POIR 613: Computational Social Science

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Today

- 1. Experimental research in the digital age
- 2. Solutions for last week's challenge
- 3. Webscraping

Experimental research in

the digital age

Field experiments combine the control of laboratory experiments (high internal validity) with the generalizability of a real setting (external/convergent validity).

Challenge: cost, particularly if scale is sufficient to study high-variance social phenomena.

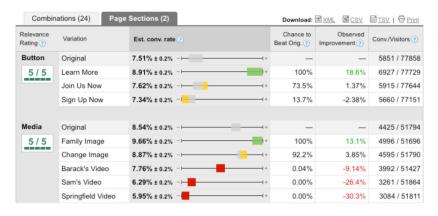
Digital technologies offer practical and cost-effective venues for conducting field experiments (aka A/B tests).

Given sufficient access and existence of software that allows randomization, researchers can study both short- and long-term effects of manipulations



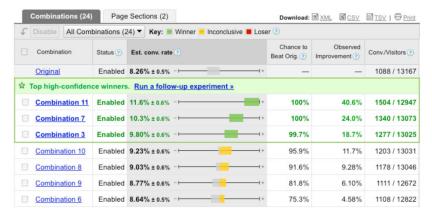


6 Media variation \times 4 button combinations = 24 combinations Which one do you think will get a higher conversion rate?



Outcome variable: sign-up rates

Dashboard shows sign-up rates for each separate variation



Dashboard shows sign-up rates for each separate variation

Experimental technologies for online interventions:

1. Email and text messages

- More likely to get subjects' attention
- e.g. Blair et al (2017): randomized text messages in India to encourage people to report corruption

2. Modified web interface

- Manipulation: platform features, exposure to information, display of specific web elements, etc.
- e.g. Bakshy et al (2012): social cues on FB ads

3. Bots

- Program or script that makes automated requests
- e.g. Munger (2016): reducing harassment on Twitter

4. Add-ons

- Additional software that nudges or tracks subjects
- e.g. Guess et al (2021): change web browser's default homepage to a partisan news outlet; then track compliance using web tracking software

Experimental technologies for *social media* interventions (Guess, 2021):

1. Recruitment:

 Followers of an account; random sample of users; survey participants

2. Treatment delivery:

DMs; replies; promoted tweets; ads; bot interventions; followed pages/groups

3. Outcome variables:

- Behavioral (e.g. clicks, tweets) or self-reported (via survey responses)
- Spillover effects

What can go wrong? (And potential solutions)

- Logging errors: covariate balance in pre-treatment variables, A/A tests
- 2. Novelty effects: longer experiments
- 3. Multiple testing: multiple comparison adjustment
- 4. High significance due to large sample sizes: Cohen's D
- SUTVA (interference between units): better research design
- 6. The 'free beer' problem: social science theory!

Side note: power calculations

- Power is the probability of detecting a specified effect size with specified sample characteristics (size and variability)
- Four interrelated components:
 - 1. Sample size
 - 2. Effect size you want to detect
 - 3. Desired significance level (false positive rate)
 - 4. Power
- ▶ Before you run an experiment, you can compute necessary sample size assuming other 3 components:

```
> power.prop.test(p1=0.30, p2=0.35,
sig.level=0.05, power=0.80)
```

 Alternatively, you can compute MDE (minimum detectable effect) given a fixed N

```
> power.prop.test(p1=0.30, n=1000,
sig.level=0.05, power=0.80)
```