A/B Testing: COVID-19 Awareness

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Abstract

- This study was completed with the intention of understanding the effects that different forms of information delivery have on comprehension of COVID-19 prevention mechanisms
- We aimed to capture respondents' understanding of the effectiveness of COVID-19 prevention methods before and after viewing information from the Centers for Disease Control and Prevention
- By randomizing the form of information delivery (text vs infographic) across participants we were able to capture any difference in knowledge gained from one form over another
- We collected demographic data as well and other information about respondents' pre-test conceptions of COVID-19

Problem statement

We are trying to help the CDC plan for how best to deliver COVID-19 prevention information in advance of the winter holidays. To do this, we want to perform an A/B test using previous CDC information released for Election Day 2020.

Question: Is there a difference in people's understanding of the content of COVID-19 prevention information released by CDC depending on if it is delivered via text vs infographic?

Experiment Design

Unit of Analysis:

Our unit of analysis was by individual.

Treatment Group:

Our treatment group was the group reading the CDC infographic for Election Day 2020.

Control Group:

Our control group was the group reading CDC's website text referring to the same information.

Experiment Design (2)

How did we implement the A/B test:

- We used Qualtrics to randomize participants into the treatment or control group.
- In the first section of the Qualtrics survey, every individual was asked to answer a certain number of questions related to COVID-19 prevention information (“pre-test” questions) to set the baseline of their understanding related to it.

Experiment Design (3)

How did we implement the A/B test (continued):

- In the second section of the survey, the individuals in the treatment group saw the infographic information and the individuals in the control group saw the same information displayed in text.
- In the third section, every individual was then asked the same set of pre-test questions again (now referred to as “post-test” questions) to check if the information they retained from the infographic or text displayed in section two of the survey improved their understanding of COVID-19 prevention measures.
- The last section of the survey asks some basic demographic information about individuals, including gender, education, race, and political tendency.

Model

As we are attempting to measure the change between our treatment and control groups over time, we employed three separate models, each one testing the change in a separate outcome of interest.

$$\text{Prevention masks} = \alpha + \text{Infographic}^*X_1 + \text{Post}^*X_2 + \text{Infographic|Post}(X_1X_2) + \varepsilon_{12}$$

$$\text{Prevention handwashing} = \alpha + \text{Infographic}^*X_1 + \text{Post}^*X_2 + \text{Infographic|Post}(X_1X_2) + \varepsilon_{12}$$

$$\text{Prevention distancing} = \alpha + \text{Infographic}^*X_1 + \text{Post}^*X_2 + \text{Infographic|Post}(X_1X_2) + \varepsilon_{12}$$

Null Hypothesis:
H0: Infographic|Post =0

Results

- According to our original hypothesis, people would successfully learn and retain more information about the effectiveness of handwashing, social distancing, and mask wearing via infographics relative to controls
- We expected this to manifest in a significant increase in the rated effectiveness of these prevention measures in the treatment group relative to the control group
- In order to test this hypothesis, we ran the aforementioned difference in differences models, along with several t-tests to ensure our variables were not significantly different between groups

Results (2)

	Dependent variable:		
	Handwashing	Wearing Masks	Maintaing Physical Distance
Infographic	-0.149	-0.151	-0.173
	(0.144)	(0.163)	(0.168)
post	0.058	0.019	0.173
	(0.143)	(0.162)	(0.136)
Infographic:post	-0.120	0.106	-0.048
	(0.210)	(0.237)	(0.229)
Constant	4.462***	4.442***	4.423***
	(0.104)	(0.111)	(0.104)
Week	No	No	No
Observations	200	200	200
R2	0.022	0.006	0.024
Adjusted R2	0.007	-0.009	0.009
Residual Std. Error (df = 196)	0.740	0.837	0.800
F Statistic (df = 3; 196)	1.440	0.410	1.611
Note:			*p<0.1; **p<0.05; ***p<0.01

- This result implies that respondents retained the same amount of information whether they saw the CDC text or infographics
- it appears the CDC's information did not significantly impact people's perception of the effectiveness of health measures regardless of the delivery mechanism
- no intervention on the CDC's part would be able to convince people that their perceptions are not properly aligned

Limitations & Next Steps

- One limitation is our respondents are more educated, younger, significantly more democratic, and work more in STEM fields than the country as a whole. This skewed sample likely has to do with the types of people immediately surrounding the researchers as the survey was primarily shared via word of mouth
- The imbalance of political affiliation is of particular interest as the virus has become so politicized. It would be interesting to see if the results have heterogeneous effects, were we able to acquire a more balanced sample

Limitations & Next Steps (2)

- Another limitation was the limited number of survey responses received. We received around 100 responses in 20 days. It is not strong enough to support the model and find correlations. In order to train a model with a high accuracy, it is necessary to collect more data. For the purpose of future research, we would like to collect more responses and expand the size of the dataset.

THANK YOU