

# Class 17: Social media and individuals

Matthew J. Salganik

Sociology 204: Social Networks  
Princeton University



1. Kross, E. et al. (2020). Social media and well-being: Pitfalls, progress, and next steps. *Trends in Cognitive Science*.
2. Allcott, H. et al. (2020). The welfare effects of social media. *American Economic Review*.
3. Baym, N.K. et al. (2020). Mindfully scrolling: Rethinking Facebook after time deactivated. *Social Media + Society*.

Community minute

Social media:

- ▶ Lecture 17: Social media and individuals

Social media:

- ▶ Lecture 17: Social media and individuals
- ▶ Lecture 18: Social media and society

Social media:

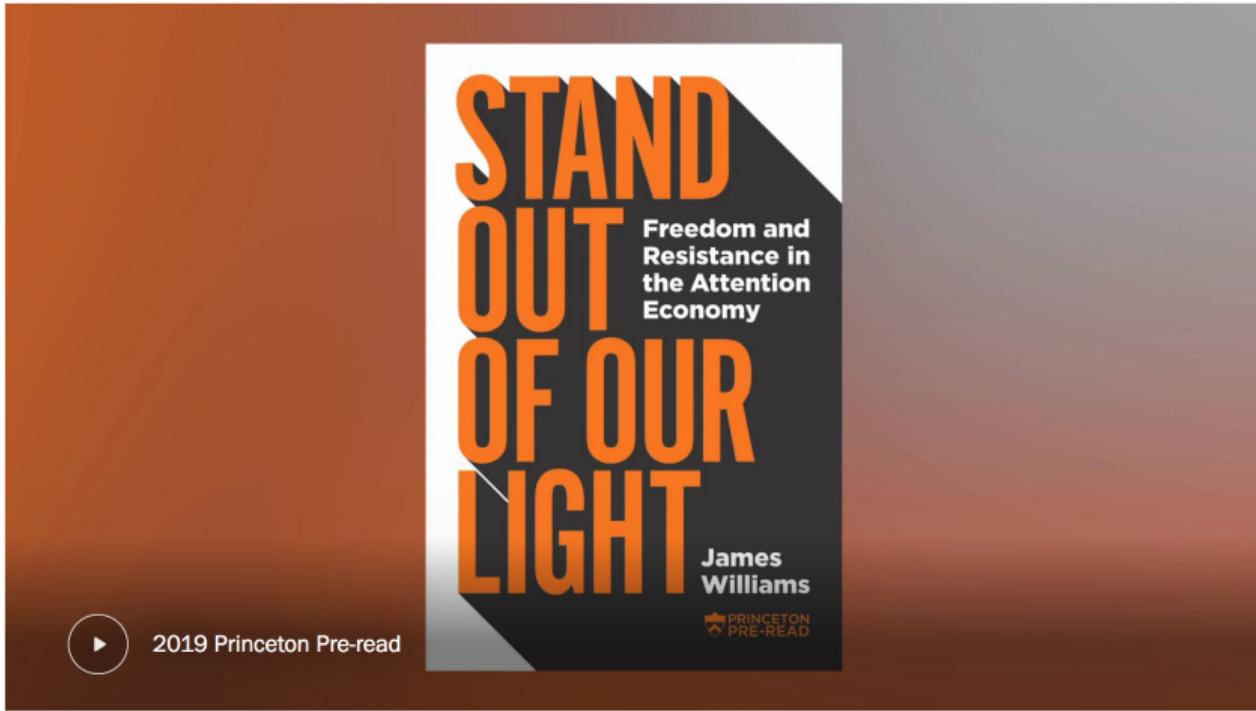
- ▶ Lecture 17: Social media and individuals
- ▶ Lecture 18: Social media and society
- ▶ Lecture 19: Social ads in social media

Social media:

- ▶ Lecture 17: Social media and individuals
- ▶ Lecture 18: Social media and society
- ▶ Lecture 19: Social ads in social media
- ▶ Lecture 20: Fixing social media

Social media:

- ▶ Lecture 17: Social media and individuals
- ▶ Lecture 18: Social media and society
- ▶ Lecture 19: Social ads in social media
- ▶ Lecture 20: Fixing social media
- ▶ Lecture 21: Facebook Files



<https://www.princeton.edu/news/2019/04/11/liberation-attention-digital-distraction-princeton-pre-read>

Big, important, and hard to study

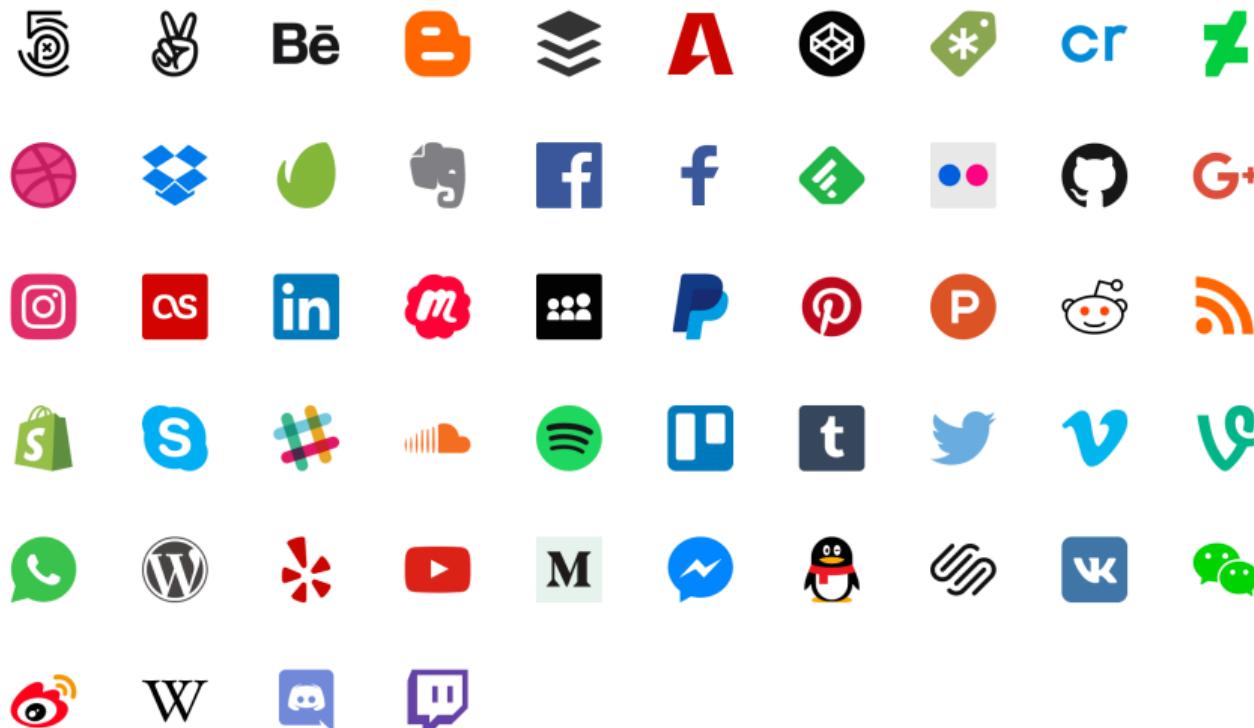
Review

# Social Media and Well-Being: Pitfalls, Progress, and Next Steps

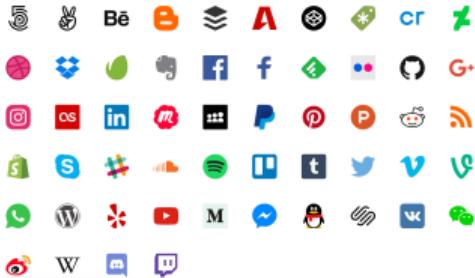
Ethan Kross,<sup>1,2,\*</sup> Philippe Verduyn,<sup>3</sup> Gal Sheppes,<sup>4</sup> Cory K. Costello,<sup>1</sup> John Jonides,<sup>1</sup> and Oscar Ybarra<sup>1,2</sup>

Social media: “online platforms that allow people to create and share information with others” (Kross et al. 2021)

Social media: “online platforms that allow people to create and share information with others” (Kross et al. 2021)



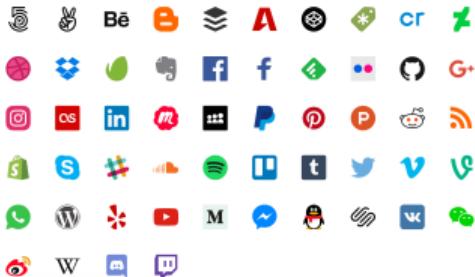
Social media: “online platforms that allow people to create and share information with others” (Kross et al. 2021)



<https://nucleoapp.com/icons/social-media>

- ▶ Should email be included? What about something like Slack?

Social media: “online platforms that allow people to create and share information with others” (Kross et al. 2021)



<https://nucleoapp.com/icons/social-media>

- ▶ Should email be included? What about something like Slack?
- ▶ This category called “social media” includes lots of quite different things. Kross et al. say this leads to “jingle-jangle” problem.

Does the amount of time that people spend on social media impact their wellbeing?

First generation: cross-sectional evidence.

- ▶ Inconsistent results. Some find positive, some find negative.
- ▶ Perhaps differences are attributed to different platforms or different groups of people?

Does the amount of time that people spend on social media impact their wellbeing?

First generation: cross-sectional evidence.

- ▶ Inconsistent results. Some find positive, some find negative.
- ▶ Perhaps differences are attributed to different platforms or different groups of people?
- ▶ Questions about what is the cause and what is the effect.

Does the amount of time that people spend on social media impact their wellbeing?

First generation: cross-sectional evidence.

- ▶ Inconsistent results. Some find positive, some find negative.
- ▶ Perhaps differences are attributed to different platforms or different groups of people?
- ▶ Questions about what is the cause and what is the effect.
- ▶ Questions about unmeasured confounders (e.g., unemployment)

Does the amount of time that people spend on social media impact their wellbeing?

First generation: cross-sectional evidence.

- ▶ Inconsistent results. Some find positive, some find negative.
- ▶ Perhaps differences are attributed to different platforms or different groups of people?
- ▶ Questions about what is the cause and what is the effect.
- ▶ Questions about unmeasured confounders (e.g., unemployment)

Does the amount of time that people spend on social media impact their wellbeing?  
Second generation: longitudinal design, experience sampling

Does the amount of time that people spend on social media impact their wellbeing?  
Second generation: longitudinal design, experience sampling

- ▶ Inconsistent results.

Does the amount of time that people spend on social media impact their wellbeing?

Second generation: longitudinal design, experience sampling

- ▶ Inconsistent results.
- ▶ Perhaps because of different operationalizations and poor accuracy of self-reported social media usage

Does the amount of time that people spend on social media impact their wellbeing?

Third generation: experimental

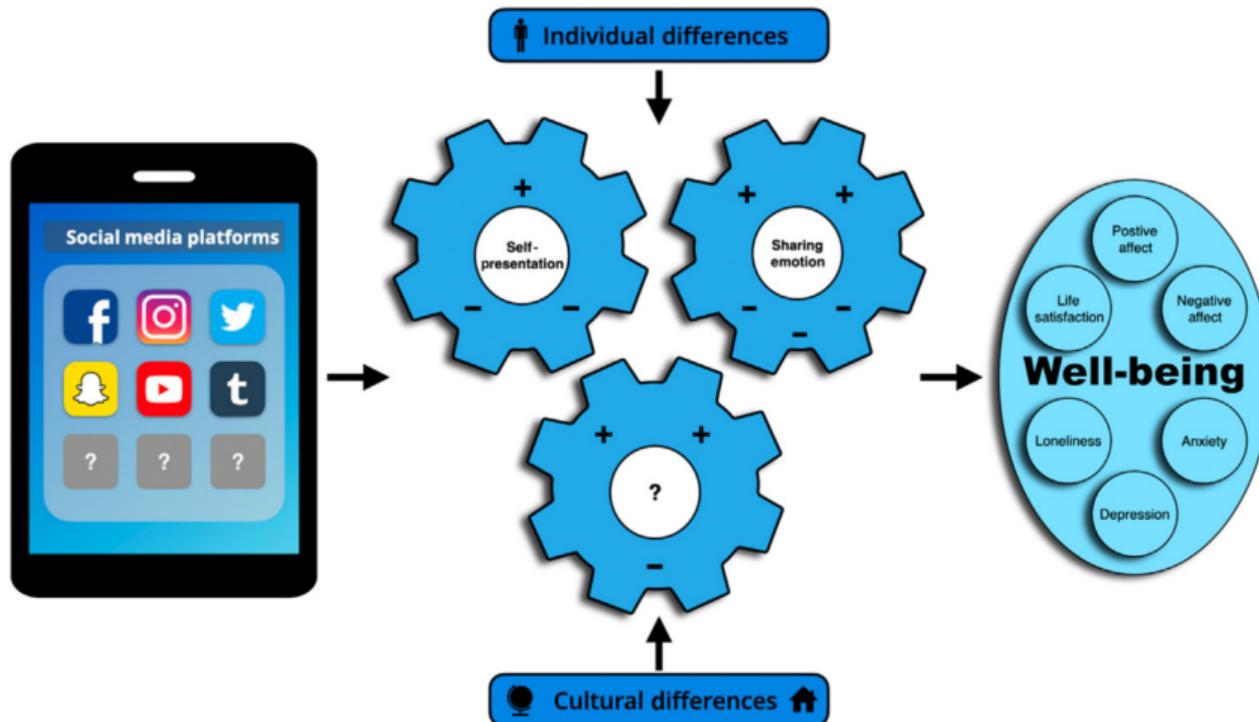
- ▶ Allcott et al.

Does the amount of time that people spend on social media impact their wellbeing?

Third generation: experimental

- ▶ Allcott et al.
- ▶ Findings are still mixed perhaps because different operationalizations and settings

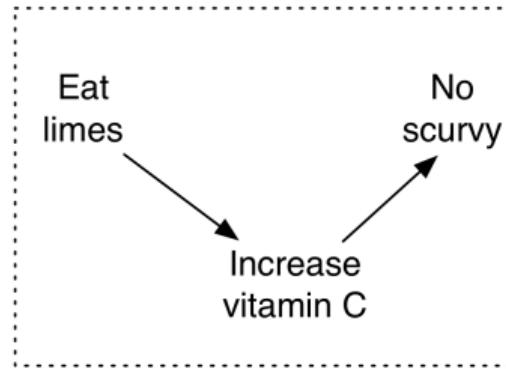
# How Does Social Media Impact Well-Being?



From what to how



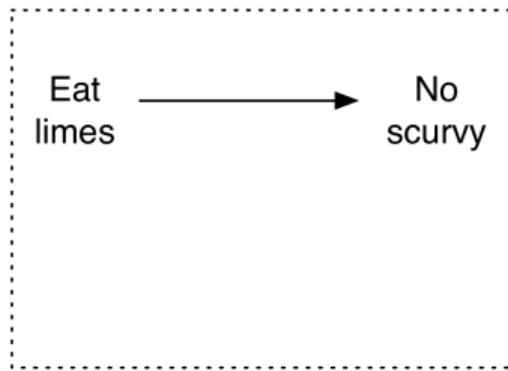
Causal effect  
without mechanism



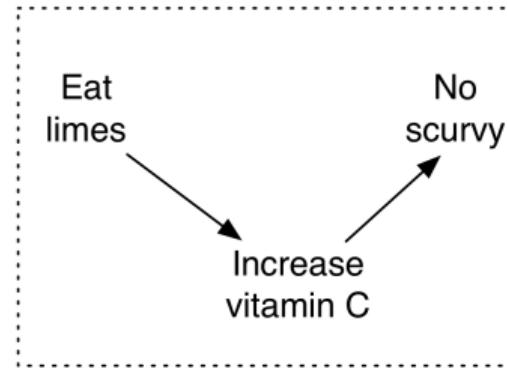
Causal effect  
with mechanism

- ▶ As you will see in Allcott et al. the what questions are easier than the how questions

From what to how



Causal effect  
without mechanism



Causal effect  
with mechanism

- ▶ As you will see in Allcott et al. the what questions are easier than the how questions
- ▶ You should think about this as you design your own self-experiment

What is the effect of Facebook on its users?



Facebook has 1.84 billion *daily* active users. What is the effect of Facebook on its users?

[https://investor.fb.com/investor-news/press-release-details/2021/  
Facebook-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx](https://investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx)

- ▶ We could compare Facebook users to non-Facebook users, but there might be lots of other differences.

- ▶ We could compare Facebook users to non-Facebook users, but there might be lots of other differences.
- ▶ Among Facebook users, we could compare “light” users to “heavy” users, but again there might be lots of other differences.

Allcott et al. run an randomized control trial (an “experiment”).



Stanford/NYU Research Study

Sponsored ·

Participate in online research study about Internet browsing and earn an easy \$30 in electronic gift cards!



STANFORDUNIVERSITY.QUALTRICS.COM

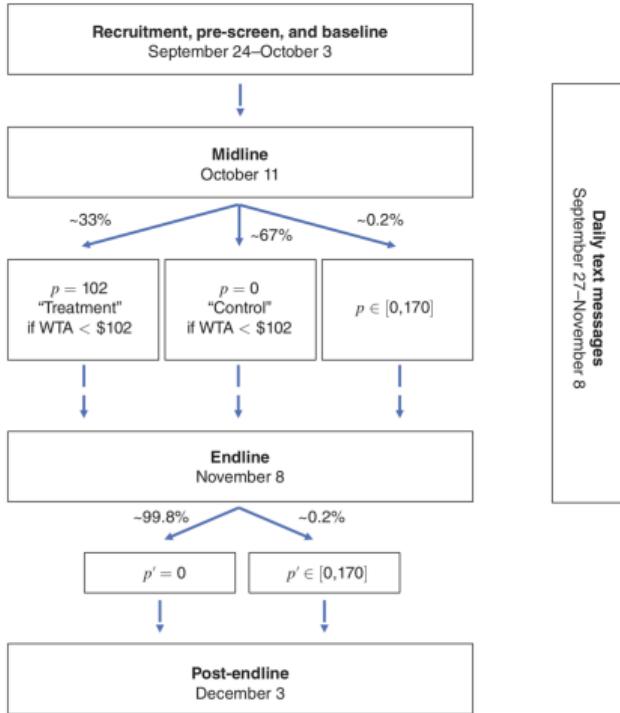
**Earn an easy \$30 by participating in online  
study**

[Learn More](#)

Like

Comment

Share



Design means that the collection of people in the treatment group are the same as people in the control group.

Thinking about external validity: who is in the experiment?

## Thinking about external validity: who is in the experiment?

TABLE 2—SAMPLE DEMOGRAPHICS

	Impact evaluation sample (1)	Facebook users (2)	US population (3)
Income under \$50,000	0.40	0.41	0.42
College	0.51	0.33	0.29
Male	0.43	0.44	0.49
White	0.68	0.73	0.74
Age under 30	0.52	0.26	0.21
Republican	0.13		0.26
Democrat	0.42		0.20
Facebook minutes	74.52	45.00	

- ▶ impact evaluation sample is younger, more educated, and uses Facebook more
- ▶ note that this experiment might not include the youngest users who might be most harmed by Facebook

Thinking about internal validity: was their differential compliance or attrition?

## Thinking about internal validity: was their differential compliance or attrition?

TABLE 3—SURVEY RESPONSE AND TREATMENT COMPLIANCE RATES

Variable	Treatment mean/SD (1)	Control mean/SD (2)	<i>t</i> -test <i>p</i> -value (1) – (2)
Completed endline survey	0.99 (0.11)	0.98 (0.12)	0.54
Share of text messages completed	0.92 (0.20)	0.93 (0.18)	0.45
Completed post-endline survey	0.95 (0.23)	0.92 (0.26)	0.07
Share days deactivated	0.90 (0.29)	0.02 (0.13)	0.00
Observations	580	1,081	

- ▶ compliance was high and there was little attrition

### **III. Empirical Strategy**

#### *A. Pre-Analysis Plan*

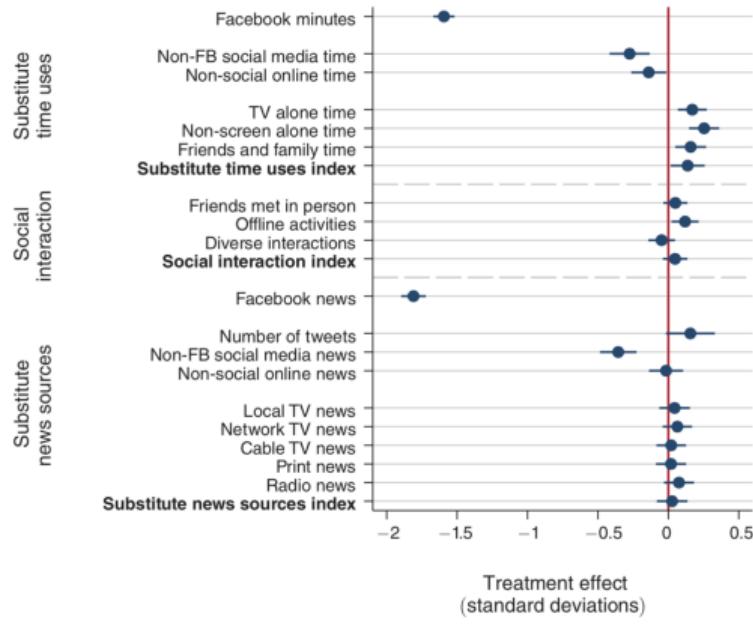
We submitted our pre-analysis plan on October 12, as this was the final day before the Treatment and Control groups could have begun to differ. We submitted a slightly updated pre-analysis plan on November 7, the day before endline, with only one substantive change: on the basis of data on reasons for non-compliance described above, we specified that our primary specifications would use IV estimates instead of intent-to-treat estimates. The pre-analysis plan specified three things. First, it specified the outcome variables and families of outcome variables

Nine families of outcome variables, focus on politics (perhaps because experiment was right before an election)

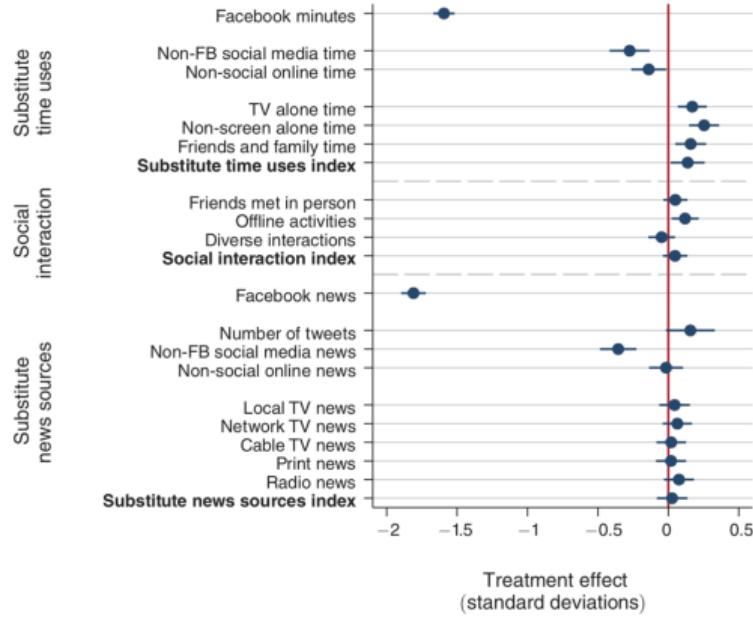
- ▶ Substitute Time Uses
- ▶ Social Interaction
- ▶ Substitute News Sources
- ▶ News Knowledge
- ▶ Political Engagement
- ▶ Political Polarization
- ▶ Subjective Well-Being
- ▶ Post-Experiment Facebook Use
- ▶ Opinions about Facebook

- ▶ Endpoint
  - ▶ Substitution
  - ▶ Well-being
  - ▶ News and politics
- ▶ Post-deactivation

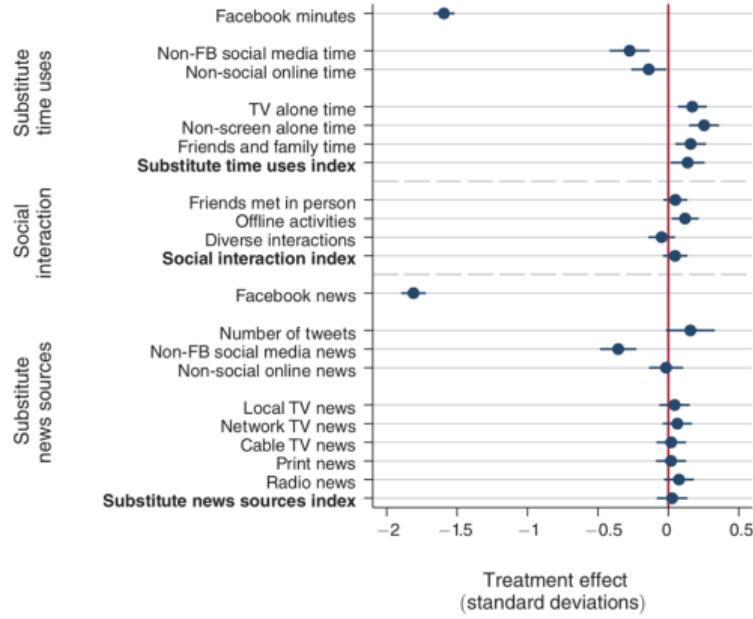
- ▶ Endpoint
  - ▶ Substitution
  - ▶ Well-being
  - ▶ News and politics
- ▶ Post-deactivation



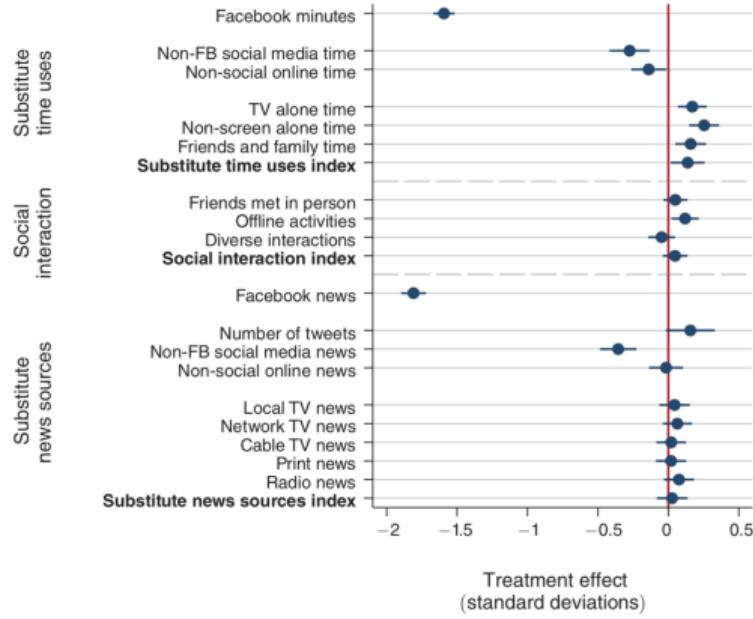
- reduced time on FB



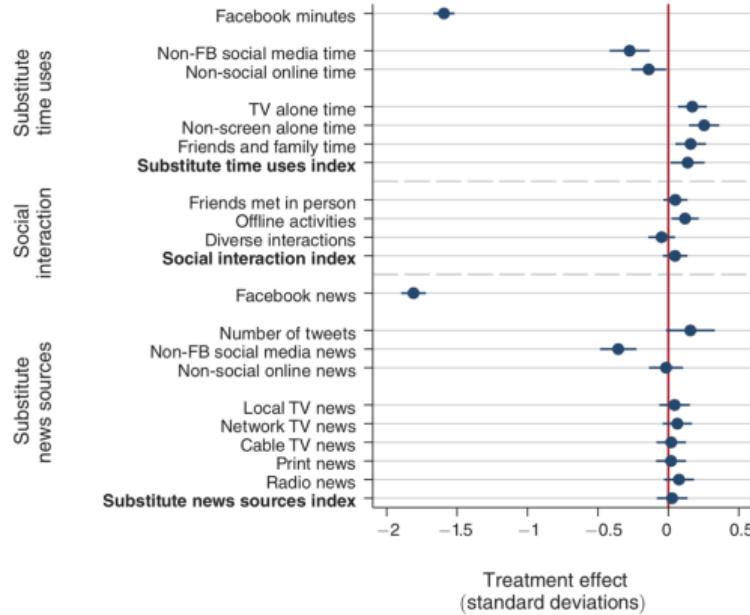
- ▶ reduced time on FB
- ▶ slightly reduced time on other social media



- ▶ reduced time on FB
- ▶ slightly reduced time on other social media
- ▶ slightly more time with offline activities



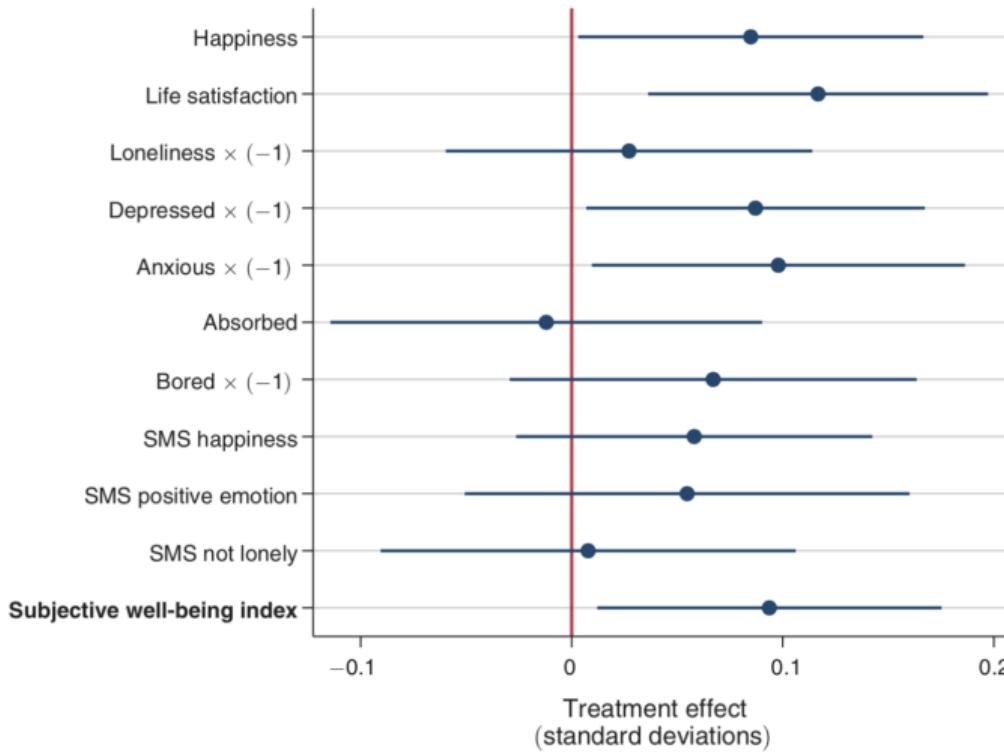
- ▶ reduced time on FB
- ▶ slightly reduced time on other social media
- ▶ slightly more time with offline activities
- ▶ didn't impact non-social media source of news



- ▶ reduced time on FB
- ▶ slightly reduced time on other social media
- ▶ slightly more time with offline activities
- ▶ didn't impact non-social media source of news

All of these are measured in terms of standard deviation units in the control group

- ▶ Endpoint
  - ▶ Substitution
  - ▶ Well-being
  - ▶ News and politics
- ▶ Post-deactivation



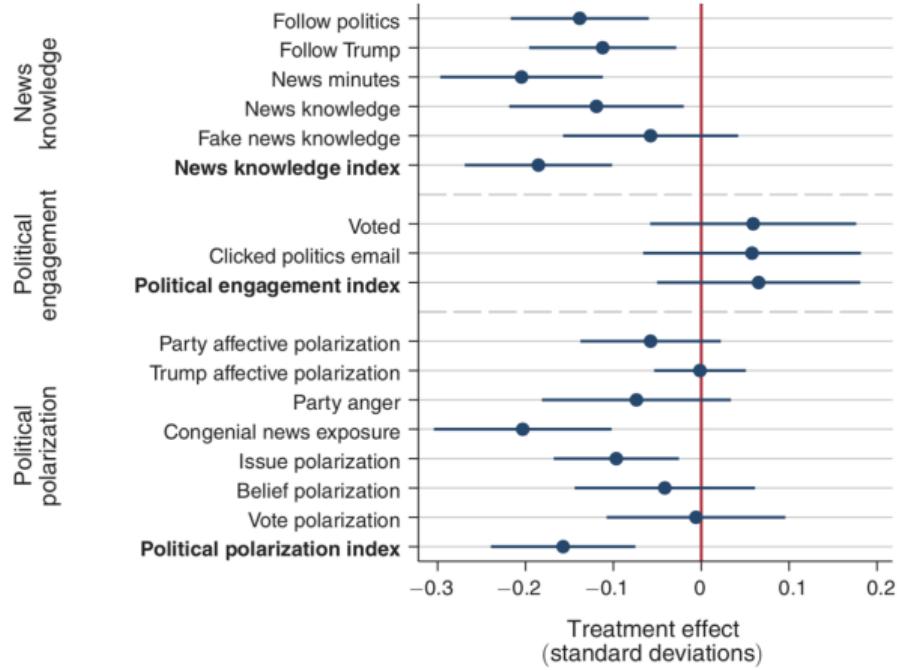
- ▶ “small” improvements in most measures

Are these subjective well-being effects large or small? As one benchmark, we can consider the effect sizes in their original units, focusing on the measures with the largest effects. *Happiness* is the average response to two questions (for example, “Over the last 4 weeks, I think I was …”) on a scale from 1 (not a very happy person) to 7 (a very happy person). The Control group endline average is 4.47 out of a possible 7, and deactivation caused an average increase of 0.12. *Life satisfaction*

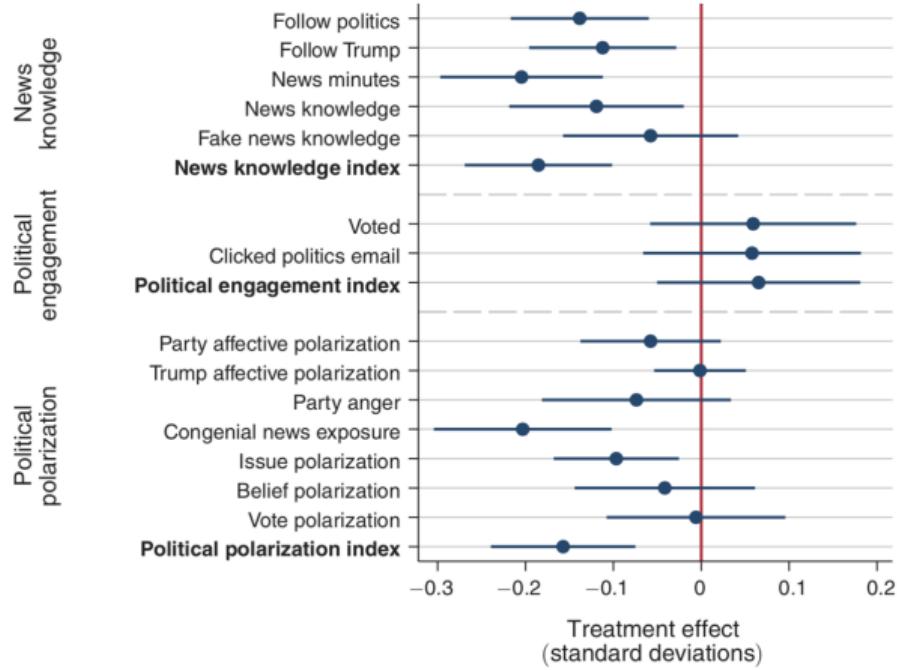
As a second benchmark, a meta-analysis of 39 randomized evaluations finds that positive psychology interventions (i.e., self-help therapy, group training, and individual therapy) improve subjective well-being (excluding depression) by 0.34 standard deviations and reduce depression by 0.23 standard deviations (Bolier et al. 2013). Thus, deactivating Facebook increased our subjective well-being index by about 25–40 percent as much as standard psychological interventions.

*I was way less stressed. I wasn't attached to my phone as much as I was before. And I found I didn't really care so much about things that were happening [online] because I was more focused on my own life ... I felt more content. I think I was in a better mood generally. I thought I would miss seeing everyone's day-to-day activities ... I really didn't miss it at all.*

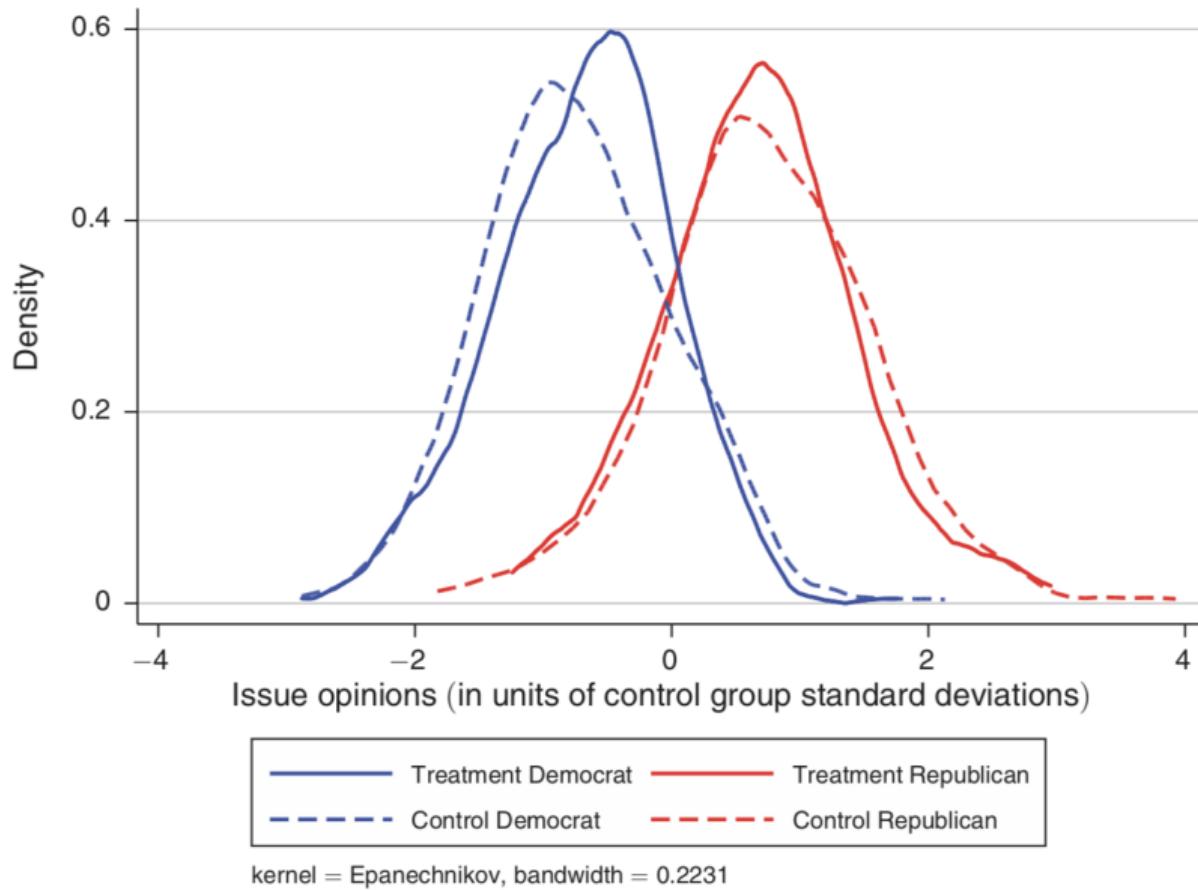
- ▶ Endpoint
  - ▶ Substitution
  - ▶ Well-being
  - ▶ News and politics
- ▶ Post-deactivation



- less news knowledge

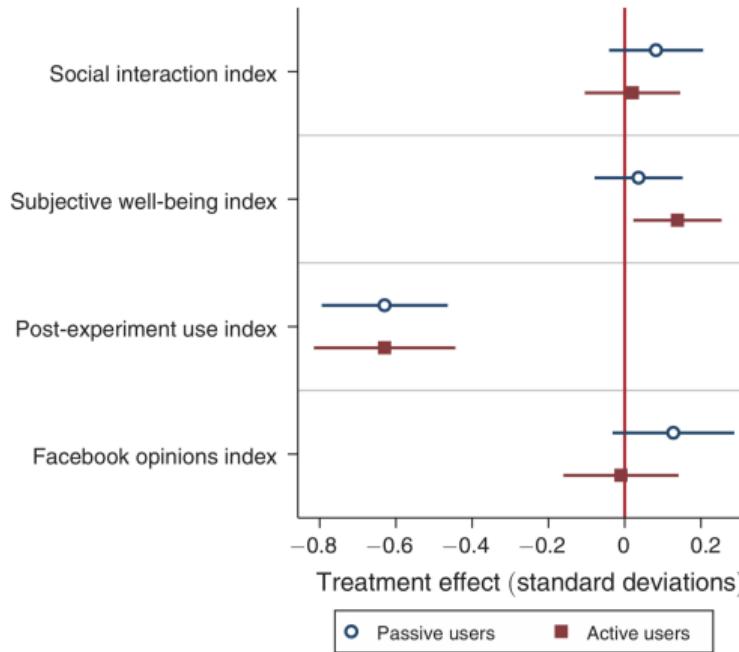


- ▶ less news knowledge
- ▶ less political polarization



Heterogenous treatment effects: are the treatment effects the same for everyone?

## Heterogenous treatment effects: are the treatment effects the same for everyone?



- ▶ Effects are similar for active and passive users

Can't learn about heterogeneity from self-experimentation

## *F. Experimenter Demand Effects*

Most of our outcomes are self-reported, and it would have been difficult to further conceal the intent of the randomized experiment. This raises the possibility of experimenter demand effects, i.e., that survey responses depend on what participants think the researchers want them to say. To test for demand effects, the endline survey asked, “Do you think the researchers in this study had an agenda?” Table 5 presents the possible responses and shares by treatment group.

## *F. Experimenter Demand Effects*

Most of our outcomes are self-reported, and it would have been difficult to further conceal the intent of the randomized experiment. This raises the possibility of experimenter demand effects, i.e., that survey responses depend on what participants think the researchers want them to say. To test for demand effects, the endline survey asked, “Do you think the researchers in this study had an agenda?” Table 5 presents the possible responses and shares by treatment group.

- ▶ double-blind experiments

## *F. Experimenter Demand Effects*

Most of our outcomes are self-reported, and it would have been difficult to further conceal the intent of the randomized experiment. This raises the possibility of experimenter demand effects, i.e., that survey responses depend on what participants think the researchers want them to say. To test for demand effects, the endline survey asked, “Do you think the researchers in this study had an agenda?” Table 5 presents the possible responses and shares by treatment group.

- ▶ double-blind experiments
- ▶ single-blind experiments

## *F. Experimenter Demand Effects*

Most of our outcomes are self-reported, and it would have been difficult to further conceal the intent of the randomized experiment. This raises the possibility of experimenter demand effects, i.e., that survey responses depend on what participants think the researchers want them to say. To test for demand effects, the endline survey asked, “Do you think the researchers in this study had an agenda?” Table 5 presents the possible responses and shares by treatment group.

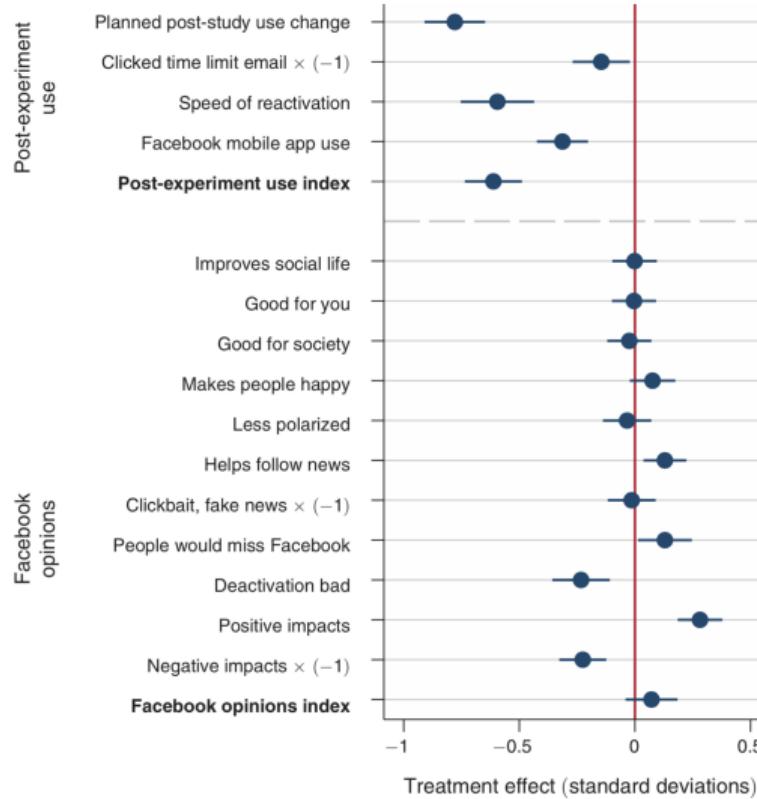
- ▶ double-blind experiments
- ▶ single-blind experiments
- ▶ unblinded experiments

## *F. Experimenter Demand Effects*

Most of our outcomes are self-reported, and it would have been difficult to further conceal the intent of the randomized experiment. This raises the possibility of experimenter demand effects, i.e., that survey responses depend on what participants think the researchers want them to say. To test for demand effects, the endline survey asked, “Do you think the researchers in this study had an agenda?” Table 5 presents the possible responses and shares by treatment group.

- ▶ double-blind experiments
- ▶ single-blind experiments
- ▶ unblinded experiments
- ▶ self experiments

- ▶ Endpoint
  - ▶ Substitution
  - ▶ Well-being
  - ▶ News and politics
- ▶ Post-deactivation



- ▶ wanting to use FB less in the future (about 20% reduction in time used)
- ▶ more awareness of the good and bad aspects of FB

## Mindfully Scrolling: Rethinking Facebook After Time Deactivated

Nancy K. Baym<sup>1</sup>, Kelly B. Wagman<sup>2</sup>,  
and Christopher J. Persaud<sup>3</sup>

Social Media + Society  
April-June 2020: 1–10  
© The Author(s) 2020  
Article reuse guidelines:  
[sagepub.com/journals-permissions](http://sagepub.com/journals-permissions)  
DOI: [10.1177/2056305120919105](https://doi.org/10.1177/2056305120919105)  
[journals.sagepub.com/home/sms](http://journals.sagepub.com/home/sms)



Baym et al. describe changes in two areas:

- ▶ Awareness:
- ▶ Behavior:

Baym et al. describe changes in two areas:

- ▶ Awareness: Automaticity, FB's value
- ▶ Behavior:

Baym et al. describe changes in two areas:

- ▶ Awareness: Automaticity, FB's value
- ▶ Behavior: Tweaking settings to avoid certain things, not structural reform

In Facebook's case, the ecological definition offered by Lindenmayer et al. (2011, p. 15887), may be a more apt metaphor. They define a **landscape trap** as

that wherein entire landscapes are shifted into a state in which major functional and ecological attributes are compromised. These shifts in a landscape lead to feedback processes that either maintain an ecosystem in a compromised state or push it into a further regime shift in which an entirely new type of vegetation cover develops. Landscape traps are large-scale ecological phenomena that arise through a combination of altered spatial characteristics of a landscape coupled with synergistic interactions among multiple human and natural disturbances. Thus, changes in the frequency and spatial contagion of large-scale disturbances are the key interacting factors driving entire landscapes into an undesirable and potentially irreversible state (i.e., landscape trap).

- ▶ The landscape has shifted because of both intentional and unintentional action

In Facebook's case, the ecological definition offered by Lindenmayer et al. (2011, p. 15887), may be a more apt metaphor. They define a **landscape trap** as

that wherein entire landscapes are shifted into a state in which major functional and ecological attributes are compromised. These shifts in a landscape lead to feedback processes that either maintain an ecosystem in a compromised state or push it into a further regime shift in which an entirely new type of vegetation cover develops. Landscape traps are large-scale ecological phenomena that arise through a combination of altered spatial characteristics of a landscape coupled with synergistic interactions among multiple human and natural disturbances. Thus, changes in the frequency and spatial contagion of large-scale disturbances are the key interacting factors driving entire landscapes into an undesirable and potentially irreversible state (i.e., landscape trap).

- ▶ The landscape has shifted because of both intentional and unintentional action
- ▶ There is an important difference between one person deactivating FB and everyone deactivating FB

Stepping back:

- ▶ Measuring and understanding the effect of social media on individuals is hard, in part because jingle-jangle problem and heterogeneity of social media and people

Stepping back:

- ▶ Measuring and understanding the effect of social media on individuals is hard, in part because jingle-jangle problem and heterogeneity of social media and people
- ▶ Allcott et al. do a randomized controlled trial to measure the effect of FB on a sample of American users

Stepping back:

- ▶ Measuring and understanding the effect of social media on individuals is hard, in part because jingle-jangle problem and heterogeneity of social media and people
- ▶ Allcott et al. do a randomized controlled trial to measure the effect of FB on a sample of American users
- ▶ Being off FB for one month leads to 1) reduced online activity and increased offline activity 2) reduced factual news knowledge and political polarization 3) increased subjective well-being and 4) caused a large persistent reduction in post-experiment Facebook use

Stepping back:

- ▶ Measuring and understanding the effect of social media on individuals is hard, in part because jingle-jangle problem and heterogeneity of social media and people
- ▶ Allcott et al. do a randomized controlled trial to measure the effect of FB on a sample of American users
- ▶ Being off FB for one month leads to 1) reduced online activity and increased offline activity 2) reduced factual news knowledge and political polarization 3) increased subjective well-being and 4) caused a large persistent reduction in post-experiment Facebook use
- ▶ Being off FB for one month also leads to new awareness about the good and bad aspects of FB

Now it is your turn: self-experimentation and social media

## Self-experimentation and social media

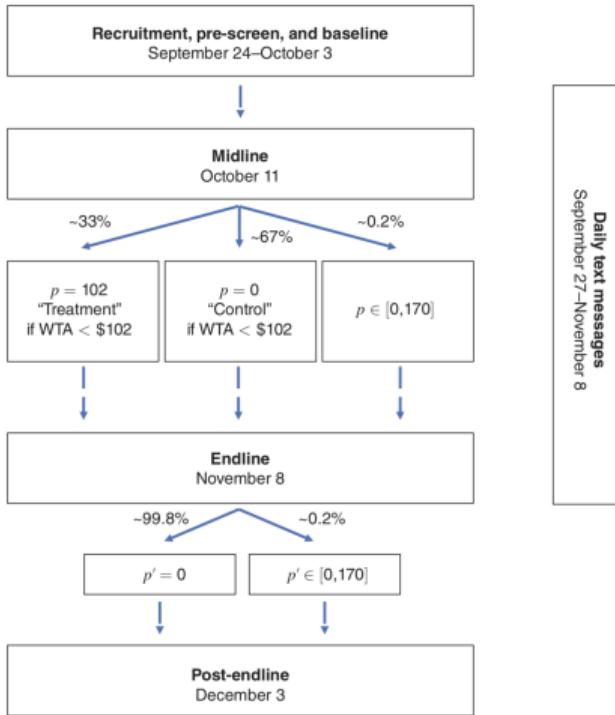
- ▶ Assignment 7: Design your intervention

## Self-experimentation and social media

- ▶ Assignment 7: Design your intervention
- ▶ Assignment 8: Conduct and analyze your intervention

## Self-experimentation and social media

- ▶ Assignment 7: Design your intervention
- ▶ Assignment 8: Conduct and analyze your intervention
- ▶ Assignment 9: Observe your post-experiment behavior and reflect on your results



Daily text messages  
September 27–November 8

# Surprises From Self-Experimentation: Sleep, Mood, and Weight

Seth Roberts

## A few notes on self-experimentation

- ▶ Long history in medicine: [https://en.wikipedia.org/wiki/Self-experimentation\\_in\\_medicine](https://en.wikipedia.org/wiki/Self-experimentation_in_medicine)

## A few notes on self-experimentation

- ▶ Long history in medicine: [https://en.wikipedia.org/wiki/Self-experimentation\\_in\\_medicine](https://en.wikipedia.org/wiki/Self-experimentation_in_medicine)
- ▶ Not blinded

## A few notes on self-experimentation

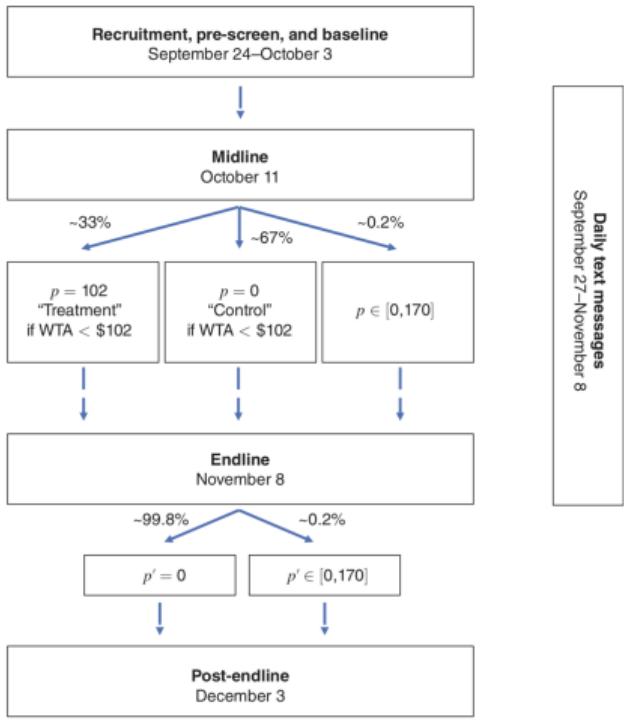
- ▶ Long history in medicine: [https://en.wikipedia.org/wiki/Self-experimentation\\_in\\_medicine](https://en.wikipedia.org/wiki/Self-experimentation_in_medicine)
- ▶ Not blinded
- ▶ Can't learn about heterogeneity across people

## A few notes on self-experimentation

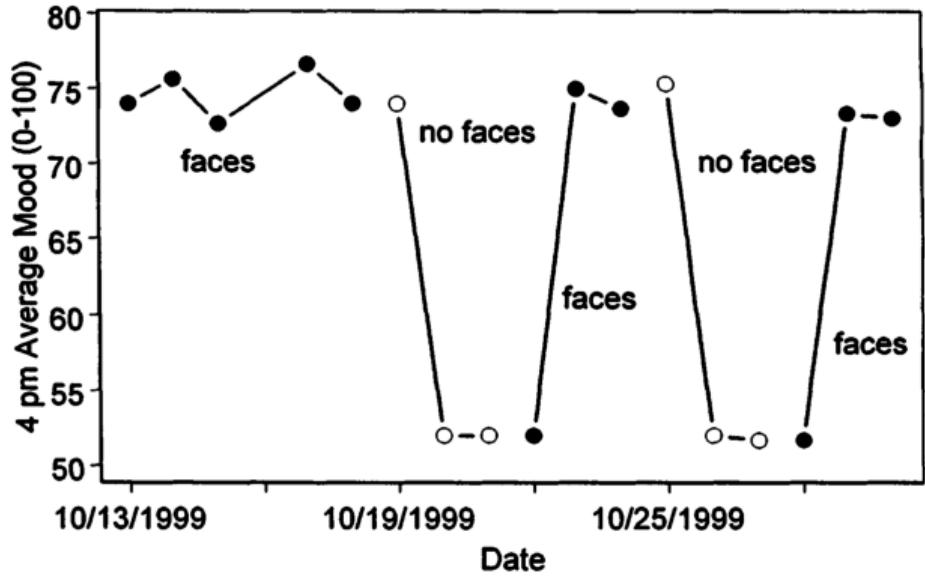
- ▶ Long history in medicine: [https://en.wikipedia.org/wiki/Self-experimentation\\_in\\_medicine](https://en.wikipedia.org/wiki/Self-experimentation_in_medicine)
- ▶ Not blinded
- ▶ Can't learn about heterogeneity across people
- ▶ Can learn about unexpected outcomes

## A few notes on self-experimentation

- ▶ Long history in medicine: [https://en.wikipedia.org/wiki/Self-experimentation\\_in\\_medicine](https://en.wikipedia.org/wiki/Self-experimentation_in_medicine)
- ▶ Not blinded
- ▶ Can't learn about heterogeneity across people
- ▶ Can learn about unexpected outcomes
- ▶ Can iterate quickly



Daily text messages  
September 27–November 8



You will be your own control group ("within-subjects design")

A few notes about this assignment:

- ▶ Choose an interesting and important intervention. Best ones will likely be either motivated by science or wellbeing.

A few notes about this assignment:

- ▶ Choose an interesting and important intervention. Best ones will likely be either motivated by science or wellbeing.
- ▶ Have realistic expectations about what is feasible in a class assignment.

A few notes about this assignment:

- ▶ Choose an interesting and important intervention. Best ones will likely be either motivated by science or wellbeing.
- ▶ Have realistic expectations about what is feasible in a class assignment.
- ▶ You can stop your self-experimentation at any time, in fact you don't have to start.

A few notes about this assignment:

- ▶ Choose an interesting and important intervention. Best ones will likely be either motivated by science or wellbeing.
- ▶ Have realistic expectations about what is feasible in a class assignment.
- ▶ You can stop your self-experimentation at any time, in fact you don't have to start.
- ▶ If this assignment causes problems, come talk to us or University Health Services.

We look forward to seeing what you come up with

## Next class

- ▶ Crokett, M.J. (2017). Moral outrage in the digital age. *Nature Human Behavior*.
- ▶ Brady, W.J. et al. (2021). How social learning amplifies moral outrage expression in online social networks. *Working paper*.
- ▶ Aral, S. (2018). How lies spread online. *New York Times*.
- ▶ Vosoughi, S. et al. (2018). The spread of true and false news online. *Science*.
- ▶ Lazer, D. (2015). The rise of the social algorithm. *Science*.
- ▶ Bakshy, E., Messing, S., and Adamic, L.A. (2015) Exposure to ideologically diverse news and opinion on Facebook. *Science*.