

Online Appendix: Not for Publication

The Welfare Effects of Social Media

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Table A1: Literature: Randomized Impact Evaluations of Facebook

Paper	N	Population	Intervention	Length	Enforcement	Outcomes	PAP
Gonzales and Hancock (2011)	63	College	Look at profile vs. mirror	3 minutes	None	Self-esteem	No
Deters and Mehl (2012)	86	College	Post more status updates	1 week	Scrape profile*	SWB	No
Mabe, Forney, and Keel (2014)	84	College women	Browse Facebook vs. research ocelots	20 minutes	None	Eating disorder risk	No
Sagioglu and Greitemeyer (2014)	263	MTurk	Browse Facebook	20 minutes	None	SWB	No
Fardouly and Vartanian (2015)	112	College women	Browse Facebook vs. other website	10 minutes	None	Body image, mood	No
Verduyn et al. (2015)	84	College	Active vs. passive use	10 minutes	Screen monitoring*	SWB	No
Theocharis and Lowe (2016)	197	Greek, without accounts	Sign up	6 months	Payment sent to Facebook account*	Voting, civic engagement	No
Tromholt (2016)	886**	Danish	Not log in	1 week	Self-report	SWB	No
Marotta and Acquisti (2017)	455	MTurk	Block Facebook and YouTube during work hours	2 weeks	Install blocking software	Work productivity	No
Hunt et al. (2018)	111	College	Limit social media to 10 minutes/day	4 weeks	Weekly time use screen shots	SWB	No
Vanman, Baker, and Tobin (2018)	123	Australian	Not use Facebook	5 days	None	Stress, SWB	No
Mosquera et al. (2018)	151 [†]	College	Not log in	1 week	Check “last active”	News, SWB, WTA***	No
Allcott, Braghieri, Eichmeyer, and Gentzkow (2018)	1,639	US Facebook ads	Deactivate	4 weeks	Check URLs	News, voting, polarization, SWB, WTA, WTA changes	Yes

Notes: “N” is the number of people in the main empirical analysis, after attrition. [†]1,765 people began this study, but 151 people were randomized and completed the endline survey. *Instead of analyzing as a randomized encouragement design, these studies dropped participants who did not comply with the treatment conditions. **This study had an 12 percent attrition rate in treatment and a 26 percent attrition rate in control. ***This study elicited WTA to participate in the experiment, which involved a 50 percent chance of Facebook deactivation plus completing a survey, and a 50 percent chance of only completing a survey.

A Experimental Design Appendix

Figure A1: Facebook Advertisement Used for Recruitment

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Figure A2: **Post-Endline Social Media Time Limit Email**

**Stanford
University**

Dear ,

Thank you for participating in our study about Facebook use!

With the end of the study, we wanted to provide resources that can help you manage the technology in your life. We know how difficult it can be to stay away from or limit the time you spend on social media and other technologies.

There are tools that can help you track and limit your social media usage on your smartphone. If you would like to learn about them, [click here](#) if you have an iPhone and [click here](#) if you have an Android device. If you would like further information about other ways to curb smartphone use, here is a TIME magazine article we hope you find useful:

[Learn more about ways to limit smartphone use](#)

Thanks again for your participation in the study, and we wish you all the best.

Sarah, Luca, Kelly, Hunt, Matt, and Raj

The Stanford Online Experience Research Study Research Team

Figure A3: **Post-Endline Politics Email**

The 2018 midterm elections are over, but you can still participate and make your voice heard in important national, state, and local issues. There are many ways you might make a difference in future elections.

If you support Democratic candidates you might:

- Volunteer to help Democratic candidates in your community [here](#).
- Sign a petition denouncing recent voter ID laws [here](#).

Donate to the Democratic Party to help prepare for future elections

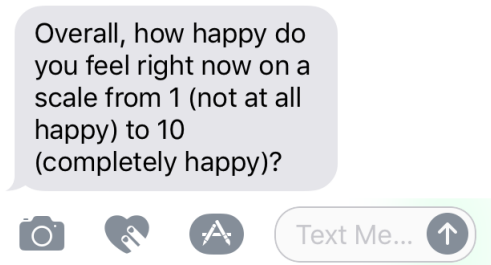
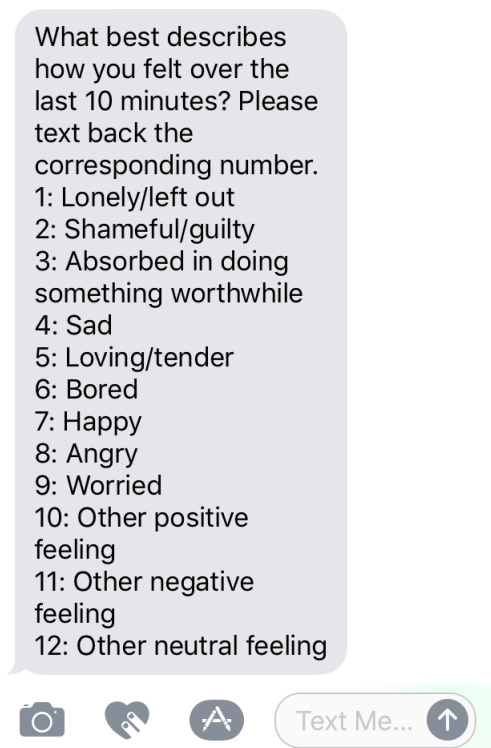
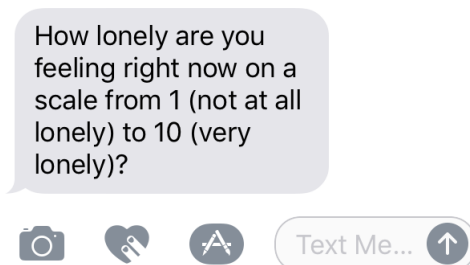
If you support Republican candidates you might:

- Volunteer to help Republican candidates in your community [here](#).
- Sign a petition to encourage people to stand for the National Anthem [here](#).

Donate to the Republican Party to help prepare for future elections

We hope you find these resources useful and engage with issues that matter to you.

The Stanford Online Experience Research Study Research Team

Figure A4: **Subjective Well-Being Text Messages**(a) **Happiness**(b) **Primary Emotion**(c) **Loneliness**

B Variable Definitions and Descriptive Statistics

B.1 Variable Definitions by Family

Variable name	Question text
<i>Substitute time uses</i>	
Facebook minutes	On an average day in the past 4 weeks, how many minutes would you say you spent on Facebook, including through the Facebook app on your phone? (<i>not included in substitute time uses index</i>)
(At baseline)	On an average day in the last 4 weeks, how much free time (i.e. excluding work) did you spend... [0 minutes, Between 1 and 30 minutes, Between 31 minutes and 1 hour, Between 1 and 2 hours, Between 2 and 3 hours, More than 3 hours]
(At endline)	In the last 4 weeks, relative to what is typical for you, would you say you spent more or less of your free time (i.e. excluding work)... [A lot less, A little less, Same, A little more, A lot more]
Non-FB social media	...using social media apps other than Facebook?
Non-social online	...online (on your computer, tablet, smartphone, etc.) for things other than social media?
TV alone	...watching TV or movies by yourself?
Non-screen alone	...on non-screen activities (e.g. cooking, reading books, exercising – anything without an electronic screen in front of you) by yourself?
Friends and family	...doing anything with friends and family (in person)?
<i>Social interaction</i>	
Friends met in person	List the first names of as many of the friends you met in person last week that you can think of in 1 minute (if none, enter "none"). Separate the names using commas (",").
Offline activities	Which of the following activities did you do at least once last week? Check all that apply Go out for dinner Go to the cinema Talk to friends on the phone Go to a party Get together with friends Go to a shopping mall Spend time with your parents

	Spend time with your kids
Diverse interactions	Interact with someone who voted the opposite way as you in the last presidential election Interact with someone from another country

Substitute news sources

(At baseline)	Over the past four weeks, how often did you... [Never, Hardly Ever, Sometimes, Fairly Often, Very Often]
(At endline)	In the last 4 weeks, relative to what is typical for you, would you say you spent more or less time... [A lot less, A little less, Same, A little more, A lot more]
Facebook news	...get news from Facebook (<i>not included in substitute news sources index</i>)
Print news	...read any newspapers in print?
Radio news	...listen to the news on the radio?
Local TV news	...watch local television news?
Network TV news	...watch national evening network television news (such as ABC World News, CBS Evening News, or NBC Nightly News)?
Cable TV news	...watch cable television news (such as CNN, the Fox News cable channel, or MSNBC)?
Non-FB social media news	...get news from social media sites other than Facebook (e.g. Twitter or Snapchat)?
Non-social online news	...get news from news websites or apps other than social media?
Number of tweets	$\ln(1+\text{number of tweets in past four weeks})$

News knowledge

Follow politics	Thinking back over the last 4 weeks, how closely did you follow US politics? [Not at all closely, somewhat closely, rather closely, very closely]
Follow Trump	Thinking back over the last 4 weeks, how closely did you follow news about President Trump? [Not at all closely, somewhat closely, rather closely, very closely]
News minutes	On an average day of the last 4 weeks, how many minutes did you spend watching, reading or listening to the news (including news via social media)? [text box]
News knowledge	Of the following news events, which ones do you think are true, and which ones do you think are false? [True, False, Unsure]

<p>(At baseline)</p> <p><i>True statements</i></p>	<p>Tension in trade negotiations escalated between the United States and China, with President Trump announcing tariffs on \$200 billion worth of goods.</p> <p>An off-duty Dallas police officer entered the apartment of an African-American neighbor and shot and killed the unarmed neighbor.</p> <p>Deputy Attorney General Rod Rosenstein early in his tenure suggested secretly recording President Trump and recruiting cabinet members to remove him from office.</p> <p>The Trump administration set the maximum number of refugees that can enter the country in 2019 to 30,000.</p> <p>Michael Cohen, President Donald Trump's former personal attorney, agreed to cooperate with the Mueller investigation team and discuss Trump's business dealings with Russia.</p> <p>President Trump blasted Attorney General Jeff Sessions for the indictments of two lawmakers who supported Trump during the 2016 election.</p> <p>CBS chief executive Les Moonves resigned after multiple sexual misconduct allegations.</p>
<p><i>False statements</i></p>	<p>President Trump's former campaign chairman Paul Manafort refused deal to cooperate with the Mueller investigation team in exchange for legal charges against him being dropped.</p> <p>President Trump spoke at the funeral of former Arizona Senator John McCain, honoring the late McCain's wish.</p> <p>Hurricane Florence caused more than 300 deaths.</p>
<p>(At endline)</p> <p><i>True statements</i></p>	<p>A prominent Saudi Arabian journalist who was critical of the country's government was killed inside the Saudi Arabian consulate in Istanbul.</p> <p>In the weeks preceding the midterm elections, several high-profile Democrats, including Barack Obama and Hillary Clinton, were sent packages containing explosive devices.</p> <p>A mass shooting fueled by anti-Semitic sentiment took place in a synagogue in Pittsburgh.</p> <p>President Trump announced he plans to sign an executive order to prevent second-generation immigrants born in the United States from automatically being granted US citizenship.</p> <p>The Department of Justice charged a Russian national allegedly involved in a wide-ranging online disinformation campaign aimed at influencing the Midterm elections.</p> <p>One of the women who made allegations against Supreme Court Justice Brett Kavanaugh has admitted to investigators that the allegations were fabricated.</p>

<i>False statements</i>	<p>Attorney General Jeff Sessions resigned at President Trump's request.</p> <p>Harvard University recently stood trial for allegedly discriminating against African-American applicants in its admission process.</p> <p>Far-right candidate Jair Bolsonaro recently won an election to become the President of Argentina.</p> <p>Senator Elizabeth Warren's DNA test results show that she has no native American ancestry.</p>
<p>Fake news knowledge (At baseline)</p>	<p>After researcher Dr. Christine Blasey Ford accused Supreme Court nominee Brett Kavanaugh of sexual assault, it is revealed that Kavanaugh's mother once ruled against Dr. Blasey Ford's parents in a foreclosure case.</p> <p>CNN's Anderson Cooper reported deceptively on Hurricane Florence, standing in a ditch to create the misleading impression that he was filming amidst waist-deep floodwaters.</p> <p>Mayor Carmen Yulín Cruz of San Juan was arrested for misappropriating \$3 million in disaster relief funds intended for the victims of Hurricane Maria in Puerto Rico.</p> <p>Clerk refused to sell gas to a man fleeing hurricane Florence over a Trump bumper sticker.</p> <p>WikiLeaks released an email showing that Hillary Clinton's presidential campaign bribed prominent Republicans to oppose Donald Trump during the 2016 election.</p>
(At endline)	<p>Billionaire George Soros was revealed to be one of the funders of a caravan of Central American emigrants traveling through Mexico to the US border.</p> <p>A Russian feminist activist poured bleach on men who were "manspreading" on the train ("manspreading" refers to men sitting in public transport with legs wide apart, thereby covering more than one seat).</p> <p>In a recent vote, all Democrats in Congress voted against a 2.8% cost of living allowance in Social Security benefits.</p> <p>Cesar Sayoc, suspect in an act of domestic terrorism directed at vocal critics of President Trump, was a registered Democrat.</p> <p>None of the 154 mass shootings in 2018 was committed by a black man, illegal alien, or woman.</p>

Political engagement

Voted	Takes value 1 if recorded as having voted in 2018 midterm, and 0 otherwise
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Clicked politics email	Takes value 1 if clicked on any link in the post-endline politics email, and 0 otherwise
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Political polarization

Party affective polarization	Thinking back over the last 4 weeks, how warm or cold did you feel towards the parties and the president on the feeling thermometer?
Trump affective polarization	Thinking back over the last 4 weeks, how warm or cold did you feel towards the parties and the president on the feeling thermometer?
Party anger	List as many recent (last 4 weeks) news events you can think of that made you angry at the [Republican/Democratic] Party. (If more than 5, just list those 5 that left you most angry. If less than 5, list less. If none, enter "none" in the first textbox.)
Other party understanding × (-1)	Thinking back over the last 4 weeks, how often did you see news that made you better understand the point of view of the Republican Party? [Never, Once, Two or three times, Four times or more] Thinking back over the last 4 weeks, how often did you see news that made you better understand the point of view of the Democratic Party? [Never, Once, Two or three times, Four times or more]
Issue polarization	To what extent do you think that free trade agreements between the US and other countries have been a good thing or a bad thing for the United States? (Pew Research Center 2018b) Overall, would you say that blacks or whites are treated more fairly in dealing with the police? (Pew Research Center 2016) Do you think that employers firing men who have been accused of sexual harassment or assault before finding out all the facts is a major or a minor problem? (Pew Research Center 2018d) As you may know, Brett Kavanaugh is a federal judge who has been nominated to serve on the Supreme Court. Would you like to see the Senate vote in favor of Kavanaugh serving on the Supreme Court, or not? (Gallup 2018b) On the whole, do you think immigration is a good thing or a bad thing for this country today? (Pew Research Center 2018e) How confident, if at all, are you that the Justice Department special counsel Robert Mueller will conduct a fair investigation into Russian involvement in the 2016 election? (Pew Research Center 2018c) In general, do you feel that the laws covering the sale of firearms should be made less strict, more strict, or kept as they are now? (Gallup 2018c)

In presenting the news dealing with political and social issues, do you think that news organizations deal fairly with all sides, or do they tend to favor one side? (Pew Research Center 2017)

To what extent do you think President Trump is honest and trustworthy? (Gallup 2018a)

Belief polarization	Level of agreement with co-partisans on beliefs questions
Vote polarization	Strength of generic ballot preference for co-partisan candidate (see Voted Republican question)

Subjective well-being

Happiness	Over the last 4 weeks, I think I was [1 (not a very happy person) ... 7 (a very happy person)] Over the last 4 weeks, compared to most of my peers, I think I was [1 (less happy) ... 7 (more happy)]
Life satisfaction	Below are three statements that you may agree or disagree with. Indicate your agreement with each item and please be open and honest in your responding. [Strongly disagree, Disagree, Slightly disagree, Neither agree nor disagree, Slightly agree, Agree, Strongly agree] In most ways my life during the past 4 weeks was close to ideal. The conditions of my life during the past 4 weeks were excellent. During the past 4 weeks, I was satisfied with my life.
Loneliness \times (-1)	How often did you feel that you lacked companionship over the past four weeks [Hardly ever, Some of the time, Often] How often did you feel left out over the past four weeks [Hardly ever, Some of the time, Often] How often did you feel isolated from others over the past four weeks [Hardly ever, Some of the time, Often]
Depressed \times (-1)	Below are some ways you might have felt or behaved in the past 4 weeks. Please tell us how much of the time during the past 4 weeks: [1 None or almost none of the time, 2, 3, 4 All or almost all of the time] ... you felt depressed.
Anxious \times (-1)	... you felt anxious.
Absorbed	... you were absorbed in doing something worthwhile.
Bored \times (-1)	... you felt bored.
SMS happiness	Overall, how happy do you feel right now on a scale from 1 (not at all happy) to 10 (completely happy)?

SMS positive emotion	What best describes how you felt over the last 10 minutes? Please text back the corresponding number. [1: Lonely/left out 2: Shameful/guilty 3: Absorbed in doing something worthwhile 4: Sad 5: Loving/tender 6: Bored 7: Happy 8: Angry 9: Worried 10: Other positive feeling 11: Other negative feeling 12: Other neutral feeling
SMS not lonely	How lonely are you feeling right now on a scale from 1 (not at all lonely) to 10 (very lonely)?

Post-experiment use

Planned post-study use change	After going through this study, how much more or less time do you plan to spend on Facebook compared to before you started the study?
Clicked time limit email $\times (-1)$	Takes value 1 if clicked on any link in the post-endline social media time limit email, and 0 otherwise
Speed of reactivation	$(-1) \times \ln(1 + \text{number of days deactivated after 24-hour post-endline deactivation period})$
Facebook mobile app use	[if have an iPhone] Please write down the amount of screen time you spent on the Facebook app according to your battery report. [if do not have an iPhone] How many hours would you say you spent on the Facebook app on your phone in the past seven days, in total?

Facebook opinions

Improves social life	To what extent do you think Facebook improves or worsens people's social lives?
Good for you	To what extent do you think Facebook is good or bad for you?
Good for society	To what extent do you think Facebook is good or bad for society?
Makes people happy	To what extent do you think using Facebook makes people more or less happy?
People would miss Facebook	To what extent do you agree or disagree with the following statement: "If people spent less time on Facebook, they would soon realize that they don't miss it."? (<i>We multiply responses by -1, so more agreement with the statement is more negative.</i>)
Helps follow news	To what extent do you think Facebook helps people follow the news better?
Clickbait, fake news $\times (-1)$	To what extent do you think Facebook exposes people to clickbait or false news stories?
Less polarized	To what extent do you think Facebook makes people more or less politically polarized?

Deactivation bad	As part of this study, you were asked to deactivate your Facebook account for [24 hours/4 weeks]. To what extent do you think that deactivating your account was good or bad for you? (<i>We multiply responses by -1, so responding that deactivation was good is more negative.</i>)
Positive impacts	What are the most important positive impact(s) that Facebook has on your life? [text box]
Negative impacts × (-1)	What are the most important negative impact(s) that Facebook has on your life? [text box]

Secondary outcomes

Voted Republican	If the elections for US Congress were being held today, would you vote for the Republican Party's candidate or the Democratic Party's candidate for Congress in your district? [Republican candidate, Democratic candidate, Other/don't know] [If would vote for Republican or Democratic candidate] How convinced are you about whether to vote for the Republican candidate or the Democratic candidate? [slider from 0 to 100]
Voted (self-report)	Did you [midline: Do you plan to] vote in the midterm elections on November 6th, 2018?
Contributions	ln(1+FEC contributions between October 12 and November 10)

Moderators

Time of day	At what times of day do you usually use Facebook the most? [Morning (6AM-12 noon), Afternoon (12 noon-5PM), Evening (5-9PM), Night (9PM-midnight), Late night/early morning (midnight-6AM)]
Active browsing	People talk about two different ways to use Facebook: "Active" users often post status updates, comment on other people's walls and pictures, post photos, etc. "Passive" users mostly check out their news feeds and/or other people's photos and profiles but don't comment or interact much with others on the site. Which would you say describes your Facebook use best? What share of your time on Facebook do you spend interacting one-on-one with people you care about (for example, commenting on their posts or sending them private messages)?
Get news from Facebook	Over the past four weeks, how often did you ... get news from Facebook [Never, Hardly Ever, Sometimes, Fairly Often, Very Often]

Facebook minutes On an average day in the past 4 weeks, how many minutes would you say you spent on Facebook, including through the Facebook app on your phone?

B.2 Descriptive Statistics

Table A3: **Descriptive Statistics: Substitutes for Facebook and News and Political Outcomes**

	Mean	Standard deviation	Minimum value	Maximum value	N in regression
Facebook minutes	59.53	37.38	0	120	1,639
Non-FB social media	2.97	0.93	1	5	1,639
Non-social online	3.28	0.88	1	5	1,639
TV alone	3.10	1.02	1	5	1,639
Non-screen alone	3.23	0.92	1	5	1,639
Friends and family	3.24	0.91	1	5	1,639
Friends met in person	1.36	0.85	0	3	1,639
Offline activities	3.06	1.53	0	8	1,639
Diverse interactions	0.99	0.79	0	2	1,639
Facebook news	2.98	1.05	1	5	1,639
Number of tweets	1.80	1.48	0	6	296
Non-FB social media news	3.04	1.03	1	5	1,639
Non-social online news	3.40	1.01	1	5	1,639
Local TV news	3.00	0.95	1	5	1,639
Network TV news	2.93	0.98	1	5	1,639
Cable TV news	2.93	1.01	1	5	1,639
Print news	2.72	0.95	1	5	1,639
Radio news	2.86	1.00	1	5	1,639
Follow politics	2.32	0.98	1	4	1,639
Follow Trump	2.09	0.92	1	4	1,639
News minutes	52.10	38.72	0	120	1,639
News knowledge	7.26	1.19	3	10	1,639
Fake news knowledge	2.72	0.74	0	5	1,639
Voted	0.77	0.42	0	1	1,639
Clicked politics email	0.02	0.15	0	1	1,651
Party affective polarization	53.21	34.37	-86	100	1,455
Trump affective polarization	32.73	26.72	-50	50	1,455
Party anger	1.97	2.27	-5	6	1,450
Other party understanding $\times (-1)$	1.00	1.54	-4	4	1,450
Issue polarization	2.89	2.97	-8	15	1,450
Belief polarization	2.16	5.21	-15	17	1,450
Vote polarization	0.63	0.48	-1	1	1,450

Notes: This table presents descriptive statistics for the dependent variables used in Equations (1) and (2). Survey outcomes were recorded in the endline or post-endline surveys. The mean, standard deviation, minimum, and maximum are for the prepared variables as used in the regressions, before normalizing to standard deviation of one, for the Control group: participants who were willing to accept less than \$102 to deactivate Facebook for the four weeks after midline and were offered $p = \$0$ to do so. See Section 2.3 for variable definitions. *Facebook minutes* and *news minutes* are winsorized at 120. *Number of tweets* is the natural log of one plus the number of tweets.

Table A4: **Descriptive Statistics: Subjective Well-Being, Post-Experiment Facebook Use and Opinions, and Secondary Outcomes**

	Mean	Standard deviation	Minimum value	Maximum value	N in regression
Happiness	4.47	1.41	1	7	1,639
Life satisfaction	12.26	4.78	3	21	1,639
Loneliness $\times (-1)$	-5.19	1.89	-9	-3	1,639
Depressed $\times (-1)$	2.99	0.97	1	4	1,639
Anxious $\times (-1)$	2.60	0.94	1	4	1,639
Absorbed	2.82	0.80	1	4	1,639
Bored $\times (-1)$	2.93	0.88	1	4	1,639
SMS happiness	6.48	1.52	1	10	1,603
SMS positive emotion	0.53	0.25	0	1	1,606
SMS not lonely	7.60	1.70	1	10	1,604
Planned post-study use change	-0.22	0.28	-1	1	1,637
Clicked time limit email $\times (-1)$	-0.09	0.28	-1	0	1,660
Speed of reactivation	-0.41	0.69	-4	0	1,661
Facebook mobile app use	52.80	38.76	0	120	1,219
Improves social life	-0.39	1.93	-5	5	1,639
Good for you	-0.28	1.76	-5	5	1,639
Good for society	-0.53	1.86	-5	5	1,639
Makes people happy	-0.82	1.81	-5	5	1,639
Less polarized	-2.48	1.76	-5	5	1,639
Helps follow news	0.31	2.41	-5	5	1,639
Clickbait, fake news $\times (-1)$	-2.71	2.06	-5	5	1,639
People would miss Facebook	-1.97	1.99	-5	5	1,639
Deactivation bad	-1.91	1.93	-5	5	1,639
Positive impacts	3.72	0.83	0	8	1,639
Negative impacts $\times (-1)$	-3.44	1.03	-7	0	1,639
Voted Republican	-0.36	0.68	-1	1	1,639

Notes: This table presents descriptive statistics for the dependent variables used in Equations (1) and (2). Survey outcomes were recorded in the endline or post-endline surveys. The mean, standard deviation, minimum, and maximum are for the prepared variables as used in the regressions, before normalizing to standard deviation of one, for the Control group: participants who were willing to accept less than \$102 to deactivate Facebook for the four weeks after midline and were offered $p = \$0$ to do so. See Section 2.3 for variable definitions. *Facebook mobile app use* is winsorized at 120. *Positive impacts* and *negative impacts* are the natural log of one plus number of characters the participant wrote in the text box. Speed of reactivation is negative one times the natural log of one plus the number of days that the participant remained deactivated after 24-hour post-endline deactivation period), top-coded at the last day of measurement. *Contributions* is the natural log of one plus the dollar amount of FEC contributions made between October 12 and November 10, 2018.

Table A5: **Descriptive Statistics: Pre-Experiment Time Use**

	Mean	Standard deviation	Minimum value	Maximum value
Facebook minutes	74.5	35.5	20	120
News minutes	53.0	37.9	0	120
Non-FB social media	75.7	76.3	0	240
Non-social online	135.9	83.7	0	240
TV alone	95.5	82.8	0	240
Non-screen alone	105.9	79.2	0	240
Friends and family	130.4	83.4	0	240
Facebook mobile app use	60.0	38.9	0	120

Notes: This table presents descriptive statistics for pre-experiment time use, for the impact evaluation sample: participants who were willing to accept less than \$102 to deactivate Facebook for the four weeks after midline and were offered $p = \$102$ or $p = \$0$ to do so. These survey outcomes were recorded in the baseline and midline surveys. See Section 2.3 for variable definitions. *Facebook minutes*, *news minutes*, and *Facebook mobile app use* are winsorized at 120.

C Tables of Treatment Effect Estimates

Table A6: **Treatment Effects: Substitutes for Facebook and News and Political Outcomes**

	Treatment effect (original units)	Standard error (original units)	Treatment effect (SD units)	Standard error (SD units)	P-value	Sharpened FDR-adjusted q-value
Facebook minutes	-59.58	1.43	-1.59	0.04	0.00	0.00
Non-FB social media	-0.25	0.07	-0.27	0.07	0.00	0.00
Non-social online	-0.12	0.06	-0.14	0.06	0.03	0.04
TV alone	0.17	0.05	0.17	0.05	0.00	0.00
Non-screen alone	0.23	0.05	0.25	0.05	0.00	0.00
Friends and family	0.14	0.05	0.16	0.06	0.00	0.01
Friends met in person	0.06	0.04	0.07	0.04	0.11	0.13
Offline activities	0.18	0.08	0.12	0.05	0.01	0.03
Diverse interactions	-0.04	0.04	-0.05	0.05	0.34	0.29
Facebook news	-1.90	0.05	-1.81	0.04	0.00	0.00
Number of tweets	0.24	0.17	0.16	0.12	0.16	0.16
Non-FB social media news	-0.37	0.07	-0.36	0.07	0.00	0.00
Non-social online news	-0.02	0.06	-0.02	0.06	0.79	0.44
Local TV news	0.04	0.05	0.05	0.06	0.41	0.33
Network TV news	0.06	0.05	0.06	0.05	0.22	0.20
Cable TV news	0.02	0.05	0.02	0.05	0.70	0.40
Print news	0.02	0.05	0.02	0.05	0.73	0.41
Radio news	0.07	0.05	0.07	0.05	0.17	0.16
Follow politics	-0.14	0.04	-0.14	0.04	0.00	0.00
Follow Trump	-0.10	0.04	-0.11	0.04	0.01	0.02
News minutes	-7.92	1.83	-0.20	0.05	0.00	0.00
News knowledge	-0.14	0.06	-0.12	0.05	0.02	0.03
Fake news knowledge	-0.04	0.04	-0.06	0.05	0.26	0.23
Voted	-0.03	0.02	-0.06	0.05	0.18	0.16
Clicked politics email	0.01	0.01	0.06	0.06	0.36	0.31
Party affective polarization	-2.09	1.40	-0.06	0.04	0.14	0.15
Trump affective polarization	-0.06	0.71	-0.00	0.03	0.93	0.50
Party anger	-0.18	0.13	-0.08	0.06	0.16	0.16
Other party understanding $\times (-1)$	-0.32	0.08	-0.20	0.05	0.00	0.00
Issue polarization	-0.29	0.11	-0.10	0.04	0.01	0.02
Belief polarization	-0.23	0.27	-0.04	0.05	0.40	0.33
Vote polarization	-0.00	0.02	-0.01	0.05	0.86	0.47

Notes: This table presents local average treatment effects of Facebook deactivation estimated using Equation (1). Column 1 and Column 2 present the effect and standard error on un-normalized outcomes. Columns 3 and 4 present the effect and standard error on normalized outcomes, where outcomes are normalized so that the Control group endline distribution has a standard deviation of one. Columns 5 and 6 present the unadjusted p-value and sharpened False Discovery Rate-adjusted two-stage q-value, respectively.

Table A7: **Treatment Effects: Subjective Well-Being, Post-Experiment Facebook Use and Opinions, and Secondary Outcomes**

	Treatment effect (original units)	Standard error (original units)	Treatment effect (SD units)	Standard error (SD units)	P-value	Sharpened FDR- adjusted q-value
Happiness	0.12	0.06	0.08	0.04	0.04	0.06
Life satisfaction	0.56	0.20	0.12	0.04	0.00	0.01
Loneliness $\times (-1)$	0.05	0.08	0.03	0.04	0.54	0.37
Depressed $\times (-1)$	0.08	0.04	0.09	0.04	0.03	0.05
Anxious $\times (-1)$	0.09	0.04	0.10	0.05	0.03	0.05
Absorbed	-0.01	0.04	-0.01	0.05	0.82	0.45
Bored $\times (-1)$	0.06	0.04	0.07	0.05	0.17	0.16
SMS happiness	0.09	0.07	0.06	0.04	0.18	0.16
SMS positive emotion	0.01	0.01	0.05	0.05	0.31	0.28
SMS not lonely	0.01	0.09	0.01	0.05	0.88	0.47
Planned post-study use change	-0.21	0.02	-0.78	0.07	0.00	0.00
Clicked time limit email $\times (-1)$	-0.04	0.02	-0.15	0.06	0.02	0.04
Speed of reactivation	-0.41	0.06	-0.60	0.08	0.00	0.00
Facebook mobile app use	-12.15	2.19	-0.31	0.06	0.00	0.00
Improves social life	-0.00	0.09	-0.00	0.05	0.99	0.50
Good for you	-0.01	0.09	-0.00	0.05	0.95	0.50
Good for society	-0.04	0.09	-0.02	0.05	0.63	0.37
Makes people happy	0.14	0.09	0.08	0.05	0.13	0.14
Less polarized	-0.06	0.09	-0.03	0.05	0.54	0.37
Helps follow news	0.31	0.11	0.13	0.05	0.01	0.01
Clickbait, fake news $\times (-1)$	-0.03	0.11	-0.01	0.05	0.80	0.44
People would miss Facebook	0.26	0.12	0.13	0.06	0.03	0.04
Deactivation bad	-0.45	0.12	-0.23	0.06	0.00	0.00
Positive impacts	0.22	0.04	0.26	0.05	0.00	0.00
Negative impacts $\times (-1)$	-0.21	0.05	-0.21	0.05	0.00	0.00
Voted Republican	-0.04	0.02	-0.07	0.04	0.06	0.08

Notes: This table presents local average treatment effects of Facebook deactivation estimated using Equation (1). Column 1 and Column 2 present the effect and standard error on un-normalized outcomes. Columns 3 and 4 present the effect and standard error on normalized outcomes, where outcomes are normalized so that the Control group endline distribution has a standard deviation of one. Columns 5 and 6 present the unadjusted p-value and sharpened False Discovery Rate-adjusted two-stage q-value, respectively.

Table A8: **Treatment Effects: Indices**

	Treatment effect	Standard error	P-value	Sharpened FDR-adjusted q-value
Substitute time uses index	0.14	0.06	0.03	0.03
Social interaction index	0.05	0.04	0.22	0.17
Substitute news sources index	-0.00	0.06	0.97	0.47
News knowledge index	-0.19	0.04	0.00	0.00
Political engagement index	-0.01	0.06	0.91	0.47
Political polarization index	-0.16	0.04	0.00	0.00
Subjective well-being index	0.09	0.04	0.02	0.03
Post-experiment use index	-0.61	0.06	0.00	0.00
Facebook opinions index	0.06	0.06	0.25	0.17

Notes: This table presents local average treatment effects of Facebook deactivation on index outcomes estimated using Equation (1). Columns 1 and 2 present the effect and standard error, with indices normalized so that the Control group endline distribution has a standard deviation of one. Columns 3 and 4 present the unadjusted p-value and sharpened False Discovery Rate-adjusted two-stage q-value, respectively.

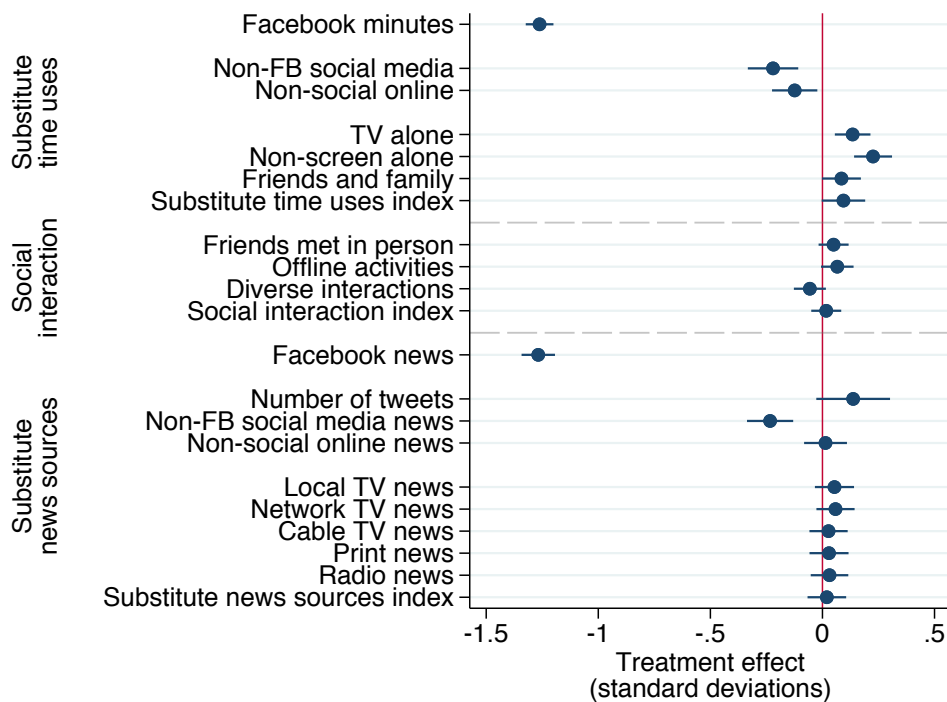
Table A9: **Treatment Effects: Post-Experiment Facebook Mobile App Usage**

	(1) Full sample LATE	(2) Full sample ITT	(3) iPhone only LATE	(4) iPhone only ITT
Share of time deactivated	-12.15 (2.19)		-3.89 (2.78)	
Treatment		-10.80 (2.00)		-3.52 (2.65)
Observations	1,219	1,219	526	526
Control group endline mean	52.8	52.8	42.3	42.3
Lee (2009) treatment effect lower bound		-8.73		-2.04
Lee (2009) treatment effect upper bound		-7.76		-1.63
Lee (2009) 95% confidence interval lower bound		-13.77		-10.31
Lee (2009) 95% confidence interval upper bound		-3.18		5.16

Notes: This table presents treatment effects of Facebook deactivation on post-experiment Facebook mobile app use in units of minutes per day, as measured in the December 3rd post-endline survey. Columns 1 and 2 include all observations, while columns 3 and 4 limit the sample to iPhone users who reported their Facebook mobile app usage as recorded by their System app, excluding participants who had reported personal estimates. Columns 1 and 3 present local average treatment effects estimated using Equation (1), while columns 2 and 4 present intent-to-treat effects and Lee (2009) bounds that account for attrition.

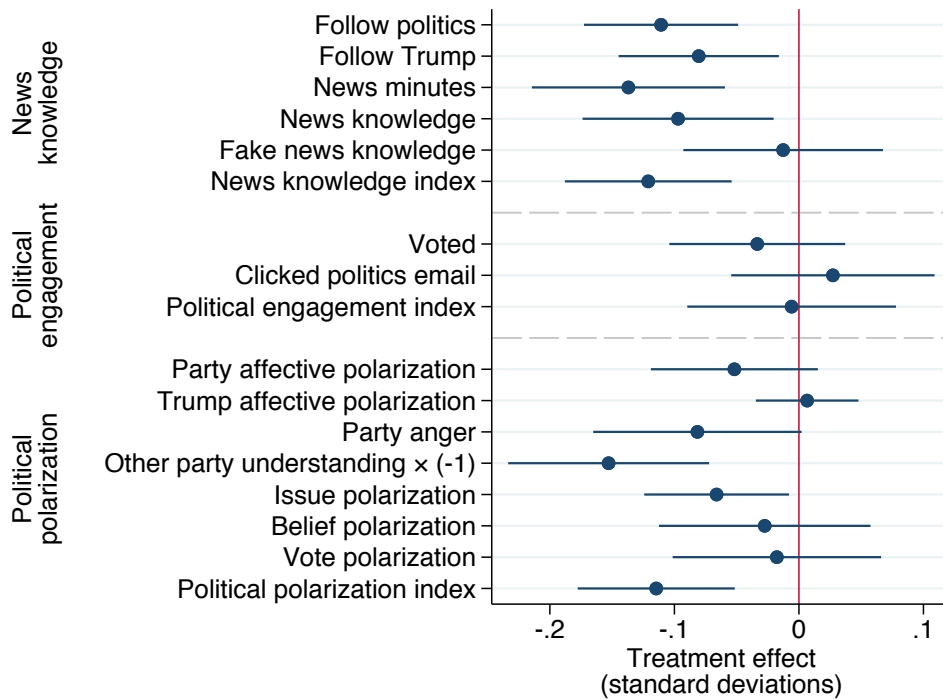
D Treatment Effect Estimates Using Equation (2)

Figure A5: Substitutes for Facebook Using Equation (2)



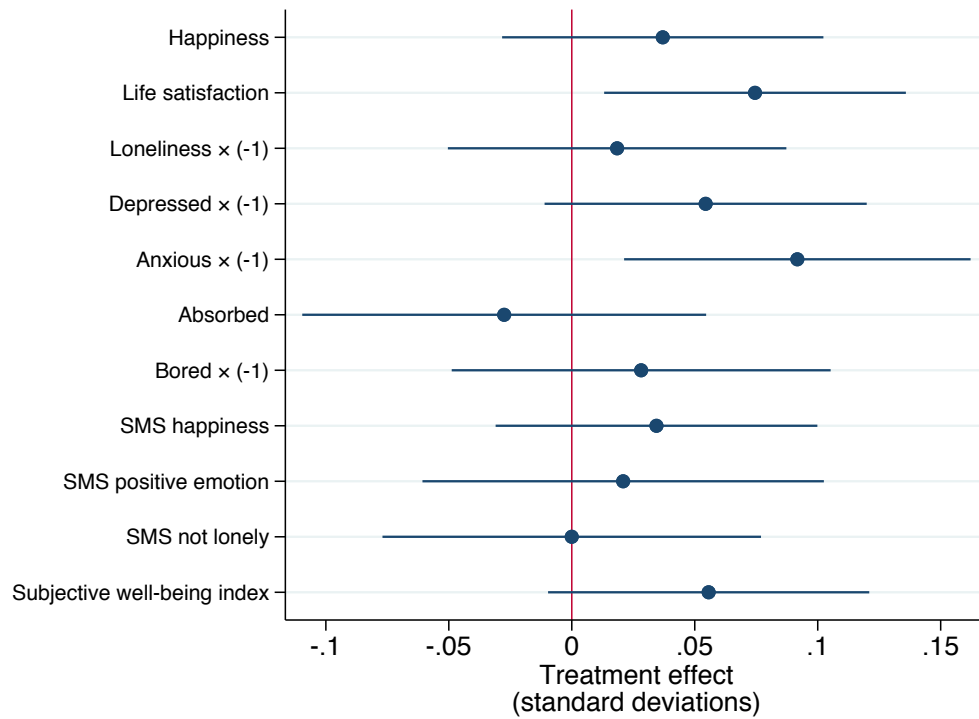
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (2). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A6: **Effects on News and Political Outcomes Using Equation (2)**



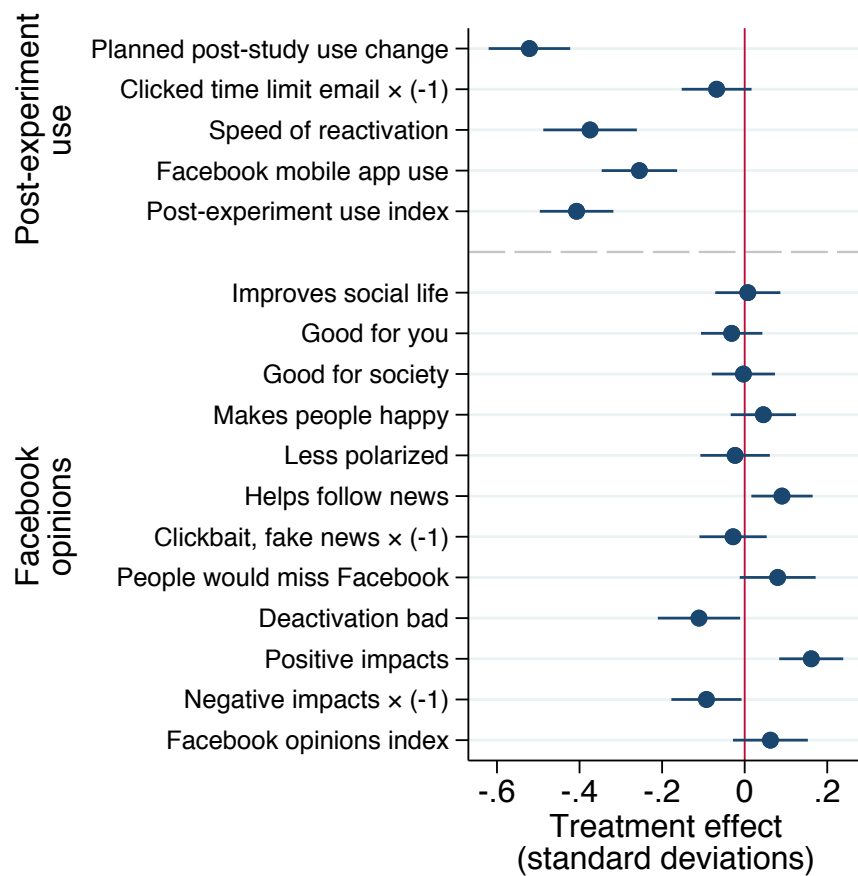
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (2). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A7: Effects on Subjective Well-Being Using Equation (2)



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (2). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A8: Effects on Post-Experiment Facebook Use and Opinions Using Equation (2)

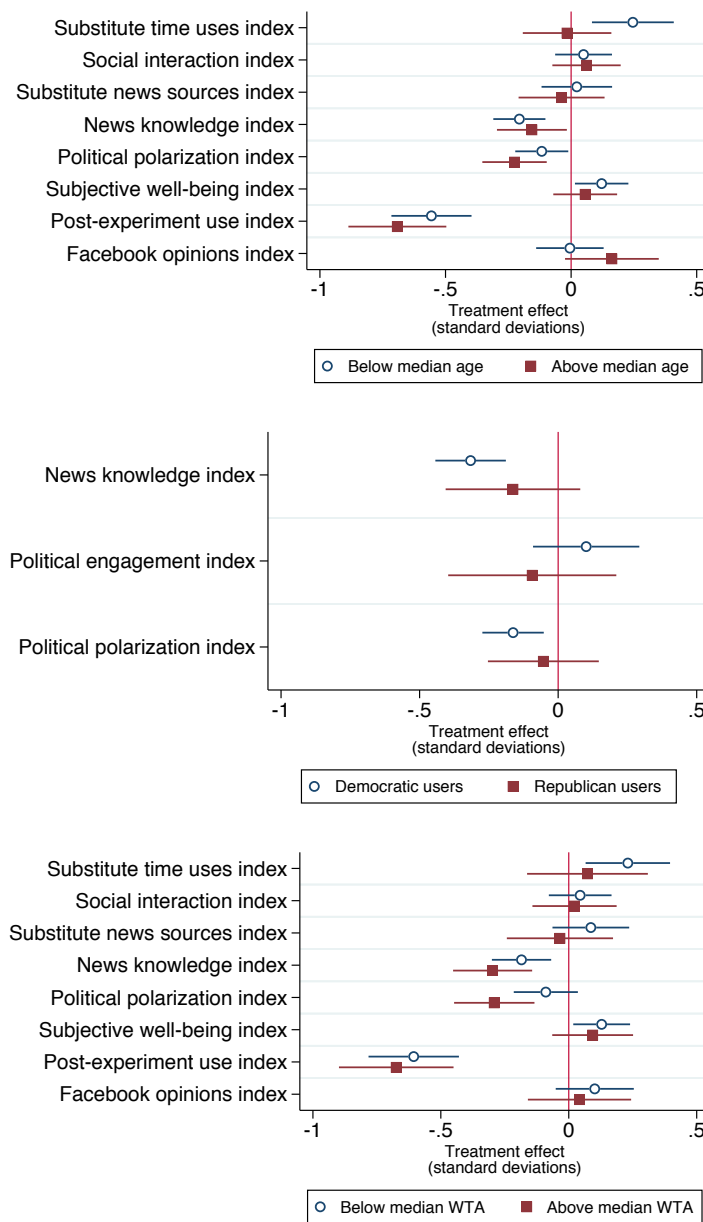


Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (2). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

E Heterogeneous Treatment Effects

E.1 Secondary Moderators

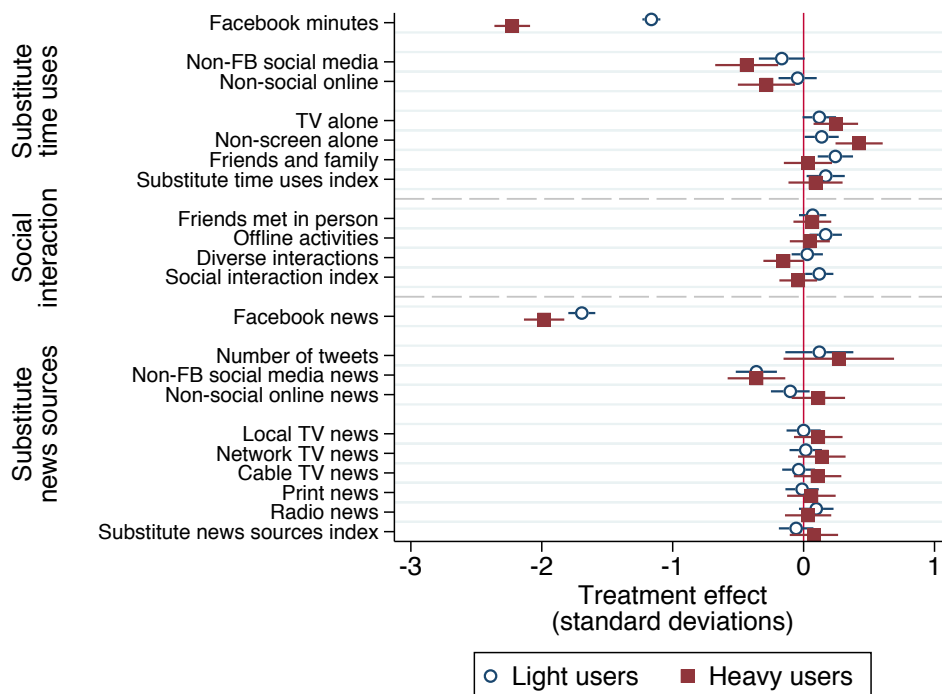
Figure A9: Heterogeneous Treatment Effects for Secondary and Ex-Post Moderators



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). Age and political party were the “secondary” moderators in our pre-analysis plan. Willingness-to-accept was not defined as a moderator of interesting in our pre-analysis plan. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

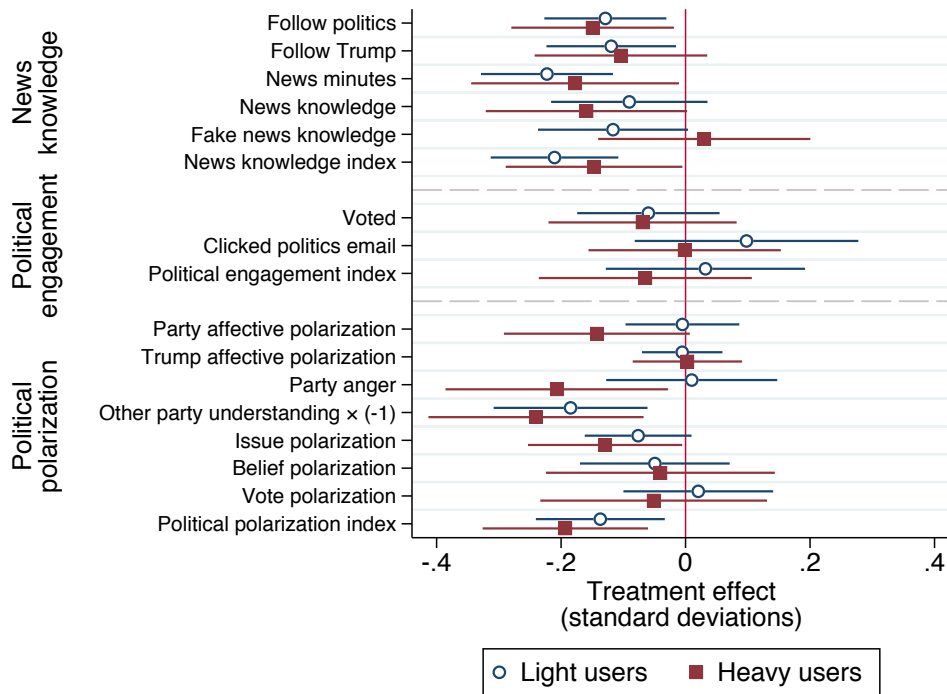
E.2 Light and Heavy Users

Figure A10: **Substitutes for Facebook for Light and Heavy Users**



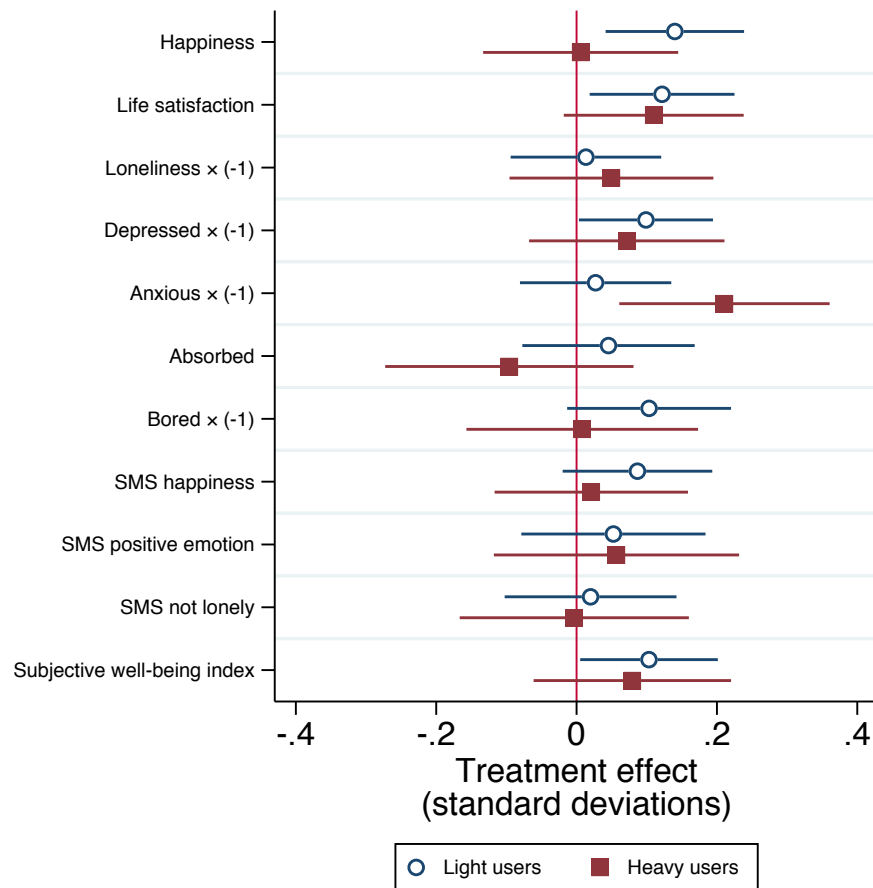
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 75 daily minutes, the median amount of Facebook use in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A11: Effects on News and Political Outcomes for Light and Heavy Users



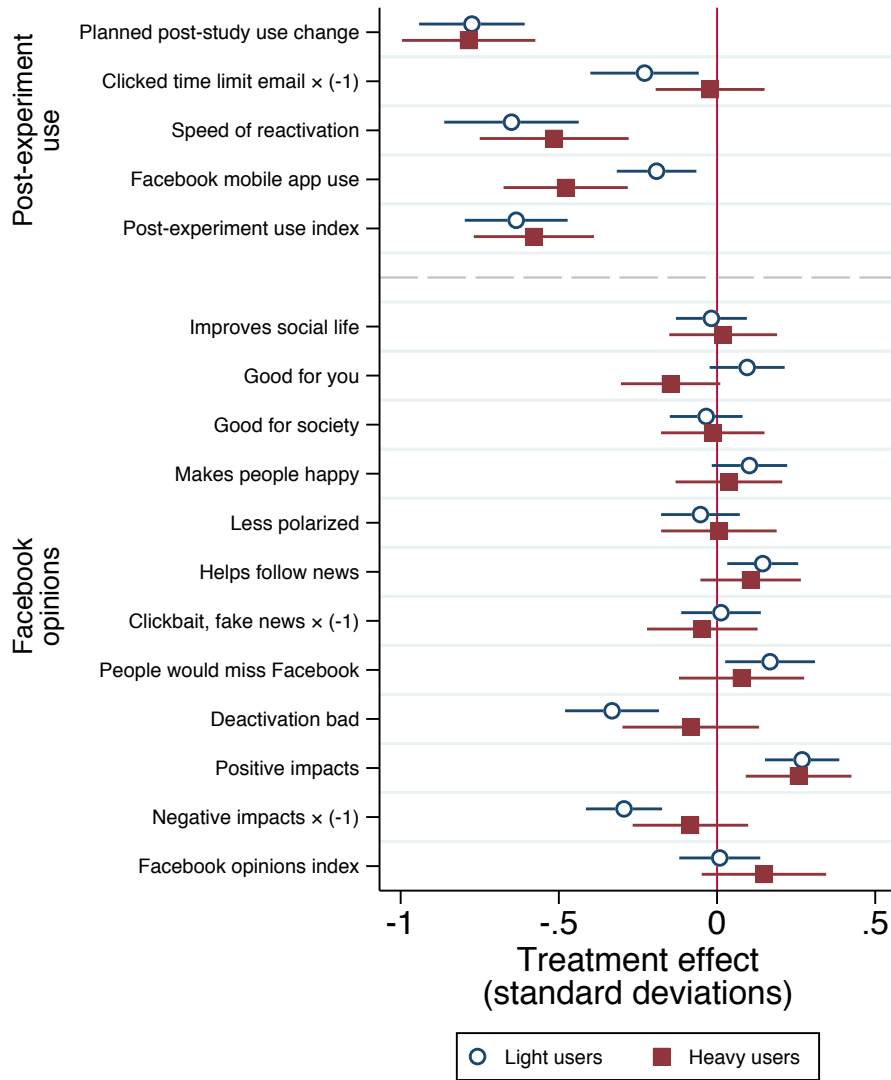
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 75 daily minutes, the median amount of Facebook use in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A12: Effects on Subjective Well-Being for Light and Heavy Users



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 75 daily minutes, the median amount of Facebook use in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

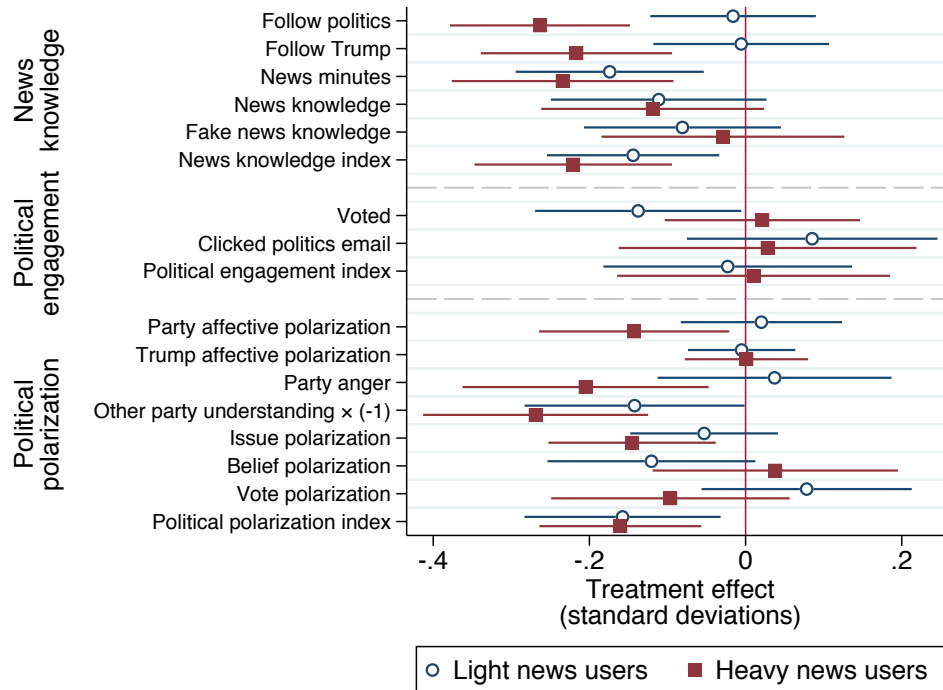
Figure A13: **Effects on Post-Experiment Facebook Use and Opinions for Light and Heavy Users**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 75 daily minutes, the median amount of Facebook use in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

E.3 Light and Heavy News Users

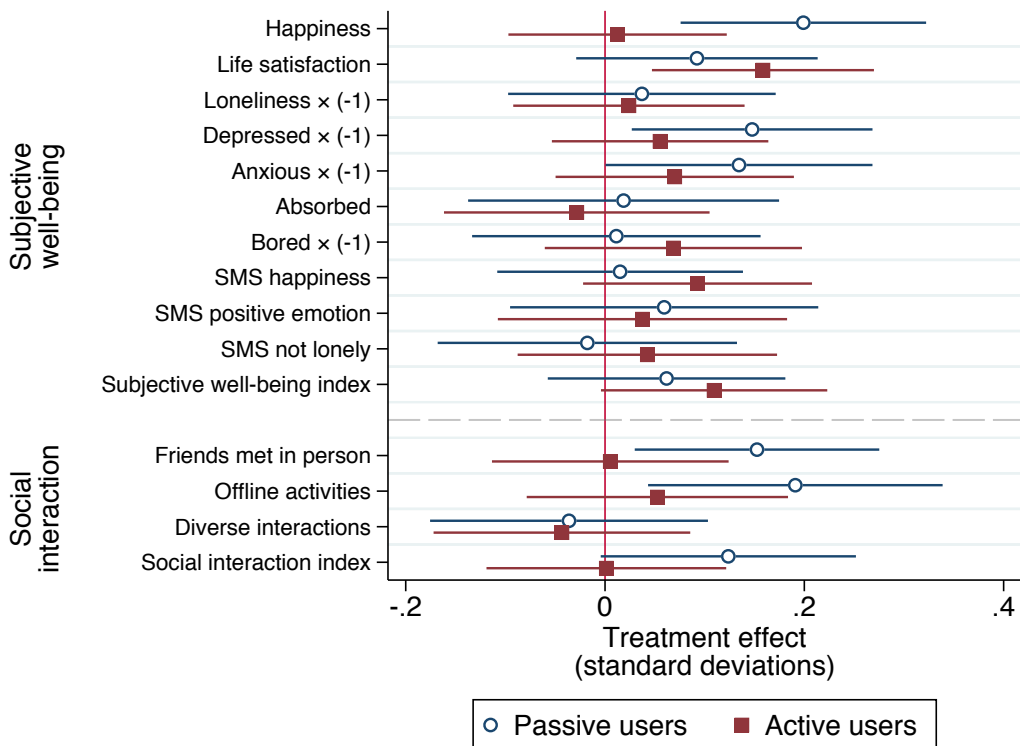
Figure A14: Effects on News and Political Outcomes for Light and Heavy News Users



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for heavy news users vs. light news users (those who get news from Facebook fairly often or very often vs. never, hardly ever, or sometimes). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

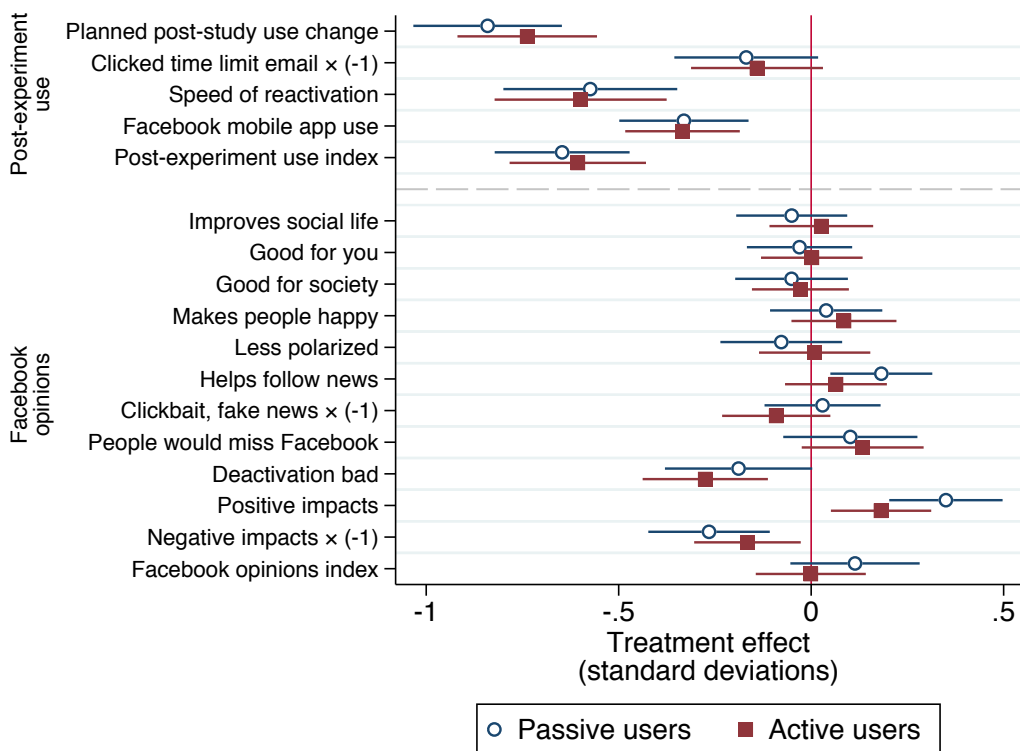
E.4 Active and Passive Users

Figure A15: Effects on Subjective Well-Being and Social Interactions for Active and Passive Users



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for active users vs. passive users. We measure this using two questions: share of active vs. passive browsing using a question based on the Passive and Active Facebook Use Measure (Gerson, Plagnol, and Corr 2017), and “what share of your time on Facebook do you spend interacting one-on-one with people you care about.” Active vs. passive users are defined as having above- vs. below-median sum of their two responses to these questions. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

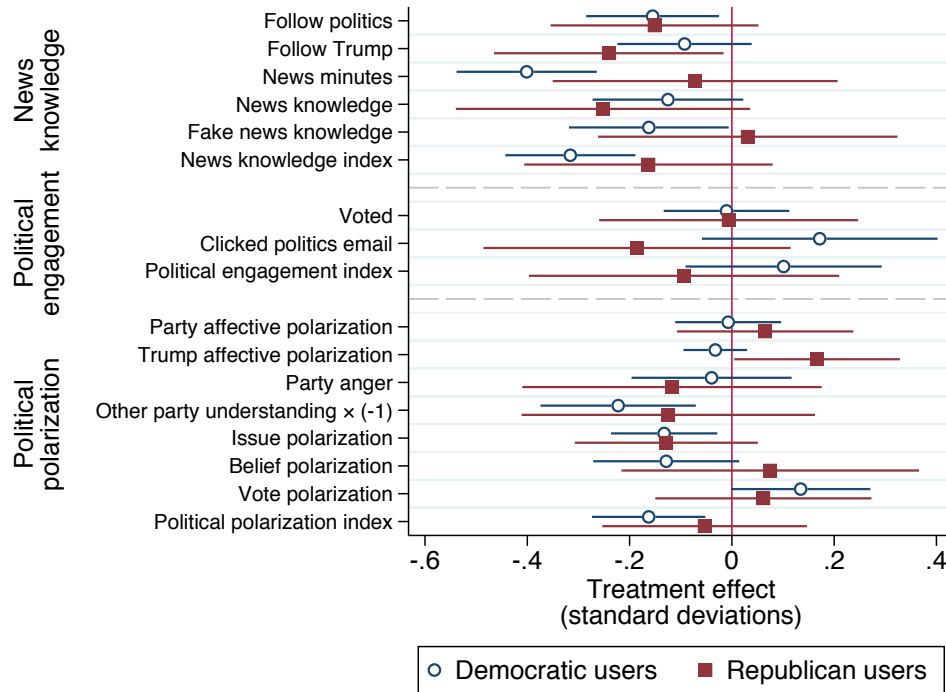
Figure A16: Effects on Post-Experiment Use and Opinions about Facebook for Active and Passive Users



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for active users vs. passive users. We measure this using two questions: share of active vs. passive browsing using a question based on the Passive and Active Facebook Use Measure (Gerson, Plagnol, and Corr 2017), and “what share of your time on Facebook do you spend interacting one-on-one with people you care about.” Active vs. passive users are defined as having above- vs. below-median sum of their two responses to these questions. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

E.5 Democrats and Republicans

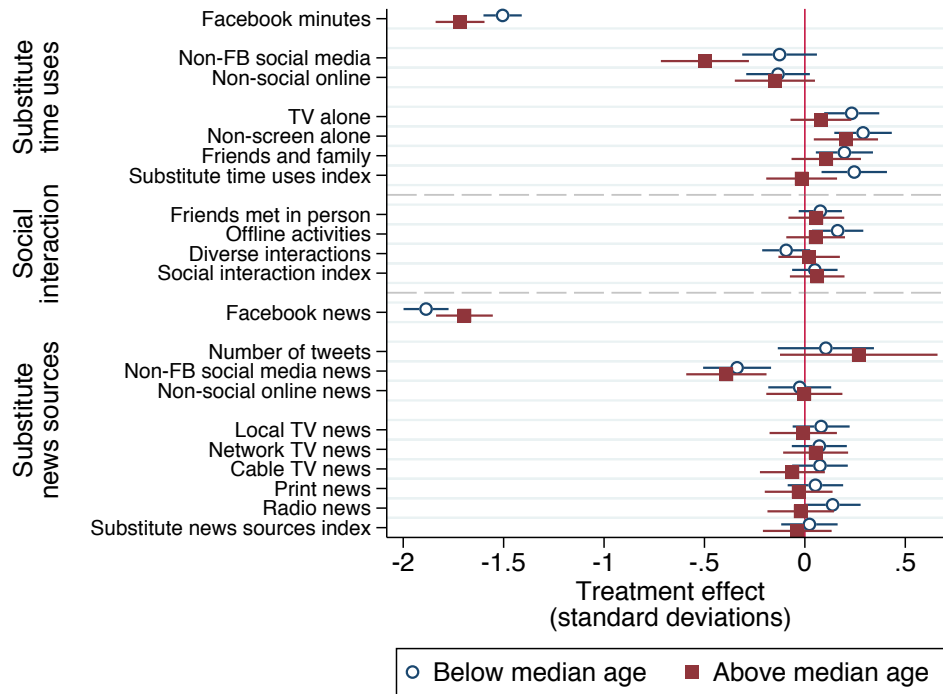
Figure A17: Effects on News and Political Outcomes for Democrats and Republicans



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for Democrats vs. Republicans. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

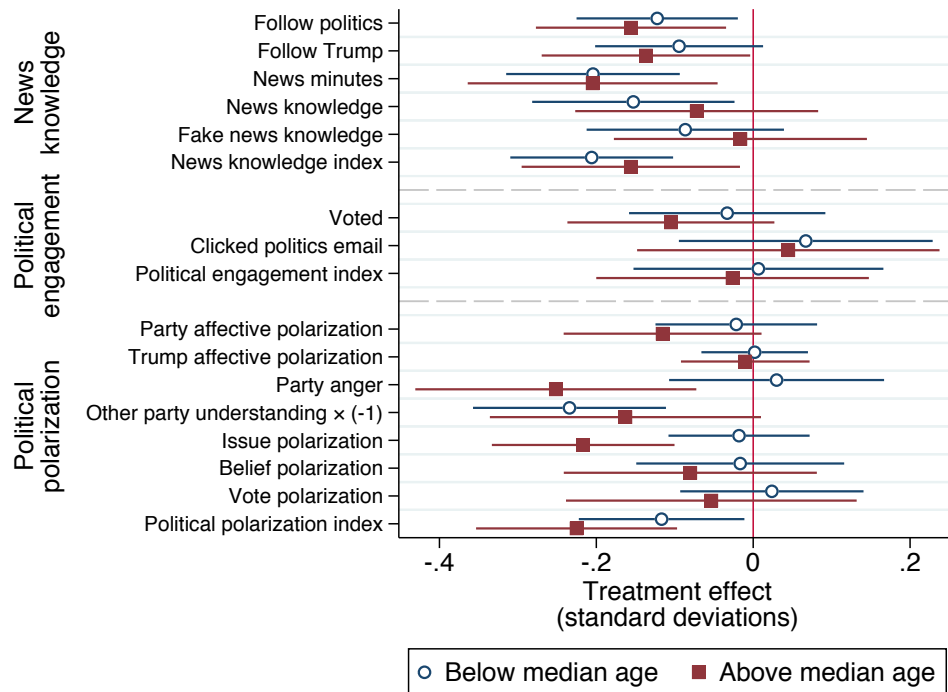
E.6 Younger and Older Users

Figure A18: **Substitutes for Facebook for Younger and Older Users**



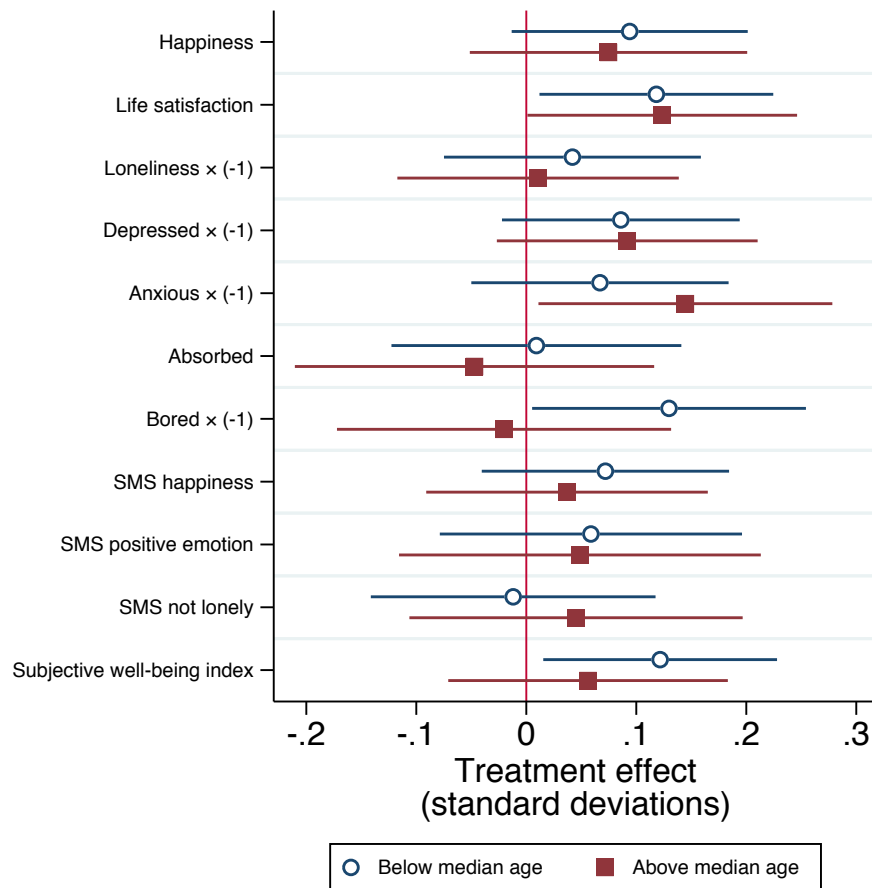
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 31.5 years, the median age in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A19: Effects on News and Political Outcomes for Younger and Older Users



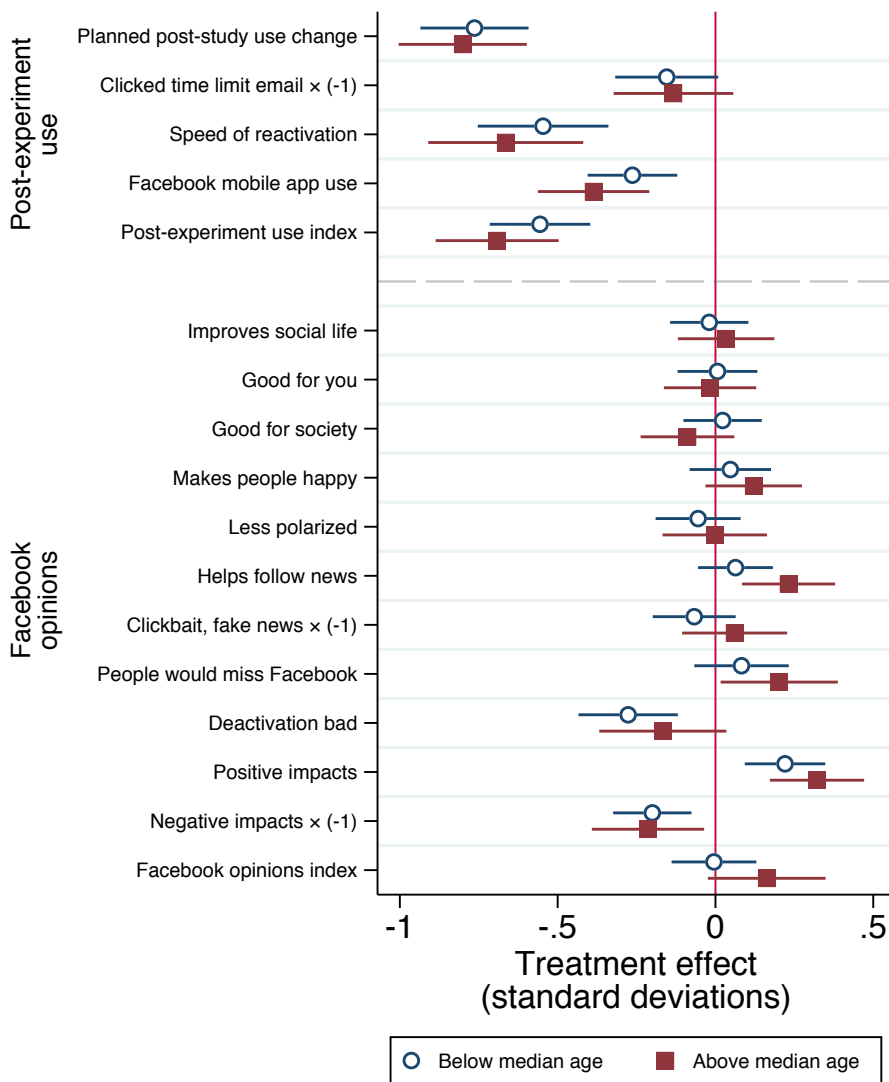
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 31.5 years, the median age in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A20: Effects on Subjective Well-Being for Younger and Older Users



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 31.5 years, the median age in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A21: **Effects on Post-Experiment Facebook Use and Opinions for Younger and Older Users**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1) for participants above vs. below 31.5 years, the median age in the impact evaluation sample. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

F News Knowledge

Appendix Figure A22 presents treatment effects on the probability of correct answers for each individual news knowledge question. Recall that we code a value of 1 for true statements correctly

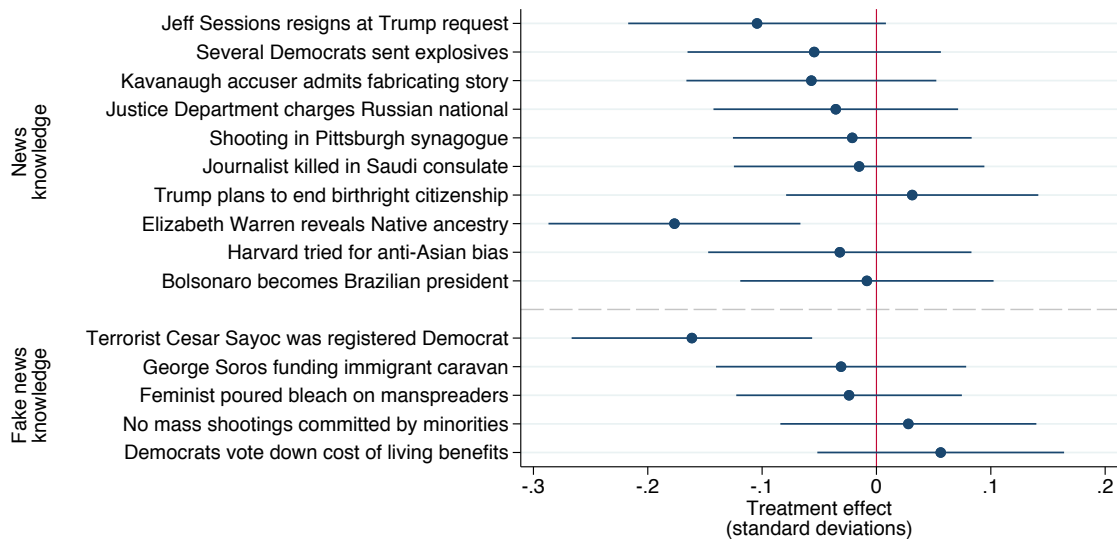
rated as true or incorrect statements correctly rated as false, 0.5 for any statement rated as “unsure,” and 0 for true statements incorrectly rated as false or incorrect statements incorrectly rated as true.

To unpack these results, Appendix Figures A23, A24, and A25 present local average treatment effects of Facebook deactivation on indicators for answering true, false or unsure to our sets of true news, false news, and fake news questions respectively. By true news, we refer to the seven statements about news events reported by major outlets in which we did not insert factual inaccuracies. By false news, we refer to the three statements about news events reported by major news outlets in which we did insert substantial factual inaccuracies. By fake news, we refer to the five statements summarizing news articles that were deemed false on fact-checking websites and that circulated heavily within the four-week period before the survey. At the bottom of each block of news questions, we present treatment effects on the average across the questions in that block.

Most of the estimates are not statistically significant at any conventional level. Notwithstanding, the pattern of point estimates for true and false news statements is cohesive: in eight out of ten questions, deactivation induced people to move away from the correct answer and towards either the incorrect answer or “unsure” (or both). This paints a richer picture of how Facebook deactivation might reduce news knowledge: Treatment group participants are more likely to answer “unsure” and, if they do not answer “unsure” and take a guess as to whether the news event is true or false, they are more likely to answer incorrectly.

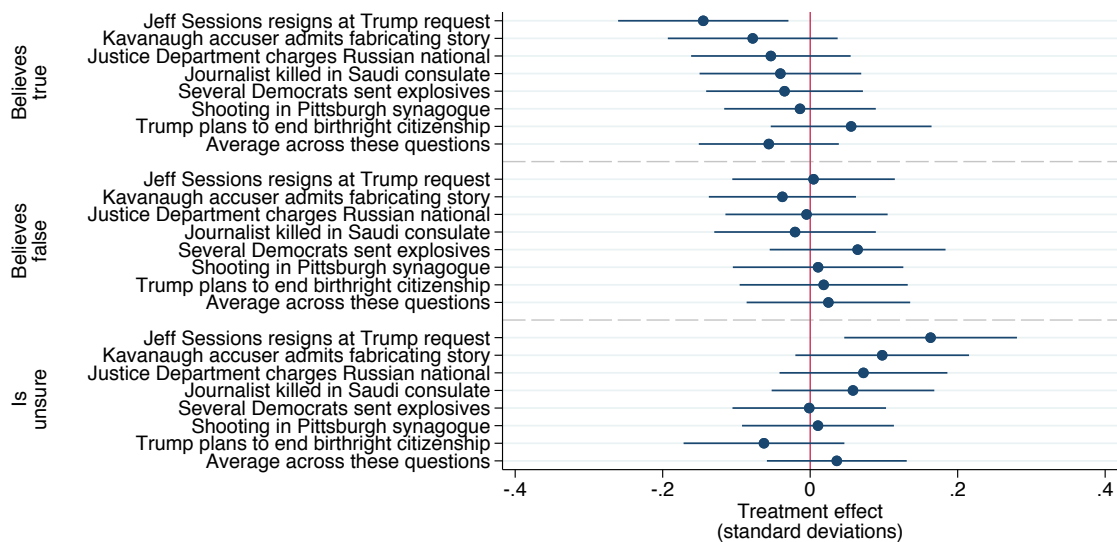
For the fake news questions, Facebook deactivation appears to have made people more likely to answer “unsure” instead of “false.” This explains the negative point estimate of the effect of deactivation on fake news knowledge presented in Figure 3. Although not nearly statistically significant, one explanation for these point estimates is that Facebook circulates fake news but, at least for the major fake news stores in our survey, provides corrective information that helps users to correctly identify these stories as fake.

Figure A22: Effects on News Knowledge and Fake News Knowledge



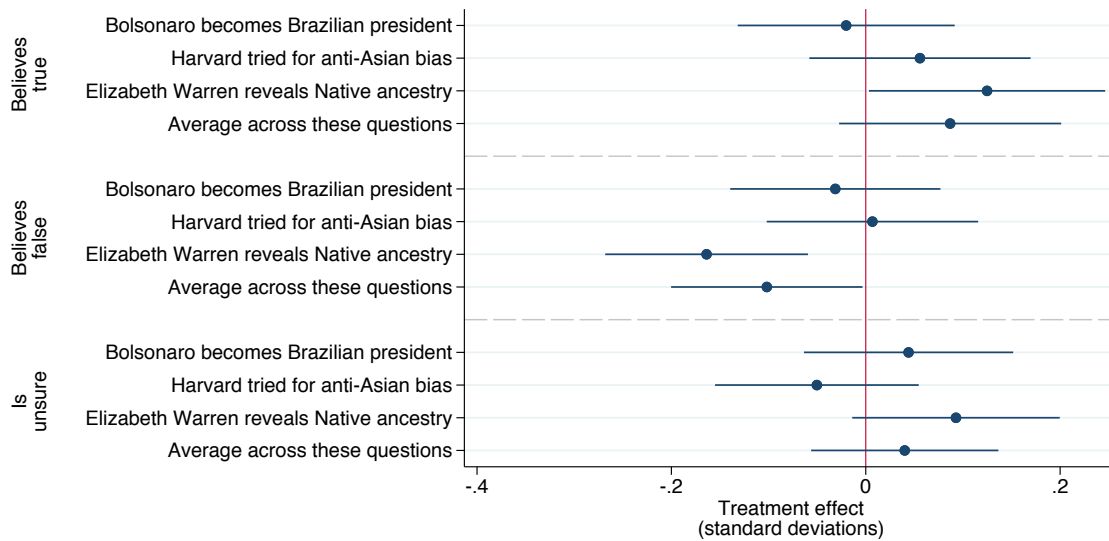
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A23: Effects on Knowledge of True News Items



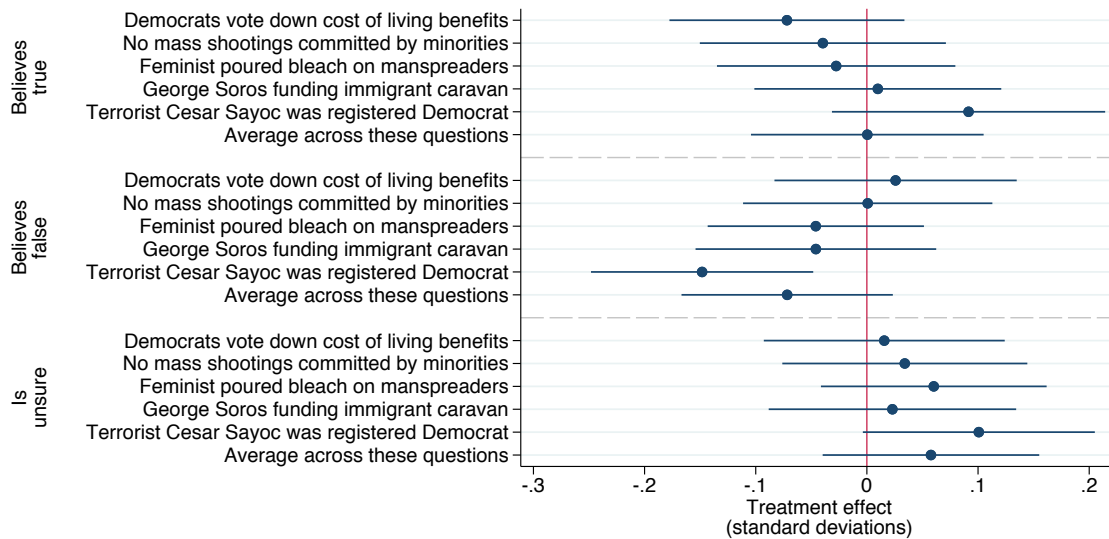
Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). The left-hand side variables are indicators for answering true, false or unsure to each of our true news items. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals.

Figure A24: **Effects on Knowledge of False News Items**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). The left-hand side variables are indicators for answering true, false or unsure to each of our false news items. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals.

Figure A25: **Effects on Knowledge of Fake News Items**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). The left-hand side variables are indicators for answering true, false or unsure to each of our fake news items. All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals.

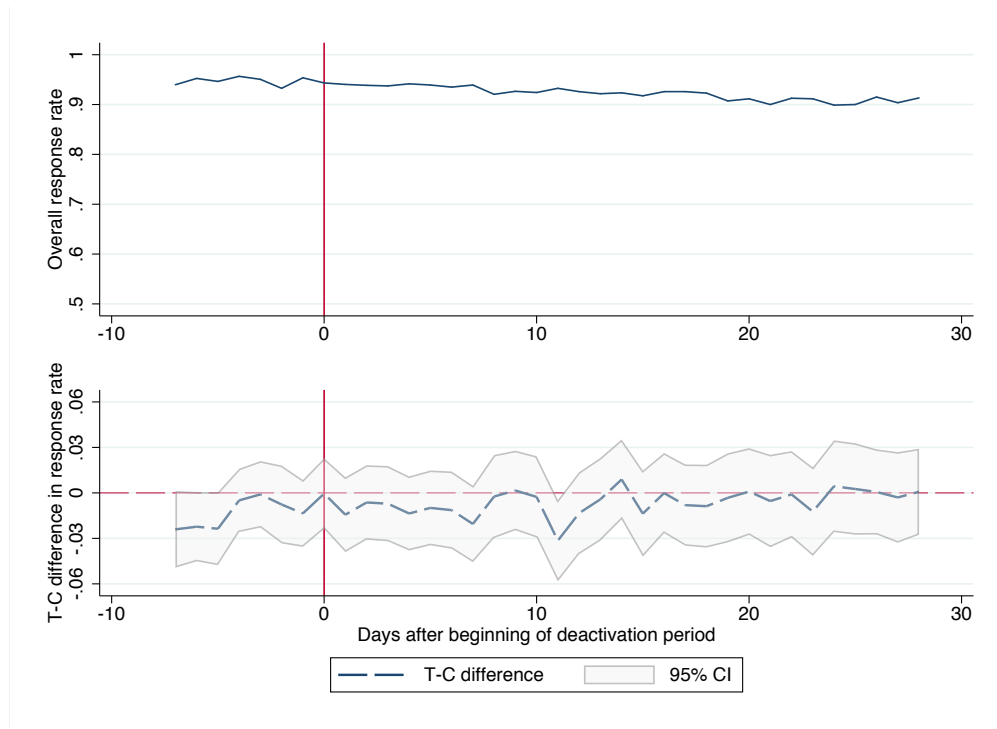
G Additional Empirical Results

Table A10: **Balance**

Variable	(1) Treatment Mean/SD	(2) Control Mean/SD	T-test P-value (1)-(2)
Income (\$000s)	71.27 (50.22)	72.69 (51.80)	0.59
College	0.52 (0.50)	0.50 (0.50)	0.61
Male	0.44 (0.50)	0.42 (0.49)	0.60
White	0.68 (0.47)	0.68 (0.46)	0.77
Age	33.04 (12.54)	32.34 (11.71)	0.27
Republican	0.13 (0.34)	0.14 (0.34)	0.85
Democrat	0.41 (0.49)	0.42 (0.49)	0.53
Facebook minutes	75.20 (35.58)	74.15 (35.49)	0.57
Get news from Facebook	3.47 (1.12)	3.43 (1.06)	0.45
Active browsing	0.14 (0.98)	0.16 (0.97)	0.73
N	580	1081	
F-test of joint significance (p-value)			0.95
F-test, number of observations			1661

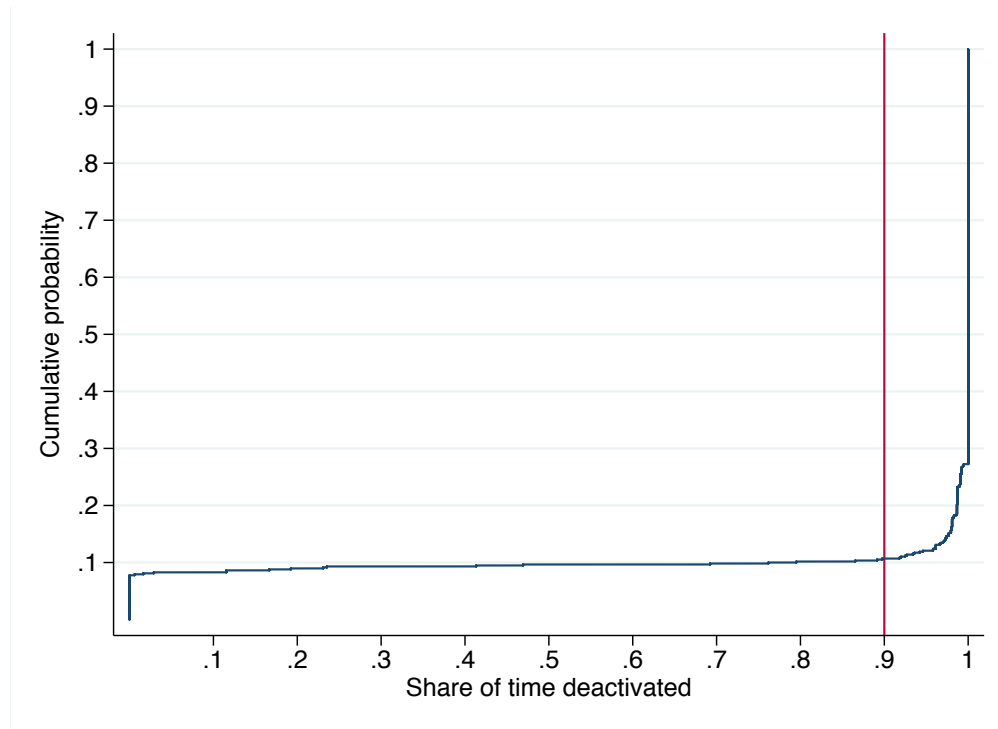
Notes: Columns 1 and 2 present demographics for the Treatment and Control groups in the impact evaluation sample: participants who were willing to accept less than \$102 to deactivate Facebook for the four weeks after midline and were offered $p = \$102$ or $p = \$0$ to do so. Column 3 presents p-values of tests of differences in means between the two groups.

Figure A26: **Response Rates to Daily Text Messages**

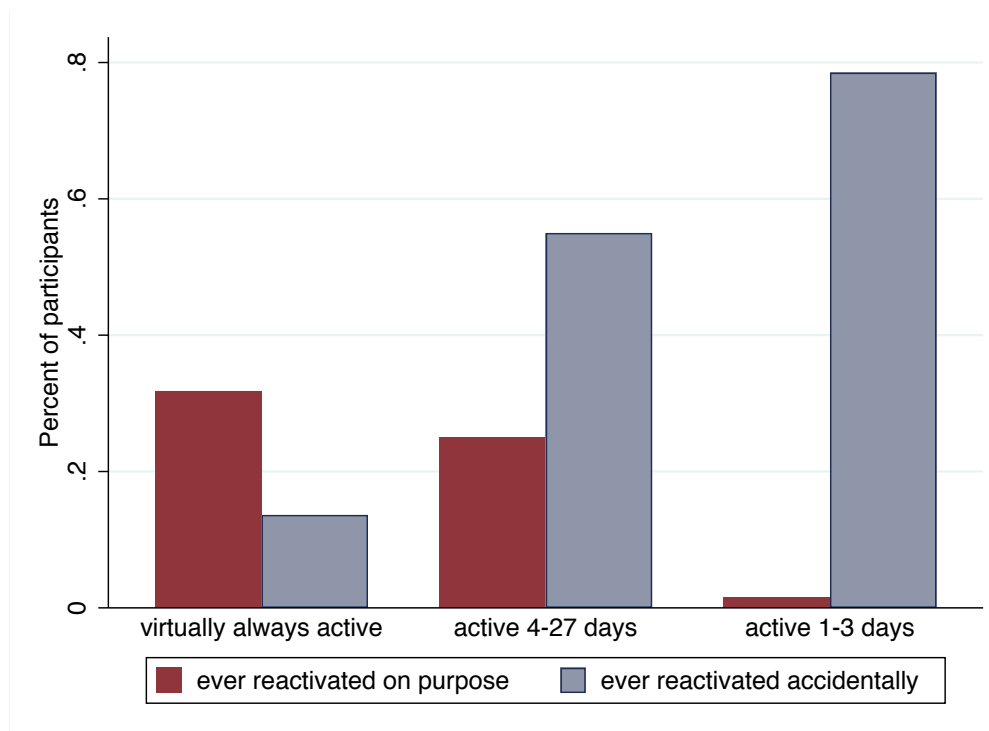


Notes: The figure shows response rates to the SMS survey and the difference in response rates between Treatment and Control, for the impact evaluation sample: participants who were willing to accept less than \$102 to deactivate Facebook for the four weeks after midline and were offered $p = \$102$ or $p = \$0$ to do so. The vertical red line reflects the date of the midline survey.

Figure A27: Treatment Group Distribution of Share of Time Deactivated

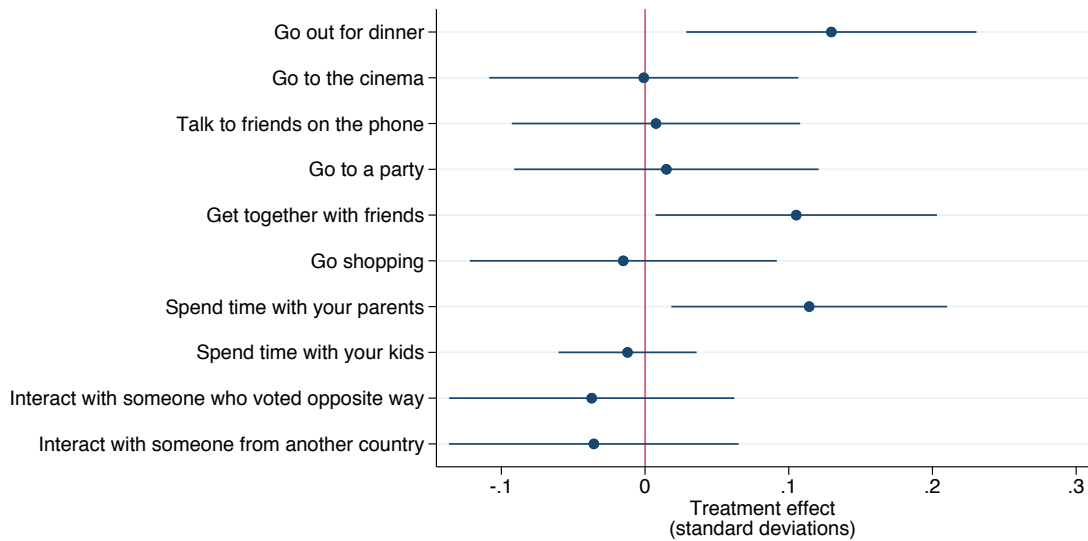


Notes: For each individual in the Treatment group who was willing to accept less than \$102 to deactivate Facebook for the four weeks after midline, we calculate the share of the deactivation checks in which that person was deactivated. This figure presents the cumulative distribution of the share of the time deactivated across people.

Figure A28: **Reasons for Failure to Deactivate**

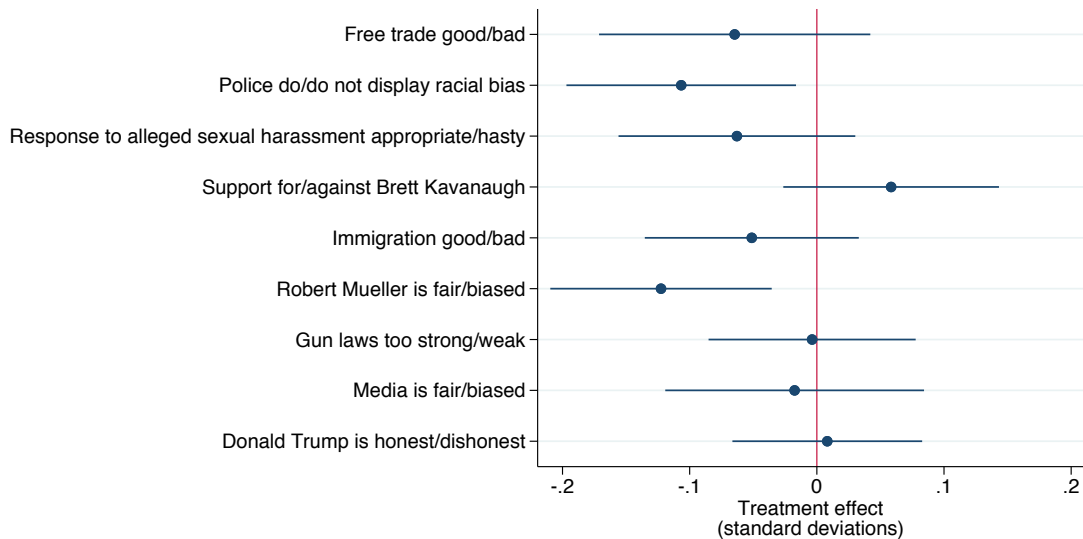
Notes: This figure presents reasons for failure to deactivate for Treatment group participants. Data were gathered from an optional survey that we emailed to participants who were not deactivated when they were supposed to be under the experiment protocols. The survey asked, “Why did your Facebook account get reactivated? Your answer won’t affect your payment – we’re just trying to figure out what problems people are having.” Possible responses were, “I logged into my account using the Facebook website or the Facebook app,” “somebody else logged into my account,” “I used an app (other than the Facebook app or the Facebook messenger app) that uses my Facebook credentials to log in,” “Other (please specify),” and “I don’t know.” We coded an individual as having reactivated “on purpose” if they ever clicked the first answer (“I logged into my account”). We coded an individual as having reactivated “accidentally” if they ever clicked on the second, third, or fifth answers. We also manually coded text that respondents wrote in the “Other (please specify)” box as either “on purpose” or “accidental.”

Figure A29: **Effects on Offline Activities and Diverse Interactions**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A30: **Effects on Issue Polarization**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Table A11: **Robustness to Omitting Each Individual Variable from the Political Polarization Index**

	Treatment effect	Standard error	P-value
Party affective polarization	-0.15	0.04	0.00
Trump affective polarization	-0.15	0.04	0.00
Party anger	-0.15	0.04	0.00
Other party understanding $\times (-1)$	-0.07	0.04	0.06
Issue polarization	-0.14	0.05	0.00
Belief polarization	-0.11	0.04	0.00
Vote polarization	-0.16	0.04	0.00

Notes: This table presents local average treatment effects of Facebook deactivation on the political polarization index estimated using Equation (1). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Each row omits the variable listed from the index. See Section 2.3 for variable definitions.

Table A12: **Correlation Between Subjective Well-Being Index and Demographics at Baseline**

	(1)
Income (\$000s)	0.0027 (0.0005)
College	0.2335 (0.0488)
Male	0.2033 (0.0482)
White	-0.0066 (0.0531)
Age	0.0154 (0.0021)
Republican	0.2136 (0.0723)
Democrat	-0.0492 (0.0507)
Observations	1,661

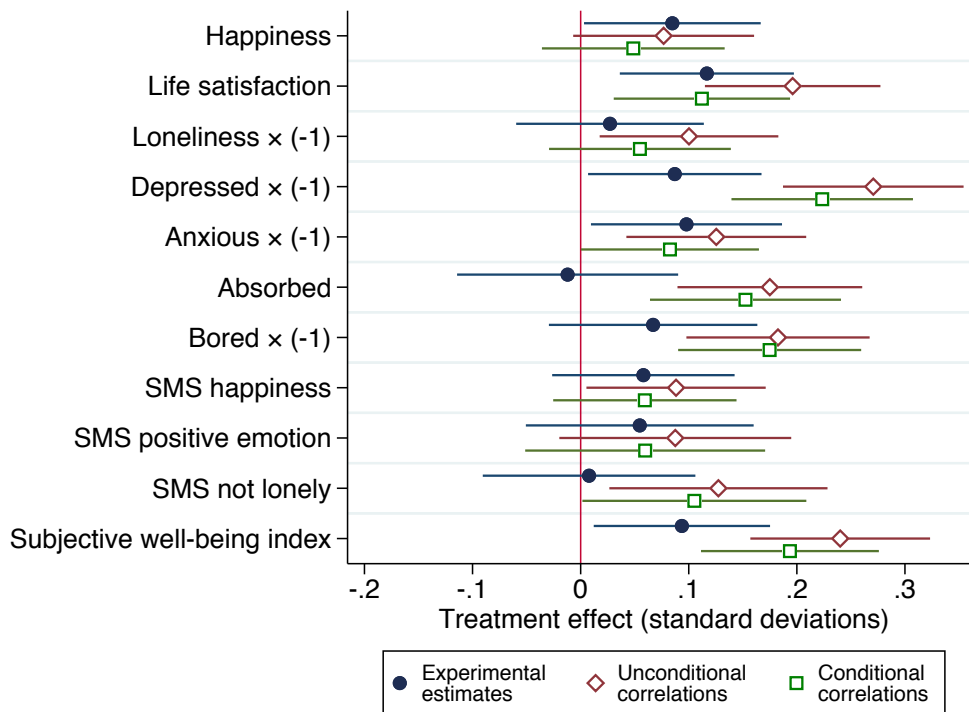
Notes: This table presents estimates of a regression of the baseline subjective well-being index on demographic variables. The subjective well-being index is normalized to have a standard deviation of one.

Figure A31: Effects on Subjective Well-Being Measured in Text Messages, By Week



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A32: Comparing Experimental and Non-Experimental Estimates of Effects on Subjective Well-Being

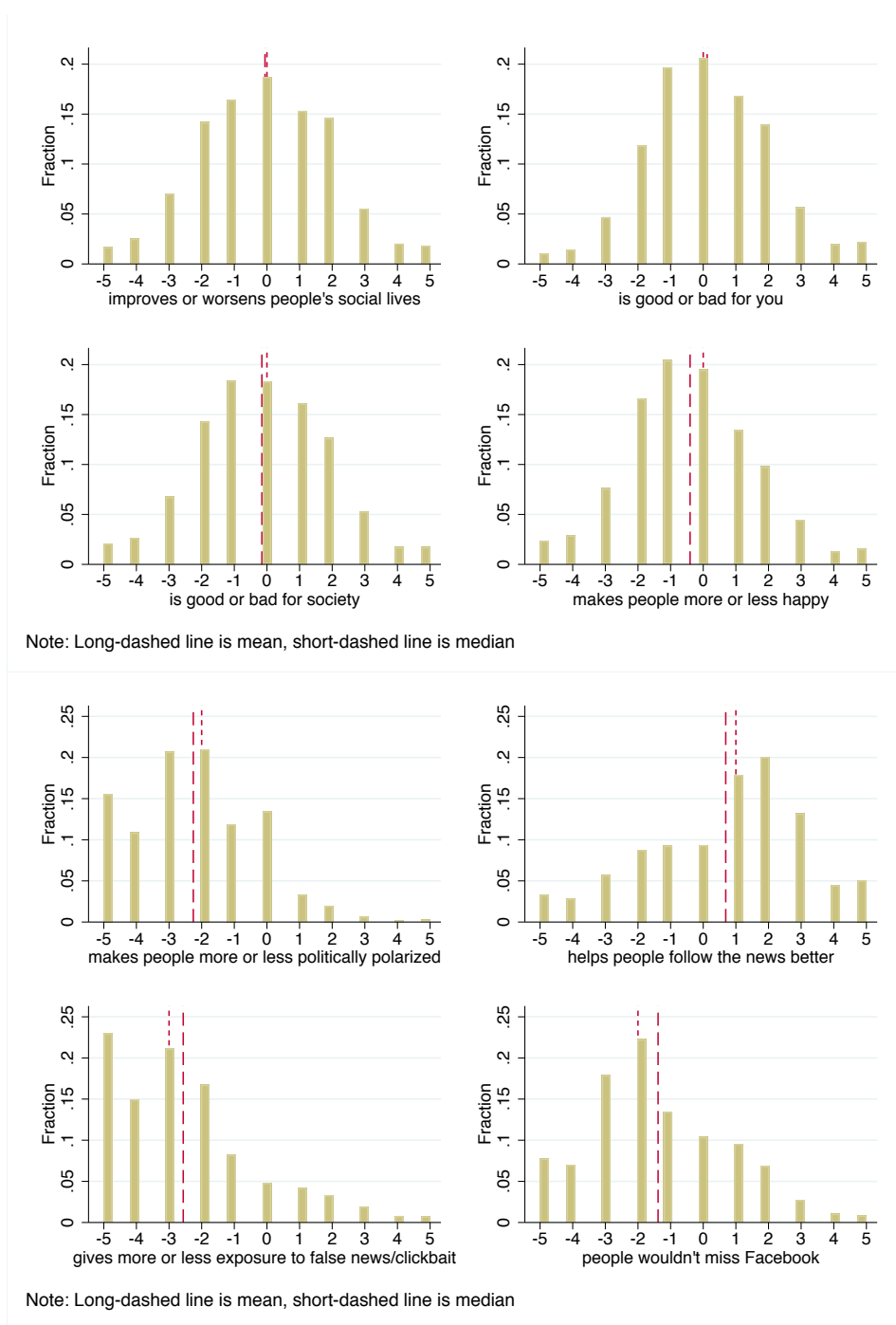


Notes: The solid markers present local average treatment effects of Facebook deactivation estimated using Equation (1). The empty markers present non-experimental estimates from the following regression:

$$Y_i^b = \tau \tilde{H}_i + \beta \mathbf{X}_i + \epsilon_i,$$

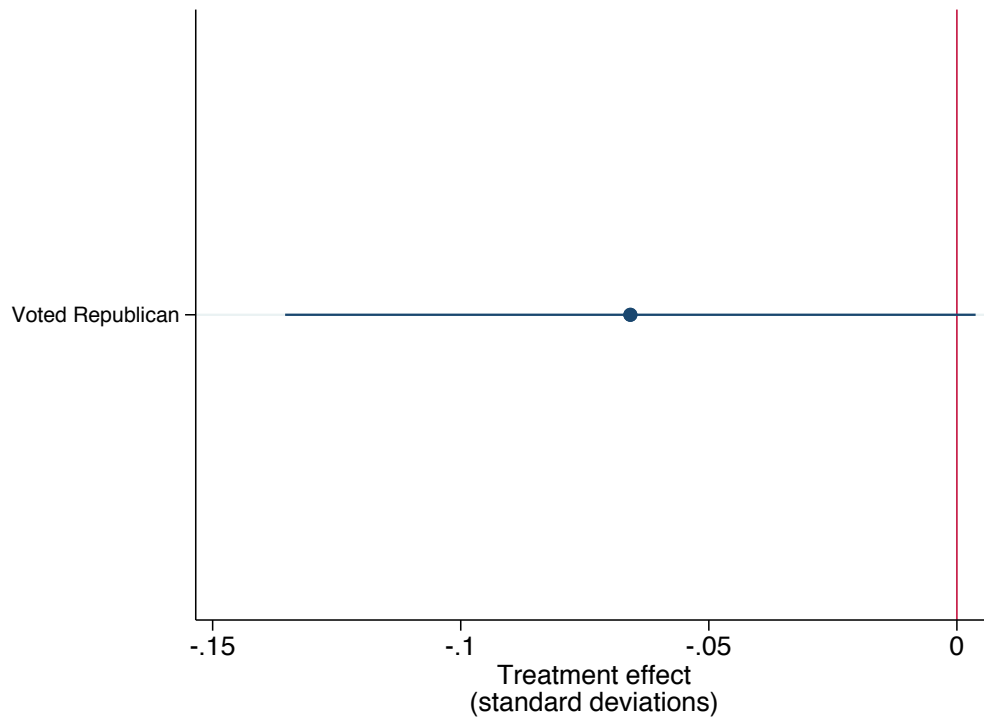
where Y_i^b is participant i 's value of some outcome measured in the baseline survey, \mathbf{X}_i is a vector of controls (household income, age, and college, male, white, Republican, and Democrat indicators), and \tilde{H}_i is baseline average daily Facebook use over the past four weeks (winsorized at 120 minutes per day) divided by the local average treatment effect on average daily Facebook use between midline and endline. This division makes experimental and non-experimental estimates comparable in the sense that they are both in units of average use per day over the past four weeks. The empty diamond markers present unconditional correlations (excluding \mathbf{X}_i from the regressions), while the empty square markers present estimates conditional on \mathbf{X}_i . All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A33: **Baseline Opinions about Facebook**



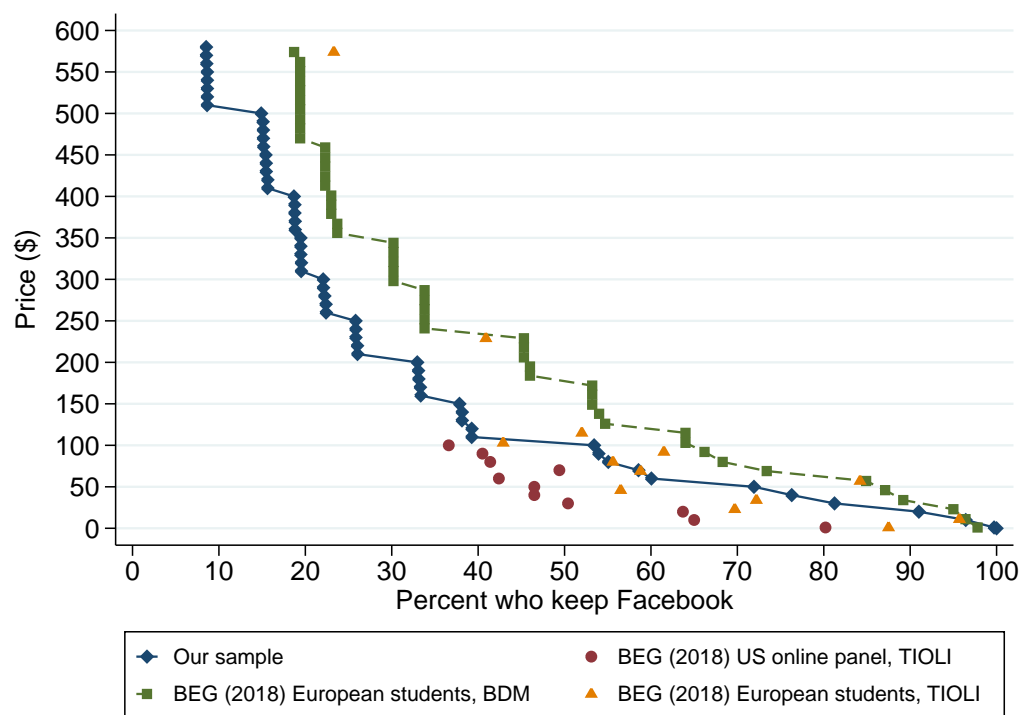
Notes: These figures present histograms of Facebook opinions from the baseline survey. Variables are re-signed so that “positive” views about Facebook are positive, “negative” views about Facebook are negative, and zero is neutral. See Section 2.3 for variable definitions.

Figure A34: **Effects on Secondary Outcomes**



Notes: This figure presents local average treatment effects of Facebook deactivation estimated using Equation (1). All variables are normalized so that the Control group endline distribution has a standard deviation of one. Error bars reflect 95 percent confidence intervals. See Section 2.3 for variable definitions.

Figure A35: Comparison to Demand Curves from Brynjolfsson et al. (2018)



Notes: This figure compares our demand curve (based on the distribution of willingness-to-accept to deactivate for the four weeks after midline) to demand curves for one month of Facebook use from Brynjolfsson, Eggers, and Gannamaneni (2018). “TIOLI” refers to their “take it or leave it” elicitation, whereas “BDM” refers to their BDM elicitation. For their European student sample, valuations were elicited in Euros; we transform these to dollars using the exchange rate when the elicitation was carried out in July 2017.

H Model Appendix

H.1 Derivations of Facebook Valuations

For these derivations, denote $\mathbf{c} = \{c_1, c_2, \dots, c_T\}$ as the composite good consumption vector, $\mathbf{f} = \{f_1, f_2, \dots, f_T\}$ as the Facebook consumption vector, and write $\tilde{U}_1(\cdot; f_{\tau-1})$ more precisely as $\tilde{U}_1(\mathbf{c}, \mathbf{f}; f_{\tau-1})$.

WTA for month 1 deactivation as of midline

Find the $v_{1,1}(1, 1)$ that equates perceived utility with Facebook to perceived utility without Facebook:

$$\begin{aligned}\tilde{U}_1(\mathbf{c}, \{1, 1, 1, \dots\}; 1) &= \tilde{U}_1(\mathbf{c}, \{0, 1, 1, \dots\}; 1) + v_{1,1}(1, 1) \\ W + \underbrace{\phi + \alpha + \xi + \omega_1}_{t=1} + \underbrace{\phi + \alpha + \xi}_{t=2} + \sum_{t=3}^T (\phi + \alpha + \xi) &= W + \underbrace{0}_{t=1} + \underbrace{\alpha + \xi}_{t=2} + \sum_{t=3}^T (\phi + \alpha + \xi) + v_{1,1}(1) \\ v_{1,1}(1, 1) &= \phi + \alpha + \xi + \omega_1 + \phi\end{aligned}$$

Treatment group: WTA for month 2 deactivation as of midline

$$\begin{aligned}\tilde{U}_1(\mathbf{c}, \{0, 1, 1, \dots\}; 1) &= \tilde{U}_1(\mathbf{c}, \{0, 0, 1, \dots\}; 1) + v_{2,1}(0, 1) \\ W + \underbrace{0}_{t=1} + \underbrace{\alpha + \xi}_{t=2} + \underbrace{\phi + \alpha + \xi}_{t=3} + \sum_{t=4}^T (\phi + \alpha + \xi) &= W + \underbrace{0}_{t=1} + \underbrace{0}_{t=2} + \underbrace{\alpha + \xi}_{t=3} + \sum_{t=4}^T (\phi + \alpha + \xi) + v_{2,1}(0, 1) \\ v_{2,1}(0, 1) &= \alpha + \xi + \phi\end{aligned}$$

Control: WTA for month 2 deactivation as of midline

$$\begin{aligned}\tilde{U}_1(\mathbf{c}, \{1, 1, 1, \dots\}; 1) &= \tilde{U}_1(\mathbf{c}, \{1, 0, 1, \dots\}; 1) + v_{2,1}(1, 1) \\ W + \underbrace{\phi + \alpha + \xi + \omega_1}_{t=1} + \underbrace{\phi + \alpha + \xi}_{t=2} + \underbrace{\phi + \alpha + \xi}_{t=3} + \sum_{t=4}^T (\phi + \alpha + \xi) &= W + \underbrace{\phi + \alpha + \xi + \omega_1}_{t=1} + \dots \\ &\dots \underbrace{0}_{t=2} + \underbrace{\alpha + \xi}_{t=3} + \sum_{t=4}^T (\phi + \alpha + \xi) + v_{2,1}(1, 1) \\ v_{2,1}(1, 1) &= \phi + \alpha + \xi + \phi\end{aligned}$$

Treatment: WTA for month 2 deactivation as of endline

$$\begin{aligned}\tilde{U}_2(\mathbf{c}, \{0, 1, 1, \dots\}; 0) &= \tilde{U}_2(\mathbf{c}, \{0, 0, 1, \dots\}; 0) + v_{2,2}(0, 0) \\ W + \underbrace{\xi + \omega_2}_{t=2} + \underbrace{\phi + \xi}_{t=3} + \sum_{t=4}^T (\phi + \xi) &= W + \underbrace{0}_{t=2} + \underbrace{\xi}_{t=3} + \sum_{t=4}^T (\phi + \xi) + v_{2,2}(0, 0) \\ v_{2,2}(0, 0) &= \xi + \omega_2 + \phi\end{aligned}$$

Control: WTA for month 2 deactivation as of endline

$$\begin{aligned} \tilde{U}_2(\mathbf{c}, \{1, 1, 1, \dots\}; 1) &= \tilde{U}_2(\mathbf{c}, \{1, 0, 1, \dots\}; 1) + v_{2,2}(1, 1) \\ W + \underbrace{\phi + \alpha + \xi + \omega_2}_{t=2} + \underbrace{\phi + \alpha + \xi}_{t=3} + \sum_{t=4}^T (\phi + \alpha + \xi) &= W + \underbrace{0}_{t=2} + \underbrace{\alpha + \xi}_{t=3} + \sum_{t=4}^T (\phi + \alpha + \xi) + v_{2,2}(1, 1) \\ v_{2,2}(1, 1) &= \phi + \alpha + \xi + \omega_2 + \phi \end{aligned}$$