

Econ 311: Behavioral and Experimental Economics

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Behavioral Economics and The Internet

1 / 26

2 / 26

Motivation

- ▶ The internet (and technology more generally) has greatly expanded the options for empirical economics
- ▶ Much more data being collected for empirical studies
 - ▶ 6,000 tweets per second
 - ▶ 41,000 Facebook posts per second
 - ▶ Terabytes of publicly available financial data every day
- ▶ Also many more platforms for running experiments
 - ▶ Social media companies running experiments essentially constantly
 - ▶ Lower barrier to entry for researchers though Amazon Mechanical Turk

3 / 26

Is All This Useful?

- ▶ Question: does the internet make people better-informed?

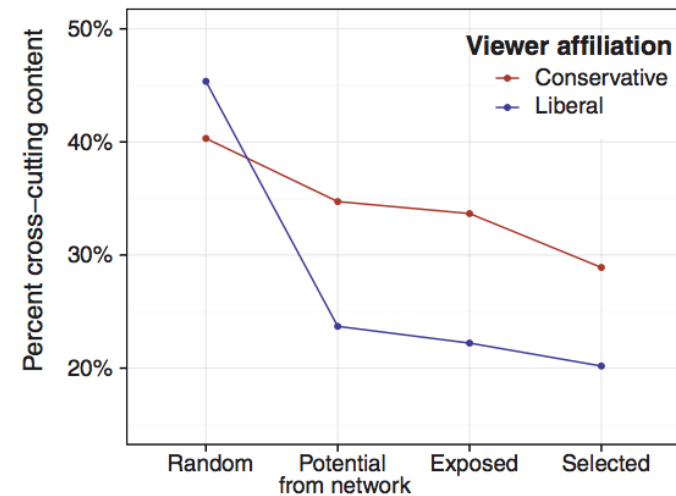
4 / 26

Facebook Echo Chamber Study

- ▶ Bakshy, Messing, Adamic (2015) address this issue using data from Facebook posts
- ▶ Observed approx. 10 million people on Facebook (no experimental variation)
- ▶ Linked stories were classified either “cross-cutting” or “ideologically consistent” with each person’s self-reported political affiliation
- ▶ What determines which content people read?
- ▶ Baseline: how much cross-cutting content you would see if you were show random Facebook posts

5 / 26

Results from Adamic et al



6 / 26

Results from Adamic et al

- ▶ Choice of friends is single biggest factor limiting exposure to cross-cutting content
- ▶ News feed algorithm has little effect on available content
- ▶ Selection from available content accounts for larger relative effect than algorithm

Viewer affiliation	Random → Potential	Potential → Exposed	Exposed → Selected
Liberal	-0.626	-0.080	-0.063
Conservative	-0.212	-0.046	-0.172

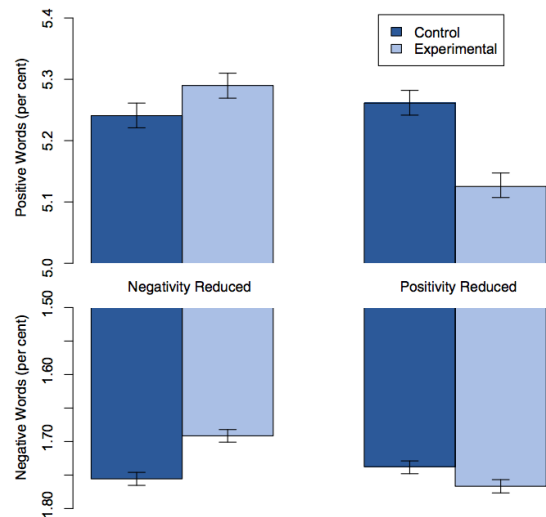
7 / 26

News Feed Experiment

- ▶ The previous study used Facebook data but did not experimentally vary the user’s experience
- ▶ Kramer, Guillory, and Hancock (2014) run experiment to determine how much of an effect news feed content has on user’s emotions
- ▶ Experimental design:
 - ▶ Facebook posts categorized as either positive or negative
 - ▶ 22.4% negative, 46.8% positive
 - ▶ Treatment 1: Omit a percentage of all positive posts by friends that would otherwise show up on Newsfeed
 - ▶ Treatment 2: Omit a percentage of all negative posts by friends that would otherwise show up on Newsfeed
 - ▶ Controls: Omit a percentage of all posts
- ▶ Outcome variable: Positive/negative content of subjects’ posts
- ▶ $N = 689,003$ people

8 / 26

Kramer et al Results



9 / 26

Kramer et al Results

- ▶ Results show emotional “contagion”
 - ▶ Omitting positive posts in feed lead to a 0.1% decrease in positive posts by subjects and a 0.04% increase in negative posts
 - ▶ Omitting negative posts in feed lead to a 0.07% decrease in negative posts by subjects and a 0.06% increase in positive posts
 - ▶ Results are statistically significant (due to large sample) but effect size is small
- ▶ Some public reaction to the paper was very negative, however:
 - ▶ One user on Twitter: “I wonder if Facebook KILLED anyone with their emotion manipulation stunt”
- ▶ What are some responses to these objections?

10 / 26

Methodology: Amazon Mechanical Turk

- ▶ Most researchers do not have access to Facebook data (and certainly not able to manipulate their software)
- ▶ However, other tools do exist to reach lots of people online
- ▶ One such tool: Amazon Mechanical Turk
 - ▶ Online labor platform of English-speaking workers
 - ▶ Employers posts small tasks with an associated wage rate
 - ▶ Tasks can include experiments (either explicitly or implicitly)
 - ▶ Much cheaper and faster than running lab or field experiment
- ▶ Another tool: Harvard Digital Lab for the Social Sciences

11 / 26

Reproducibility and Research Integrity

12 / 26

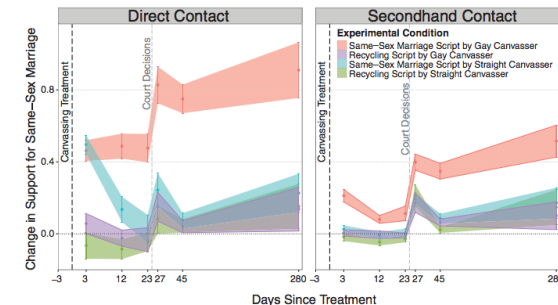
LaCour and Green (2014)

- ▶ We saw that the “echo chamber effect” can make it difficult for people’s opinions to change?
- ▶ But forcing “cross-cutting” interactions might sway opinions
- ▶ La Cour and Green (2014) report an experiment attempting to change opinions on gay rights via canvassing
 - ▶ Initial baseline survey of opinions of voters in Los Angeles
 - ▶ Send either gay or straight canvasser to discuss gay rights with each voter for 22 minutes on average
 - ▶ Measure opinions on gay rights again with delay of 3 weeks, 5 weeks, and 9 months
 - ▶ Also measure opinions of people in the same household who did not talk directly to canvasser
 - ▶ Outcome: response on scale of 1-100, where 1=very cold and 100=very warm to idea of gay rights (thermometer scale)

13 / 26

Reported Results

- ▶ Both gay and straight canvassers were able to increase support for same-sex marriage
- ▶ Effect from gay canvassers persisted (or even increased) over time
- ▶ Gay canvassers also had an effect on other members in household



14 / 26

Just One Problem

- ▶ All the results reported by LaCour and Green (2014) were likely fabricated
- ▶ The deception appears to have been perpetrated entirely by LaCour (a graduate student at the time)
 - ▶ Canvassing was actually carried out as described by a non-profit (at great expense of time and money)
 - ▶ However, pre- and post-canvassing responses (allegedly collected via online surveys sent to the canvassed households) were entirely made up by LaCour
 - ▶ LaCour even fabricated the research grants that he supposedly used to fund the surveys

15 / 26

How Was This Discovered?

- ▶ Two researchers, Josh Kalla and David Broockman, attempted to replicate LaCour and Green’s methods, but with the goal of reducing transphobia
- ▶ However, did not get responses rates to follow-up surveys that were similar to LaCour
- ▶ Suspicious, they investigated individual response data from LaCour (which was published along with paper)
- ▶ They found several suspicious trends in data:
 - ▶ Initial survey responses were remarkably similar to responses from another well-known paper that used same thermometer scale
 - ▶ Follow-up responses were much more highly correlated with initial responses than usually seen in literature
 - ▶ Follow-up responses seemed to be created by taking initial responses and adding positive random numbers

16 / 26

This Has Happened Before

- ▶ This is not the only time such fabrication has happened, unfortunately
 - ▶ One social psychology researcher in the Netherlands believed to have fabricated data in over 50 published papers
 - ▶ Not just social science: A Japanese anesthesiologist believed to have fabricated data in at least 172 papers
 - ▶ Hundreds of examples across all major research fields

17 / 26

Research Integrity More Broadly

- ▶ Problem is not limited to outright fabrication or falsification of data
- ▶ More subtle choices by researcher can call reproducibility of results into question
 - ▶ Choice of which data to use: throw out outliers, focus on subsample analysis, pilot several designs of experiment
 - ▶ Choice of which regressions to run
 - ▶ Choice of which statistical tests to use
 - ▶ These issues put under the general umbrella of “p-hacking”

18 / 26

Motivating Example

- ▶ Suppose you are running a simple experiment
 - ▶ Randomly assign people to either hot or cold room
 - ▶ Ask whether they would like \$10 now (impatient) or \$11 tomorrow (patient)
- ▶ Suppose your sample size is $N = 2$ individuals, one to each treatment
- ▶ Suppose you find that the person in the hot room takes the patient option and the person in the cold room takes the impatient option
- ▶ Can you conclude that warmer rooms cause people to act more patient?

19 / 26

Review of Hypothesis Testing

- ▶ More generally, are testing whether we can accept or reject a certain hypothesis
- ▶ Typically, the *null hypothesis* predicts that there will be no difference between our treatments, while the *alternate hypothesis* predicts there will be a difference
- ▶ In temperature example:
 - ▶ Null hypothesis: temperature has no effect on patience
 - ▶ Alternate hypothesis: temperature causes people to act more patient

20 / 26

Review of p -values

- ▶ The p -value measures the probability of getting the observed result *under the null hypothesis*
 - ▶ A p -value close to 0 means that there is only a small likelihood that results are due to chance
 - ▶ A p -value close to 1 means that there is a high likelihood that results are due to chance
- ▶ For historical and largely arbitrary reasons, a p -value of 0.05 or less is considered “statistically significant”
- ▶ If we look at p -values across an entire field, distribution should be smooth

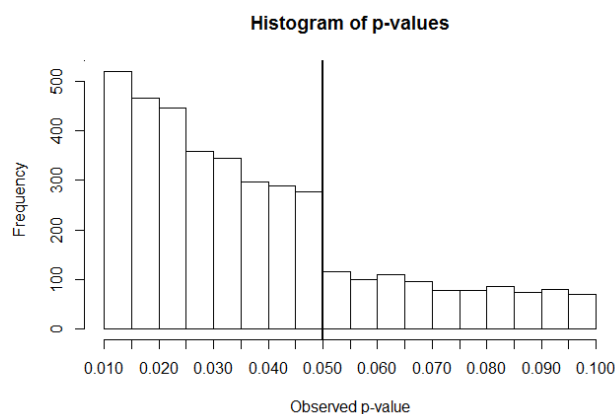
21 / 26

Research Integrity

- ▶ Consider all the choices we made when running the temperature experiment:
 - ▶ What temperature to make the rooms
 - ▶ What size prizes to use
- ▶ And choices made when analyzing the data:
 - ▶ Throw out responses from that one subject that fell asleep
 - ▶ Maybe we should control for gender, or GPA, or income, or ...
- ▶ If we make these choices in an attempt to get $p = 0.05$ (even subconsciously), then these are all ways of p -hacking

22 / 26

Visualization of p -hacking



Data: 3627 p -values reported in 3 different psychology journals, from Masicampo and LaLande (2012)

23 / 26

Returning to Example

- ▶ Now suppose sample size was $N = 100$, with 50 people in each treatment
- ▶ Suppose you find that all 50 people in the hot room take the patient option and all 50 people in the cold room take the impatient option
- ▶ Now can you conclude that temperature has an effect on patience?

24 / 26

What To Do?

1. Open up the data
 - ▶ Make all researcher publish raw data and code
 - ▶ Issue: what about proprietary/sensitive data?
2. Encourage replication
 - ▶ Don't put too much credence in results until they have been replicated independently
 - ▶ Issue: how to incentivize more replications?
3. Encourage pre-analysis plans
 - ▶ Force researchers to register experimental designs and analysis plans (eg which regressions to run) before running experiment
 - ▶ Would alleviate p-hacking and *file-drawer* effect (papers with null results not seeing the light of day)

Replication Can Work

- ▶ Recall that Broockman and Kalla were attempting to replicate LaCour and Green's canvassing methods to reduce transphobia
- ▶ Replication paper was recently published in Science (same journal that publish now-discredited LaCour and Green paper)
- ▶ Data: 1825 voters in Florida
- ▶ What they found:
 - ▶ Both transgender and non-transgender canvassers effective at changing opinions
 - ▶ These changes lasted at least 3 months
 - ▶ Key seems to be forcing respondents to do "perspective-taking" rather than logical or legal arguments