# Experiments on Social Media

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- Study properties and features of the platform
- High ecologically valid setting to study human behavior

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**Some example studies**: Levy (2021), Allcott et. al (2020, 2022), Guriev et. al (2023), Aridor (2025), Beknazar-Yuzbashev et. al (2022), Larsen et. al (2023)

**This talk**: A practical guide to conducting these types of studies

# Introduction

Typical components of a social media experiment

- Recruit participants (**Social Media Ads**, **Labs/Online Samples**)
- Generates an intervention (**Manipulate experience at individual level**)
- Analyzes social media data (**Posts/time spent**, **Behavioral outcome**)

Can use social media for all of those or only some subset

A relevant analogy is running a small business:

- Successful marketing campaign to recruit users (good targeting, messaging)
- Maintaining and running an active intervention (good IT management)
- Manage participant communication to minimize attrition (good customer service)

**This talk**: Focus on each component separately

# Overview

1. Recruitment

2. Interventions

3. Limitations and Challenges

4. Conclusion and the Future of Social Media

# Benefits of Social Media Samples

Accessing a **broad sampling** frame

- 2 billion reachable users via ads (120k on Prolific, 26 million on YouGov)
- Typically not “professional" survey takers
- Particularly useful in developing countries with limited reach by survey panels (e.g., Aghajanian et al. 2021, Rosenweig-Zhou 2021, Singh et. al 2022)

Targeting niche sets of users

- **Direct**: Geography, interests, demographics
- **Indirect**: “Lookalike" audiences to an existing set of users
- Examples: Political activists (Jäger 2017), French high school seniors (Hakimov et. al 2022), LGBTQ young adults (Guillory et al 2018), voters in local elections (Sances 2018)

# Mechanisms of Advertising on Social Media

Typical sequence of events for setting advertisements:

(1) Advertiser **buys ad** on Facebook/Instagram/Audience Network
(2) Advertiser **places "pixel"** on their website
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(4) Data used to **measure and optimize distribution**

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Important considerations:

Choose to optimize for impressions/clicks/conversions (see Neundorf et. al 2023 for differences in selection)
Targeting typically improves over time: **delivery optimization**
Placement of tracking pixel on "success" (e.g., end of survey, software installation) **determines optimization**

# Recruitment Challenges

## Representativeness

"Black box" selection due to delivery optimization (Rosenzweig et al. 2020)
Boas et. al (2020) show similar selection to crowd-sourced platforms
Solution: Quota sampling (e.g., see Allcott et al 2020)

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More granular targeting is typically costlier
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Higher in recent years due to privacy regulation

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**Sample Quality**: No one vouching for participants

Possible fraudulent and duplicated responses
Higher chances of "low quality" participants

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Physical: Conlon et. al (2023) measure second-choice diversion from *overall* product removal

Digital: Aridor (2025) measures second-choice diversion from *individual* product removal

**Experimenter POV**: Interested in the effect of **X** on **Y**

**X**: Induce *individual* level variation in X via platform features or external software

**Y**: Measure *individual* level of Y via the platform directly, external software, or surveys

**Z**: Sometimes can only move Z that moves X

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Enables conducting platform experiments *without* platform cooperation

# Technical Preliminaries

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- Read and write arbitrary HTML/JS into a page
- Extraction of content, time spent, browser settings
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- Typically only Android phones enable 3P software
- Extraction of time spent on apps (limited content)
- Limited interventions (app restrictions)

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**Selenium bots**: Imitate real users

- Explicitly code routine of user interactions
- Useful for extracting information from sites with dynamic JS

# Useful Open-Source Software Tools

**Browser Extensions**: Webmunk (Farronato-Fradkin-Karr 2024)

Allows for modification of content (e.g., Farronato et. al, 2025 modify Amazon search rankings)
Tracks browsing behavior, prompts users to complete tasks
Build on top of core abstractions (no need to replicate core functionality)
Reference: `http://www.webmunk.org`

**Mobile Phones (Time Use)**: Phone Dashboard (Allcott-Gentzkow-Song 2022)

Control and set limits on time on applications
Reference: `https://github.com/Phone-Dashboard`

**Mobile Phones (Screen Content)**: Princeton-SMART

Collects second-by-second screenshots of content
Combination of OCR plus accessibility data
Reference: `https://www.screenlake.com/princeton-smart`

# Different Types of Interventions

## Encourage change in time use

Manual deactivation: Allcott et. al (2020) encourage account deactivation

Software restrictions: Aridor (2025), Allcott et. al (2022) use third-party software to restrict access at application-level

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## Encourage installation of third-party software

Beknazar-Yuzbashev et. al (2022) measure the effect of toxic content
Farronato et. al (2025) measure degree of Amazon self-preferencing
Higher compliance costs, wider scope of interventions

# Different Types of Interventions (Continued)

**Manipulate Experience through platform features**

Larsen et. al (2023) use geographically targeted ads on vaccine campaigns
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## Algorithmic Audits

Brown et al. (2022) randomize the initial YouTube view a consumer watches
Can use selenium bots to randomize feedback and observe changes in algorithm

# Collecting Data and Compliance

We can use the same tools to collect data for analysis and assessing compliance

**API**: Directly operated by the platform

Data: Burtch et. al (2022) randomly give peer awards and extracts Reddit posts
Compliance: Levy (2021) monitors compliance with following FB pages

**Challenges with API**: Instability over time

Platforms may remove posts (content moderation)
Platform policies highly variable (e.g., X and Reddit)
“Unofficial" APIs are a gray area in terms of whether data can be used

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**Third-Party Software**: Browser extensions, mobile phones

Extensions: Browsing history (Levy 2021), time spent (Aridor 2025), posts / ads observed by individuals (Beknazar-Yuzbashev et. al 2022)
Mobile Phones: Time spent (Allcott et. al 2022, Aridor 2025), keyword content (Reeves et. al 2021)

**Challenges with Third-Party Software**: external validity

Higher chance of self-selection into studies
Most usage is on mobile, but harder to collect on mobile

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**Manually collected data**: valuable, but high labor costs

Agan et. al (2023) collect posts by recording via Zoom
Collis et. al (2021), Lin et. al (2023) incentivize participants to export data

**Survey Data**: traditional and requires joining to platform ID

Allcott et. al (2020) measure valuations and political attitudes
Challenge: Especially for time-spent, survey measures can be noisy (e.g., Ernala et. al (2020) find a correlation of 0.42 using internal FB data)
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Tradeoff: Data quality, representativeness, feasibility

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**Power**: More difficult with low effect size interventions

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- Enables within-participant designs (List et. al 2011)
- Temporally granular data eases testing dynamics of treatment effects

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**Attrition**: Typically comparable with other field experiments

Ghanem et. al (2023) report a mean attrition of 15% among 88 field experiments
Threaten internal validity when select out based on potential outcomes

**Overcome attrition**

Postponing treatment to a relatively late stage
Conducting multiple survey waves to identify attriters (Allcott et. al 2020)

# Limitations and Challenges (Continued)

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Short-term effects: difficult to measure “long term" interventions

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**External Validity**: Differences from target population

Often recruited sample will not be representative
Targets: nationally representative sample and representative of *platform* users
Nationally representative sample: reweight on demographics
Platform: American Trends Panel or manual approach (e.g., Barberá (2016) sampled random Twitter users and hand-coded demographic information)

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**Ethics**: Impacts consent, intervention, and outcomes

Facebook's Emotion Contagion Study (Kramer et. al 2014) measured the effect of hiding posts with positive/negative words on subsequent emotions of posting

Heavily criticized (no informed consent, large potential risk, no opting out)

Given data sensitivity, ethical considerations are a first-order part of design

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While involved, lower barriers to entry relative to platform cooperation

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## Future Directions of Social Media

- Rise of TikTok: Content entirely from algorithmic curation, move towards video
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- Change in business models: Subscriptions, instead of ad-supported
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**An exciting time to study social media, rapidly evolving and many open questions**

- Social media experiments represent an important tool in our researcher toolkit
- Complementary to platform economics theories and observational work