


CIVIC

DIGITAL

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Bayesian Inference for A/B Testing Evaluation

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United States[®]
Census
2020

U.S. Census Bureau Digital Marketing

1.6M

subscribers

48.5M

digital impressions*

58.1%

engagement rate*

**Past 12 months*

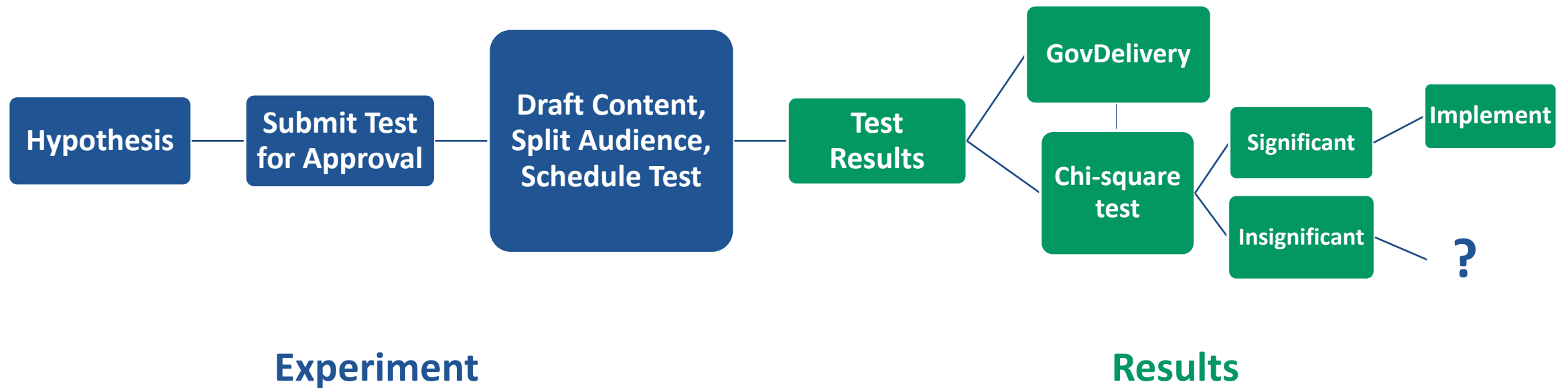
How do we know what is and what is not working?

- A/B Tests
- Email metrics
- Qualitative feedback

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Census
2020

Current Evaluation Methods

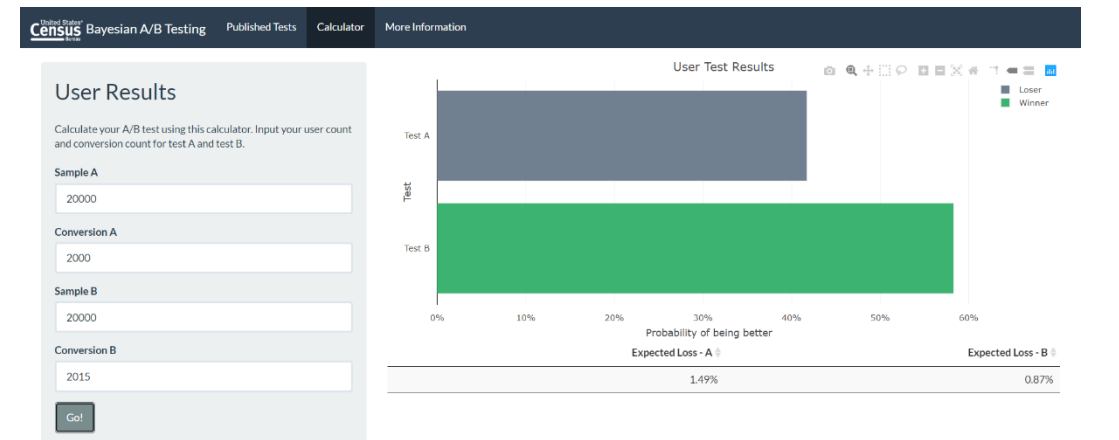
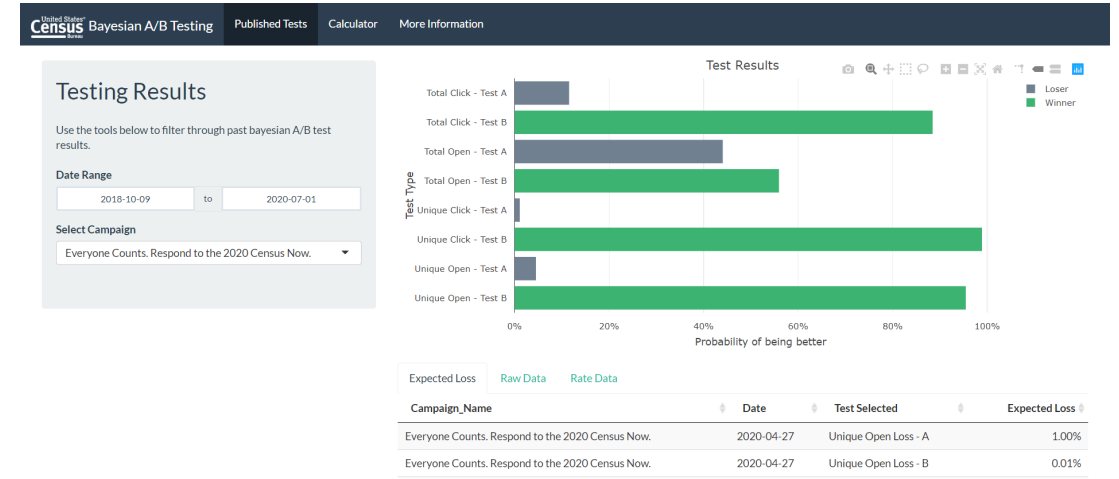


Bayesian A/B Evaluation

- Direct probability of whether one test is better than the other
- Expected loss
- Posterior distributions

How?


- Conduct tests with R bayesab library
- Beta-binomial model



Dashboard Demo


Campaign: We All Benefit by Responding to the 2020 Census

Test A: Image Link



Your Response Can Make a Difference


Counting everyone in the 2020 Census can help communities receive funding for health care, education, emergency services, and more. Over the next decade, lawmakers, business owners, and many others will use 2020 Census data to make critical decisions for communities nationwide.



If you have already responded to the 2020 Census—thank you! Your response helps shape your future. If you have not yet responded online or by phone, you may receive a paper questionnaire so you can respond by mail. You are strongly encouraged to respond promptly. Even if you receive a paper questionnaire, you can still respond online at 2020census.gov.


[Respond Now](#)

Test B: GIF Link (treatment)



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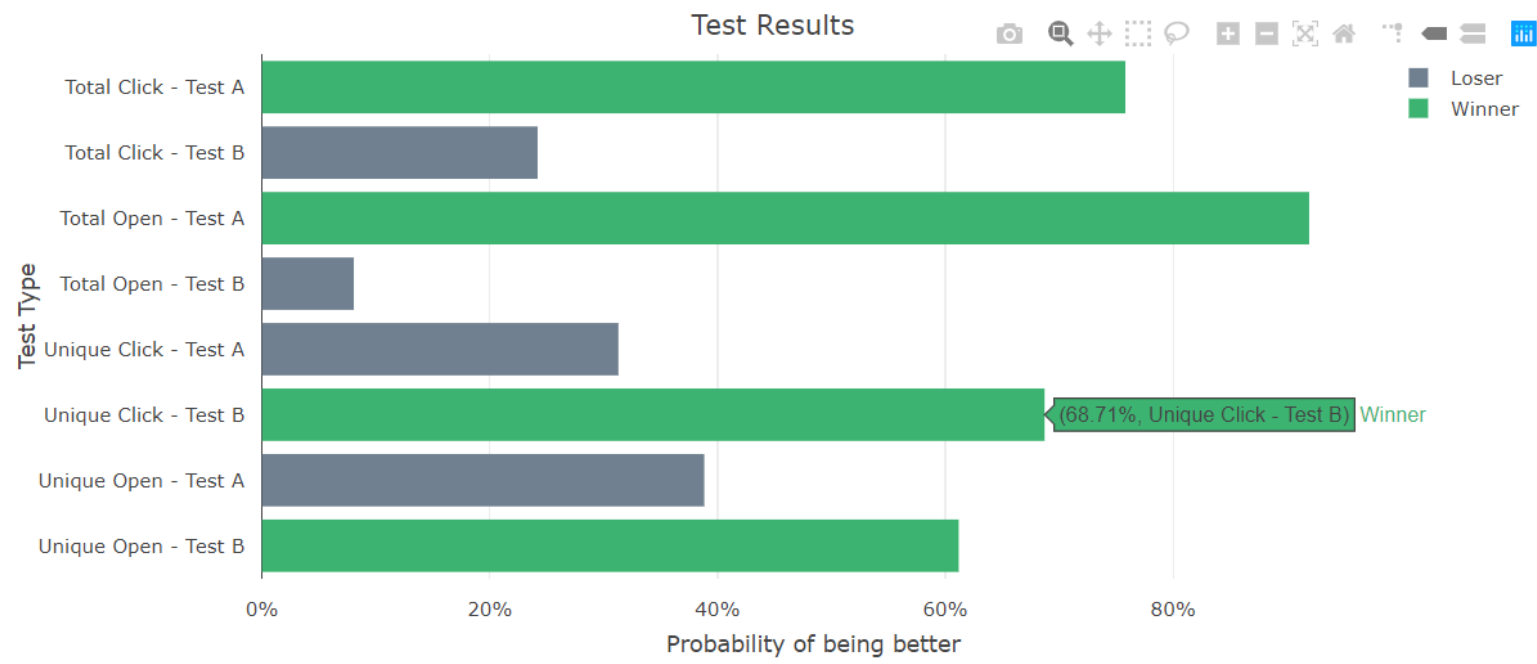
[Respond Now](#)

Unique Clicks

p-value: 0.62

fail to reject the
null hypothesis

Dashboard Demo



Expected Loss Raw Data Rate Data

Campaign_Name	Date	Test Selected	Expected Loss
We All Benefit by Responding to the 2020 Census	2020-05-18	Unique Open Loss - B	0.16%
We All Benefit by Responding to the 2020 Census	2020-05-18	Unique Open Loss - A	0.32%
We All Benefit by Responding to the 2020 Census	2020-05-18	Unique Click Loss - B	0.49%
We All Benefit by Responding to the 2020 Census	2020-05-18	Unique Click Loss - A	1.68%
We All Benefit by Responding to the 2020 Census	2020-05-18	Total Open Loss - B	0.66%

Benefits

- No 'insignificant' results
- Better audience insights
- Better risk assessment for decision makers

Next Steps

- **Short term:**
 - Conduct A/B tests and evaluate results using dashboard (started)
 - Re-examine audience engagement efforts with test results from dashboard
- **Long term:**
 - Explore more complex models of analysis (hierarchical/multilevel)
 - Apply framework to other Census departments A/B testing efforts

Thank you!