The Welfare Economics of Digital Media

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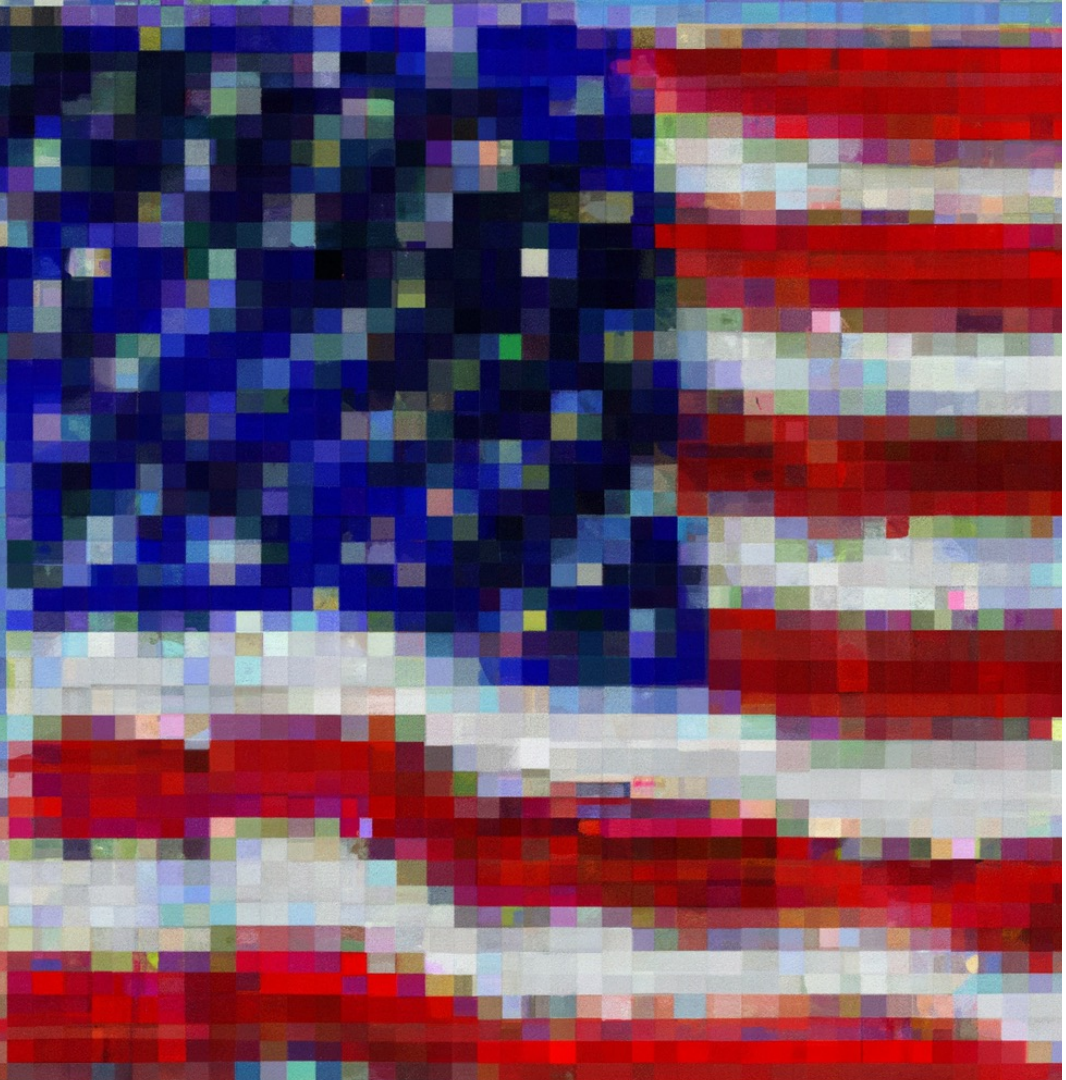
Stanford University

- 4+ bn smartphone owners worldwide
- >3 hours per day average use, much more among kids
- Avg. US consumer willing to pay $50+/month for FB alone
- Traditional economic lens: **vast consumer benefits**



“Externalities”

Polarization
Misinformation
Violence
Bullying

“Internalities”

Addiction
Loneliness
Anxiety
Depression
Suicide

Today: Recent research on social media and social welfare

1. Impacts on **polarization** and **well-being**

2. Digital **addiction**

Impacts

The Welfare Effects of Social Media[†]

By Hunt Allcott, Luca Braghieri, Sarah Eichmeyer, and Matthew Gentzkow[*]

The rise of social media has provoked both optimism about potential societal benefits and concern about harms such as addiction, depression, and political polarization. In a randomized experiment, we find that deactivating Facebook for the four weeks before the 2018 US midterm election (i) reduced online activity, while increasing offline activities such as watching TV alone and socializing with family and friends; (ii) reduced both factual news knowledge and political polarization; (iii) increased subjective well-being; and (iv) caused a large persistent reduction in post-experiment Facebook use. Deactivation reduced post-experiment valuations of Facebook, suggesting that traditional metrics may overstate consumer surplus. (*JEL* D12, D72, D90, I31, L82, L86, Z13)

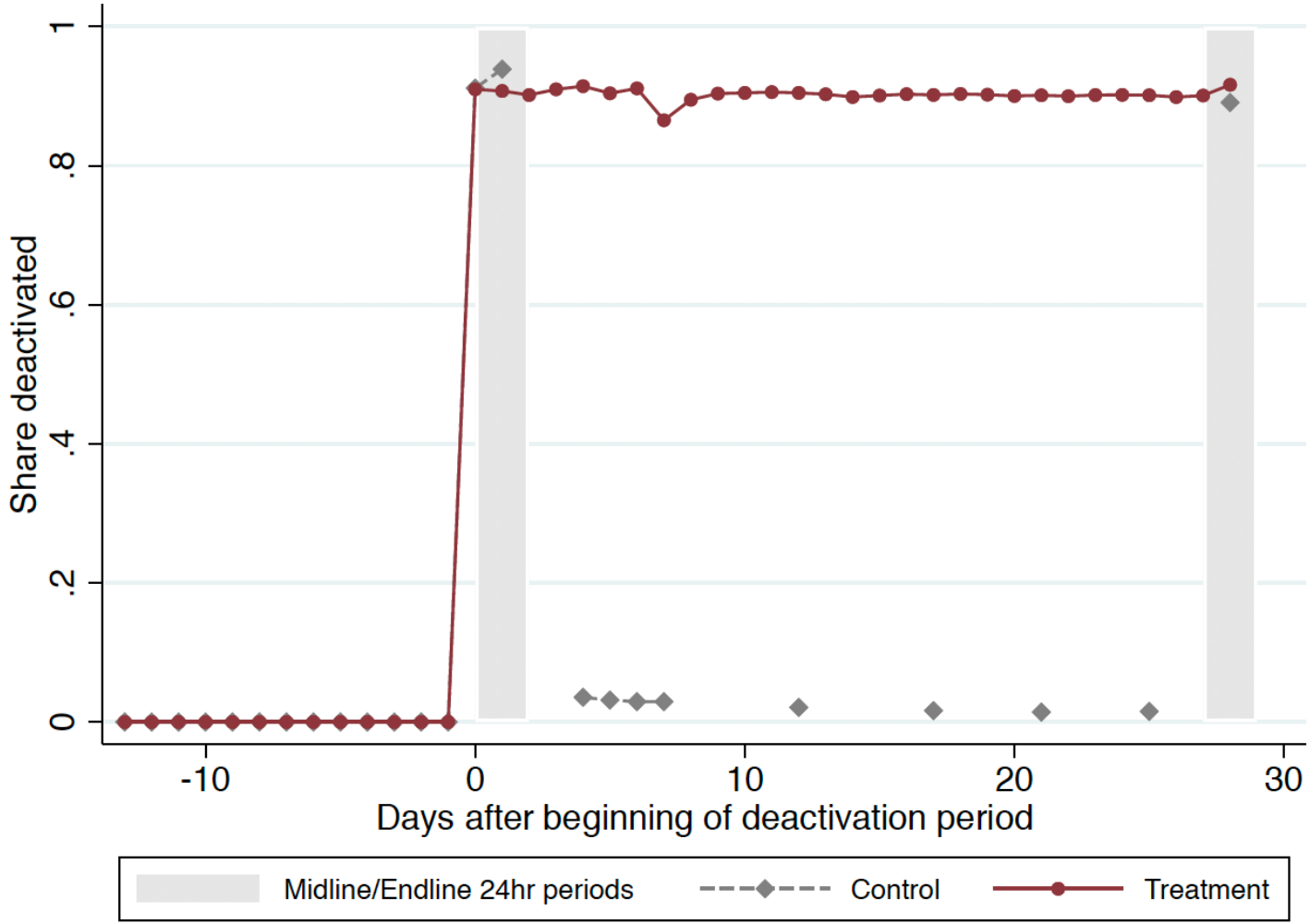
Randomized experiment: Paid users to deactivate Facebook for 4 weeks before the US 2018 midterm election

Individual effects

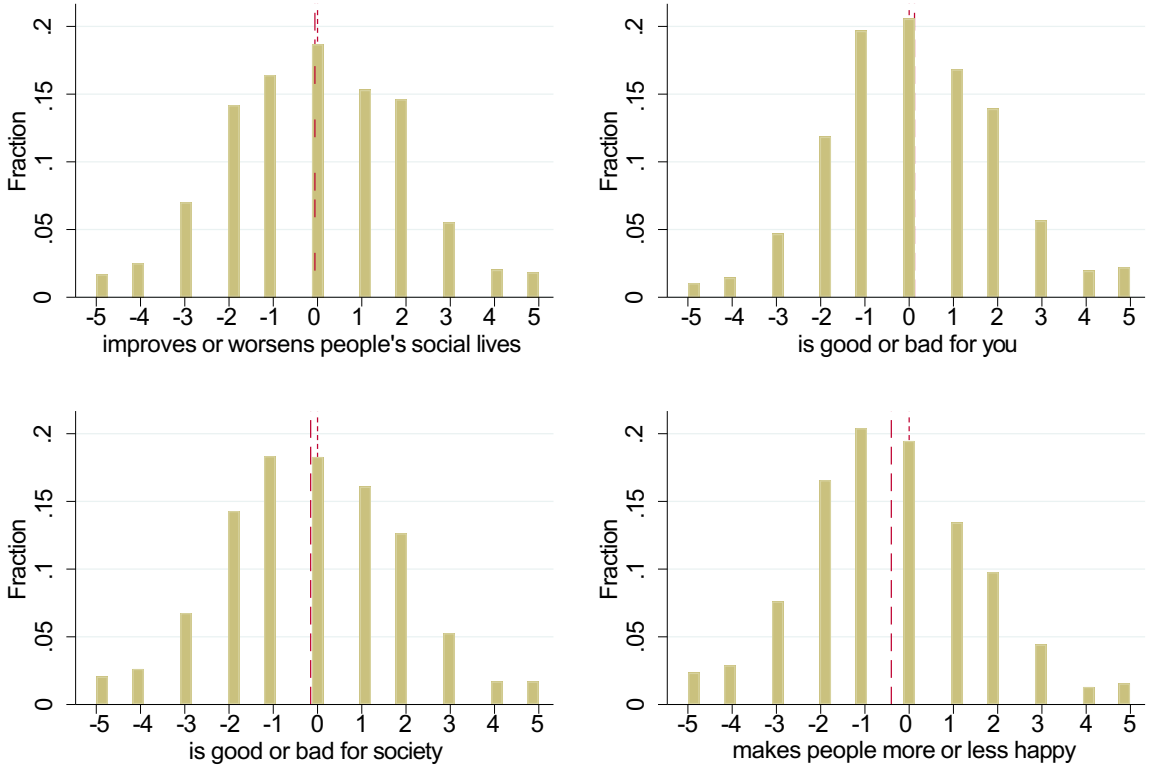
- Substitute time uses
- Happiness
- Post-experiment use & valuation

Broader social impacts

- News knowledge
- Voting
- Political polarization

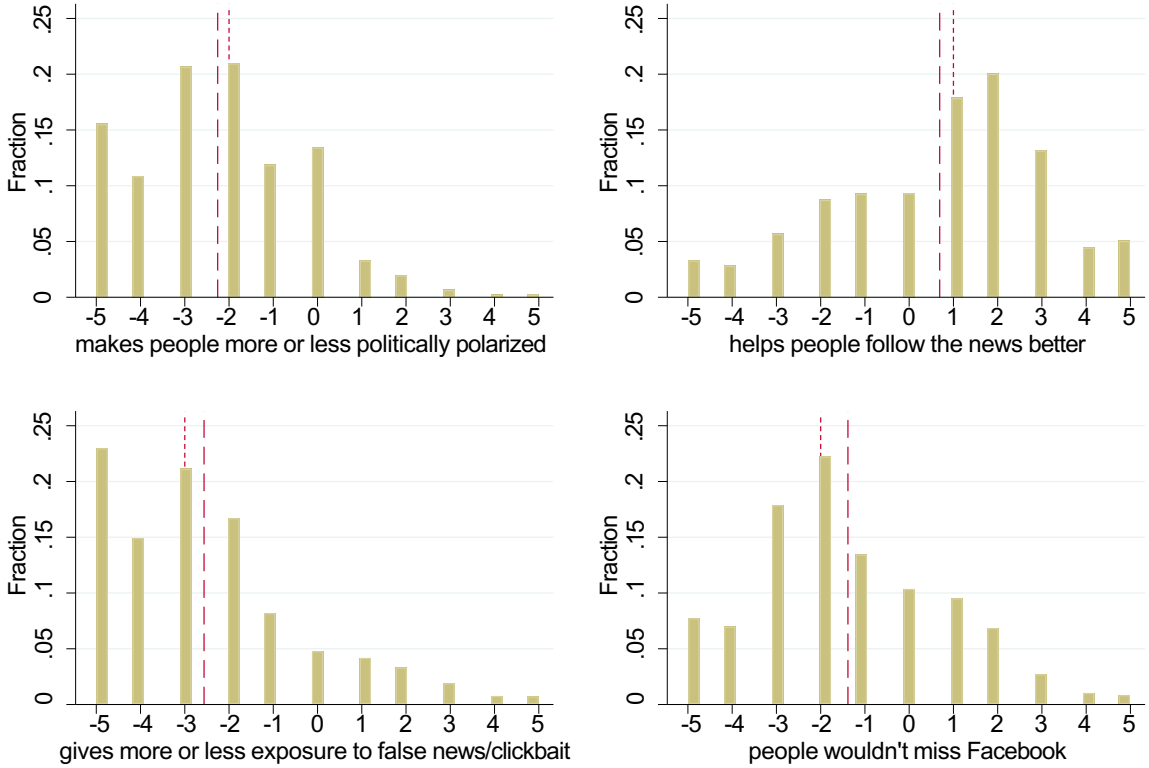

Share deactivated
0
.2
.4
.6
.8
1
-10
0
10
20
30
Days after beginning of deactivation period
Midline/Endline 24hr periods
Control
Treatment

Baseline opinions about Facebook (right is “good”)



Note: Long-dashed line is mean, short-dashed line is median

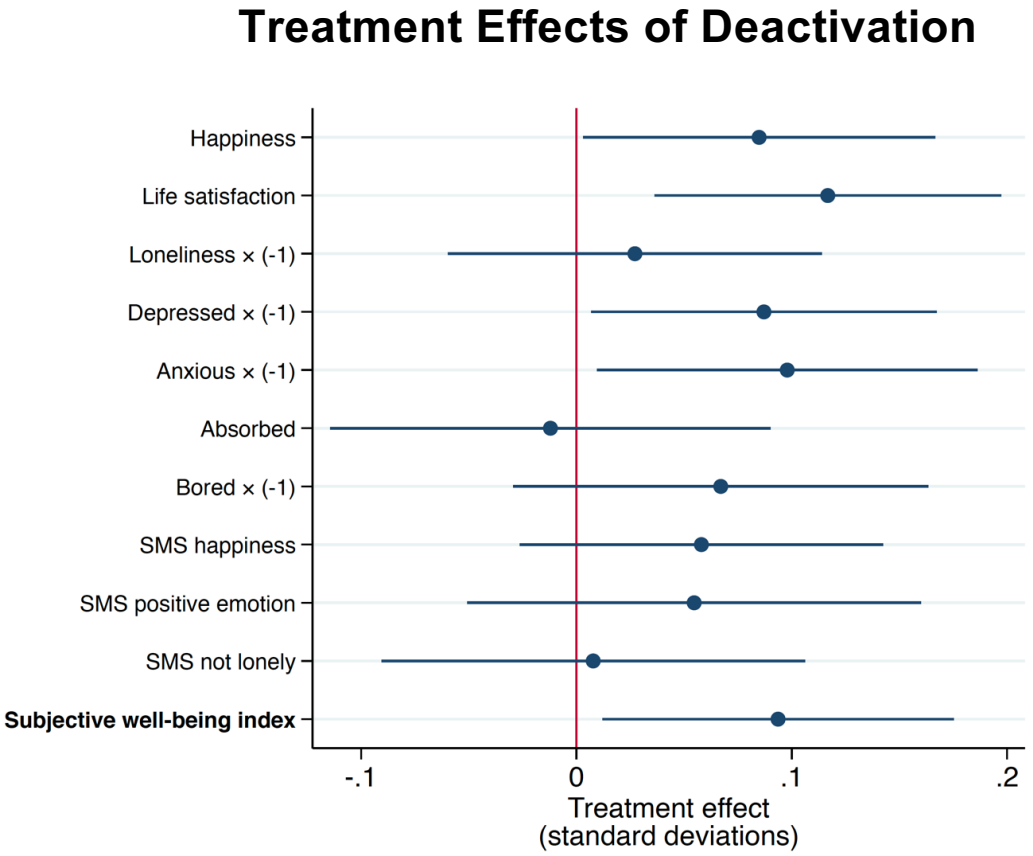
Baseline opinions about Facebook (right is “good”)



Note: Long-dashed line is mean, short-dashed line is median

Results: Well-Being

- 4-week FB deactivation in 18+ sample led to significant improvements in well-being and mental health
- 25-40% as large as RCT effects of therapy
- ~20% reduction in usage post-experiment



Qualitative interviews

“I was way less stressed. I wasn’t attached to my phone as much as I was before. . . I felt more content. I think was in a better mood generally. . . I didn’t really miss it at all. I was just more focused on my life.”

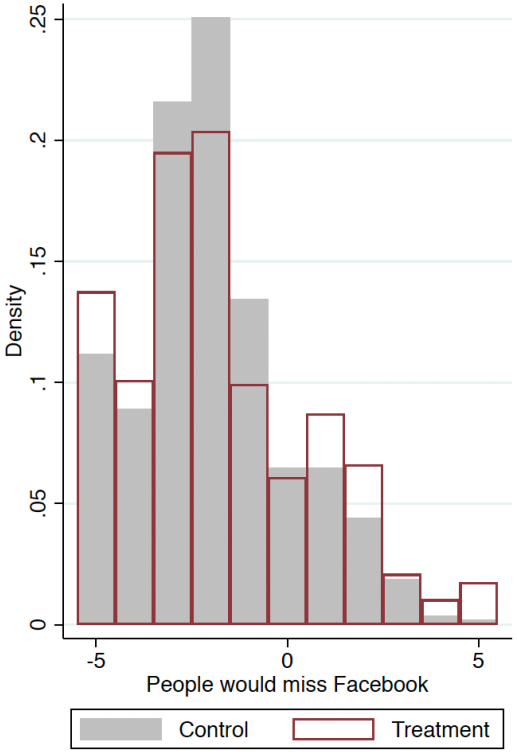
Qualitative interviews

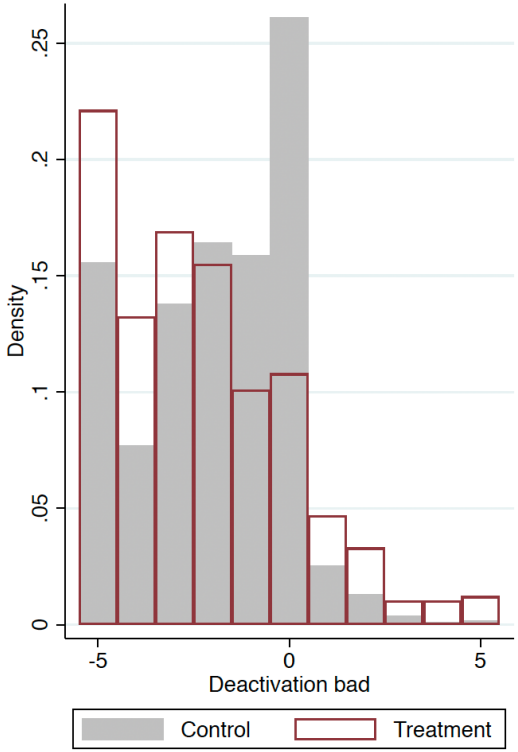
“The relief of not having to deal with all the news from the election. . . I have a big problem with the way that people argue and the comments that people make on opposite ends of the spectrum so that was kind of a relief to not have to look at that or think about it. . . it can be really stressful having to keep up the presence and keep up the façade and so it was kind of a relief not to have to do that. . . and not having to look at other people’s stuff that I don’t want to see.”

Qualitative interviews

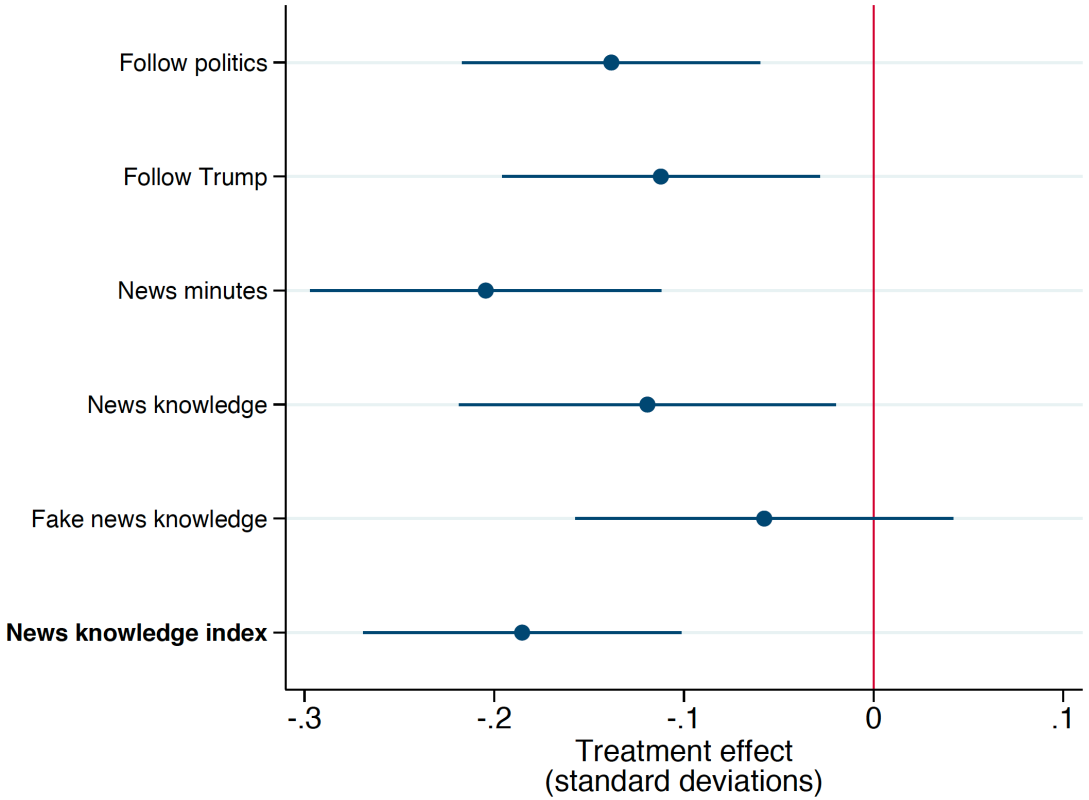
“I was shut off from those conversations, or just from being an observer of what people are doing or thinking. . . I didn’t like [deactivation] because I spend a lot of time by myself anyway, I’m kind of an introvert, so I use Facebook in a social aspect in a very big way. . . ”

Heterogeneous Effects

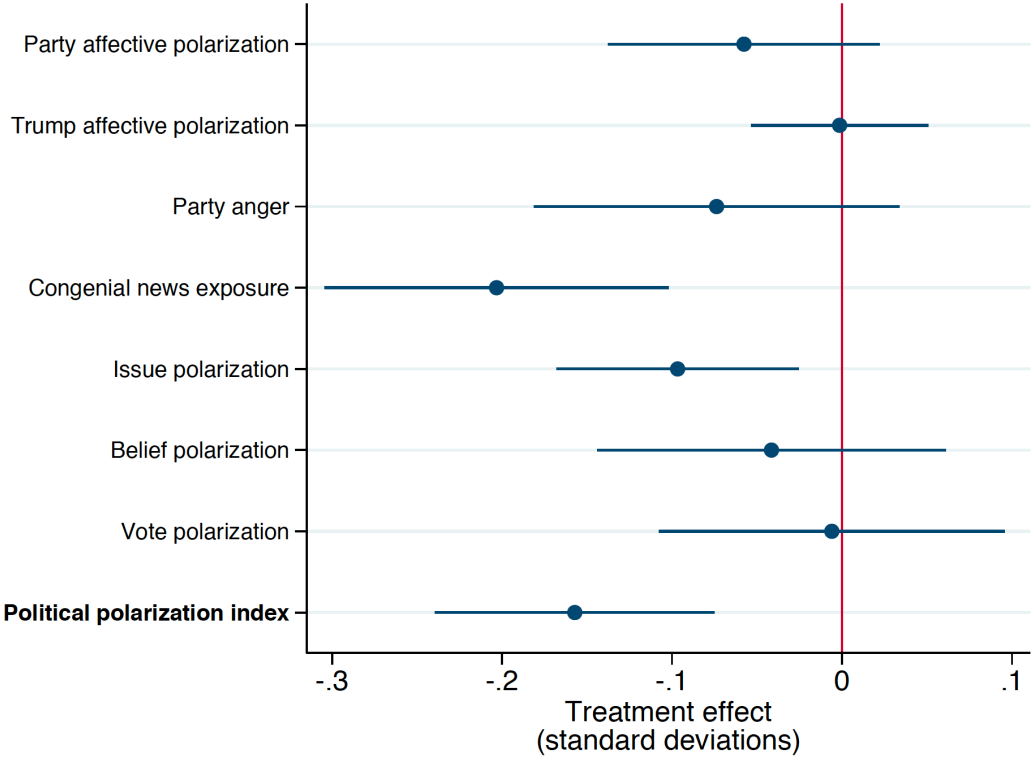




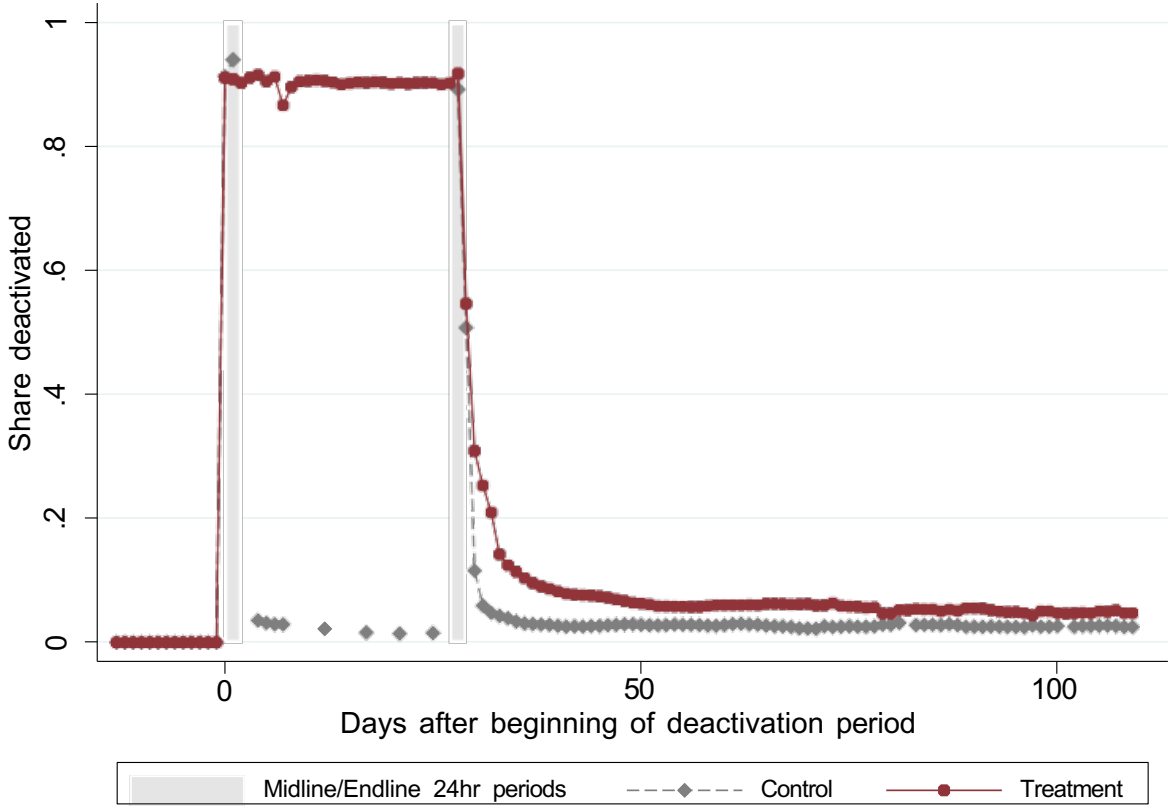
Results: Knowledge



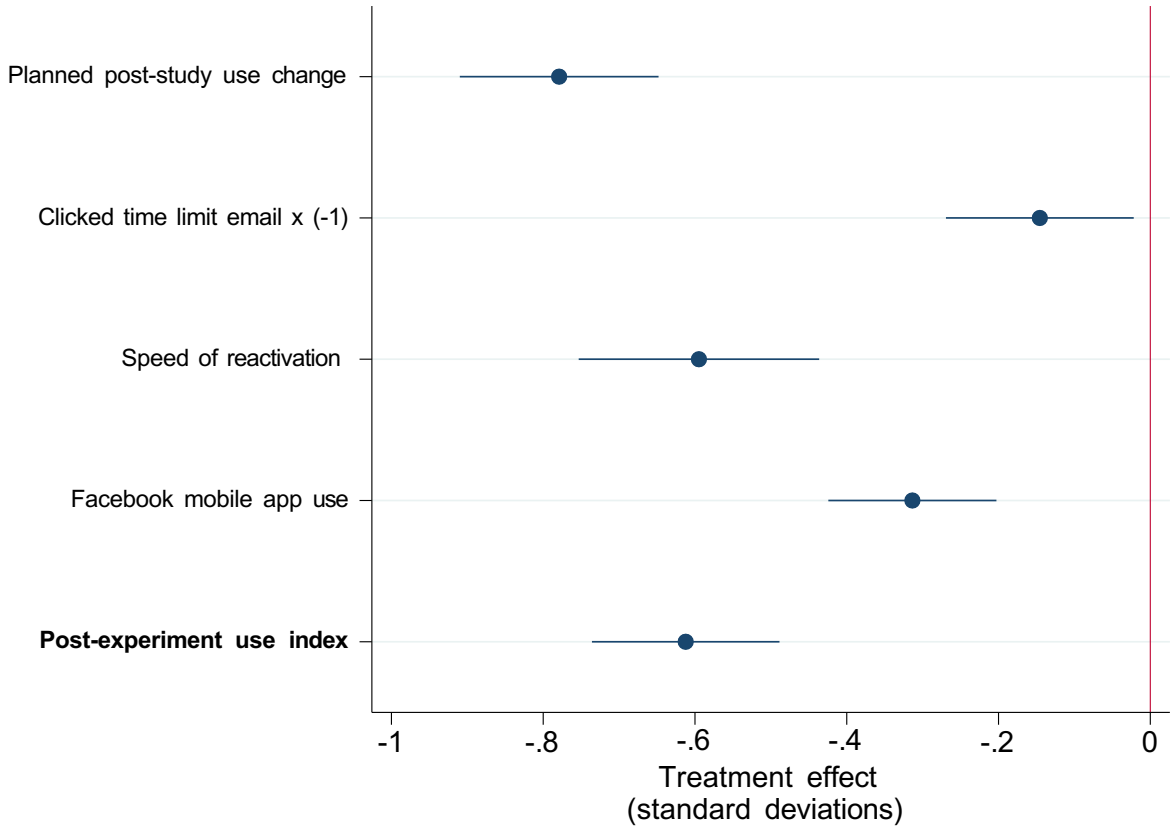
Results: Polarization



Speed of reactivation



Effects on post-experiment use



How has the way you use Facebook changed?

“I try to be more aware of how much time I spend on it and try to actively make it a point to decrease the amount of time I spend on it.”

“I now find myself uninstalling the entire app and giving myself a break for a few days at a time if I ever feel like I am becoming obsessed with it.”

“I deleted the Facebook app so I am no longer mindlessly scrolling and wasting hours on Facebook. I use Facebook about 1-2 times a day, and i just check my notifications or post in my clubs’ pages.”

“I deactivated Facebook since [the experiment]. I grew tired of having to see all of the negative things that are posted there. I just don’t care to read that stuff anymore.”

“I have been working on spending less time on Facebook. I realized during that 24 hour period how much of a weird habit it was - if I had my phone on my hand, my first action was to instantly click the app button.”

Consumer Surplus

- Standard welfare calculation based on incentivized willingness to accept
  - Median valuation = $100
  - Total US consumer surplus = $31bn per 4 weeks

- Deactivation causes 15% drop in valuation

- To ponder: How to reconcile large dollar valuations with negative impacts on well-being?

2020 Election Study

- Collaboration between Meta and academic researchers to study FB and IG's impact on the 2020 election
- Randomized experiments and observational studies
- Outcomes measured through surveys, platform data, and external administrative data

Deactivation Experiment

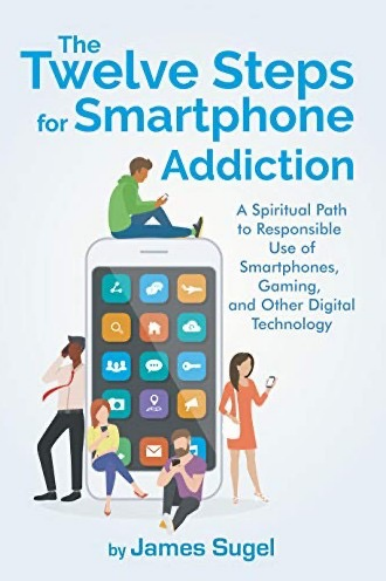
- **Goal**: Measure total impact of Facebook and Instagram access on political attitudes, beliefs, and behaviors
- ~35k users randomly assigned to deactivate accounts for 6 weeks prior to the election

2020 Election Study: Results

- **Political outcomes**
  - Replicate strong effect of Facebook deactivation on knowledge
  - Precise zero effect on polarization
  - Precise zero effects on other electoral outcomes

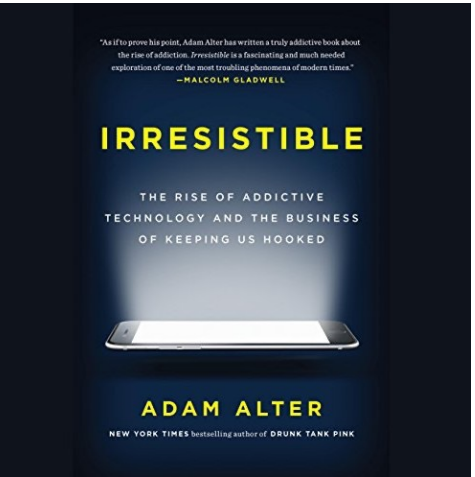
- **Well-being**
  - Replicate strong effect of Facebook deactivation on well-being
  - Instagram deactivation also improves well-being, particularly for young women

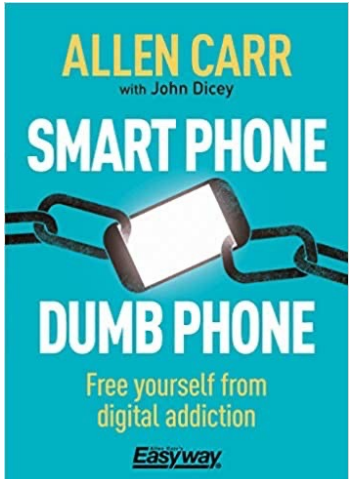
Digital addiction

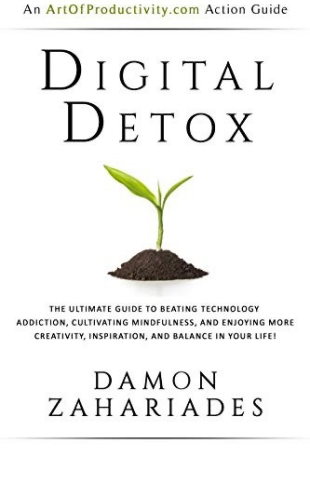

The Twelve Steps for Smartphone Addiction
A Spiritual Path to Responsible Use of Smartphones, Gaming, and Other Digital Technology
by James Sugel

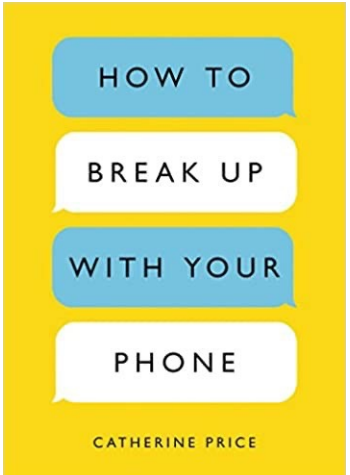

DIGITAL ADDICTION
A&E

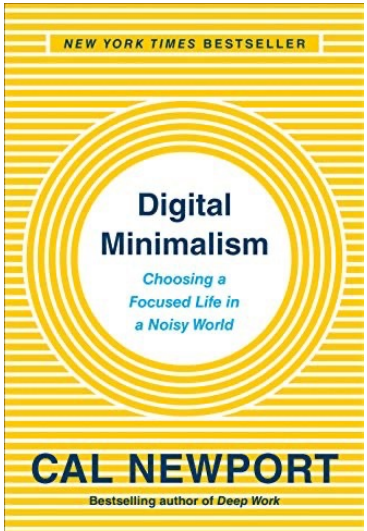

the phone addiction workbook
How to Identify Smartphone Dependency, Stop Compulsive Behavior and Develop a Healthy Relationship with Your Devices
Hilda Burke
Integrative Psychotherapist, Couples Counselor and Life Coach


"As if to prove his point, Adam Alter has written a truly addictive book about the rise of addiction. Irresistible is a fascinating and much needed exploration of one of the most troubling phenomena of modern times."
—MALCOLM GLADWELL
IRRESISTIBLE
THE RISE OF ADDICTIVE TECHNOLOGY AND THE BUSINESS OF KEEPING US HOOKED
ADAM ALTER
NEW YORK TIMES bestselling author of DRUNK TANK PINK

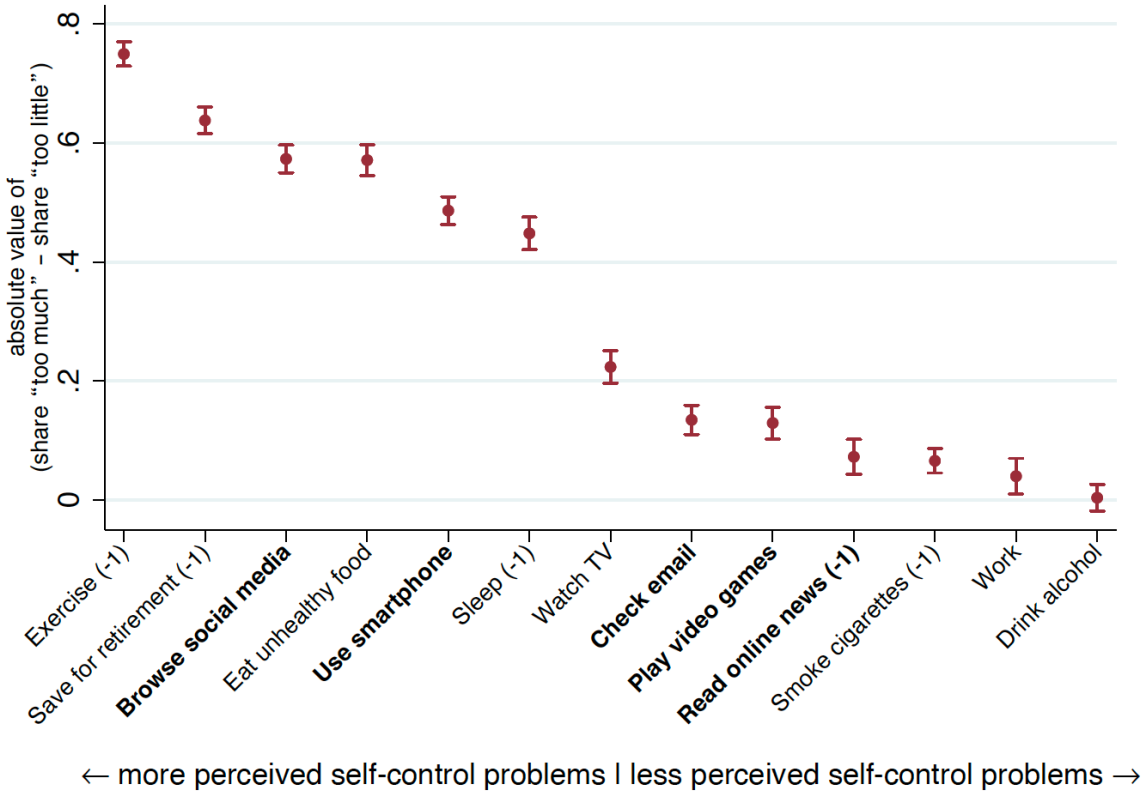

ALLEN CARR
with John Dicey
SMART PHONE
DUMB PHONE
Free yourself from digital addiction
Easyway


An ArtOfProductivity.com Action Guide
DIGITAL DETOX
THE ULTIMATE GUIDE TO BEATING TECHNOLOGY ADDICTION, CULTIVATING MINDFULNESS, AND ENJOYING MORE CREATIVITY, INSPIRATION, AND BALANCE IN YOUR LIFE!
DAMON ZAHARIADES


HOW TO
BREAK UP
WITH YOUR
PHONE
CATHERINE PRICE


NEW YORK TIMES BESTSELLER
Digital Minimalism
Choosing a Focused Life in a Noisy World
CAL NEWPORT
Bestselling author of Deep Work

Please tell us whether you think you do [each activity] too little, too much, or the right amount.



Our research

Are we addicted to smartphones and social media?

How much does digital addiction affect our time use?

1. **Model** of daily phone use
2. **Descriptive evidence** on importance of habit formation and temptation
3. **Structural estimates** to quantify effects on time use

Model

- Goal: capture economic meaning of phone addiction

- Key elements
  - **Habit formation** (Becker & Murphy 1988)
  - **Temptation** (Laibson 1997; Banerjee & Mullainathan 2010)

Utility

$$u(x_t; s_t, p_t)$$

$$s_{t+1} = \rho(s_t + x_t)$$

- x_t: Smartphone use (e.g., minutes)
- s_t: Habit stock
- p_t: Price of minutes (0 at baseline)

Habit formation

$$u(x_t; s_t, p_t)$$

$$s_{t+1} = \rho(s_t + x_t)$$

- Consumption x_t today adds ρ units to habit stock s_{t+1} tomorrow
- $\partial^2 u(x_t; s_t, p_t)/\partial x_t \partial s_t > 0$: habit stock increases marginal utility of consumption
- Direct effect $\partial u(x_t; s_t, p_t)/\partial s_t$ may be positive or negative

- **Prediction**:
  - Higher $p_t \to$ lower x_t *and* lower x_{t+1}, x_{t+2}, ...
  - Anticipated higher $p_{t+1} \to$ lower x_t

Temptation

- Present self perceives utility to be

$$u(x_t; s_t, p_t) + \gamma x_t$$

  where $\gamma > 0$

- **Prediction**:
  - Present self consumes more optimal from long-run perspective
  - Long-run self would like to **commit** to consume less

Experiment

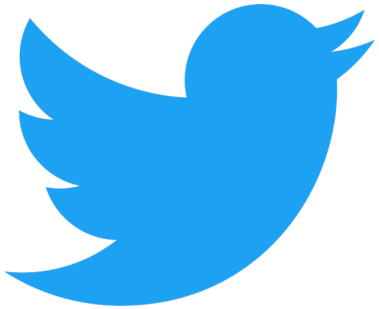
- Sample of ~2,000 Android users recruited via Facebook ads
- Install custom app (“Phone Dashboard”) to measure and control use

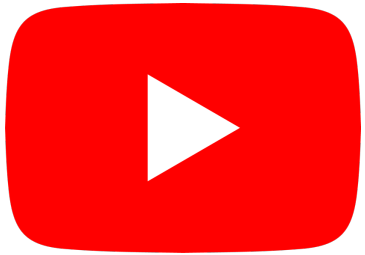
- **Treatments**
  1. Screen time **bonus**
  2. Phone Dashboard **limits** w/ “delay” function

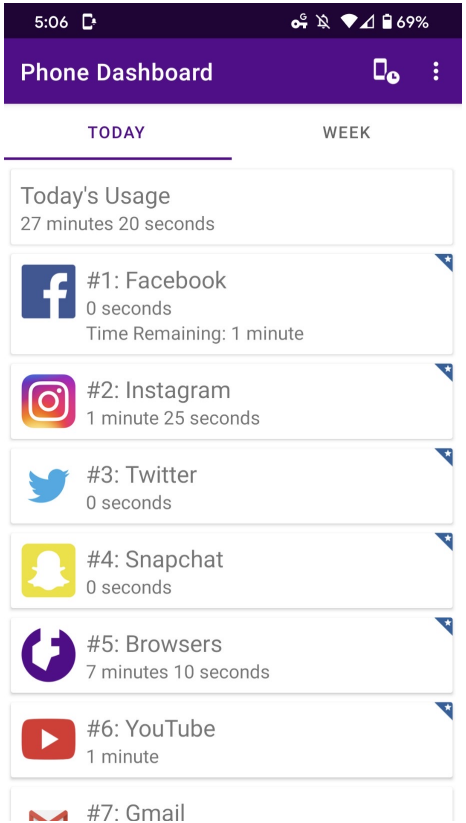
- **Survey outcomes**
  - Ideal use
  - Digital addiction scale
  - Subjective well being

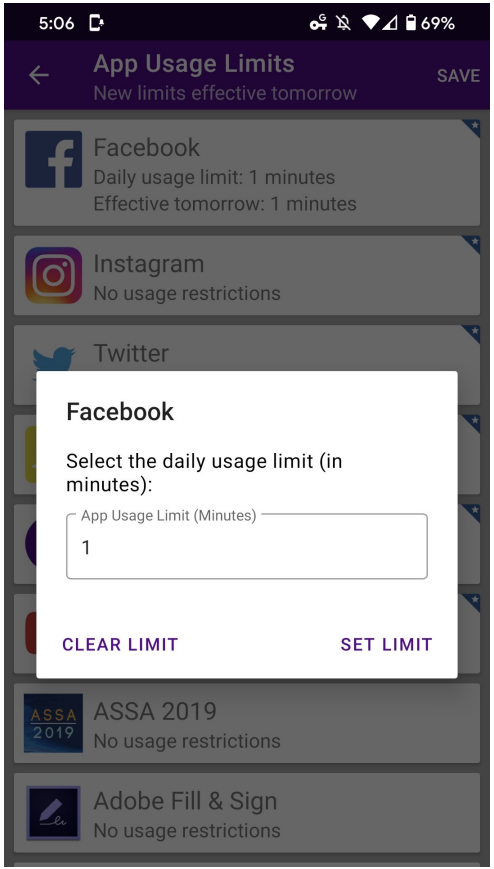
- **Valuations** of bonus and limits using multiple price list (MPL)
- **Predictions** of future use

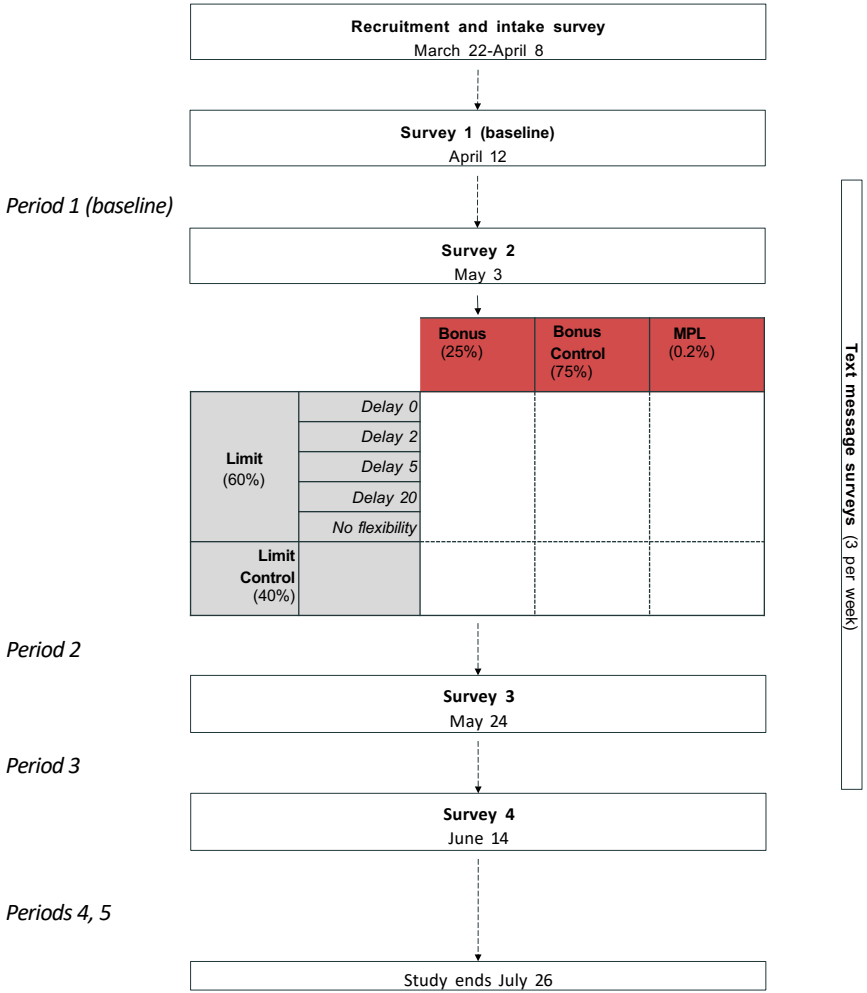





5:06
69%
Phone Dashboard
TODAY
WEEK
Today's Usage
27 minutes 20 seconds
#1: Facebook
0 seconds
Time Remaining: 1 minute
#2: Instagram
1 minute 25 seconds
#3: Twitter
0 seconds
#4: Snapchat
0 seconds
#5: Browsers
7 minutes 10 seconds
#6: YouTube
1 minute
#7: Gmail


5:06
69%
App Usage Limits
New limits effective tomorrow
SAVE
Facebook
Daily usage limit: 1 minutes
Effective tomorrow: 1 minutes
Instagram
No usage restrictions
Twitter
Facebook
Select the daily usage limit (in minutes):
App Usage Limit (Minutes)
1
CLEAR LIMIT
SET LIMIT
ASSA 2019
No usage restrictions
Adobe Fill & Sign
No usage restrictions


Recruitment and intake survey
March 22-April 8
Survey 1 (baseline)
April 12
Period 1 (baseline)
Survey 2
May 3
Bonus (25%)
Bonus Control (75%)
MPL (0.2%)
Limit (60%)
Delay 0
Delay 2
Delay 5
Delay 20
No flexibility
Limit Control (40%)
Text message surveys (3 per week)
Period 2
Survey 3
May 24
Period 3
Survey 4
June 14
Periods 4, 5
Study ends July 26

Caveats

- Selected sample
- Substitution to use on other devices
- Partial equilibrium experiment
- COVID

Bonus Treatment

If you're selected for the **Screen Time Bonus**, you would receive $50 for every hour you **reduce your average daily FITSBY screen time** below a Bonus Benchmark of **3 hours per day** over the 3-week period, **up to $150**.

- **Announced** before period 2
- **Effective** in period 3

- Period 3 effect on usage: *Price sensitivity*
- Period 4,5 effect on usage: *Habit formation*

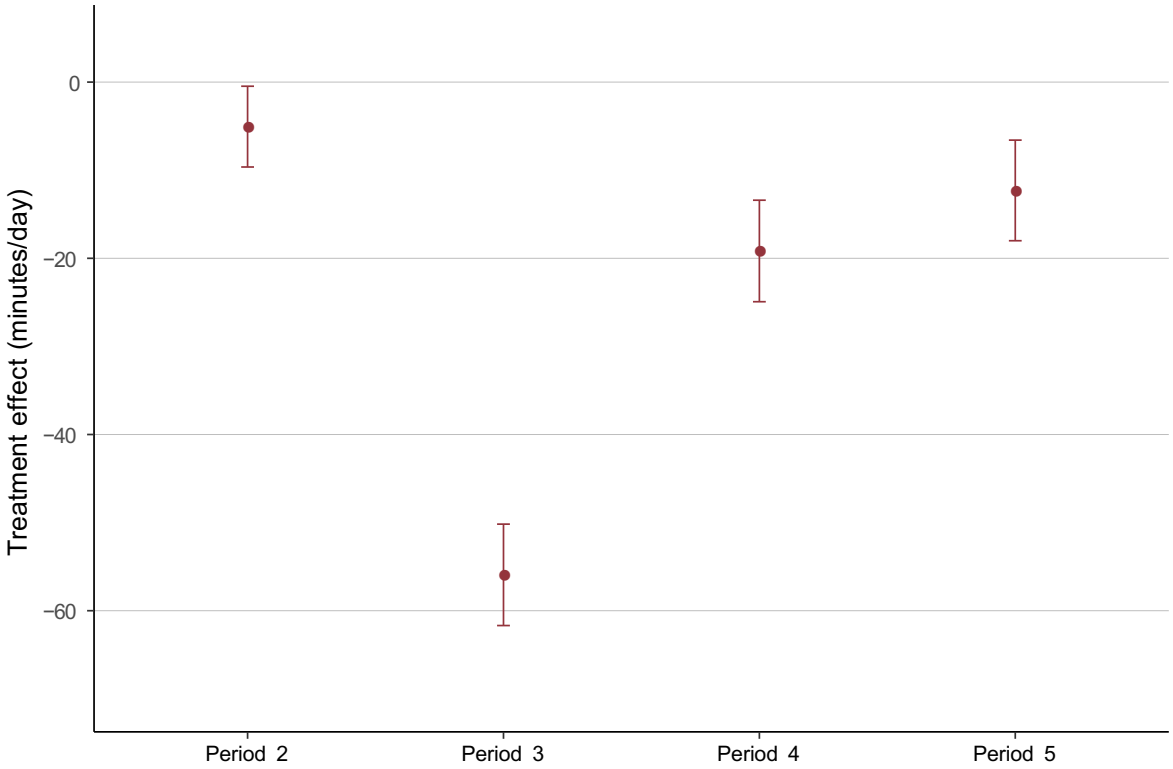
Limit Treatment

- Makes commitment device available
- No incentives – free to use or not (though encouraged to do so)
- Delay duration in $\{0, 2, 5, \infty\}$

- **Announced** before period 2
- **Available** in periods 2-5

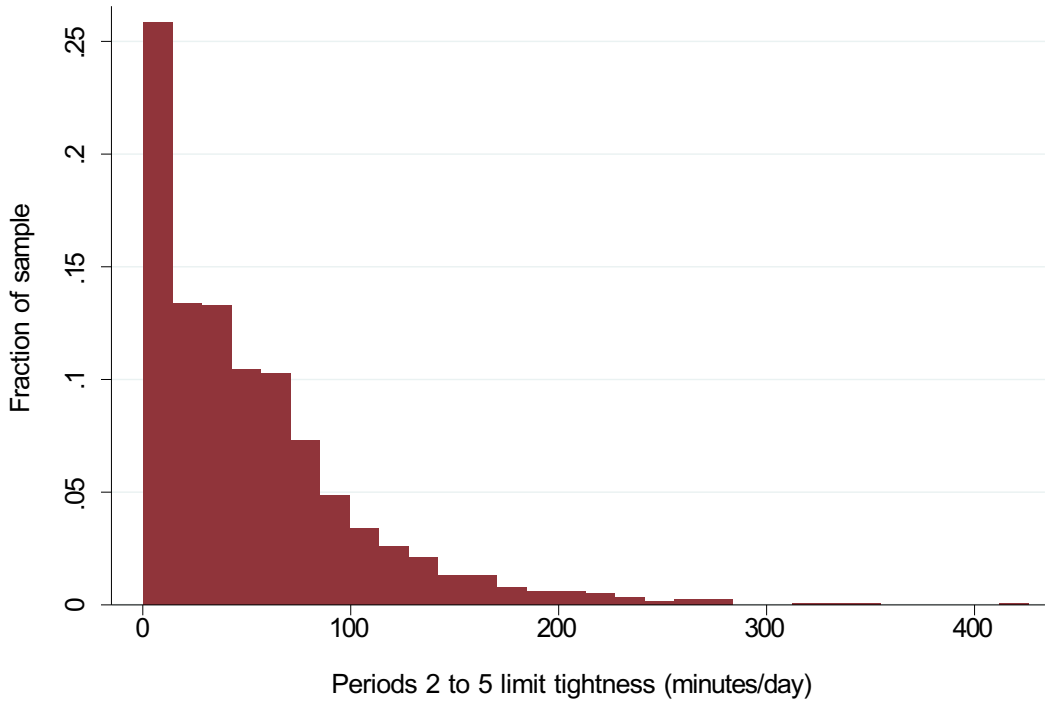
- Period 2-5 limits set, effect on usage: *Temptation*

Effect of bonus on FITSBY use



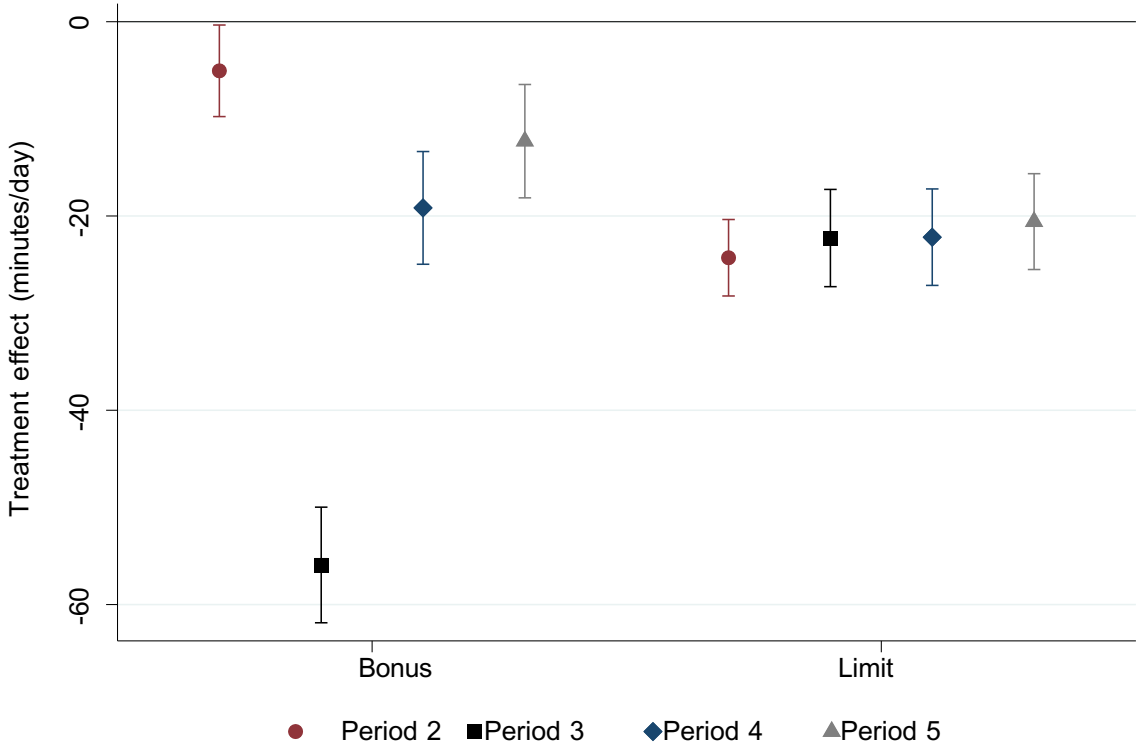
Effects by day | Effects by week

Distribution of user-level limit tightness



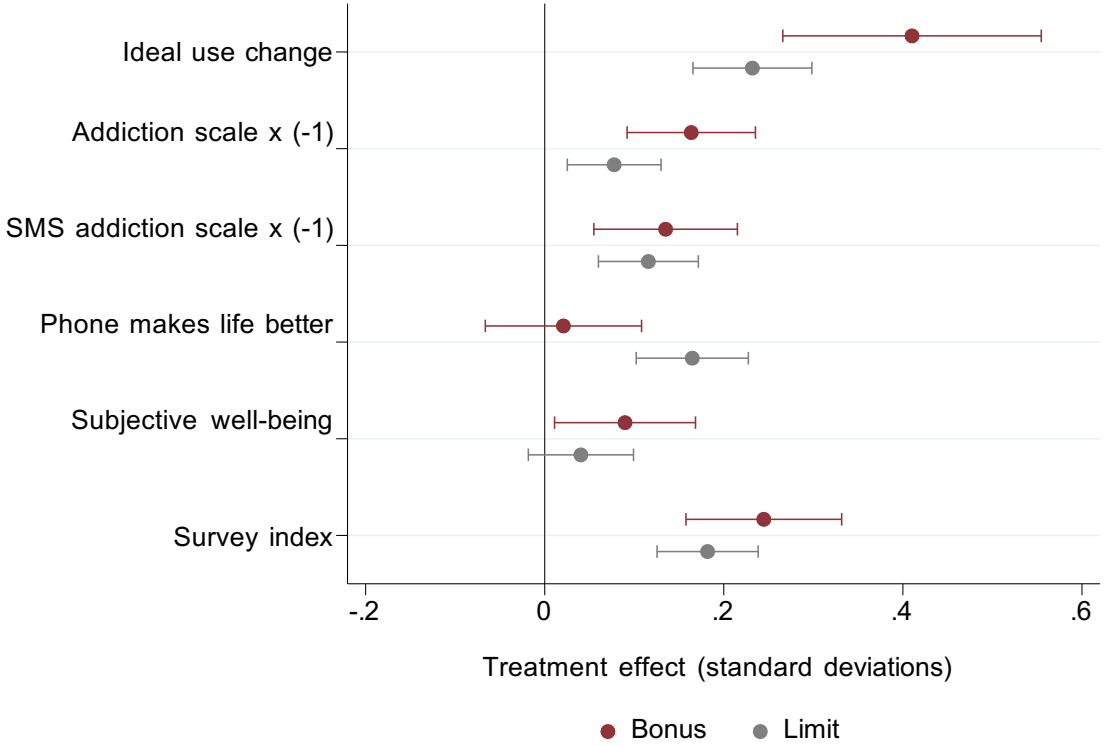
Tightness ≈ usage reduction limit would have caused in the baseline period

Effect of limit on FITSBY use

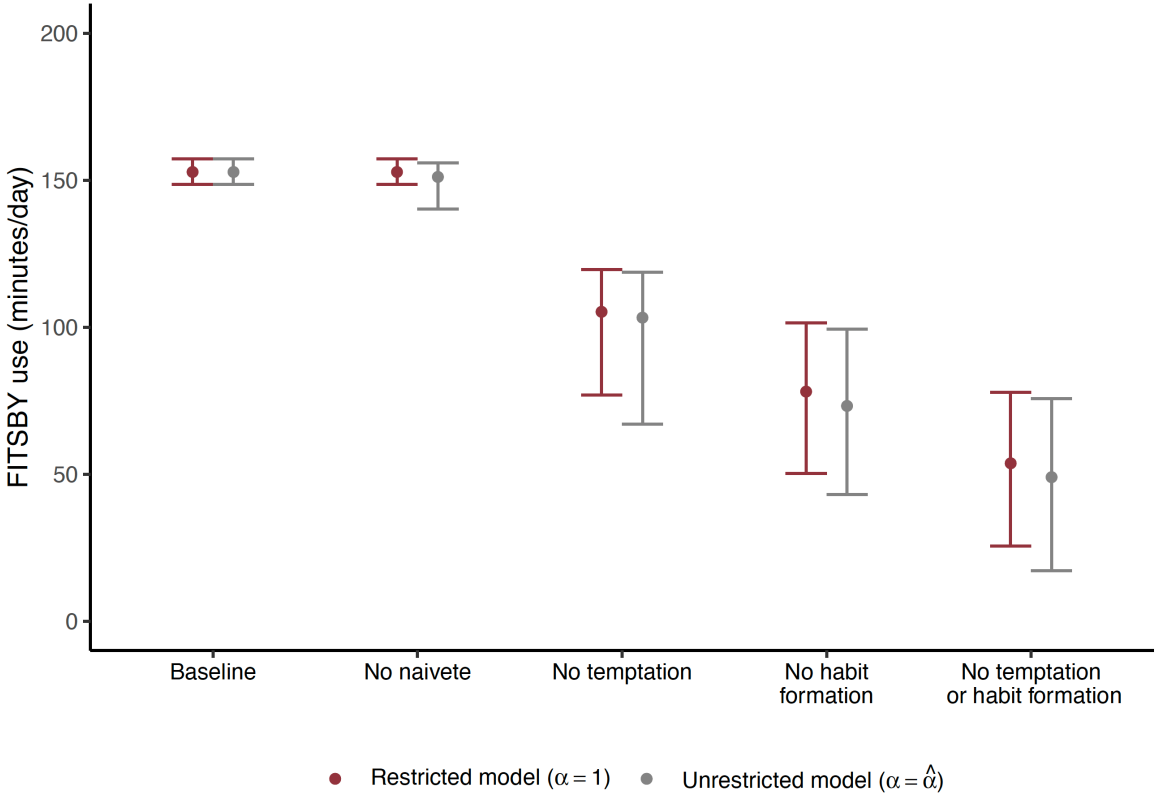


Zero interaction effects | Effects by week

Treatment effects of Bonus and Limit on survey outcomes



Structural Counterfactuals



Conclusion: Digital Addiction

- Clear evidence of habit formation and temptation
- Bonus and limit improve survey measures of addiction
- Structural analysis: ~30+% (~45+ minutes per day) of smartphone social media use caused by temptation