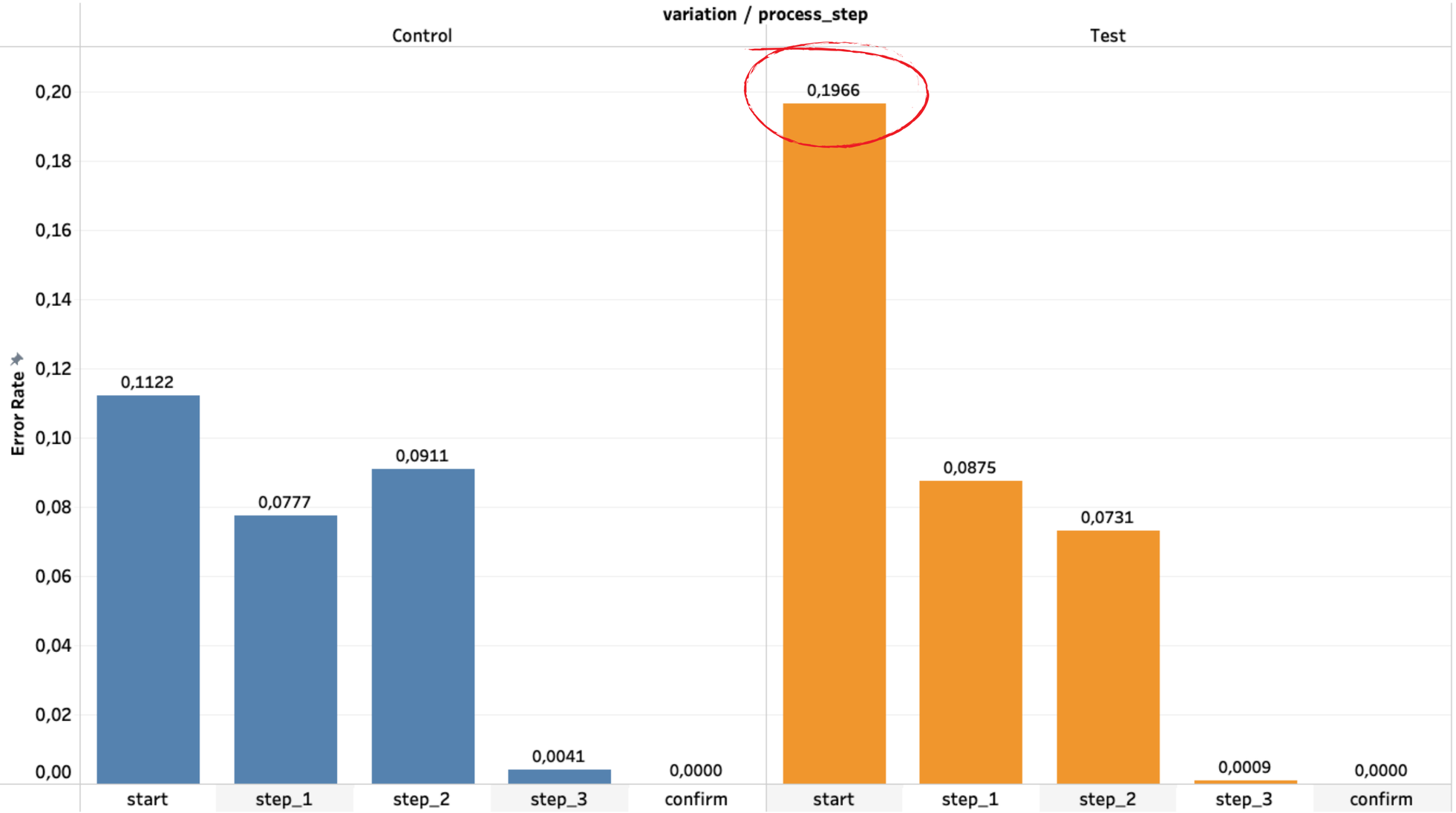


ERROR RATE BY PROCESS STEPS

Measures how often users go backward in a process or revisit previous steps.

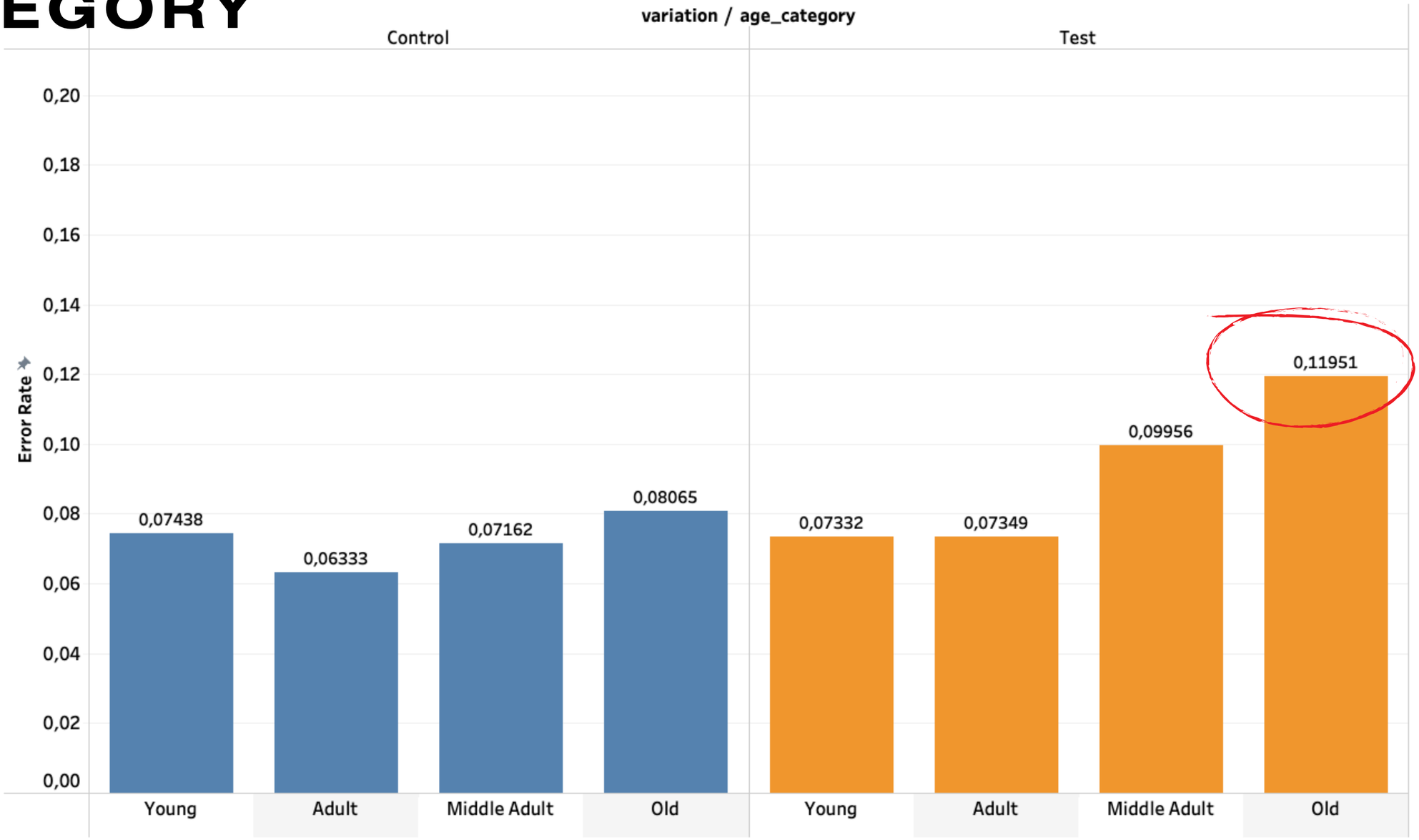
Frequent backward navigation may indicate user confusion, unclear instructions, or usability issues within the flow.

Overall the trend is improving step over step.



ERROR RATE BY AGE CATEGORY

The new version shows **higher error rates** in **older users** (> 65 years) mostly driven by Start step.



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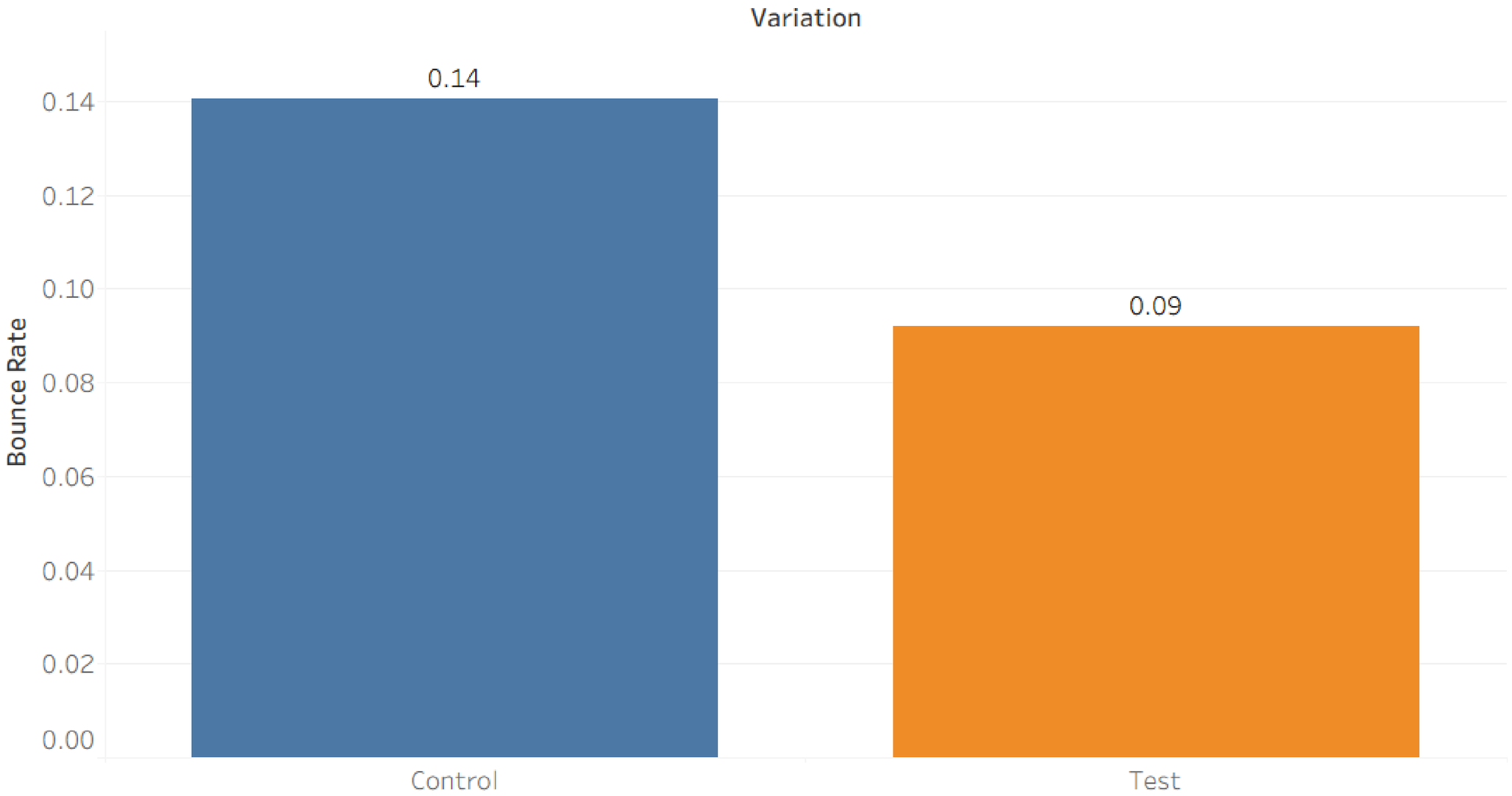
BOUNCE RATE

The proportion of people who started but did not progress further, out of the total number of people who started.

The highest score registered by Control



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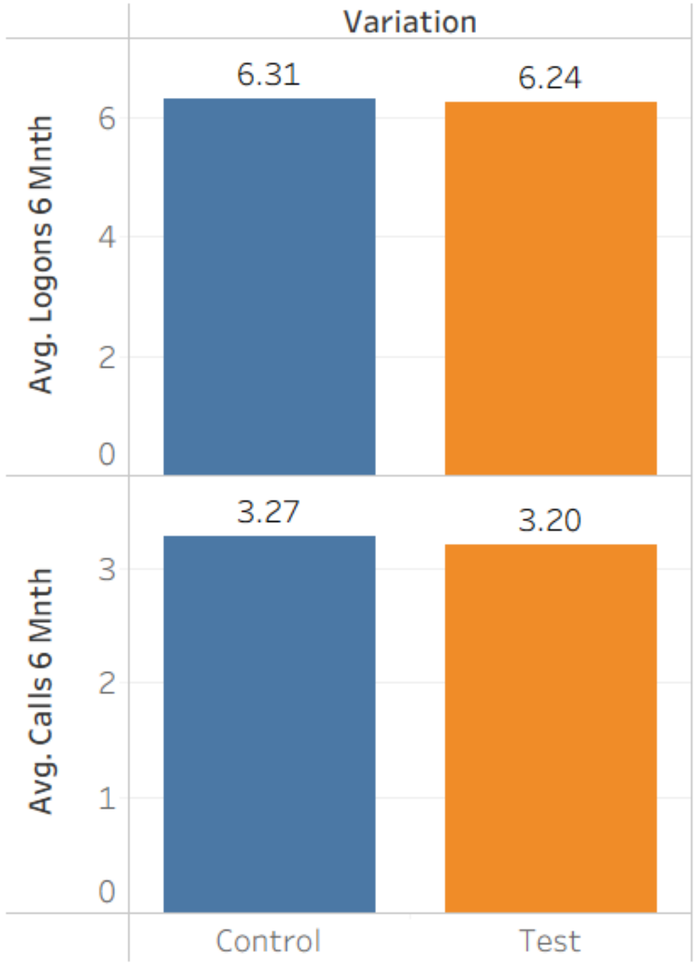
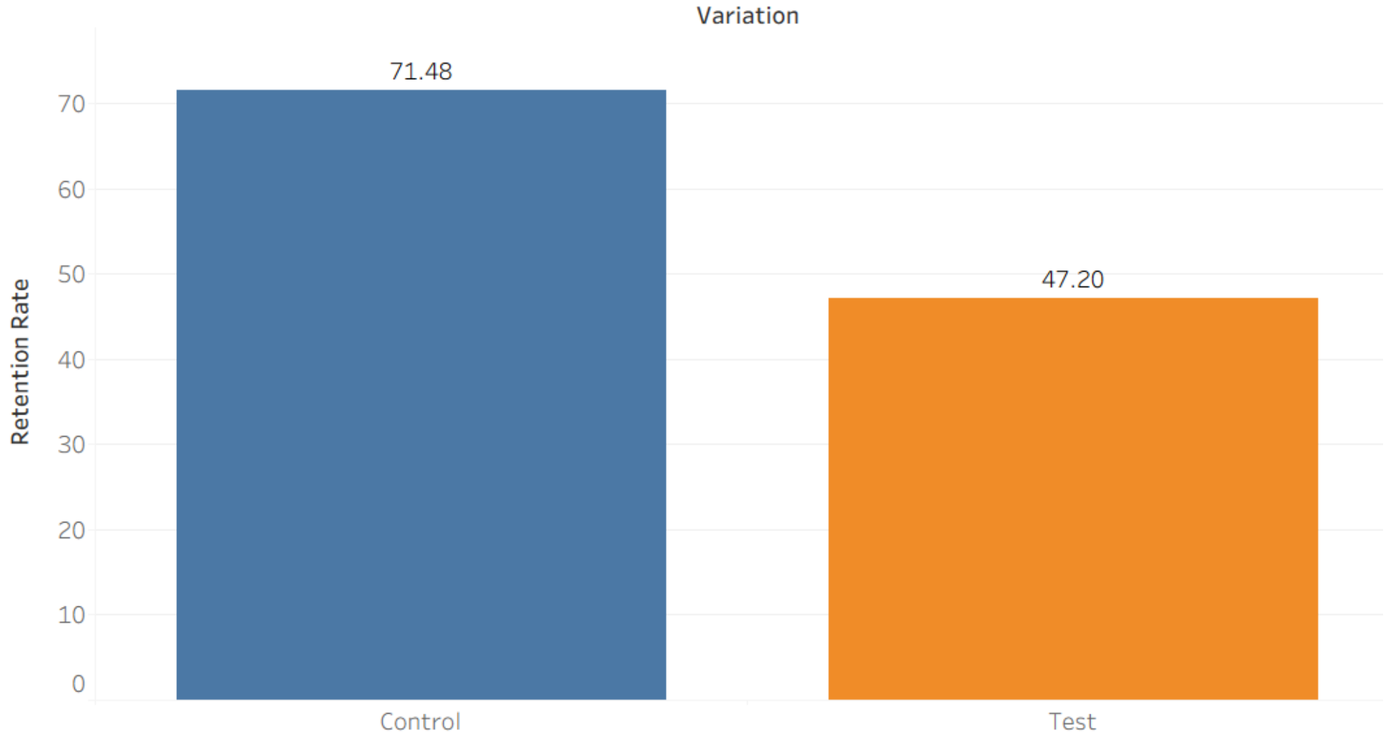
ENGAGEMENT RATE



On avg., the engagement rate on Test vs Control decreased.
Users might find the new design easier to navigate without needing as much support or multiple logins.

RETENTION RATE



RR% is lower in Test vs Control.
The new version encourages users less to return and engage.

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HYPOTHESIS TESTING

HYPOTHESIS COMPLETION RATE

HYPO	STATISTICAL METHOD	OUTCOME	CONCLUSION

• **Null Hypothesis (H_0):** There is no difference in completion rates between the old UI and the new UI.
• **Alternative Hypothesis (H_1):** The new UI has a different (higher) completion rate than the old UI.
	Chi-square Test
	• **p-value < 0.05,**
	  ◦ significant difference in completion rates between the new and old UI.
	• **p-value> 0.05,**
	  ◦ no significant difference in completion rates
		• **Chi-square statistic:** 524.0080
		• **p-value**: 0.0000
		• Reject the null hypothesis
			Statistical testing confirms that the new UI leads to a significantly higher completion rate, validating the redesign and supporting rollout.

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HYPOTHESIS COMPLETION RATE WITH A COST-EFFECTIVENESS THRESHOLD

HYPO

- **Null Hypothesis (H_0):** The completion rate of the new UI (Test) is less than or equal to the completion rate of the old UI (Control), increased by 5% (relative uplift threshold).
- **Alternative Hypothesis (H_1):** The completion rate of the new UI (Test) is greater than the completion rate of the old UI (Control), increased by 5%.

STATISTICAL METHOD

One-sided two-proportion z-test

- Superiority test with a 5% relative uplift margin

OUTCOME

- Control Completion Rate: 65.47%
- Test Completion Rate: 69.01%
- Relative Uplift: +5.41%
- Required Threshold: +5.00%

CONCLUSION

- The new UI meets the **cost-effectiveness threshold.**
- **Observed uplift** (5.41%) exceeds the minimum required uplift (5.00%).
- The Test design demonstrates a statistically significant improvement in completion rate.

HYPOTHESIS BOUNCE RATE

HYPO

- **Null Hypothesis (H_0):** The bounce rate of the test group is the same as or higher than the bounce rate of the control group.
- **Alternative Hypothesis (H_1):** The bounce rate of the test group is lower than the bounce rate of the control group.

STATISTICAL METHOD

- Z-test

OUTCOME

- **Z-statistic**: 16.970889701000196
- **P-value**: 6.74365410543222e-65
- Test bounce rate (0.091982) **<** control bounce rate (0.140403)
- p-value **below** 0.05 (6.743654105432252e-65)

CONCLUSION

We have strong statistical evidence that the new version of the app **decrease** the bounce rate compared with the control.

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HYPOTHESIS RETENTION RATE

HYPO	STATISTICAL METHOD	OUTCOME	CONCLUSION
• **Null Hypothesis (H_0):** There is no significant difference in ***retention rates*** between the Test and Control groups. • **Alternative Hypothesis (H_1):** There is a significant difference in ***retention rates*** between the Test and Control groups.	• **Z-test** • **p-value < 0.05,** significant difference in retention rates • **p-value > 0.05,** no significant difference in retention rates	• **Z-statistic:** -5.5156 • **P-value**: 0.0000 • Reject the null hypothesis: significant difference in retention rates.	• There is a significant difference in retention rates between the Test and Control groups (Z-statistic of -5.5). • validating the redesign based on the assumptions of less engagement.

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HYPOTHESIS ENGAGEMENT RATE

HYPO	STATISTICAL METHOD	OUTCOME	CONCLUSION
• **Null Hypothesis (H_0):** There is no significant difference in engagement rates ***(calls & logons)*** between the Test and Control groups. • **Alternative Hypothesis (H_1):** There is a significant difference in engagement rates.	• **T-test** • **p-value < 0.05**, significant difference in engagement rates • **p-value > 0.05**, no significant difference in engagement rates	• **T-statistic** = 5.7	• Strong significant difference between the engagement rates of the Test and Control groups. • Users might find the new design easier to navigate without needing as much support or multiple logins.

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EXPERIMENT EVALUATION

Experiment evaluation

Experiment Evaluation	Well-Structured	Biases	Recommendation
Design effectiveness	✓	no demographics gaps in Test vs Control	
Design effectiveness	✓	no relevant deviation in sample size	sample size >50k ppl
Duration assessment	✗	time constraints	Factor in a trial period to familiarize (>3m)

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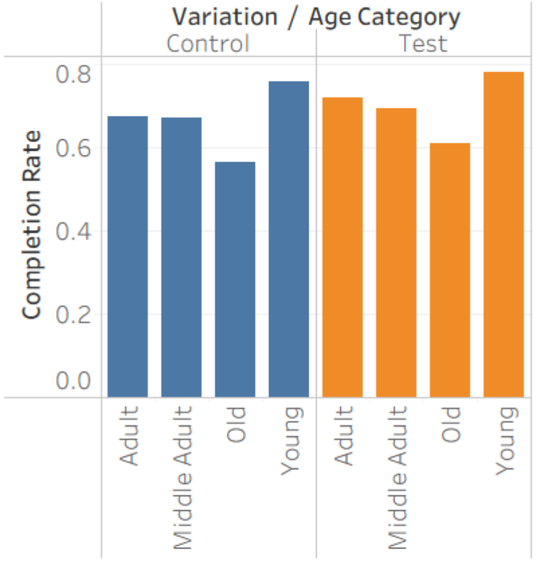
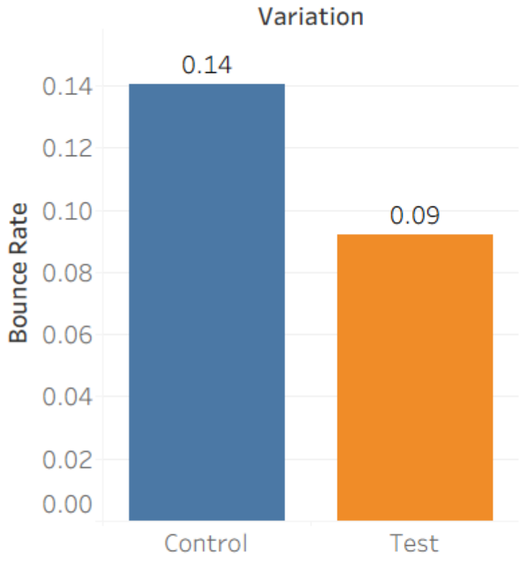
TABLEAU VISUALIZATIONS

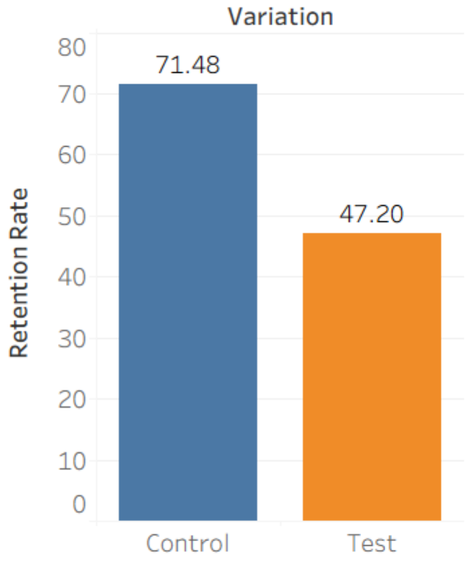
Completion Rate



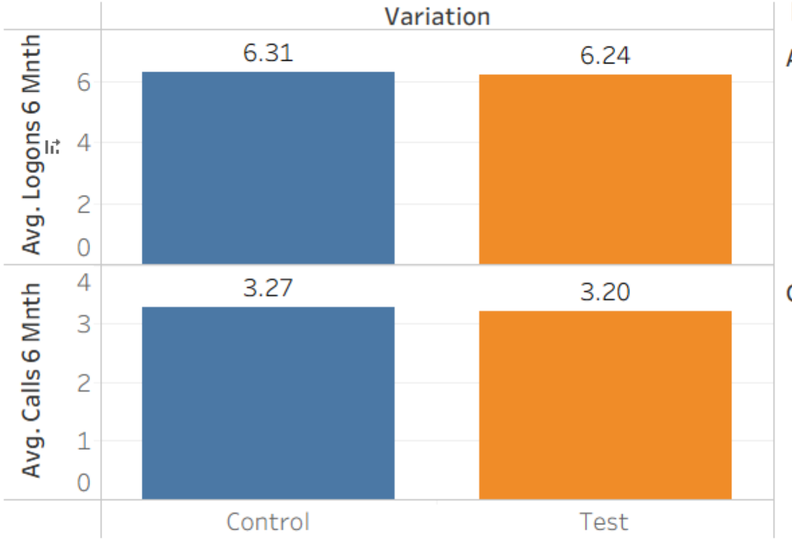
Bounce Rate

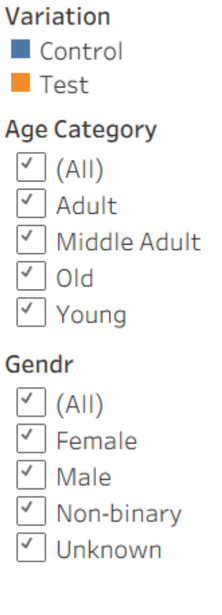


Retention Rate

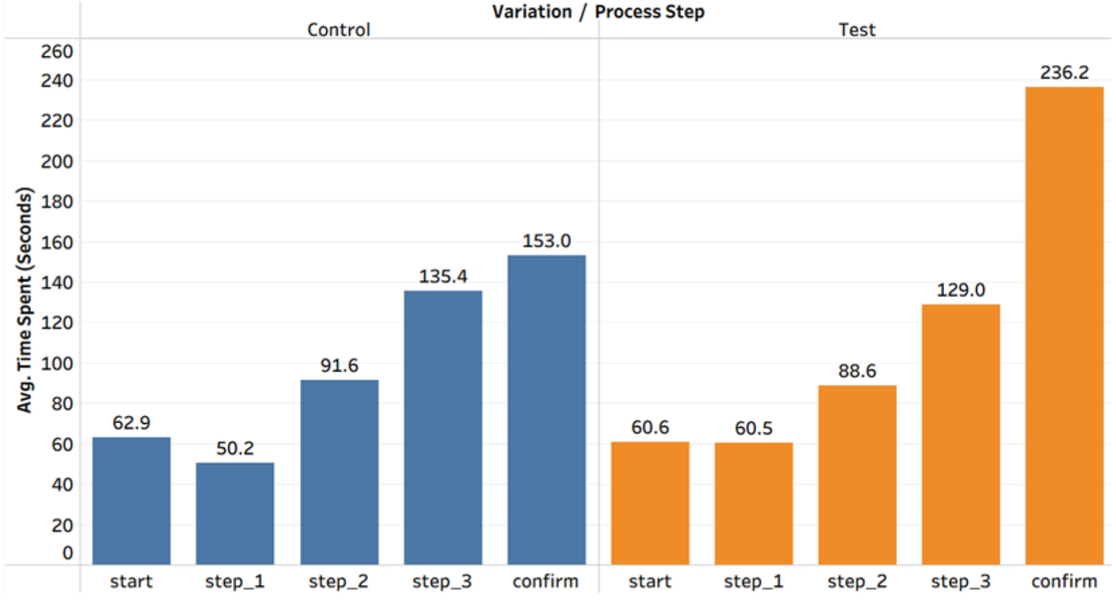


Engagement Rate

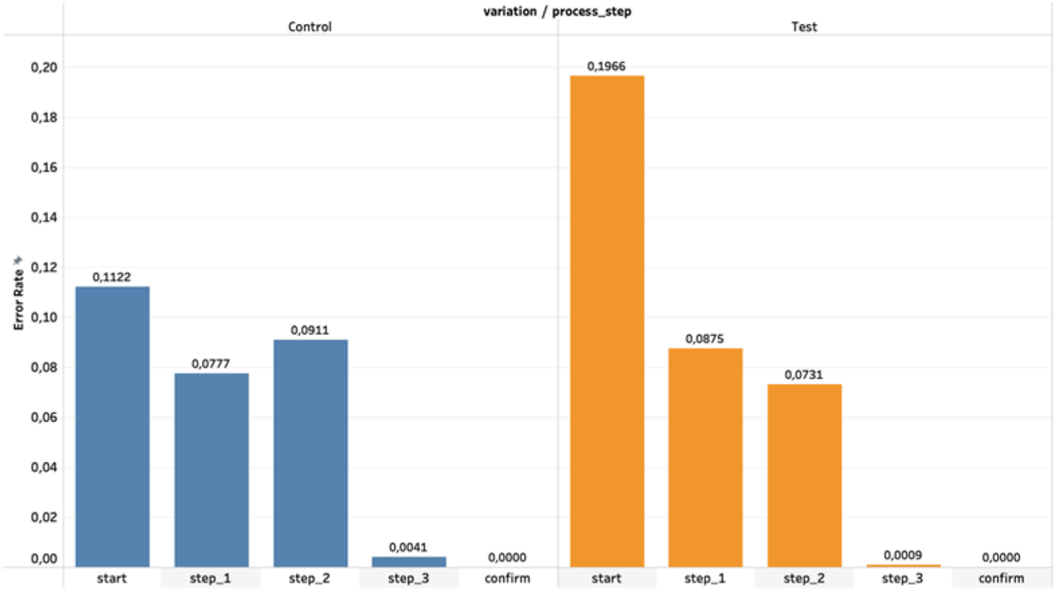




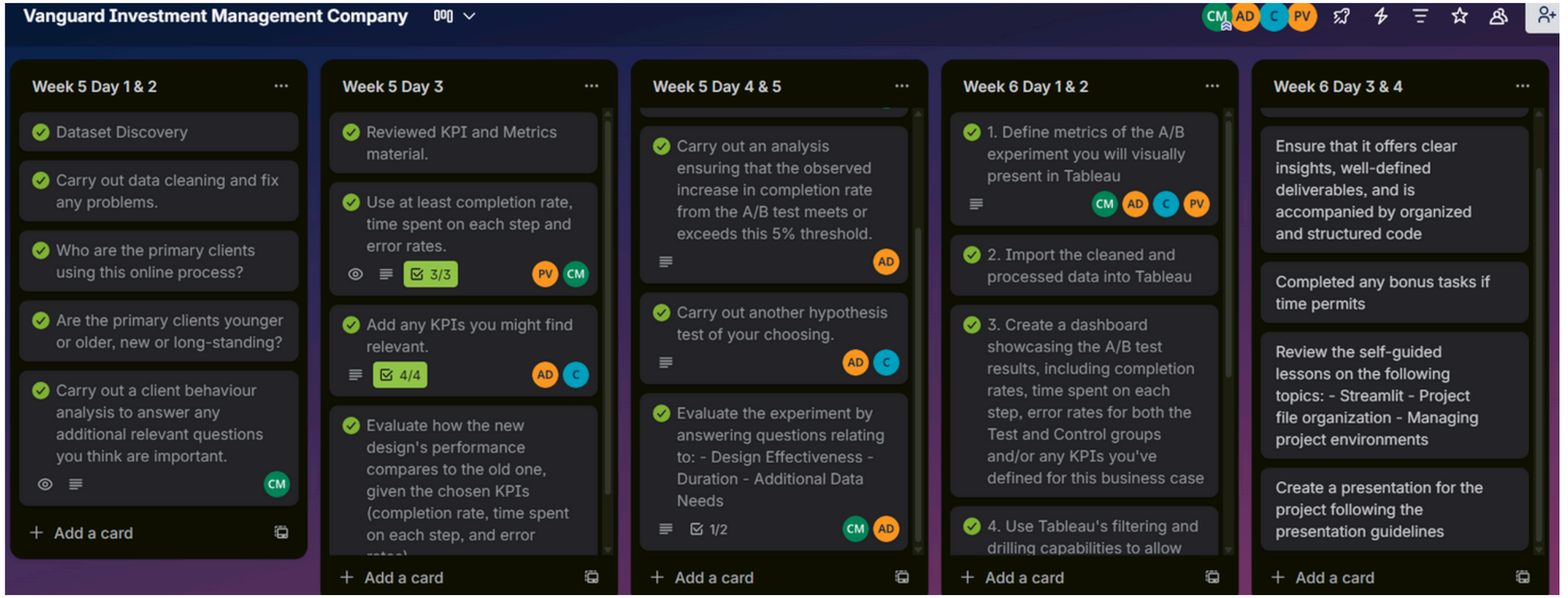
Time Spent per Step



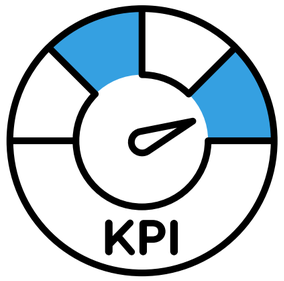
Error Rate



TEAMWORK & PROJECT MANAGEMENT



Challenges & Learnings



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CONCLUSION:

Completion rate
Control: 65%
Test: 69%

Lift
5,4%

Bounce rate
Control: 14%
Test: 9%

Retention rate

Engagement rate

Error rate

The drop in Retention rate is directly tied to the high Error Rate that we see at the 'start' process.

Solution: *Improve the 'start' experience and sort the bottlenecks out*

Test Insights

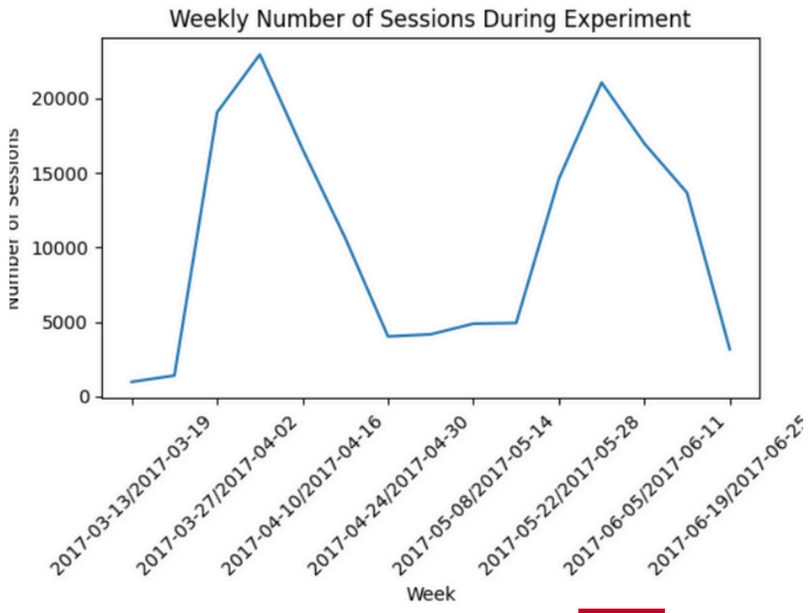
- Further analysis is needed on the transition from Step 3 to Confirmation, where time spent increases by +70% → potential critical step.
- Deep dive on the session drop between 14th April.- 30th April.

Next Steps

- Proceed with the rollout by expanding the sample size and extending the testing period.

Conclusion

- From a business perspective, the new UI meets the cost-effectiveness threshold.



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THANK YOU FOR YOUR TIME & ATTENTION!