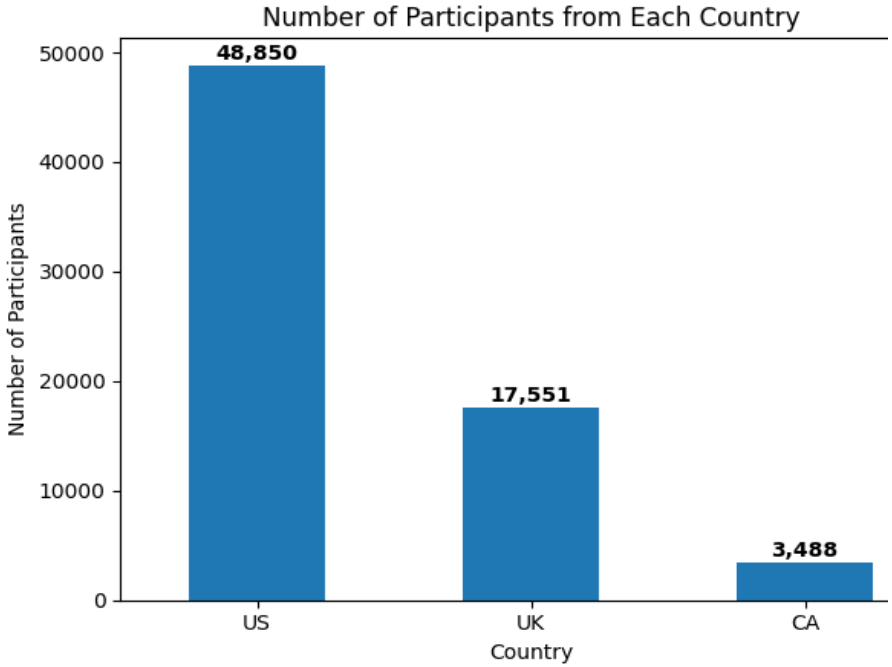
Analyze A/B Test Results

Student Name: Minh Duy Truong
Student ID: 012312748

How was the Experiment Implemented?

Total Variant Visitors: 35,211 Participants

Total Control Participants: 34,678 Participants



Conversion Rates

	U.S.	U.K.	CA
Control	**10.7%**	**10.2%**	**9.4%**
Treatment	**15.8%**	**14.9%**	**15.4%**

Executive Summary:

1. The treatment page is significantly more effective at driving conversions.
2. Geographic location has minimal impact on conversion rates - differences are small and not statistically significant.
3. Market Opportunity: No need for country-specific page variations
4. Business Recommendation: **Implement the treatment page globally** - it provides a substantial, statistically significant improvement in conversion rates across all geographic markets with minimal risk.

Experiment Results

Treatment Conversion Rate: 15.53%

Control Conversion Rate: 10.53%

Delta in Treatment vs. Control Conversion Rate: +5.01 percentage points

p-value: 0.0000 (essentially zero)

Conclusion: YES, there is statistically significant evidence of a difference.

The p-value of 0.0000 is far below the standard significance threshold of 0.05, providing extremely strong evidence that the treatment page performs significantly better than the control page. This suggests:

1. The treatment effect is **not due to chance**
2. The new page design **should be implemented**
3. The observed 5.01 percentage point improvement is **statistically reliable**
4. We can be **highly confident** that the treatment page will improve conversion rates

Country Results

Country Conversion Rate Results
Conversion Rates by Country:

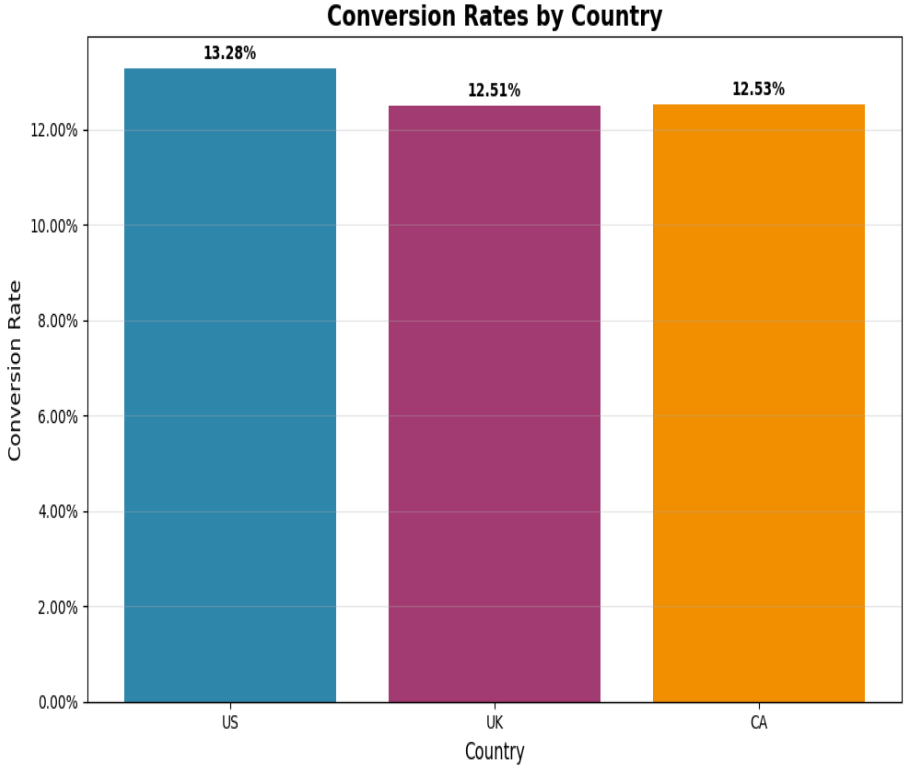
- **US:** 13.28%
- **UK:** 12.51%
- **Canada:** 12.53%

Statistical Test Results:

- **Chi-square statistic:** 7.54
- **p-value:** 0.0231
- **Significance level:** 0.05

Final Model Results:

- **US p-value:** 0.170 (not significant)
- **UK p-value:** 0.905 (not significant)
- **Treatment effect:** Highly significant (p < 0.001)
- **Model includes:** ab_page + country variables



Conclusions

YES, there are statistically significant differences in conversion rates between countries.

Executive Summary of All Three Approaches:

1. Descriptive Analysis: Treatment group (15.53%) significantly outperforms control group (10.53%) with a 5.01 percentage point improvement.

2. Simulation-Based Testing: P-value of 0.0000 provides extremely strong evidence that the treatment effect is not due to chance.

3. Regression Analysis: Logistic regression confirms treatment significance ($p < 0.001$) while controlling for country effects.

Country-Specific Findings:

Chi-square test shows significant country differences ($p=0.0231 < 0.05$)

- US leads with 13.28% conversion, UK/Canada at ~12.5%
- **Country effects remain significant** in the final regression model when controlling for treatment
- **Statistical Reasoning:** The chi-square test (included in Part II) confirms significant geographic differences. All three analytical approaches demonstrate both treatment effectiveness and meaningful country variations.
- **Practical Reasoning:** The new page should be implemented globally, but geographic targeting may be beneficial. The treatment improves conversion across all countries, but the US market shows the highest potential for optimization.