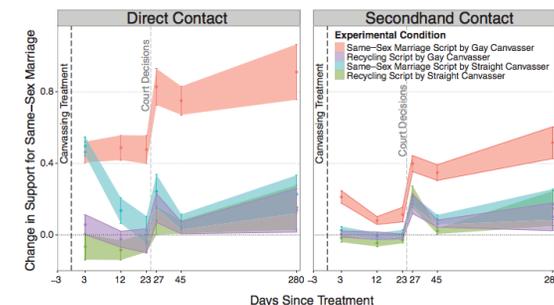


LaCour and Green (2014)

- ▶ 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)

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



Just One Problem

- ▶ All the results reported by LaCour and Green (2014) were 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

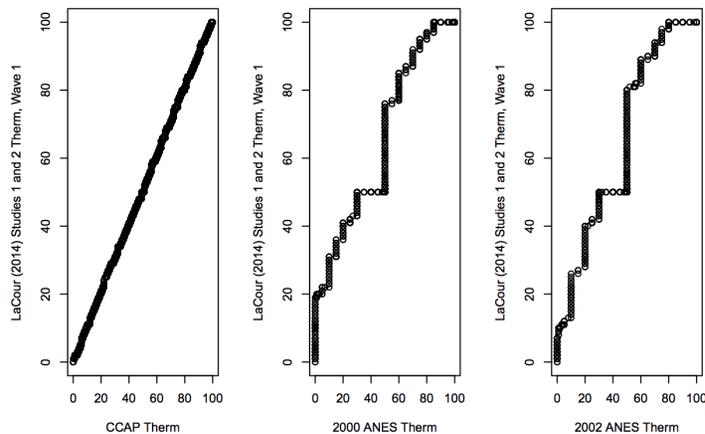
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How Was This Discovered?

- ▶ 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

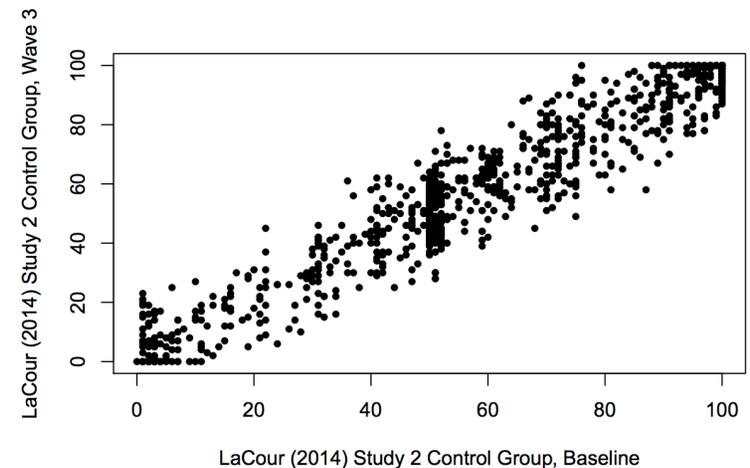
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LaCour Data Nearly Identical to Other Study



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LaCour Baseline vs Follow-up



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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

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Reinhart and Rogoff

- ▶ Reinhart and Rogoff (2009) reported that countries with debt above 90% of GDP have lower growth
- ▶ Paper was influential for policy during great recession and financial crisis
 - ▶ Used to justify austerity measures in Europe, for example
- ▶ However, other economists could not replicate results
- ▶ Turns out Reinhart and Rogoff used Excel for data analysis, and didn't select the right cells of the spreadsheet when crunching their numbers
- ▶ After correcting their errors, no apparent threshold at 90%

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Research Integrity More Broadly

- ▶ The above are extreme and (hopefully) rare example
- ▶ However, even seemingly benign choices by researcher can call 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 and which variables to include
 - ▶ Choice of which statistical tests to use
- ▶ These issues put under the general umbrella of *p-hacking*
- ▶ Also called *research degrees of freedom* or *the garden of forking paths*

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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?

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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

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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

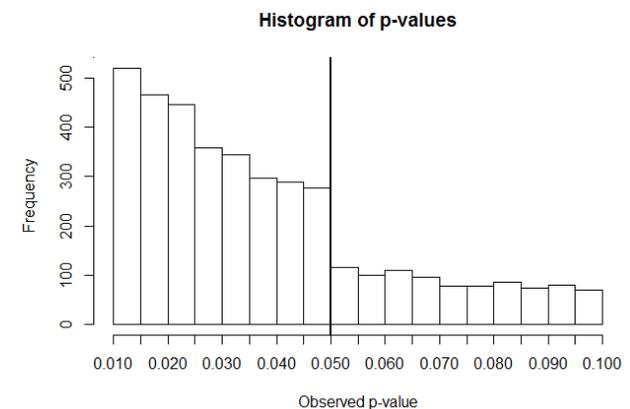
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Research Degrees of Freedom

- ▶ 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

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Visualization of p -hacking



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

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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?

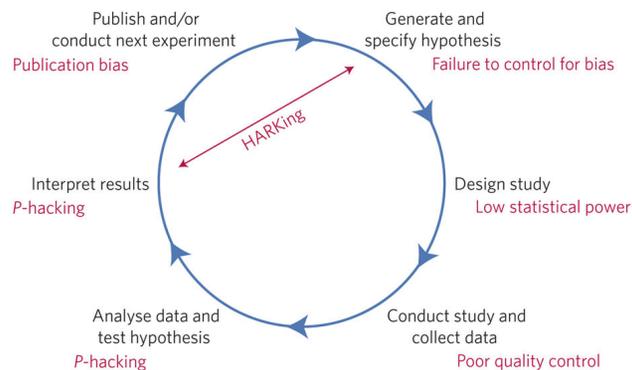
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Other Transparency Issues

- ▶ Publication bias
 - ▶ Journals have a tendency to favor studies with statistically significant results
 - ▶ This leads to *publication bias*: significant results are published more quickly and in higher-status journals
 - ▶ Also causes *file drawer effect*: researchers don't even try to publish null (non-significant) results
- ▶ HARKing (Hypothesizing After the Results are Known)
 - ▶ Ideally, hypothesis should be generated *before* experiment is run or data are analyzed
 - ▶ However, researchers often generate hypothesis/theory *after* data are analyzed to make it seem like they predicted the results all along

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Overview



Source: Munafo et al (2017)

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Reproducibility vs Replication

- ▶ A study is *reproducible* if the exact same results can be re-generated using the exact same data set and (intended) methods
 - ▶ LaCour fabrication is not reproducible since data don't exist
 - ▶ Reinhart and Rogoff also not reproducible since methods not executed as intended
- ▶ A study is *replicable* if the results can be re-generated using similar data and methods
 - ▶ Replications attempt to verify the underlying theory and/or methods
 - ▶ Studies that are fully reproducible may still not replicate
 - ▶ In recent replication projects, only about 40% of psych studies and about 60% of econ studies replicated

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What To Do?

1. Make the research process transparent and reproducible
 - ▶ 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 (also know as pre-registration)
 - ▶ 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

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Coda

- ▶ Recall that Broockman and Kalla were attempting to replicate LaCour and Green's canvassing methods to reduce transphobia
- ▶ Their 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

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