

Methods Core Workshop: Week 6

Causation, II: What can go wrong



Summary of Two Weeks on Causality: *Problems*

Selection Bias

Contamination Bias

Distribution Problems

Threats to External Validity (Generalisation)

Threats to Internal Validity

What is Selection Bias?

Selection Bias

“Is the observed outcome due to the treatment or due to self selection of subjects into treatment and control groups?”

- We try and determine the causal effect of a treatment by taking two similar groups of individuals and exposing them to the treatment.
- But, what happens when the two groups were not similar to begin with?
- Selection bias occurs when there are key characteristics distinguishing the two groups that potentially produce different outcomes, influencing the results of the treatment.
- A problem in observational studies.

Question: Where would selection bias fall in the category of errors provided in Amaya (2020) or Lyberg & Weisberg (2017)?

What is Contamination?

Contamination

“Treatment influences both treatment and control group.”

- Contamination occurs when the individuals in the control group receive elements of the intervention treatment.
- E.g., Communication

Question: Where would contamination fall in the category of errors provided in Amaya (2020) or Lyberg & Weisberg (2017)?

What are potential distribution problems?

Distribution Problems

Asymmetry

- Violates the assumptions that underpin standard statistical tests

Outliers

- Decrease normality, increase error variance and reduce the power of statistical tests

Question: Where would distribution problems fall in the category of errors provided in Amaya (2020) or Lyberg & Weisberg (2017)?

What are four threats to external validity?

Threats to external validity

1. **Testing effect** - if a person is tested more than once, this can influence their behaviour in the post-test, confounding the results.
2. **Selection effect** - see previous slide
3. **Experimental effect** - participants can behave differently in a research environment.
4. **Heterogeneous treatment effect** - the effect of the treatment within some subgroups may vary considerably from the average treatment effect.

Question: Where would external validity threats fall in the category of errors provided in Amaya (2020) or Lyberg & Weisberg (2017)?

What are seven threats to internal validity?

Threats to internal validity

- **Maturation** - the outcomes of a treatment may vary naturally over time.
- **Selection bias** - treatment and control groups are not comparable
- **History** - some unrelated, prior event influences the study outcomes
- **Testing effect** - The pre-treatment testing procedure influences the outcome
- **Instrumentation** - different measures used to measure the variable of interest before and after treatment
- **Regression to the mean** - a statistical tendency for individuals who initially report extreme outcomes to later score closer to the mean
- **Lack of control** - inability to control for potential confounding variables

What are some of the potential *causal* pitfalls with this research? (*Omundsen et al., 2021*)

Research question: Why do people share ‘fake news’ on Twitter?

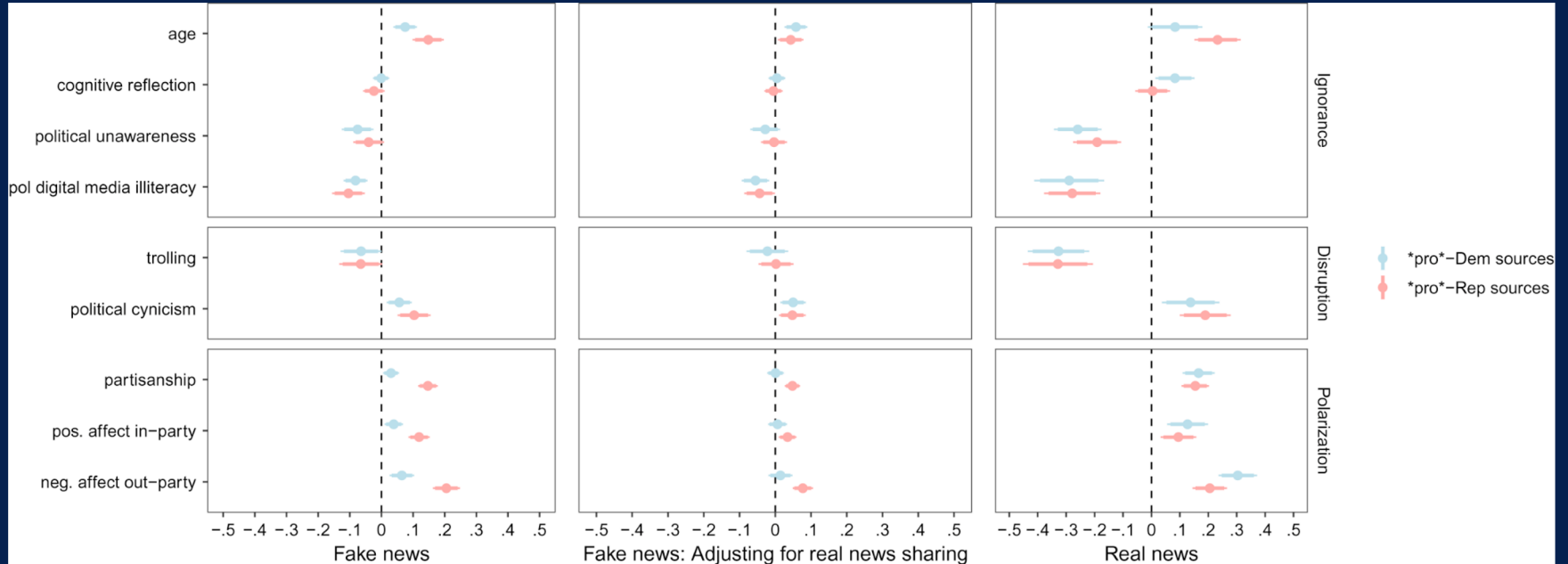
Hypotheses: “Are citizens who share fake news *ignorant* and lazy? Are they fueled by sinister motives, seeking to *disrupt* the social status quo? Or do they seek to attack partisan opponents in an increasingly *polarized* political environment?”

Method: “This article tests these competing hypotheses by mapping the psychological profiles of over 2,300 American Twitter users. We link this to behavioral sharing data and sentiment analyses of more than 500,000 news story headlines.”

Think about selection bias, contamination, distribution problems, external validity and internal validity.

What did the author find?

“The findings contradict the ignorance perspective but provide some support for the disruption perspective and *strong support for the partisan polarization perspective*. Thus, individuals who *report hating their political opponents* are the *most likely to share political fake news* and selectively share content that is useful for derogating these opponents.”



Questions?

Bibliography

Osmundsen, Mathias, et al. "Partisan polarization is the primary psychological motivation behind political fake news sharing on Twitter." *American Political Science Review* 115.3 (2021): 999-1015.