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Are Facebook and other social media platforms bad for our well-being?

September 09, 2019 by Esteban Ortiz-Ospina

- Several surveys show that frequent users of social media tend to have problems with anxiety, depression and sleep problems. Newspapers often interpret this correlation causally, and paint a scary picture in which social media is to blame for large and persistent mental health problems.
- If you dig deeper, you find that comparisons across individuals with different levels of social media use can yield conflicting results – depending on how you slice the data you get a different perspective.
- Surveys that track individuals over time suggest that the relationship is reciprocal (depression and social media use go hand in hand), and social media use only predicts a small change in well-being over time.
- Large and credible experimental studies have found that quitting facebook has a positive but small short-run causal impact on well-being, detectable only on some specific outcome measures.
- Overall, the evidence does not support the sweeping newspaper headlines. There is much to be learned about how to make better use of these complex digital platforms, but for this we need more granular data to unpack the different effects that certain types of content have on specific population groups.

Facebook, Youtube, Whatsapp, WeChat, and Instagram are the top five social media platforms globally, with over one billion active users each. In most rich countries the proportion of young people using online social networks exceeds 90% and teens spend on average more than 4 hours online every day.

We're repeatedly told in the news that social media is bad for us. The stories are often alarming, suggesting social media and smartphones are responsible for sweeping negative trends, from rising suicide rates in the US, to

limit how much time we spend online.

At the same time, most of us would agree that digital social media platforms can make our lives easier in many ways – opening doors to new information, connecting us with people who are far away, and helping us to be more flexible with work.

What does the research tell us about the causal impact of social media use on our well-being?

In a nutshell: From my reading of the scientific literature, I do not believe that the available evidence today supports the sweeping newspaper headlines.

Yes, there is evidence suggesting a causal negative effect, but the size of these causal effects is heterogeneous and much, much smaller than the news headlines suggest.

There are still plenty of good reasons to reflect on the impact of social media in society, and there is much we can all learn to make better use of these complex digital platforms. But this requires going beyond universal claims.

Let's take a look at the evidence.

Comparisons across individuals

Most of the news stories that claim social media has a negative impact on well-being rely on data from surveys comparing individuals with different levels of social media use as evidence. In the chart below, I show one concrete example of this type of correlational analysis.

The chart plots the average amount of time that people spend on social media each day, among people who are and aren't happy with the amount of time spent on these platforms.

The data comes from an app called Moment, which tracks the amount of time users spend on social media platforms on their smartphones. The app also asks people a yes/no question: "Are you happy with your time spent?"

As we can see there is quite a bit of heterogeneity across platforms, but the pattern is clear: People who say they are happy with how much time they spend on social media spend less time on these platforms. Or put differently, using social media more heavily is correlated with less satisfaction.

This is certainly interesting, but we should be careful not to jump to conclusions – the correlation actually raises as many questions as it answers.[1]

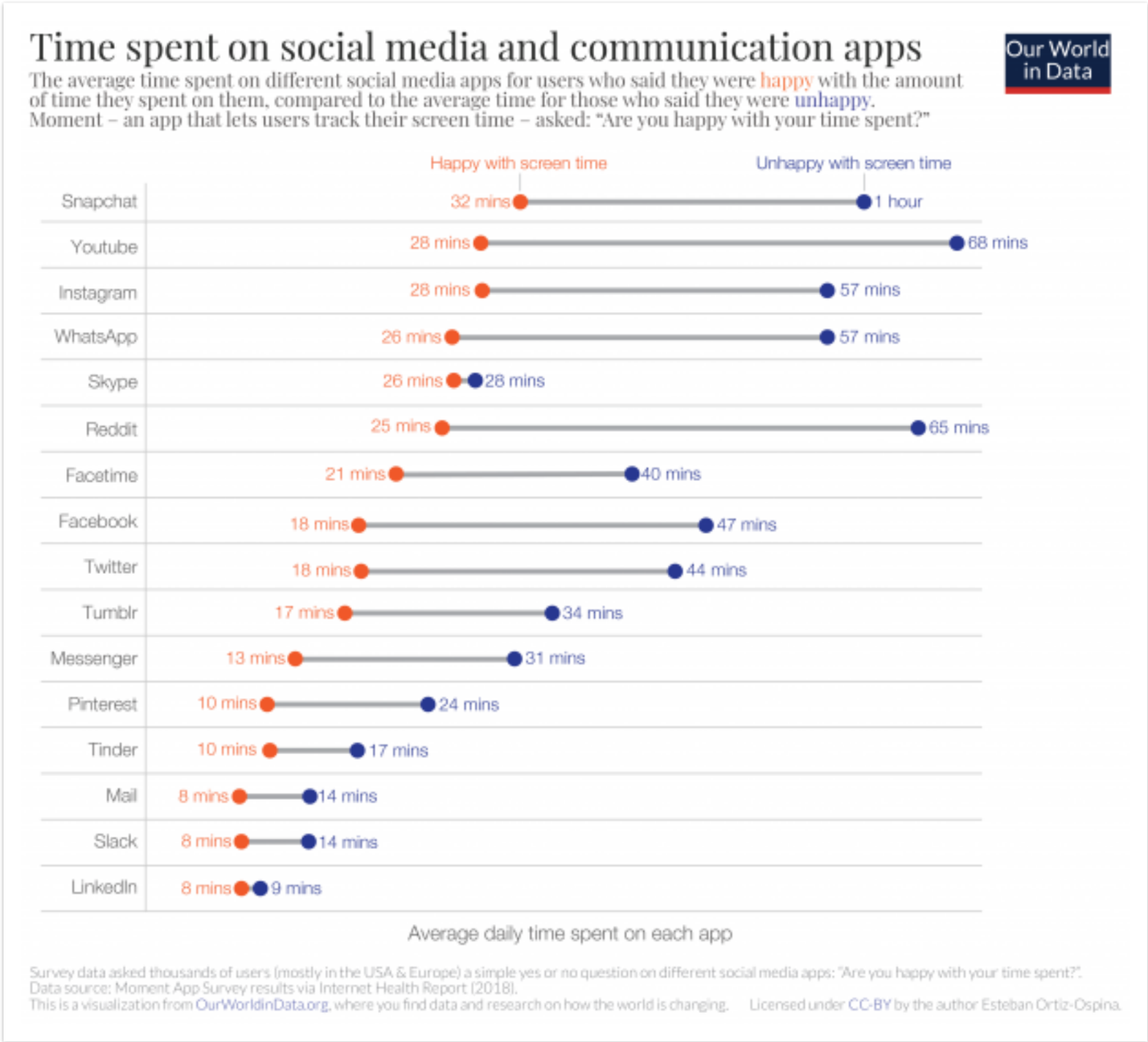
Does this pattern hold if we control for user characteristics like age and gender? Would we get similar results if we focused on other measures of well-being beyond 'happy with time spent'?

The answer to both questions is 'no'. Depending on what outcome variables you focus on, and depending on which demographic characteristics you account for, you will get a different result. It is therefore not surprising that some empirical academic studies have found negative correlations; while others actually report positive correlations.[2]

Amy Orben and Andrew Przybylski published a paper earlier this year in the journal *Nature* where they illustrated that given the flexibility to analyze the data (i.e. given the number of possible choices researchers have when it comes to processing and interpreting the vast data from these large surveys), scientists could have written thousands of papers describing positive, negative and non-significant associations. Different ways of measuring well-being and social media use will yield different results, even for the same population.[3]

Even the answers to some of the most fundamental questions are unclear: Do we actually know in which direction the relationship might be going? Does frequent social media use translate into lower happiness, or is it the other way around – are anxious, stressed or depressed people particularly prone to use social media?

This takes us to another branch of the literature: longitudinal studies that track individuals over time to measure changes in social media use and well-being.



Studies of social media use and well-being over time

One longitudinal study that has received much attention on this subject was published by Holly Shakya and Nicholas Christakis in the *American Journal of Epidemiology* in 2017. It used data from a survey that tracked a group of 5,208 Americans over the period 2013 – 2015, and found an increase in Facebook activity was associated with a future *decrease* in reported mental health.[4]

Two years later, Amy Orben, Tobias Dienlin and Andrew Przybylski published a paper in the *Proceedings of the National Academy of Sciences* using a similar source of data. They relied on a longitudinal survey from the UK covering 12,672 teenagers over the period 2009 – 2016, and reached a different conclusion. They found that there was a small and reciprocal relationship: social media use predicted small decreases in life satisfaction; but it was also the case that decreasing life satisfaction predicted subsequent increases in social media use.[5]

Summarizing their research in *The Guardian*, Amy Orben and Andrew Przybylski explained: *"we did find some small trends over time – these were mostly clustered in data provided by teenage girls… But – and this is key – it's not an exaggeration to say that these effects were minuscule by the standards of science and trivial if you want to inform personal parenting decisions. Our results indicated that 99.6% of the variability in adolescent girls' satisfaction with life had nothing to do with how much they used social media."*

In their paper Orben and co-authors argue again that these large datasets allow many different types of empirical tests; so it is natural to expect conflicting results across studies, particularly if there is noise in measurement and the true effect sizes are small.[6]

Orben and co-authors tested thousands of empirical tests and indeed, some of these tests could have been interpreted on their own as evidence of a strong negative effect for social media – but clearly the broader picture is important. When looking at the results from all their thousands of tests, they concluded that social media effects were nuanced, small at best and reciprocal over time.[7]

Facebook experiments

Establishing causal impacts through observational studies that track the well-being of individuals over time is difficult.

First, there are measurement issues. Long-run surveys that track people are expensive and impose a high burden on participants, so they do not allow in-depth high-frequency data collection, and instead focus on broad trends across a wide range of topics. Orben and co-authors, for example, rely on the *Understanding Society Survey* from the UK, which covers a wide range of themes such as family life, education, employment, finance, health and wellbeing. Specifically on social media use, this survey only ask how many hours teenagers remember using apps during normal weekdays, which is of course an informative but noisy measure of actual use (a fact that Orben and co-authors mention in their paper).

Second, there are limitations from unobservable variables. Frequent users of social media are likely different from less frequent users in ways that are hard to measure – no matter how many questions you include in a survey, there will always be relevant factors you cannot account for in the analysis.

Given these limitations, an obvious alternative is to run an experiment: you can, for example, offer people money to stop using Facebook for a while and then check the effect by comparing these "treated participants" against a control group that is allowed to continue using Facebook as usual.[8]

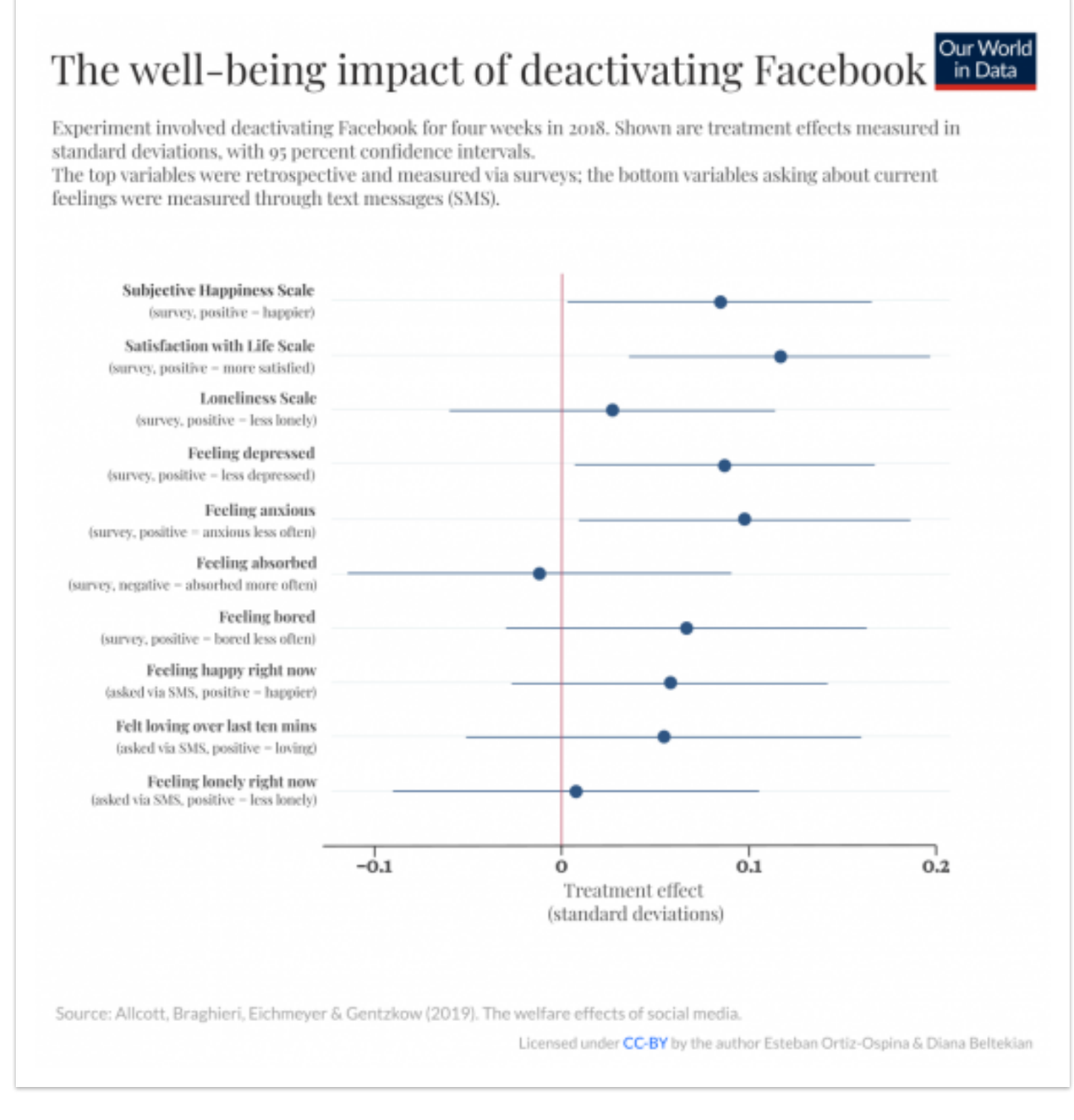
Several recent papers followed this approach. Here I'll discuss one of them in particular, because I find its approach particularly compelling. The analysis relies on a much larger sample than other experiments, and the researchers registered a pre-analysis plan to insure themselves against the 'analytical flexibility' criticisms discussed above.[9]

This experiment was done by four economists: Hunt Allcott, Sarah Eichmeyer, Luca Braghieri and Matthew Gentzkow. They recruited 2753 Facebook users in the US, and randomly selected half of them to stop using Facebook for four weeks. They found that deactivating Facebook led to small but statistically significant improvements in some measures of self-reported well-being.[10]

The chart below shows a summary of their estimated effect sizes. As we can see, for all measures the effects are small (amounting to only around a tenth of the standard deviation of the studied variable), and in most cases the effects are actually not statistically significant (the 'whiskers' denoting 95% confidence intervals often include an effect of size zero).[11]

Allcott and co-authors also compare the treatment effects against the observational correlations in their sample and conclude: "*the magnitudes of our causal effects are far smaller than those we would have estimated using the correlational approach of much prior literature*".[12]

The relatively small experimental effect of social media use on subjective well-being has been replicated. Another experiment conducted almost at the same time and with a very similar approach, produced similar results.[13]



Mechanisms

In the US, where many of these studies have been conducted, roughly two-thirds of people get news from social media, and these platforms have already become a more widely accessed source of news than print newspapers.

I think this link between social media, news consumption and well-being is key.

In their experiment, Allcott and coauthors found that quitting Facebook did not lead people to use alternative online or offline news sources; so those in the treatment group reported spending less time consuming news overall. This tells us that the effect of social media on well-being is not only relatively small, but also likely mediated by the specific types of content and information that people are exposed to.[14]

The fact that news consumption via social media might be an important factor affecting well-being is not surprising if we consider that news are typically biased towards negative content, and there is empirical research suggesting people are triggered, at a physiological level, when exposed to negative news content.[15]

Building and reinforcing a scary overarching narrative around "the terrible negative effects of social media on well-being" is unhelpful because this fails to recognise that social media is a large and evolving ecosystem where billions of people interact and consume information in many different ways.

What are the key takeaways?

The first takeaway is that the association between social media and well-being is complex and reciprocal, which means that simple correlations can be misleading. A careful analysis of survey data reveals that, yes, there is a correlation between social media and well-being; but the relationship works both ways. This becomes clear from the longitudinal studies: Higher use of social media predicts decreases in life satisfaction; and decreasing life satisfaction also predicts subsequent increases in social media use.

The second takeaway is that the causal effect of social media on well-being is likely small for the average person. The best empirical evidence suggests the impact is much smaller than many news stories suggest and most people believe.

There is much to be learned about how to make better use of these digital platforms, and there is an important discussion to be had about the opportunity costs of spending a large fraction of our time online. But for this we need to look beyond the sweeping newspaper headlines.

We need research with more granular data to unpack diverse use patterns, to understand the different effects that certain types of content have on specific population groups. Time alone is a poor metric to gauge effects. As Andrew Przybylski put it: nobody would argue we should study the causes of obesity by investigating 'food time'.

Going forward, the conversation in policy and the news should be much more about strategies to promote positive content and interactions, than about one-size-fits-all restrictions on social media 'screen time'.

Footnotes

1. A concrete example of how this correlational evidence is reported in the news can be found in this article from The Economist, where a very similar chart is presented under the headline "How heavy use of social media is linked to mental illness".
2. Here are some examples of studies reporting a positive correlation between social media use and subjective well-being: – Kim, J. and Lee, J. (2011). The facebook paths to happiness: Effects of the number of face- book friends and self-presentation on subjective well-being. CyberPsychology, Behavior, and Social Networking, 14(6):359–364 – Gonzales, A. L. and Hancock, J. T. (2011). Mirror, mirror on my facebook wall: Effects of exposure to Facebook on self-esteem. Cyberpsychology, Behavior, and Social Networking, 14(1-2):79–83. – Valenzuela, S., Park, N., and Kee, K. F. (2009). Is there social capital in a social network site?: Facebook use and college students' life satisfaction, trust, and participation. Journal of Computer-Mediated Communication, 14(4):875–901.
3. It's also important to mention that the correlations between social media use and wellbeing are not generally comparable across countries and time. For example, commentators often highlight that depression and suicide rates among adolescents in the US have been going up ever since the rise of smartphone, and that this is a clear red flag. Yet as Andrew Przybylski explained in a recent interview, this is just not a general observation: *"You don't see things like it in more tech-saturated countries, or in other industrialized countries. You don't see, two or three years ahead of the United States, the South Koreans and the Japanese having spiking rates of self-harm or depression"*.
4. The full reference is: Shakya, H. B., & Christakis, N. A. (2017). Association of Facebook use with compromised well-being: A longitudinal study. *American journal of epidemiology*, *185*(3), 203-211. Online here.
5. The full reference is: Orben, A., Dienlin, T., & Przybylski, A. K. (2019). Social media's enduring effect on adolescent life satisfaction. Proceedings of the National Academy of Sciences, 116(21), 10226-10228. Online here.
6. What's more, if the cutoff for a statistically significant finding is 5% and you test 100 independent hypotheses of which in reality none are true, you will (in expectation) still find 5 significant associations in either direction simply by chance. Here is a good example and discussion of how this works: https://fivethirtyeight.com/features/science-isnt-broken/#part1.
7. One more piece of evidence that confirms this conclusion, comes from a more recent long-run study that tracked 500 adolescents for eight consecutive years, between the ages of 13 and 20, and found that *"increased time spent on social media was not associated with increased mental health issues across development."* The full reference is Coyne, S. M., Rogers, A. A., Zurcher, J. D., Stockdale, L., & Booth, M. (2019). Does time spent using social media impact mental health?: An eight year longitudinal study. *Computers in Human Behavior*, 106160. Available online here.
8. Experiments like this will tell us the short-run effect among experiment participants. This is of course not a silver bullet – one could raise concerns about how generalizable the estimates are (e.g. Are participants representative of the general population? Do effects remain over time?). No method is perfect, but experiments do address the issue of causality, so they provide critical evidence to understand the link between social media and well-being.
9. The full reference is: Allcott, H., Braghieri, L., Eichmeyer, S., & Gentzkow, M. (2019). The welfare effects of social media (No. w25514). National Bureau of Economic Research. Available online here.
10. They recruit participants by giving them electronic gift cards. Loosely speaking, the idea was that participants were paid to play a lottery: Everybody received the monetary incentive, but only those who 'lost the lottery' had to deactivate their account.
11. The paper provides the following definition for the variables: *The happiness variable is the average response to two questions from the Subjective Happiness Scale (Lyubomirsky and Lepper 1999), asking how happy participants were over the past four weeks and how happy they were compared to their peers. Life satisfaction is the sum of responses to three questions from the Satisfaction with Life Scale (Diener et al. 1985), such as the level of agreement with the statement, "During the past 4 weeks, I was satisfied with my life." Loneliness is the Three-Item Loneliness Scale (Hughes et al. 2004). Finally, depressed, anxious, absorbed, and bored reflect how much of the time during the past four weeks respondents felt each emotion, using questions from the European Social Survey well-being module (Huppert et al. 2009). The daily text messages allowed us to measure the aspects of subjective well-being that are most important to record in the moment instead of retrospectively. This approach builds on the Experience Sampling Method of Csikszentmihalyi and Larson (2014) and Stone and Shiffman (1994). The variable SMS happiness is the answer to the question, "Overall, how happy do you feel right now on a scale from 1 (not at all happy) to 10 (completely happy)?" The variable SMS positive emotion is an indicator variable for whether the participant reports a positive emotion when asked, "What best describes how you felt over the last ten minutes?", with possible responses such as "angry," "worried," "loving/tender," etc. Finally, SMS not lonely uses the answer to the question, "How lonely are you feeling right now on a scale from 1 (not at all lonely) to 10 (very lonely)?"*
12. To get a sense of the magnitudes of these effects, the authors discuss effect sizes in their original units, focusing on the measures with the largest effects. Happiness is the average response to two questions 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. This is of course very, very small. In fact, the authors explain that given how small these effect sizes are, they would have been unlikely to have sufficient statistical power to detect any effects if they had used sample sizes similar to those from previous experiments in this field, all of which are much smaller.
13. In this other experiment, quitting Facebook for a week led to a small but statistically significant decrease in self-reported feelings of depression, yet there was no significant effect on other measures of life satisfaction. The full reference is: Mosquera, R., Odunowo, M. M., McNamara, T., Guo, X., & Petrie, R. (2018). The Economic Effects of Facebook.
14. This effect has also been replicated: The other contemporary experiment that followed a similar approach (Mosquera et al. 2019), found that individuals facing a Facebook restriction reduced their news consumption.
15. A new paper published in the Proceedings of the National Academy of Sciences concludes that all around the world, the average human is more physiologically activated by negative than by positive news stories. The authors come to this conclusion through an experiment: Participants watched 7 randomly ordered BBC World News stories on a laptop computer while wearing noise-cancelling headphones and sensors on their fingers to capture skin conductance and blood volume pulse. The experiment was conducted with 1,156 participants across 17 countries: Brazil, Canada, Chile, China, Denmark, France, Ghana, India, Israel, Italy, Japan, New Zealand, Russia, Senegal, Sweden, the United Kingdom, and the United States. The full reference is Soroka, S., Fournier P., & Nir L., (2019) Cross-national evidence of a negativity bias in psychophysiological reactions to news. Proceedings of the National Academy of Sciences. DOI: 10.1073/pnas.1908369116. Available online here.