

The Effects of Facebook Access during the 2022 French Presidential Election: Can We Incentivize Citizens to be Better Informed and Less Polarized?

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Abstract

Despite its early promise to empower and inform, many political and social observers fret that social media has become a cesspool of division and misinformation that threatens its users' mental health and the health of democracy. Social media platforms are rife with polarizing content, misinformation, disinformation, and are designed to ensnare its users. Nonetheless, people choose to use social media platforms, making it difficult to infer the causal effects of social media platforms from either its content or affordances. Recent research addresses this problem by conducting randomized field experiments that incentivize users to deactivate their Facebook accounts. Facebook continues to be the most popular social media platform in most countries and provides a meaningful window into the social and political effects of social media more generally. A parallel line of research recruits survey experiments to show that minimalist informational treatments that encourage people to consider the accuracy of information that they receive via social media, for instance, helps counteract the negative effects the kinds of misinformation that people encounter in social media environments. We combine, replicate, and extend previous research by conducting a preregistered randomized field experiment during the 2022 French presidential election that incentivizes some participants to deactivate their Facebook account and provides some of those participants with minimalistic informational treatments. In line with previous research, we find that Facebook informs people about politics, but also reduces subjective well-being. We find little evidence that Facebook affects either social or political polarization. In contrast with previous research, we find that minimalistic informational treatments have limited effects on political knowledge and practically no effects on subjective well-being and polarization.

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In the space of the past two decades, optimism that the Internet would provide a deliberative space for the free exchange of ideas and give voice and a tool for political organization to the less powerful and oppressed has given away to deep pessimism about the deleterious social and political effects of social media (Zhao 2014). Instead of reasoned, respectful deliberation about politics, messages on social media often include invective along with arguments put forth in bad faith that engender outrage and polarization (Bail 2022; Kubin and von Sikorski 2021; Rathje, Van Bavel, and Linden 2021; Settle 2018; Van Bavel, et al 2021). Because social media sites, such as Facebook, use algorithms to provide its user with diverse set of options that attract engagement, people are more likely to be exposed to information about news and politics that they may not have sought out (Bashky et al. 2015; Eady, et al. 2019; Fletcher, Robertson, and Nielsen 2021). Exposure to counter-attitudinal social media posts that come from acquaintances or friends of friends can increase polarization (Anspach 2016; Bail 2022; Rathje, Van Bavel, and Linden 2021 but see Levy 2021). Moreover, people with a strong interest in politics are more likely to use social media to seek out information about politics (Cacciatore et al. 2018), and those who do use social media to learn about politics often become more politically engaged in the process (Lee, Shin, and Hong 2018). At the same time, people do not always read information carefully while scrolling, diminishing the quality of some social media users' political knowledge (Anspach, Jennings, and Arceneaux 2019).

Much of the research on the effects of social media either come from observational studies that report correlations between social media use and political attitudes and behavior or from survey and lab experiments that isolate the effects of specific pieces of information in a stylized environment. Observational studies can provide a descriptively accurate understanding of how people behave on social media, but it is difficult to make strong causal inferences from these kinds of studies given the degree of selectivity in social media settings. Survey experiments allow researchers to isolate the causal effects of encountering particular content in a stylized setting, but without a more complete assessment of one's personalized social media environment, it is difficult to know whether the internally valid causal effects observed in these experiments would manifest in real-world settings.

Randomized field experiments offer a way to address both limitations, because they use experimental methods to isolate causal effects in real-world settings. Two innovative field experiments employing a deprivation design that incentivized some participants to deactivate their Facebook account. The first of these studies was conducted during the 2018 midterm elections in the United States, and these scholars found that giving up Facebook for a month increased happiness, reduced polarization, but also reduced levels of political engagement and knowledge (Allcott et al. 2020). A similar experiment conducted outside of an electoral context in Bosnia Herzegovina during the summer of 2019 found that those who gave up Facebook for a week were also happier and less informed, but (unexpectedly) *more* polarized toward their ethnic outgroup (Asimovic et al. 2021).

Taken together, these findings suggest that people do learn about politics from Facebook, but at the potential cost of their own subjective well-being. At the same time, they also leave open to question whether Facebook polarizes. It may have a polarizing effect in the US (Allcott et al. 2020; Anspach 2016; Bail 2022; Settle 2018), but perhaps not in other contexts. Moreover, Allcott et al. studied the effects of Facebook on political polarization (partisan and ideological), while Asimovic et al. studied the effects of Facebook on social polarization (ethnicity). One plausible, albeit post-hoc, explanation is that Facebook increases political polarization, while reducing social polarization. Another possibility is that cultural, political, or social differences between the US and Bosnia Herzegovina

explain the difference. Only additional research can provide insight into the differences in findings between the two studies.

Moreover, the deprivation experimental design used in previous research simulates what happens when people are left to their own devices once they choose to give up Facebook while it continues to exist, as opposed to a world in which Facebook (or other social media) never existed. In the Allcott et al. experiment, participants in the deprivation treatment group reported spending more time with friends, alone watching television, and less time learning about the news than they would have otherwise. Many of these individuals were habituated to getting their news from Facebook and were not prepared to substitute it with other news sources, and the experience of giving up Facebook for a month left many participants wrestling with the desire to find a way to “mindfully” engage with social media (Baym et al 2020).

A parallel stream of research, largely conducted in more controlled experimental settings, suggests that targeted interventions could help people use social media in a healthier manner. Providing people with information can motivate them to reach accurate conclusions as opposed to ones that favor their favored positions or groups. These informational treatments, in turn, reduce levels of misinformation and polarization (e.g., Groenendyk and Krupnikov 2022; Pennycook et al. 2020; Ruggeri et al. 2022). A striking feature about this stream of research is these informational treatments are rather modest. Participants in these studies are merely requested to consider the accuracy of information or to observe norms regarding civility. If these types of treatments are effective it suggests that, perhaps, people *want* to use social media in ways that are more aligned with the utopian Internet envisioned by cyberoptimists, but they need to be given a nudge to do so.

A Direct Replication and an Extension

We conducted a similar randomized field experiment in which we asked a diverse sample of Facebook voters to deactivate their Facebook account during the 2022 French presidential election. There were nearly 46 million adult Facebook users in France in 2022 (nearly 70% of its population).¹ France elects its president through a two-round system. The first-round election was held on 10 April, featuring 12 candidates. Since none of the candidates received a majority of the votes, the top two vote recipients — incumbent President Emmanuel Macron (centrist) and Marine Le Pen (far right) — competed in the second-round election held on 24 April. President Macron won the election with 58.5% of the validly casted votes.

Our experiment offers two contributions. First, we built into our experiment a direct replication of the Allcott et al. and Asimovic et al. experiments. Participants in our study were randomly assigned to a treatment arm in which they were compensated to deactivate Facebook for 25 days during the presidential election. Direct replications do more than verify the empirical scope of previous findings, they also facilitate theoretical refinement by confirming or disconfirming the scope of previous theoretical claims (Chambers 2017). France is similar and different in many ways from

¹ [https://napoleoncat.com/stats/facebook-users-in-france/2022/02/#:~:text=There%20were%2047%20495%20600,group%20\(12%20300%20000\).](https://napoleoncat.com/stats/facebook-users-in-france/2022/02/#:~:text=There%20were%2047%20495%20600,group%20(12%20300%20000).)

Bosnia Herzegovina and the US.² If we replicate the key findings of these studies, it offers further evidence that these effects of Facebook are robust across contexts.

Second, we extended previous research by testing whether deactivating Facebook coupled with minimalist informational treatments aimed at helping people better navigate and process information that they encounter in the digital sphere would counteract the negative effects of Facebook deactivation on political engagement found in previous studies as well as decrease polarization. We designed informational treatments that built on the kinds of treatments featured in other studies. Half of the participants assigned to the deactivation treatment group were randomly assigned to receive four brief messages over the course of the study that informed them about: 1) the need to see the potentially addictive nature of social media, 2) the need to recognize the social (and thus public) nature of one's behavior on social media, 3) the need to seek out a diversity of information and consider the accuracy of the news that they find in order to counter attempts at spreading misinformation (a treatment similar to Pennycook et al. 2020), and 4) the need to foster a space with civility and tolerance. We preregistered our hypotheses prior to receiving the data (<https://osf.io/xt5zg/>).

Methods

Participants

We engaged a well-respected international survey research firm to recruit 2,246 French citizens who were eligible to vote and who reported that they regularly used Facebook. We randomly assigned 1,117 of these participants to receive 80€ for deactivating their Facebook account for a little more than three weeks, starting 10 days prior to the first-round election (1 April 2022) and lasting until the day after the second-round election (25 April 2022). Participants were surveyed at three times during the study: before the study began (1 April), in between the first- and second-round elections (19 April), and after the second-round election (29 April). Participants were paid for their participation after completing all three survey waves. See the Supplemental Information (SI) for descriptive statistics.

Procedures

After participants completed the baseline survey, they were informed whether they had been randomly assigned to the deactivation treatment or the control group. Those assigned to the treatment group were instructed how to deactivate their Facebook account and we explained that deactivation did not delete their data (they could reactivate after the study) and that they would continue to have access to Facebook Messenger. The research firm tasked employees with pinging the Facebook accounts of those assigned to the treatment to ensure that the accounts were deactivated. If an account had been reactivated, the research firm sent a message to the participant

² Like the US, France is a western democracy with a presidential system, and similar to Bosnia Herzegovina the major political cleavage in France is ethno-religious (Northern African immigrants and their descendants who tend to identify as Muslims). Yet, there are important differences as well. France, unlike the US, has a multi-party system and political polarization does not reflect two opposing, equally sized party coalitions, and unlike Bosnia Herzegovina where Muslims and Christians each make up roughly 50% of the population, Christians and non-religious people in France far outnumber the adherents of Islam. In this way, France offers a less extreme case with respect to social and political polarization, while having important political cleavages nonetheless.

reminding them that they had agreed to deactivate their account for 80€ and requesting that they comply with the protocol.

Of the 1,117 participants assigned to the deactivation treatment, 547 were assigned to the pure deactivation treatment, which replicates previous studies, and 570 were assigned to receive four informational messages during the experiment. The messages were delivered via email on fixed days. The addiction message was sent on 12 April 2022, the privacy message was sent on 14 April (both before the midline survey), the accuracy message was sent on 21 April, and the civility message was sent on 22 April (before the second-round election). See the SI for the full wording of the messages.

Outcome Measures

Subjective Well-being. Participants were asked on the midline and endline surveys several questions that tapped their subjective sense of well-being. We asked people to evaluate “how satisfied are you in the life that you lead” on an 11-point scale ranging from 0 (not at all satisfied) to 10 (absolutely satisfied) where 5 indicated “neither satisfied nor dissatisfied.” In addition to making this general evaluation, participants were asked to self-report how much they felt several positive and negative discrete emotions on a 11-point scale ranging from 0 to 10 (“How much have you felt these emotions over the past two weeks?”). The list of emotions included: joy, fulfillment, anxiety, boredom, loneliness, depression, and isolation. We created a well-being index by taking the average of participants’ responses to the life satisfaction question and seven discrete emotion questions (the negative emotion items — anxiety, boredom, loneliness, depression, and isolation — were reverse coded so that larger numbers indicated positive well-being). All of these outcomes were measured by Asimovic et al, whereas Allcott et al measured happiness (similar to joy), loneliness, depression, anxiety, boredom, and life satisfaction. See the SI for summary statistics and full question wording in French.

Political Engagement. We included two measures of political engagement on the midline and endline surveys. One measured online political engagement simply: “Have you recently engaged in online discussions on social media about the elections?” (yes/no). The other measured how much time people spent recently following the news: “Last week, how many minutes did you spend reading/watching/listening to news about politics, including news on social media?” The response set offered participants the following options: 0 minutes, less than 30 minutes, between 30 and 60 minutes, between 1 and 2 hours, and 2 hours or more (similar to Allcott et al’s measure). See the SI for summary statistics and full question wording in French.

News Knowledge. Following both Asimovic et al and Allcott et al’s approach, we asked participants on the midline and endline surveys to read 12 headlines and tell us whether each was true or false. Of the 12 headlines, six described events that had actually been reported in the news in the past week, while the other six were written in the style of a fake news headline: plausible, but false. In addition, we chose or created six headlines that were about politics and six that were about entertainment or sports. Thus, we ended up with three true statements about politics, three false statements about politics, three true statements about entertainment/sports, and three false statements about entertainment/sports. See the SI for the headlines that we showed to participants in the midline survey and the endline survey (the headlines are different, since they reflect current events from the previous week).

Affective Polarization. On the midline and endline surveys, participants were asked to rate how they felt about members of different groups on an 11-point scale ranging from 0 (“you don’t like them at all”) to 10 (“You have a very warm feeling toward members of this group”). For the purpose of this project, we measured three forms of affective polarization: 1) partisan, 2) ideological, and 3) social. Similar to Allcott et al., we measured partisan and ideological polarization by taking the difference between the rating of a participant’s ingroup (their preferred party or ideological group) and outgroup (their rating of their least preferred party or opposing ideological group). Similar to Asimovic, et al, we measured social polarization by taking the difference between participants’ feelings toward citizens without an immigrant background as well as their feelings toward citizens with a Maghreb and African immigration background, which represents an important social (cultural and religious) cleavage in France. See the SI for question wording and descriptive statistics.

Manipulation Check

Figure 1 shows the effect of treatment assignment on self-reported Facebook use on the midline and endline surveys. Participants were asked “How often do you currently check your Facebook feed?” and the response set included: 0 times per week, once per week, once per day, more than once per day, and more than 10 times a day. The treatments reduced Facebook use considerably in the midline wave (treatment – control = -1.1 for both treatment arms, $p < 0.01$) and endline waves (Deactivation Only – Control = 0.78; Deactivation + Information – Control = 0.73, $p < 0.01$). On the midline survey, 37.7% of the Deactivation Only group and 35% of the Deactivation + Information group reported not check their Facebook feed at all as required by the experimental protocol, compared to just 0.01% of the control group. Given that the survey firm checked that the treatment group participants’ Facebook accounts were deactivated, we are not sure why many other continued reporting Facebook use. One possibility is that they interpreted the question as asking about their general behavior. Another possibility is that some participants found a way around the experimental protocol. Almost all field experiments contend with the issue of non-compliance (Gerber and Green 2012). In many ways this is a feature and not a bug of these experiments as it allows researchers to evaluate the effects of real-world treatments where people have agency over their behavior. Most importantly, non-compliance does not affect the internal validity of our experimental design, since we report intent-to-treat effects that compare the behavior of randomly assigned group members, irrespective of their compliance with the experimental protocol.

Note that part of the explanation for why more participants reported using Facebook in endline survey is because they were allowed to do so, since the experiment ended five days before the survey was conducted. On the endline survey, 20% of treatment group participants reported that they had opted to continue to forgo using Facebook. Of those who reported on the midline survey that they were not currently checking their Facebook feed, 33.3% in the Deactivation Only group and 35.3% in the Deactivation + Information group reported returning to pre-study levels of Facebook use. Of those, who reported that they quit using Facebook during the study, 58.9% of the Deactivation Only group and 61.2% of Deactivation + Information group reported returning to Facebook but at lower levels than before the study began.

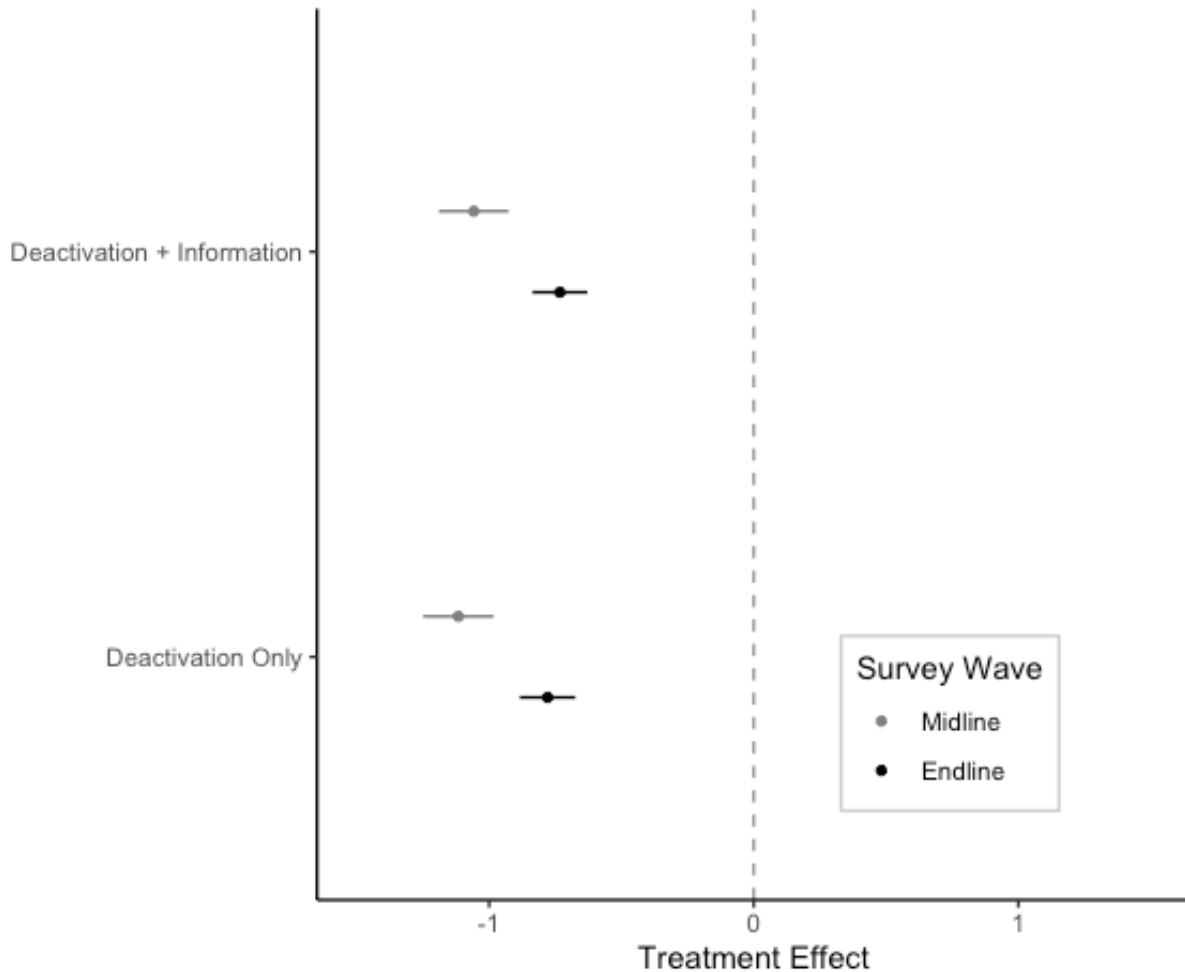


Figure 1: Manipulation Check for Self-reported Time Spent on Facebook

Note: The dots indicate the difference between the treatment and control group and horizontal lines represent 95% confidence intervals.

With respect to the informational treatments, we asked participants randomly assigned to the deactivation + information group if they “received informative messages by email indicating the negative effects of social media and online platforms?” Of the 570 participants, 74% reported that they had, 72.6% reported that they read them, and 68.6% reported that they followed their suggested guidelines.

Preregistered Hypotheses and Analysis Plan

For this project, we pre-registered several findings in line with the previous literature:

H1a. Participants in the Deactivation Only treatment condition will report higher levels of subjective well-being relative to participants in the control group.

H1b. Participants in the Deactivation + Information treatment condition will report higher levels of subjective well-being relative to participants in the control group and those in the Deactivation Only treatment condition.

H2a. Participants in the Deactivation Only treatment condition will report lower levels of news knowledge relative to participants in the control group.

H2b. Participants in the Deactivation + Information treatment condition will report higher levels of new knowledge relative to participants in the Deactivation Only treatment condition.

H3a. Participants in the Deactivation Only treatment condition will report lower levels of affective polarization relative to participants in the control group.

H3b. Participants in the Deactivation + Information treatment condition will report lower levels of affective polarization relative to participants in the Deactivation Only treatment condition.

For each outcome variable, we preregistered the following OLS regression model for testing the hypotheses above:

$$y_i = \beta_0 + \beta_1 DO_i + \beta_2 DI_i + \beta_3 y_{it-1} + e_i,$$

where y_i = the outcome variable for each participant i , DO = an indicator variable $\{0, 1\}$ for those assigned to the Deactivation Only treatment condition, DI = an indicator variable $\{0, 1\}$ for those assigned to the Deactivation + Information treatment condition, y_{it-1} = the outcome variable for each participant recorded in the previous wave (if available), and e = error term. For ease of interpretation, we report coefficient plots in the main text, but the regression models for all the analyses the follow can be found in the SI.

Findings

Substitution Effects

We asked participants in the treatment arm on the midline survey how they spent most of their time and we gave them several options from which to choose. Figure 2 reports the proportion of participants who fell into each category. For the most part, participants in the treatment arm reported spending more time with friends and family as well as watching television. There do not appear to be major differences between the Deactivation Only and the Deactivation + Information conditions. Both groups were just as likely to consume other social media (Twitter and Instagram, specifically), spent time on the Internet, read a newspaper, read news online, or to not use technology. While it appears that the Deactivation + information group was more likely to watch television than the Deactivation Only group (41.7% versus 36.4%) and the Deactivation Only group was more likely to spend time with their friends and family than the Deactivation + Information group (31.2% versus 26.5%), neither of these differences are statistically significant, which means that we cannot rule out sampling variability as a possible explanation.

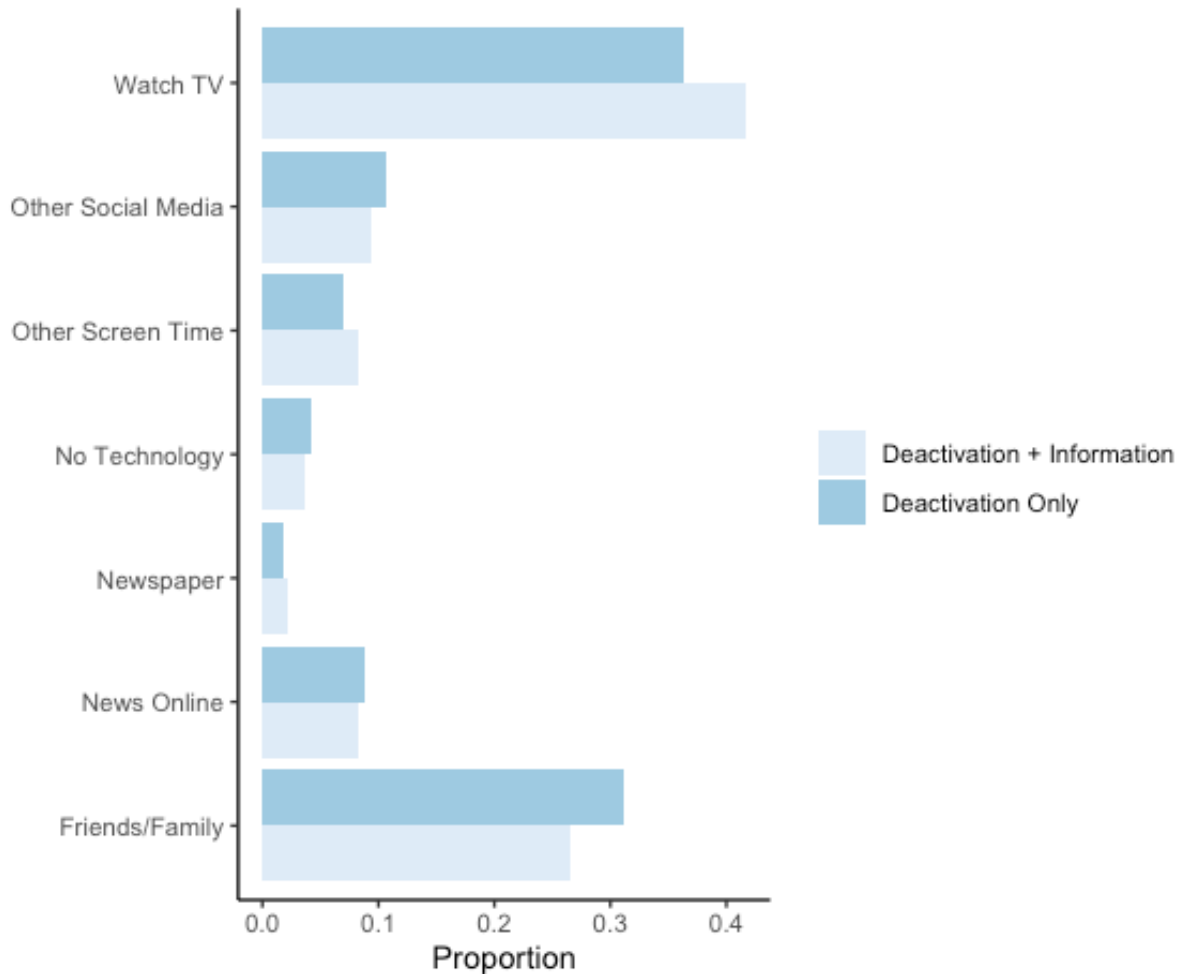


Figure 2: Where Participants in the Treatment Arms Reported Spending Most of their Time on the Midline Survey

Subjective Well-being

Figure 3 summarizes the effects Facebook deactivation on our measures of subjective well-being. The results are largely in line with previous research. By the end of the study, those in the Deactivation Only group rated their overall well-being, measured by the well-being index, more positively than those in the control group ($d = 0.05$, $p < 0.05$), which mirrors Allcott et al. and Asimovic et al's findings. Those who deactivated Facebook for nearly a month reported feeling more joy, fulfilled, better life satisfaction, less anxiety, less boredom, less loneliness, less isolation, and less depression by the end of the study. The positive effects of the Deactivation only treatment were evident on the midline survey with respect to the positive indicators (joy, fulfilled, and life satisfaction), but less so with respect to the negative indicators (anxiety, boredom, loneliness, isolation, and depression). In fact, the immediate effect of deactivating Facebook appears to have increased anxiety and boredom. Irrespective of the nuances, French citizens who deactivated Facebook for one month felt better at the end of the study, just as Americans and Bosnia Herzegovinians who deactivated their Facebook accounts. These findings are consistent with H1a and corroborate previous research.

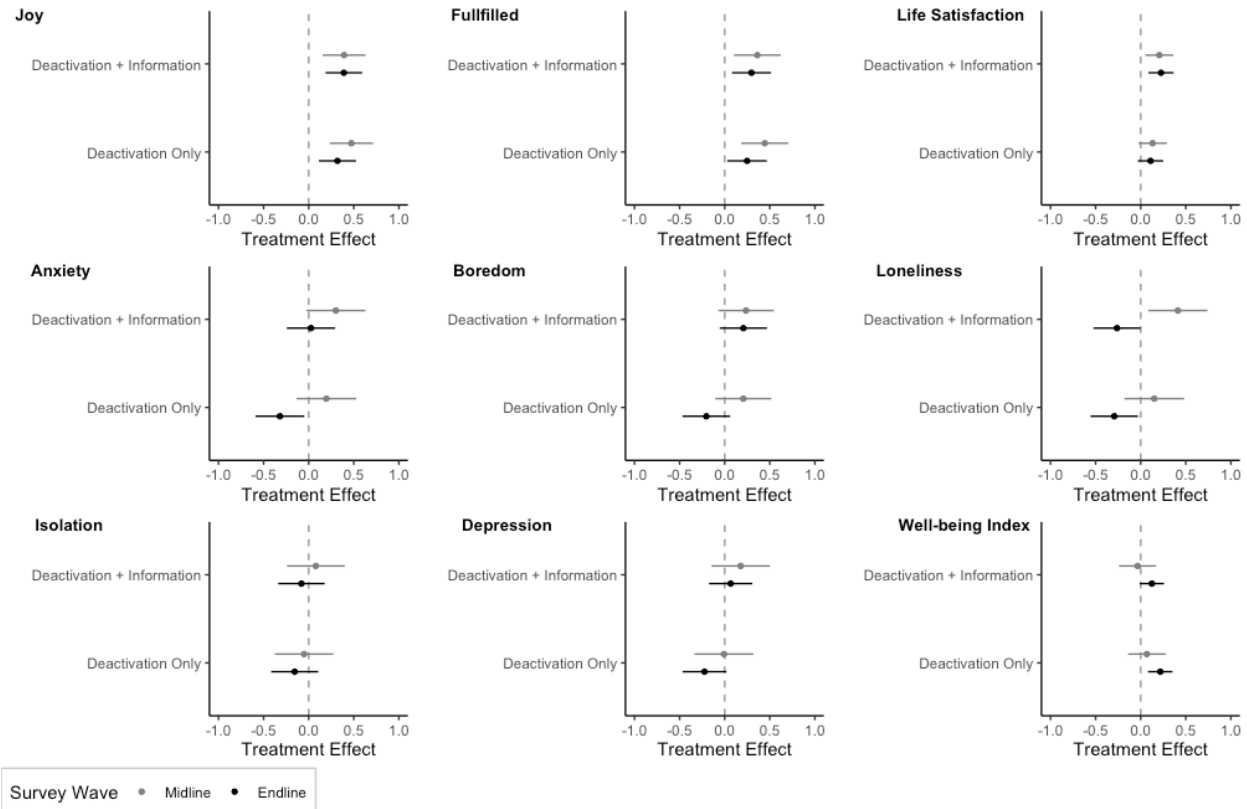


Figure 3: The Effects of Facebook Deactivation on Subjective Well-being

Note: The dots indicate the difference between the treatment and control group and horizontal lines represent 95% confidence intervals.

In contrast, we do not find consistent evidence for H1b. While the Deactivation + Information group also reported higher levels of well-being by the end of the study relative to the control group ($p < 0.05$), we do not observe that they report higher levels of well-being than those in the Deactivation Only group. If anything, by the endline survey, those in the Deactivation + Information reported feeling higher levels of anxiety and boredom than those in the Deactivation Only group.

News Knowledge and Political Engagement

In line with Alcott et al and Asimovic et al, Facebook deactivation decreased participants knowledge about *political* news ($d = -0.07$, $p < 0.05$) on the endline survey (Figure 4). Interestingly, it had no effects on people's knowledge about sports and entertainment events (non-political news). These results are consistent with H2a and replicate previous research. H2b anticipated that the information treatments would counteract the negative effects of Facebook deactivation on news knowledge. The results partially corroborate this prediction. On the midline survey, those who received the informational messages in the deactivation treatment condition, knew more about politics relative to the Deactivation Only group *and* the control group ($d = 0.08$, $p < 0.05$). However, by the endline survey, those in the Deactivation + Information group knew less about political news than the control group, similar to the Deactivation Only group.

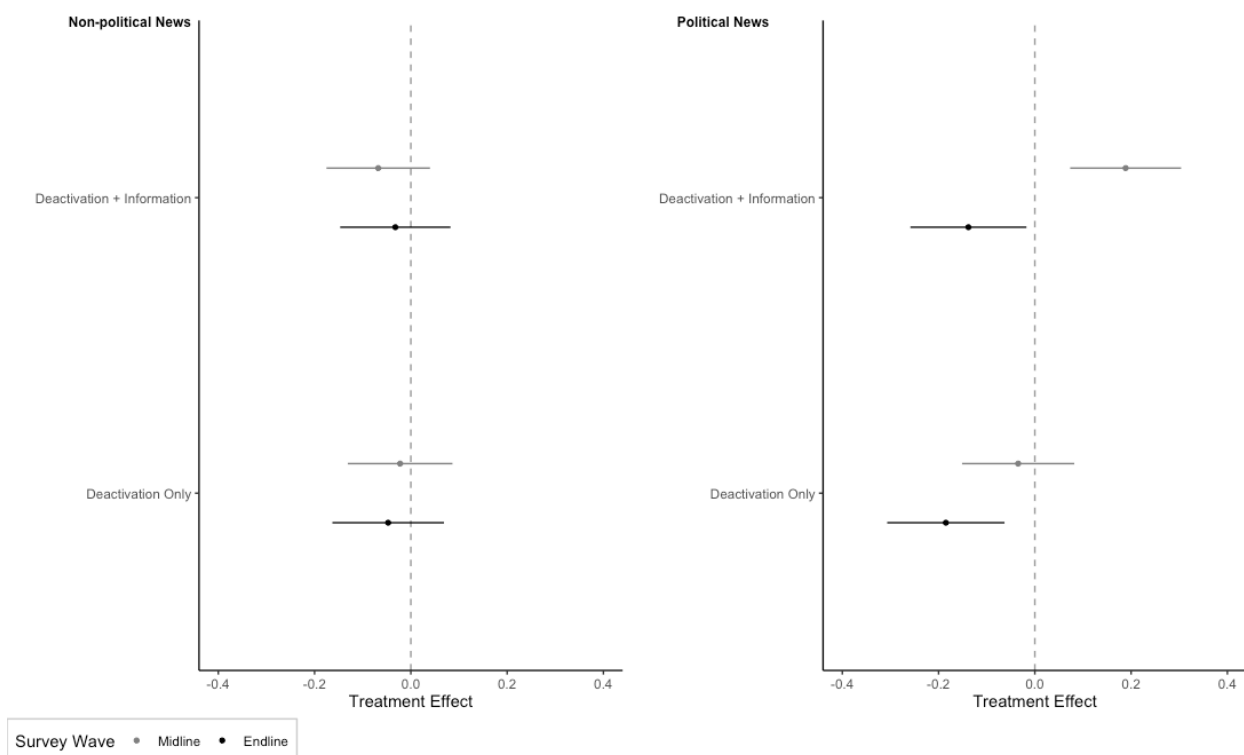


Figure 4: The Effects of Facebook Deactivation on News Knowledge

Note: The dots indicate the difference between the treatment and control group and horizontal lines represent 95% confidence intervals.

When we dig deeper, we find that the negative effects of the Deactivation Only treatment on news knowledge on the endline survey were largely driven by participants' diminished ability to identify true political news ($p < 0.05$). Facebook deactivation had essentially no effect on people's belief in false news. Put differently, participants in the control group – who continued to use Facebook – were *not* more likely to believe fake news headlines relative to those who deactivated Facebook. Likewise, the Deactivation + Informational treatment increased participants' knowledge of true political news in the midline survey and this positive effect dissipated by the endline survey. The informational treatments had essentially no effect on people's ability to identify fake news.

A possible explanation for the negative effects of Facebook deactivation on political news knowledge is that those in the deactivation treatment arm reported spending less time following the news in the previous week ($p < 0.05$, see the SI). Participants in the Deactivation + Information treatment condition were also less likely to follow the news in the previous week, which indicates that the informational treatments did not nudge people who deactivated Facebook to seek it out through other means (other social media, offline news, etc.).

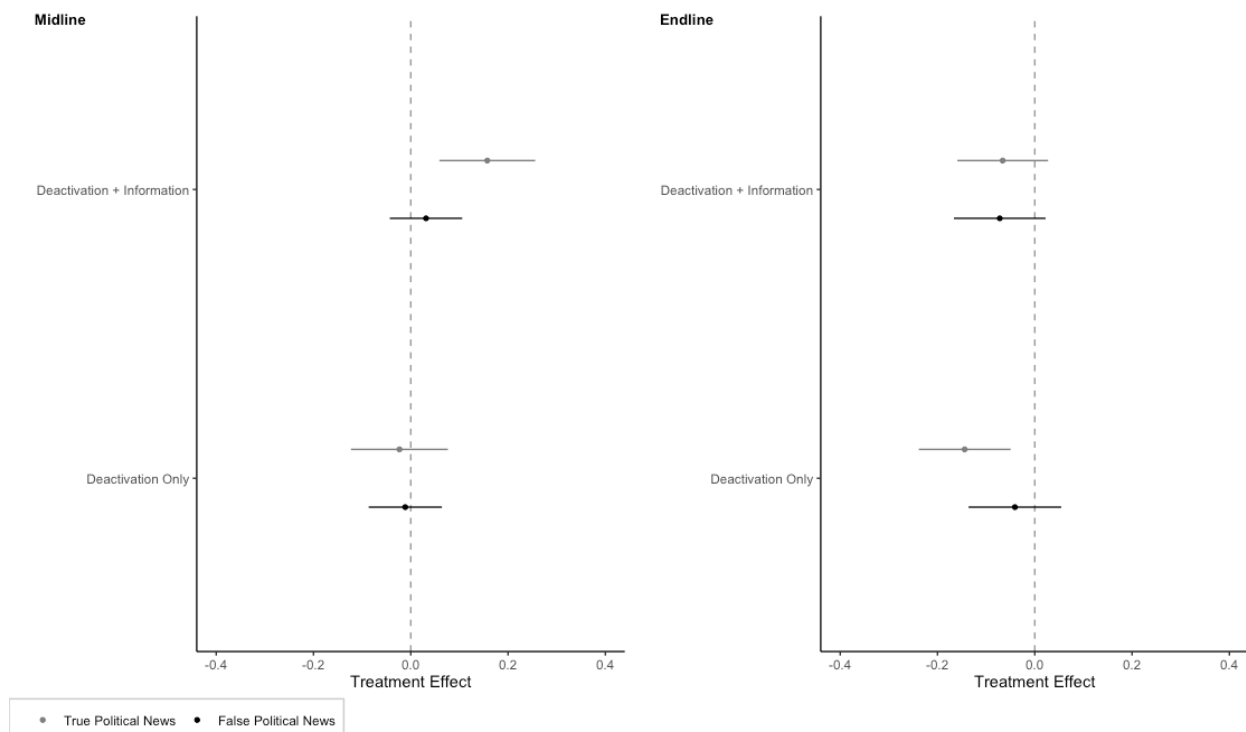


Figure 5: The Effects of Facebook Deactivation on Discernment Between True and False Political News

Note: The dots indicate the difference between the treatment and control group and horizontal lines represent 95% confidence intervals.

Affective Polarization

Recall that H3a and H3b predicted that Facebook deactivation would reduce affective polarization, which is in line with Alcott et al., who found that Facebook deactivation reduced affective political polarization, and in contrast with Asimovic et al., who found (contrary to their preregistered expectations) that Facebook deactivation increased social polarization. Our results, shown in Figure 6, contradict both studies. We find that Facebook deactivation had essentially no effect on partisan polarization, ideological polarization, or social polarization (feelings toward those with and without Maghreb or African ancestry). Not only are all of the effects that we observed statistically insignificant ($p > 0.05$), the effect size in almost every case is near zero. The only exception to this pattern is that the Deactivation + Information treatment may have slightly increased partisan polarization on the midline survey – although this effect is not statistically significant. In sum, we find no evidence that either Facebook deactivation or Facebook deactivation supplemented with information treatments has a robust consistent effect on affective polarization.

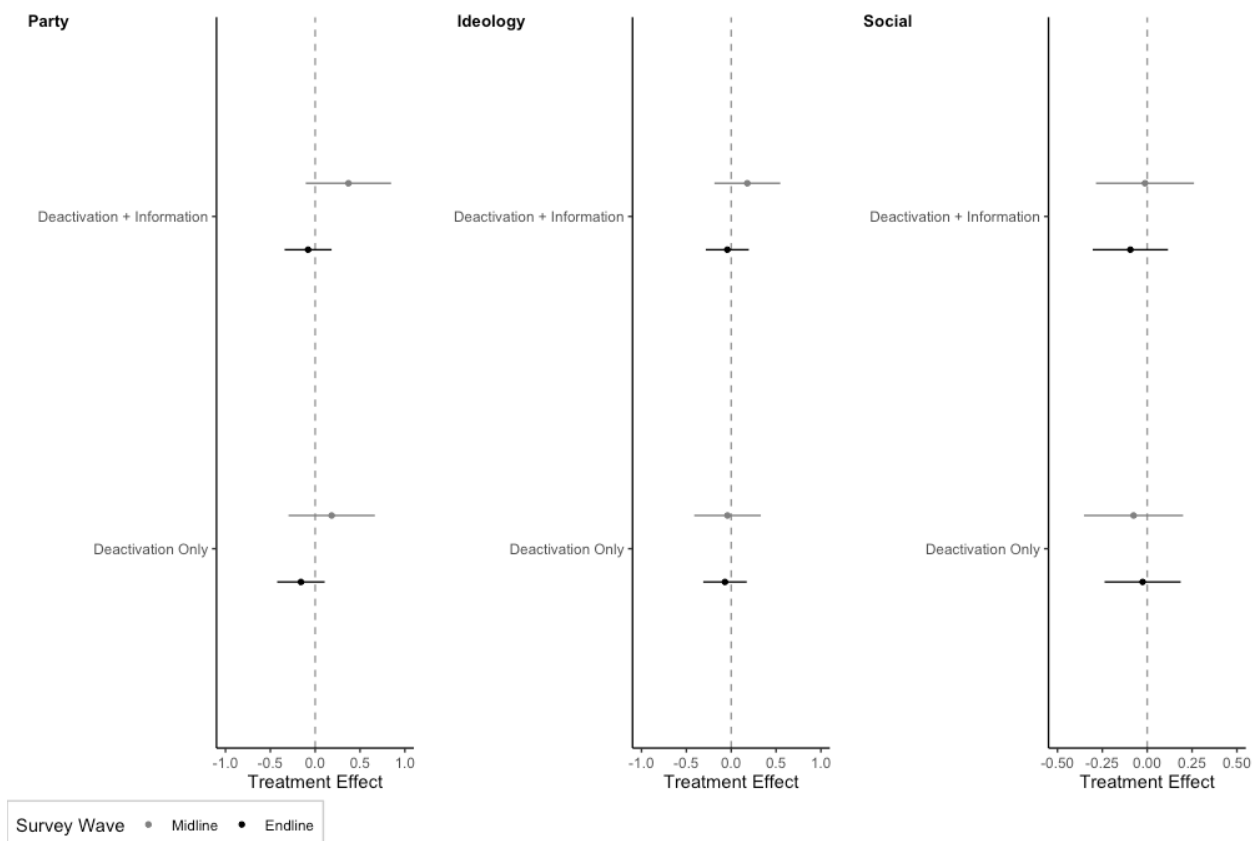


Figure 6: The Effects of Facebook Deactivation on Political and Social Affective Polarization

Note: The dots indicate the difference between the treatment and control group and horizontal lines represent 95% confidence intervals.

Heterogenous Treatment Effects

We preregistered that people's propensity to second guess their intuitions, known as cognitive reflection (Stanovich 2011), would facilitate the effectiveness of informational treatments and, in doing so, increase political knowledge and decrease affective polarization. These hypothesized heterogenous effects are consistent with research on the political effects of individual differences in reflection (Arceneaux and Vander Wielen 2017; Pennycook and Rand 2019). We measured cognitive reflection using a three-item Cognitive Reflection Task developed by Frederick (2005) and refined by Thomson and Oppenheimer (2016), and we estimated heterogenous treatment effects by interacting the treatment indicators with the cognitive reflection task measure. See the SI for question wording and regression results.

Figure 7 offers suggestive evidence that those with higher levels of cognitive reflection reversed the negative effects of Facebook deactivation on political news knowledge, but only in the Deactivation + Information condition. The x-axis in Figure 7 represents the range of values on the Cognitive Reflect scale: -3 (a participant only provides intuitive but incorrect answers) to +3 (a participant only provides all correct answers). The y-axis reported the treatment effect (treatment mean – control mean), with the graphs in the lefthand column reporting the effects of the Deactivation Only treatment and the righthand column reporting the effects of the Deactivation + Information treatment. The first row reports the treatment effects across values of cognitive reflection for the

overall news knowledge measure; the second row reports treatment effects across values of cognitive reflection for non-political news knowledge; and the third row does so for political news knowledge.

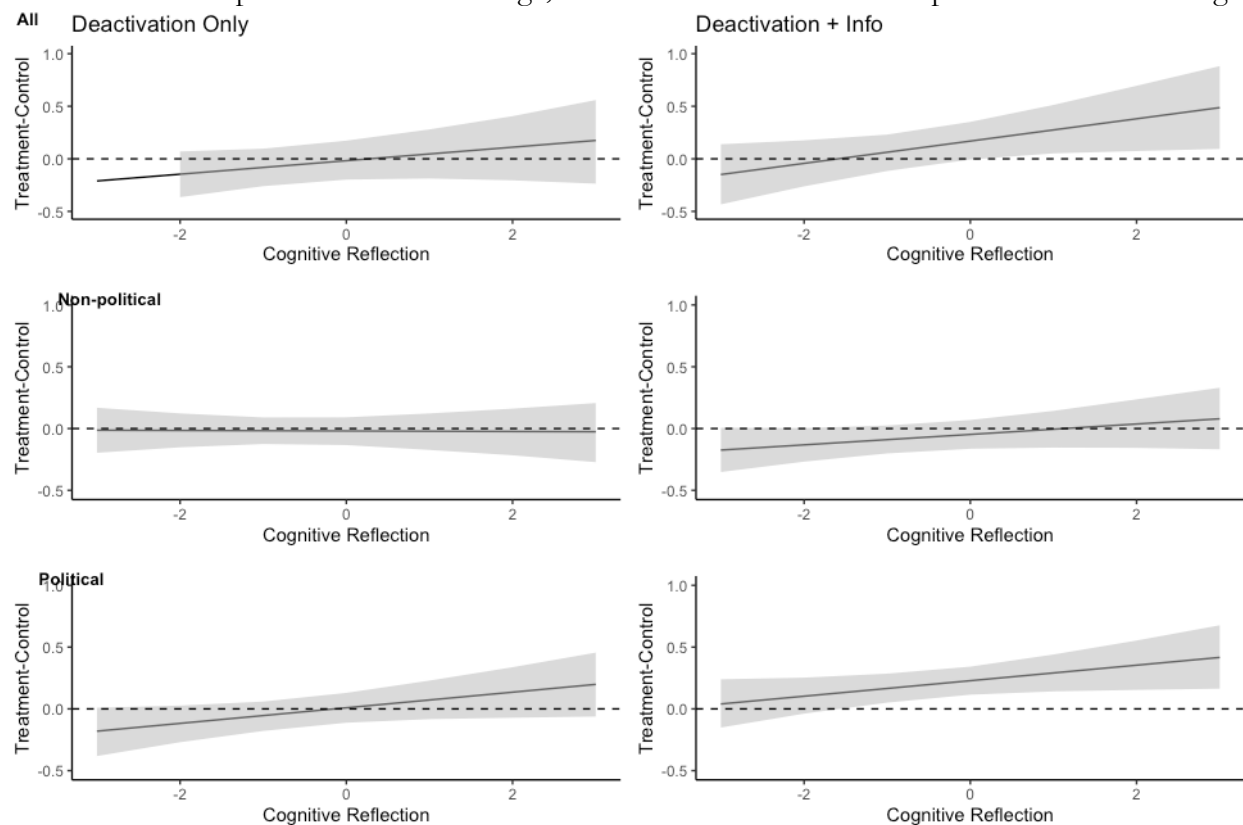


Figure 7: The Effects of Facebook Deactivation News Knowledge, by Cognitive Reflection (Midline Survey Wave)

Note: The lines indicate the difference between the treatment and control group across levels of cognitive reflection, the dotted horizontal line references zero (no effect), and the shaded area represents the 95% confidence intervals.

We focus on the midline survey, because it is the only wave where we observed a positive overall effect. Consistent with the direct effects reported above, Facebook deactivation had no effect on non-political news knowledge. The Deactivation + Information treatment increased political news knowledge, but these positive effects only reach statistical significance among those with higher levels of cognitive reflection. We note that, while this pattern of results is consistent with our preregistered hypothesis, they are suggestive because the interaction between cognitive reflection and the Deactivation + Information treatment is not statistically significant at the pre-registered 0.05 level ($p = 0.157$).

We find a similar suggestive pattern with respect to how cognitive reflection moderates the Deactivation + Information treatment on affective political polarization (see Figure 8). In the interest of space, we report the results for the midline survey, but we find similar results for the endline survey (see SI). The Deactivation + Information condition appeared to *increase* political polarization among intuitive reasoners and this effect attenuates to a null effect among reflective reasoners. These findings are consistent with the thesis that intuitive reasoners are more likely to engage in partisan motivated reasoning (Arceneaux and Vander Wielen 2017). Yet once again they are suggestive because the interaction between cognitive reflection and the Deactivation +

Information treatment is not statistically significant ($p = 0.207$ for party polarization and $p = 0.164$ for ideological polarization).

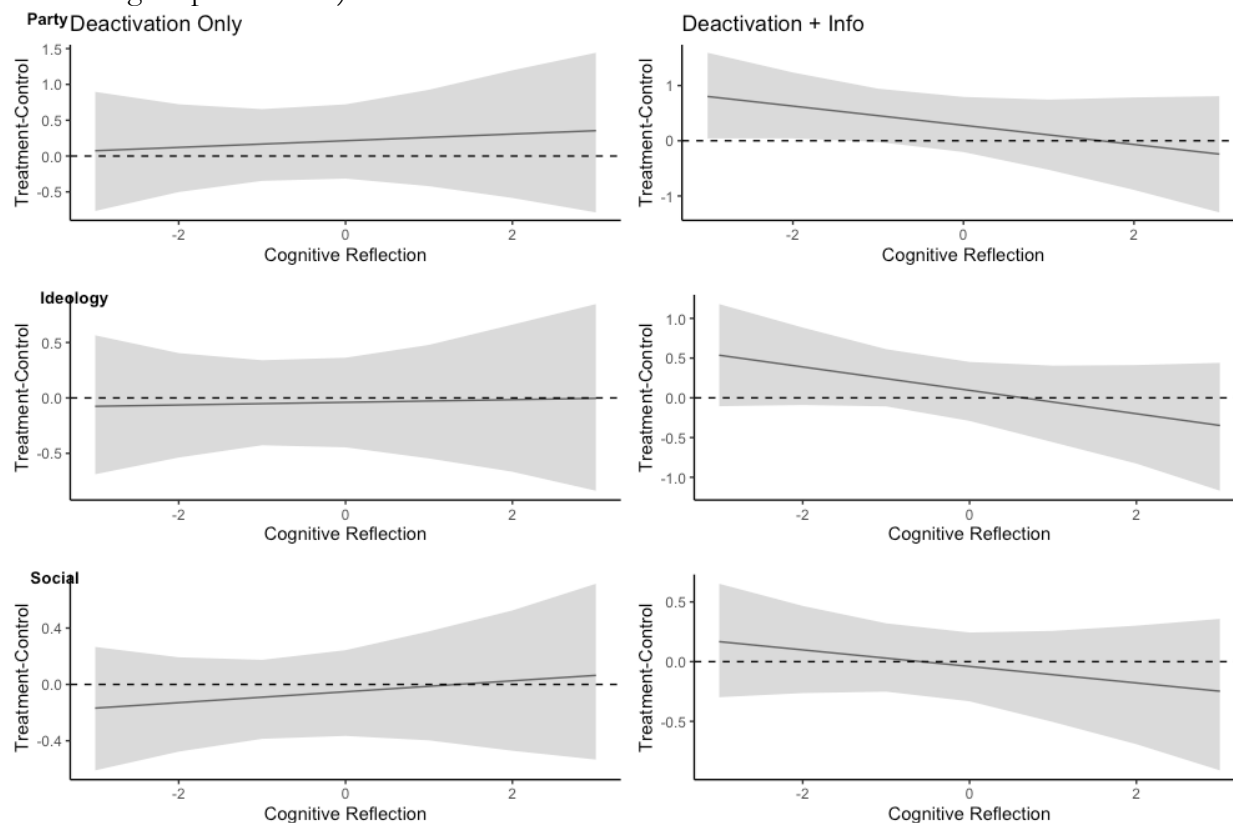


Figure 8: The Effects of Facebook Deactivation on Political and Social Affective Polarization, by Cognitive Reflection (Midline Survey Wave)

Note: The lines indicate the difference between the treatment and control group across levels of cognitive reflection, the dotted horizontal line references zero (no effect), and the shaded area represents the 95% confidence intervals.

In addition to the heterogeneous effects of cognitive reflection, we also preregistered the hypothesis that education would moderate the effects of Facebook deactivation on affective polarization. Following recent research documenting growing political polarization in western countries, including France, between individuals who have a college education and those who do not (Abou-Chadi and Hix 2021; Gethin, Martínez-Toledano, and Piketty 2022), we hypothesized that Facebook deactivation would decrease partisan polarization more among college educated participants than among non-college educated participants. In contrast, we hypothesized that Facebook deactivation would decrease social polarization the most among non-college educated participants relative to college educated ones. Our reasoning was that social media serves to polarize college educated people along partisan lines, while it does so among non-college educated people with respect to immigration. Our results are summarized in Figure 9. Again, we save space by reporting the results for the midline survey, but we find similar results for the endline survey (see SI). The results corroborate our hypothesis with respect to partisan affective polarization. There were lower levels of partisan affective polarization among college educated individuals in the Deactivation Only group and there were lower levels of party polarization among college educated participants in both treatment arms relative to non-college educated participants. The data do not support our hypothesis for social polarization, as we observe no statistically or substantively significant difference between college and non-college educated participants' feelings towards those with African ancestry.

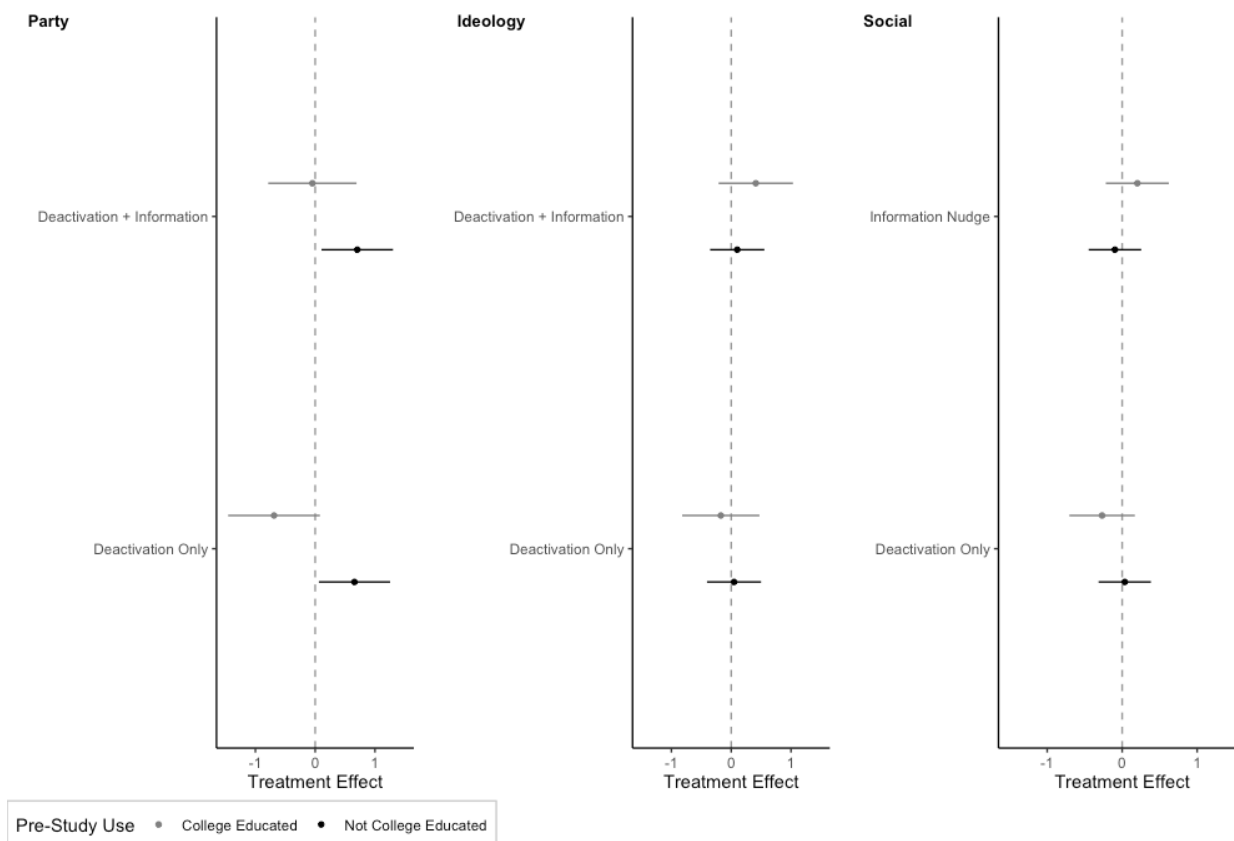


Figure 9: The Effects of Facebook Deactivation on Political and Social Affective Polarization, by Education (Midline Survey)

Note: The dots indicate the difference between the treatment and control group and horizontal lines represent 95% confidence intervals.

Although we did not preregister any hypotheses about the moderating effects of pre-study Facebook use, we replicated Alcott et al.’s analysis where they compared their treatment effects for “heavy” and “light” users. Following their definition, we categorized participants as heavy users if their reported use of Facebook on the baseline survey was above the median and as light users if their pre-study Facebook use was below the median. Like Alcott et al, we find no evidence that the treatments were consistently different for heavy and light users. See the SI for details.

Discussion

Our study replicates and extends previous research on the effects of social media on well-being, news knowledge, and affective polarization. Building on deprivation field experiments conducted in the United States (Alcott et al. 2020) and Bosnia Herzegovina (Asimovic et al. 2021), we incentivized over 1,100 French citizens to deactivate their Facebook accounts during the 2022 presidential election. Our results corroborate previous research with respect to well-being and news knowledge. Participants who gave up Facebook for roughly one month were happier, but less informed about politics than those randomly assigned to the control group who continued to have access to Facebook. In contrast to previous work, which has found that Facebook deactivation can either increase or decrease affective polarization, we found that those who deactivated Facebook were, on average, just as polarized along political and social dimensions.

We extend previous research by combining the parallel stream of research that shows that subtle informational treatments can motivate people to pay more attention to accuracy when evaluating news headlines (e.g., Pennycook, et al. 2021) with the deprivation field experimental design. We find modest evidence that our informational treatments helped people be more accurate when evaluating political news headlines. We only found positive results in the midline survey and these effects dissipated by the endline survey. Moreover, to the extent that our informational treatments were effective, they did so by boosting participants' knowledge about true news, as opposed to enhancing their ability to identify fake news. Beyond news knowledge and contrary to our preregistered expectations, we find little evidence that informational treatments aimed at encouraging people to be civil and recognize the addictive nature of social media caused participants' to be happier than participants who deactivated their Facebook account but did not receive informational treatments, nor did we find evidence that these informational treatments helped reduce affective polarization. Nonetheless, we did find suggestive evidence that our informational treatments may be more effective among those who engage in cognitive reflection (Arceneaux and Vander Wielen 2017; Erlich et al. 2023; Pennycook and Rand 2019). While it is certainly possible that "better crafted" informational treatments would have "worked" for everyone, we note that our informational treatments were no different in terms of quality or content than the those employed in survey experiments. Our findings also fall in line with recent research that call into question the generalizability that subtle informational treatments can consistently motivate behavioral change (Szasz et al. 2022).

We believe that reproducing previous research findings regarding subjective well-being and news knowledge is important for two reasons. First, it bolsters confidence in the generalizability of the claim that social media use makes people less happy but also more informed about politics. These findings appear to be true across different cultural contexts as well as time. Second, it bolsters our confidence in the integrity of the Deprivation + Information treatment. To the extent we find null effects when we go beyond previous work, we are less concerned that our failure to administer the treatments properly is to blame. Replication also provides clarity on the substantive impact of interventions. In this respect, we find smaller effect sizes than previous research, which reported effect sizes between 0.10 SD to 0.25 SD, whereas we found effect sizes between 0.05 SD and 0.08 SD. Our effect sizes are consistent with the "smallest effect size of interest" in terms of people recognizing that they feel slightly better than before (Anvari and Lakens 2021). In terms of substantive importance, then, our results suggest that if people were to give up Facebook without any incentives, it would potentially make the world a slightly happier and slightly less political informed place. Yet if 80€ per person a month were the price tag for this hypothetical world, it is not clear to us that these (mixed) benefits would be worth the costs, and from the standpoint of future research, it certainly suggests that research dollars may be better allocated if we move beyond the deprivation treatment design for social media.

What should we make of the fact that, across three diverse cultural contexts and different research teams, we observe a consistent finding that giving up Facebook causes people to be less informed about politics? First, it offers strong evidence that Facebook informs people about politics. Despite concerns that social media is awash in fake news and other forms of misinformation about politics, people learn more true things about politics from Facebook than false things. Second, these findings are consistent with the notion that social media, and Facebook in particular, provide political information to people who do not actively seek out the news. Before the rise of social media, the expansion of entertainment choices in the media environment allowed people who were not very interested in news to avoid it, or at least not actively seek it out, which increased the gap in political

knowledge between news-seekers and entertainment-seekers (Prior 2007) and blunted the reach and effects of the news media (Arceneaux and Johnson 2013). The social nature of media, though, means that people are often exposed to information, including information about politics, that they may not seek out. If their friends are posting about a political event, such as an election, they will learn about it even if they do not regularly read the newspaper, for instance. In this way, social media allows news to find people (Anspach 2016; de Gil de Zúñiga, Weeks, and Ardèvol-Abreu 2017). Our findings confirm that among the group of people who depend on news to find them, giving up Facebook impoverishes their knowledge about politics. In short, Facebook informs.

At the same time, the informational gains about politics from Facebook appear to come at a cost of a decrease in people's happiness. Our results, in line with previous research, show that giving up Facebook modestly increases people's subjective well-being. When we dig a bit deeper into the endline survey, 27.6% of participants in the treatment arm reported that they did not miss interactions on Facebook "at all," and only 31.4% indicated that they missed interactions somewhat to very much. Likewise, 36.5% of participants reported that they did not miss sharing content at all, while only 25% reported that they missed sharing content on Facebook. These descriptive statistics suggest that the people's experience on Facebook – the interactions that they engage in or observe as well as the social engagement that Facebook affords – do not spark joy among most Facebook users. If that is the case, what brings Facebook users coming back to the platform? The answer is, in part, the content: 55.5% of participants reported that they missed the content on Facebook, while only 14% said that they did not miss the content at all. Taken together, these self-reports from the treatment group suggest that it is, in part, the Facebook environment itself that makes people a bit less happy.

Contrary to our preregistered expectations, giving up Facebook did not decrease levels of either political or social polarization. These findings are also inconsistent with previous research that found that giving up Facebook decreased political polarization (Alcott et al. 2020) but increased social polarization (Asimovic et al. 2021). While we can only speculate about why we observe these null findings, we find it instructive that giving up Facebook increased political polarization among those lower in cognitive reflection as well as among those who did not possess a college education. These findings suggests that the effects of Facebook on political polarization is contingent on the individual characteristics of the Facebook user. As a result, the general population effect of Facebook on affective polarization may depend on who tends to use the platform as well as the content that they encounter.

Our research helps clarify some aspects of Facebook's societal effects. It informs and disheartens. Future avenues of research could better understand the mechanisms for how and why Facebook informs its users about politics, despite the presence of mis- and disinformation. We also find little evidence that minimalistic informational treatments do much to help counteract the negative aspects of Facebook use, suggesting that we need more theoretically informed work to better understand when and how informational treatments work. A clear limitation of our research is that we focus on one particular social media platform, which has a particular set of affordances and population. We should be cautious making inferences to other social media platforms. Finally, our research, like previous research, focuses on an environment in the Northwestern hemisphere, and we should be cautious when it comes to making inferences from this research about the influence of social media in other regions of the world.

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Supplemental Information for “The Effects of Facebook Access during the 2022 French Presidential Election: Can We Incentivize Citizens to be Better Informed and Less Polarized?”

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1 Summary Statistics

Table 1 shows summary statistics for the participants’ demographics (age, gender identity, education, region), political orientations (partisan identity and ideology), individual difference in cognitive reflection, and pre-study Facebook use.

2 Informational Treatments

Below is the English translations of the informational treatments that participants in the Deactivation + Information treatment received.

2.1 Addiction Message (Delivered 12 April 2022)

How much of your life is absorbed by screens?

According to a scientific study, beyond 30 minutes of exposure to social networks, there is a danger for our mental health*.

More generally, a correlation can be established between the time spent on digital platforms and a decrease in well-being**.

Table 1: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Age	2246	47	14	18	36	58	79
Woman	2246	0.66	0.47	0	0	1	1
Education	2246						
... 1. Elementary School	7	0%					
... 2. Middle School	56	2%					
... 3. Technical School	371	17%					
... 4. High School	554	25%					
... 5. Some College	524	23%					
... 6. College	452	20%					
... 7. Postgraduate	282	13%					
Ideology	2055	5.5	2.6	0	4	7	10
Region	2246						
... Northeast	531	24%					
... Northwest	542	24%					
... Paris	356	16%					
... Southeast	563	25%					
... Southwest	254	11%					
Reflection	1955	-0.62	1.7	-3	-2	1	3
Facebook.Use	2246						
... 15 minutes	544	24%					
... 20 minutes	415	18%					
... 30 minutes	493	22%					
... 45 minutes	273	12%					
... 60 minutes or more	521	23%					

The risks for mental health are numerous and proven: anxiety, negative self-image, depression, paranoia, among others.

Disconnecting from screens, resisting information overload, means taking back control of your life, your attention, your emotional balance.

3 things you could do:

- Suppress the applications from your mobile phone so that you are not tempted to use them.
- Engage in offline activities and discussions with real people.
- Read offline news media (newspapers, journals and magazines).

*Source: Hunt, M. G., Marx, R., Lipson, C., Young, J. (2018). "No more FOMO: Limiting Social Media Decreases Loneliness and Depression", *Journal of Social and Clinical Psychology*, 37(10), pp. 751-768.}

**Source: Courbet, Didier, et al. (2020) "Addictions" et comportements problématiques liés à Internet et aux réseaux sociaux. Synthèse critique des recherches et nouvelles perspectives. *ESSACHESS*, 13(1), 209–35.}

2.2 Privacy Message (Delivered 14 April 2022)

Your privacy is exploited and your access to the world is limited.

As soon as you connect to the Internet, your personal data is collected and used for advertising purposes: you are a source of revenue.

This collection of your personal data also allows digital interfaces (social networks, search engines, sites) to offer you targeted content based on your presumed tastes.

The consequences:

You will never know how much information is being retrieved about you and your activity.

You will never have access to the world's information like your neighbor.

The risks:

You have no real control over your personal data.

You may find yourself "imprisoned" in a distorted vision of the world, or even indoctrinated with your own beliefs*. This is detrimental to democratic debate and can lead you to a disconnected perception of the real world's diversity and priorities.

3 things you could do:

- Try to navigate in "private mode" and to regularly erase your browser's search history.
- If you would like to see how your information is collected and shared by online platforms, you can use this software created by the CNIL for information purposes: <https://linc.cnil.fr/fr/cookieviz-une-dataviz-en-temps-reel-du-tracking-de-votre-navigation>
- You can download an information brochure about the General Data Protection Regulation (GDPR): <https://www.droit-technologie.org/wp-content/uploads/2016/11/annexes/dossier/274-1.pdf>

*Source: Pariser, Eli (2011). 'The Filter Bubble, What the Internet Is Hiding From You'. New York: Penguin Press.

2.3 Misinformation Message (Delivered 21 April 2022)

Misinformation only exists if we don't know where the information comes from.

On the Internet, information circulates very quickly, often before we even know where it comes from. Information is sometimes relayed without any knowledge of its origin or veracity, and real information stands next to false information in an often undetectable way.

False information or "fake news" is promoted either with a bad intention, an interest (political, economic), or simply to take advantage of the online visibility and the revenues they generate. In all cases, the victim is you.

Misinformation has a major impact on political life and threatens democratic debate: it can cause political polarization*, serve hidden interests and deprive you of the right to have an objective perception of the issues. Misinformation can lead you to have a distorted perception of political agendas and a distorted view of political debates.

3 things you could do:

- Always check who is/are the author(s) or the owner(s) of the website and the type of platform.
- Cross-check the information with other media platforms, other views and try to find scientific sources on the topic.
- Before you share any content, try to identify: who made it; what is the source; where did it come from; why are you sharing this; when was it published?

*Source: Doublet, Yves-Marie (2019). Désinformation et Campagnes électorales. Namur : Council of Europe.

2.4 Civility and Tolerance Message (Delivered 22 April 2022)

Civility and tolerance for a better democratic debate.

Online content (messages, news feeds, blog posts, articles, etc.) can trigger extreme emotional reactions.

Freedom of expression should never lead to harassment.

Freedom of expression should never lead to hate speech.

A free and quality democratic debate implies being able to accept different opinions, without locking oneself into a position that excludes others. Studies have shown that media platforms (such as YouTube) drive audiences towards politically extreme content*.

3 things you could do:

- Restrain from any emotional comments on the Internet.
- When you disagree with a view or consider it inaccurate, do not enter into a confrontation.
- Do online research to avoid viewing the content that is suggested by media platforms (like YouTube).

*Source: Ribeiro, M. H., Ottoni, R., West, R., Almeida, V. A. F., and Meira, W. (2020). 'Auditing radicalization pathways on YouTube'. In Proceedings of the 2020 Conference on Fairness, Accountability, and Transparency (FAT '20). Association for Computing Machinery, New York, NY, USA, 131–141.

3 Outcome Measures

3.1 Subjective Well-being

Our measure of subjective well-being follows the standard approach of measuring life satisfaction along with positive and negative affect.

3.1.1 Life Satisfaction

French Version: Dans quelle mesure êtes-vous satisfait de la vie que vous menez ? 0 (Absolument pas satisfait) to 5 (Ni insatisfait, ni satisfait) to 10 (Absolument satisfait)

English Translation: How much are you satisfied with the life that you lead? 0 (Absolutely not satisfied) to 5 (Neither unsatisfied nor satisfied) to 10 (Absolutely satisfied)

3.1.2 Positive and Negative Affect

French Version: Dans quelle mesure avez-vous ressenti chacune de ces émotions au cours des deux dernières semaines ? Pour chaque émotion, veuillez indiquer un chiffre sur une échelle de 0 à 10 : [Order randomized] 1. Joie 2. Epanouissement 3. Anxiété 4. Ennui 5. Solitude 6. Dépression 7. Isolement

English Translation: How much have you felt each of these emotions during the past two weeks? For each emotion, please choose a number on the scale going from 0 to 10: [Order randomized] 1. Joy 2. Fulfillment 3. Anxiety 4. Boredom 5. Loneliness 6. Depression 7. Isolation

Table 2 shows summary statistics for the indicators of subjective well-being for the midline and endline surveys.

Table 2: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Midline.Life.Satisfaction	1955	6.1	2	0	5	8	10
Endline.Life.Satisfaction	2246	6.2	2	0	5	8	10
Midline.Joy	1955	6.3	2.2	0	5	8	10
Endline.Joy	2246	6.1	2.2	0	5	8	10
Midline.Fulfillment	1955	5.7	2.4	0	4	7	10
Endline.Fulfillment	2246	5.6	2.4	0	4	7	10
Midline.Anxiety	1955	4.6	3	0	2	7	10
Endline.Anxiety	2246	4.5	3	0	2	7	10
Midline.Bored	1955	3.7	2.8	0	1	6	10
Endline.Bored	2246	3.6	2.9	0	1	6	10
Midline.Lonely	1955	3.6	3	0	1	6	10
Endline.Lonely	2246	3.5	3	0	0	6	10
Midline.Depressed	1955	2.9	3	0	0	5	10
Endline.Depressed	2246	2.9	2.9	0	0	5	10
Midline.Isolated	1955	3.3	3	0	0	5	10
Endline.Isolated	2246	3.2	3	0	0	5	10

3.2 Political Engagement

3.2.1 Online Political Engagement

French Version: Avez-vous récemment participé à des discussions en ligne sur les réseaux sociaux en rapport avec les élections ? 1. Oui 2. Non

English Translation: Have you recently participated in online discussions on social media about the elections. 1. Yes 2. No

3.2.2 Time Spent Following News about Politics

French Version: La semaine dernière, combien de minutes avez-vous passé à lire/regarder/écouter des nouvelles sur la politique, y compris des nouvelles sur les réseaux sociaux ? 1. 0 minute 2. Moins de 30 minutes 3. Entre 30 min. et 60 min. 4. Entre 1 heure et 2 heures 5. 2 heures et plus

Table 3: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Midline.Online.Discussion	1955	0.22	0.42	0	0	0	1
Endline.Online.Discussion	2246	0.22	0.41	0	0	0	1
Midline.Time.Following.News	1955	3.3	1.3	1	2	5	5
Endline.Time.Following.News	2246	3.1	1.3	1	2	4	5

English Translation: Last week, how many minutes did you spend reading, watching, and/or listening to news about politics, including news on social media? 1. 0 minutes 2. Less than 30 minutes 3. Between 30 and 60 minutes 4. Between 1 and 2 hours 5. 2 or more hours

Table 3 shows summary statistics for the indicators of political engagement for the midline and endline surveys.

3.3 News Knowledge

3.3.1 Midline Survey

French Version: Veuillez indiquer si les affirmations suivantes concernant l'actualité (politique et non-politique) vous semblent vraies ou fausses. 1. Vrai 2. Faux [Key: (T)true, (F)alse, (P)olitical, (N)on-political]

1. La sous-traitance des politiques publiques par des sociétés de conseil privées représente un montant de 160 milliards d'euros par an [T,P]
2. La dette publique de la France a atteint 2813 milliards d'euros fin 2021, soit 116 % du PIB [T,P]
3. Les grands magazines français (L'Express, L'Obs, Le Point, Paris Match) appartiennent à des milliardaires proches du pouvoir politique [T,P]
4. L'Ukraine et le Royaume-Uni ont fait une déclaration commune indiquant leur intention de rejoindre l'Union européenne [F,P]

5. Dans les semaines précédant les élections, un partisan d'extrême gauche a été soupçonné d'avoir envoyé de la ricine (poison mortel) dans une enveloppe adressée à Marine Le Pen [F,P]
6. La France s'apprête à se retirer de l'OTAN en réponse à l'immobilisme dans le cadre de la guerre en Ukraine [F,P]
7. Paris accueillera les Jeux olympiques d'été de 2024, avec une cérémonie d'ouverture qui se déroulera sur la Seine [T,N]
8. La France a commencé à utiliser la reconnaissance faciale, notamment à des fins judiciaires [T,N]
9. Un tribunal français retire la licence Starlink de SpaceX [T,N]
10. Un groupe de scientifiques a découvert que le Covid-19 a émergé dans le sud de la France bien avant 2020 [F,N]
11. Le Metaverse (mondes virtuels interconnectés promus par Facebook), imposera à tous les utilisateurs actuels de Facebook de rejoindre le nouveau réseau social d'ici 2027 [F,N]
12. Le PSG est la dernière équipe française à s'être qualifiée pour les quarts de finale de la Ligue des champions après avoir battu le Real Madrid [F,N]

English Translation: Please indicate whether the following statements about current events (political and non-political) are true or false. 1. True 2. False [Key: (T)rue, (F)alse, (P)olitical, (N)on-political]

1. The outsourcing of public policies by private consulting firms amounts to 160 billion euros per year. [T,P]
2. France's public debt reached 2.8 trillion euros in 2021, amounting to 116% of GDP. [T,P]
3. Prominent French magazines (l'Express, l'Obs, le Point, Paris Match) are owned by billionaires who are close to the political power. [T,P]

4. Ukraine and the United Kingdom made a joint statement that they are ready to rejoin the European Union. [F,P]
5. In the weeks preceding the elections, a far-left supporter was suspected of sending the deadly poison ricin in an envelope addressed to Marine Le Pen. [F,P]
6. France prepares to withdraw from NATO in response to idleness amidst the war in Ukraine [F,P]
7. Paris to host the 2024 Summer Olympics with the opening ceremony taking place on the Seine. [T,N]
8. France has started using facial recognition, particularly for judicial purposes. [T,N]
9. French court pulls SpaceX's Starlink license. [T,N]
10. A group of scientists discovered that Covid-19 originated in Southern France long before 2020. [F,N]
11. The Metaverse (interconnected virtual worlds promoted by Facebook), will impose all current Facebook users to join the new social network by 2027. [F,N]
12. PSG is the last French team to qualify for the quarterfinals of the Champions League after beating Real Madrid. [F,N]

3.3.2 Endline Survey

Veillez indiquer si les affirmations suivantes concernant l'actualité (politique et non-politique) vous semblent vraies ou fausses. 1. Vrai 2. Faux [Key: (T)rue, (F)alse, (P)olitical, (N)on-political]

1. Le 18 avril 2022, le président ukrainien Volodymyr Zelensky a officiellement remis à l'envoyé de l'Union européenne à Kiev un questionnaire rempli en vue d'une adhésion à l'UE [T,P]
2. Jean-Luc Mélenchon demande aux Français de l'élire comme « Premier ministre » [T,P]

3. Le président ukrainien Zelensky sur BFM TV annonce que Marine Le Pen doit admettre qu' « elle s'est trompée sur la Russie et Poutine » [T,P]
4. Le constructeur automobile Porsche veut lancer sa propre constellation de satellites pour concurrencer Tesla et SpaceX dans les futures voitures autonomes [T,N]
5. L'action de Netflix chute de 25 % après la perte de 200 000 abonnés [T,N]
6. Le Festival de Cannes a annoncé la sélection officielle de sa 75e édition, qui débutera le 17 mai 2022 [T,N]
7. Jean-Luc Mélenchon espérait que l'issue du scrutin du deuxième tour de la présidentielle mène à un troisième tour de l'élection présidentielle. [F,P]
8. Débat présidentiel français 2022 : Macron attaque Le Pen sur ses liens avec l'Australie sur la crise diplomatique concernant un contrat de sous-marin abandonné [F,P]
9. La semaine dernière, le ministre de l'Economie, Bruno Le Maire, a annoncé délivrer dès septembre 2022 des chèques alimentaires d'une valeur mensuelle de 80€ aux foyers les plus modestes [F,P]
10. Suite aux contaminations récentes aux bactéries listeria, salmonelle et E. Coli (fromages, chocolats, pizzas), les marques concernées se sont vues interdire la commercialisation de leurs produits en France [F,N]
11. Guinness a mesuré un rugissement de 142,2 dbA au Parc des Princes lors de la déroute du PSG contre l'Olympique de Marseille (2-1) [F,N]
12. Le milliardaire Elon Musk propose d'acheter la principauté d'Aigues-Mortes, une micronation du sud de la France, pour lancer son programme « SpaceX Europe » [F,N]

English Translation: Please indicate whether the following statements about current events (political and non-political) are true or false. 1. True 2. False [Key: (T)rue, (F)alse, (P)olitical, (N)on-political]

1. On April 18, 2022, Ukrainian President Volodymyr Zelensky officially handed over to the European Union envoy in Kiev a completed questionnaire for EU membership.

[T,P]

2. Jean-Luc Mélenchon asks French voters to elect him 'as prime minister'. [T,P]
3. Ukraine's President Zelensky on BFM TV: Le Pen should admit that "she was mistaken about Russia and Putin". [T,P]
4. Carmaker Porsche wants to launch its own satellite constellation to compete with Tesla and SpaceX in future autonomous cars. [T,N]
5. Netflix shares drop 25% after service loses 200,000 subscribers. [T,N]
6. The Cannes Film Festival has announced the official selection for its 75th edition, which kicks off on May 17, 2022. [T,N]
7. Jean-Luc Mélenchon hoped that the outcome of the second round of the presidential election would lead to a third round of the presidential election. [F,P]
8. French presidential debate 2022: Macron attacks Le Pen over her links to Australia on the diplomatic crisis over a scrapped submarine deal. [F,P]
9. Last week, the Minister of Economy, Bruno Le Maire had promised to deliver by September 2022 a monthly food voucher of €80 to all low-income households. [F,P]
10. Following the recent contamination with listeria, salmonella and E. Coli bacteria (cheese, chocolate, pizza), the brands concerned have been banned from marketing their products in France. [F,N]
11. Guinness measured an ear-shattering 142.2 dbA roar at Parc des Princes in the PSG's 2-1 rout of Olympique de Marseille. [F,N]
12. Billionaire Elon Musk offers to buy The Principality of Aigues-Mortes, a micronation in southern France, to launch his "SpaceX Europe" program. [F,N]

Figure 1 shows the distribution of correct responses for all of the news items for the midline and endline surveys. Figure 2 shows the distribution of correct responses for the political news items for the midline and endline surveys. Figure 3 shows the distribution of correct responses for the non-political news items for the midline and endline surveys. Figure 4 shows the distribution of correct responses for the true political news items for

the midline and endline surveys. Figure 5 shows the distribution of correct responses for the false political news items for the midline and endline surveys.

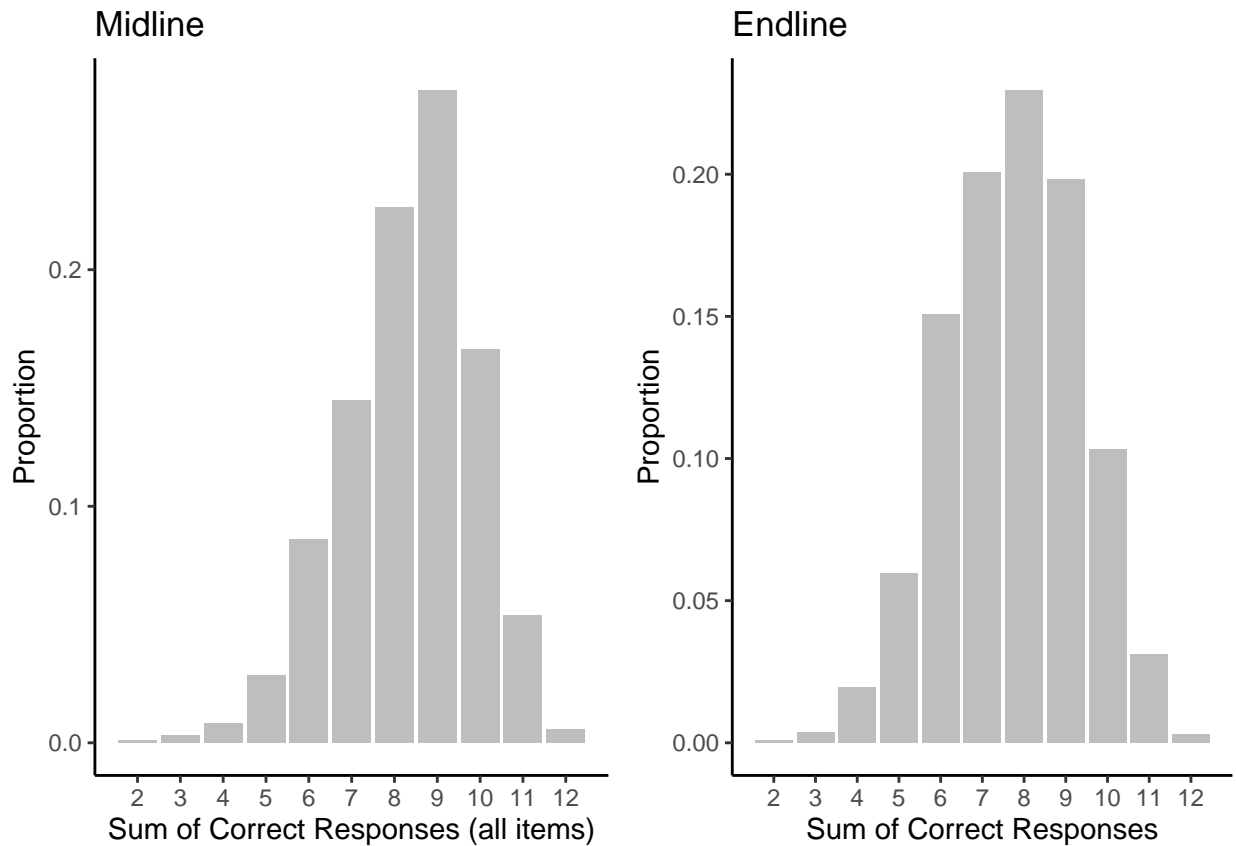


Figure 1: Distribution of Correct Responses for All News Items

3.4 Affective Polarization

French Version: Nous aimerions connaître vos sentiments envers ces différents groupes : veuillez indiquer votre ressenti sur ces groupes en utilisant une échelle allant de 0 à 10. Une note de 10 signifie que vous éprouvez un sentiment très chaleureux envers ce groupe, la note 0 signifie que vous ne les aimez pas du tout. Une note de 5 signifie que vous n'éprouvez pas une sympathie ou une antipathie particulière envers ce groupe. Les notes intermédiaires permettent de nuancer votre ressenti.

Party Polarization

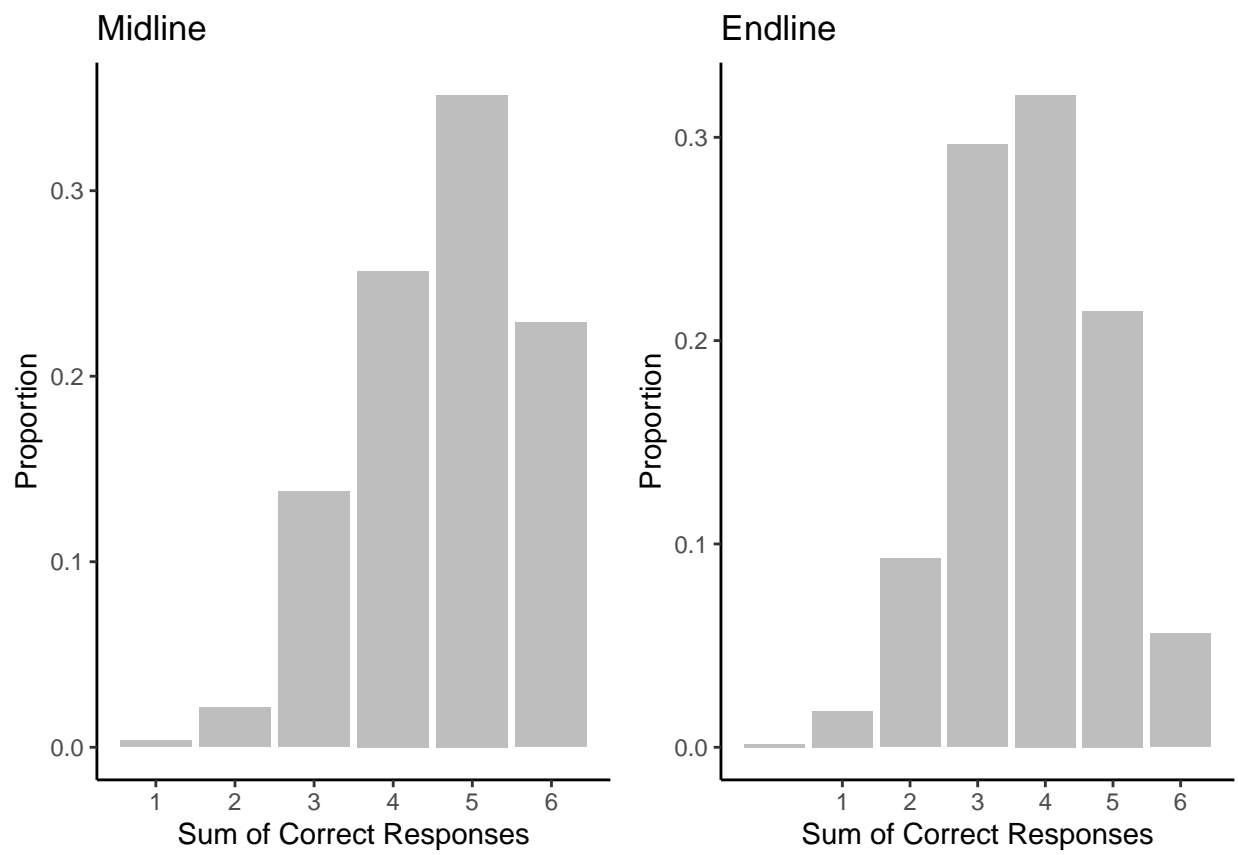


Figure 2: Distribution of Correct Responses for Political News Items

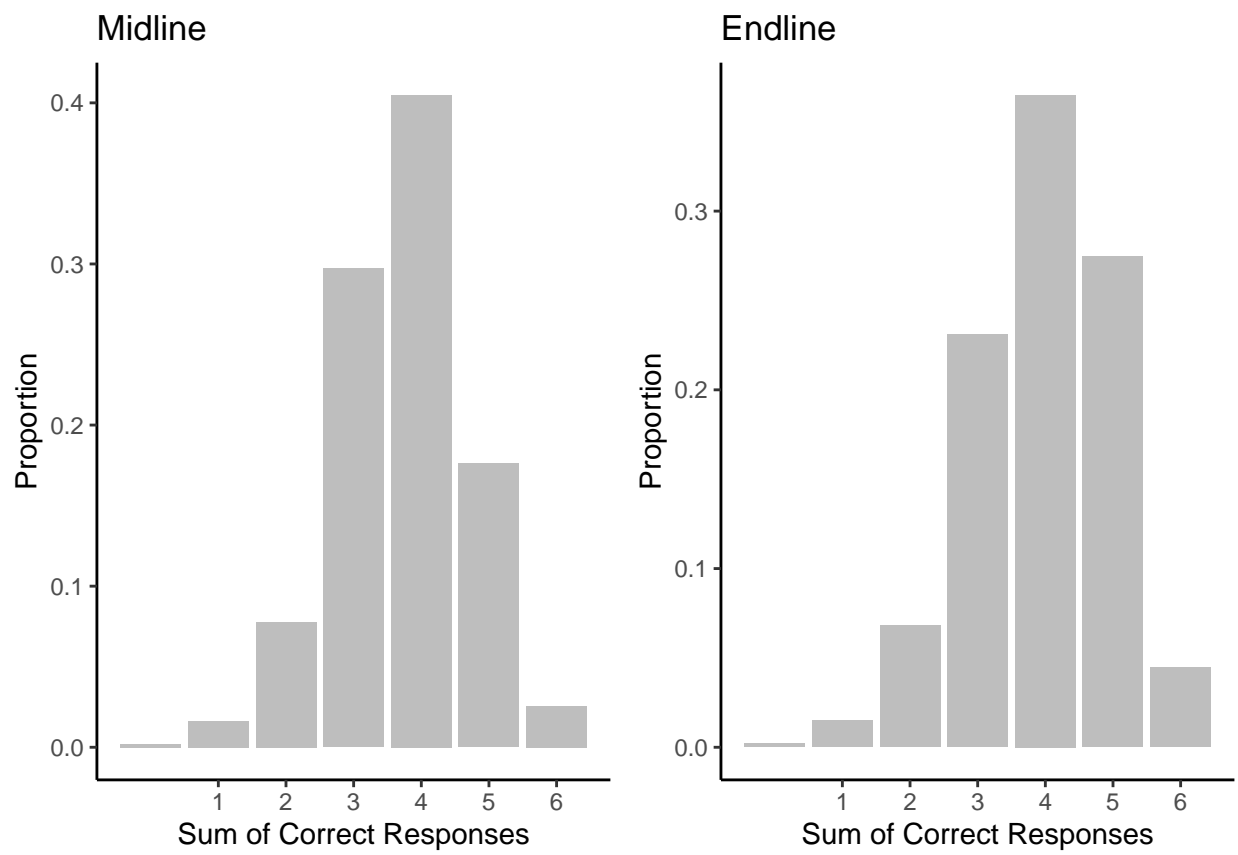


Figure 3: Distribution of Correct Responses for Non-political News Items

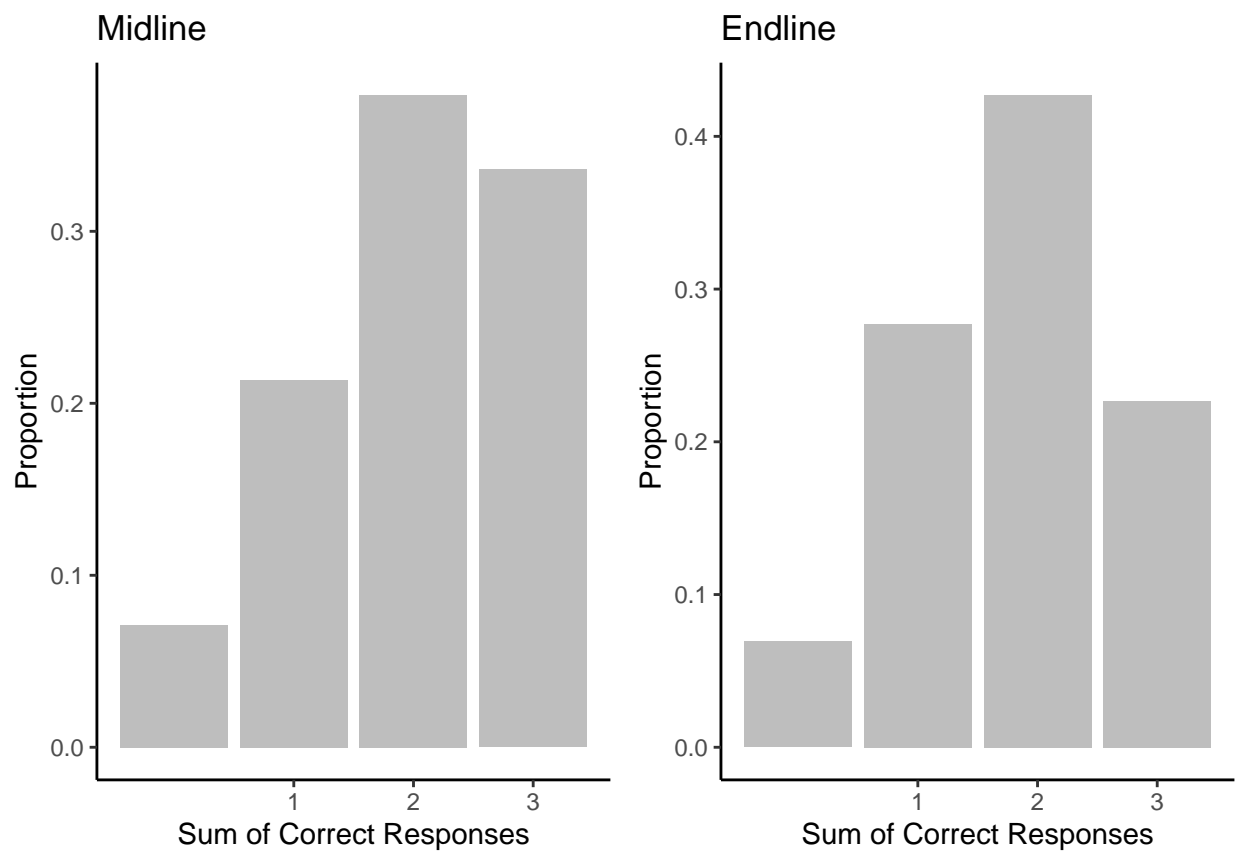


Figure 4: Distribution of Correct Responses for the True Political News Items

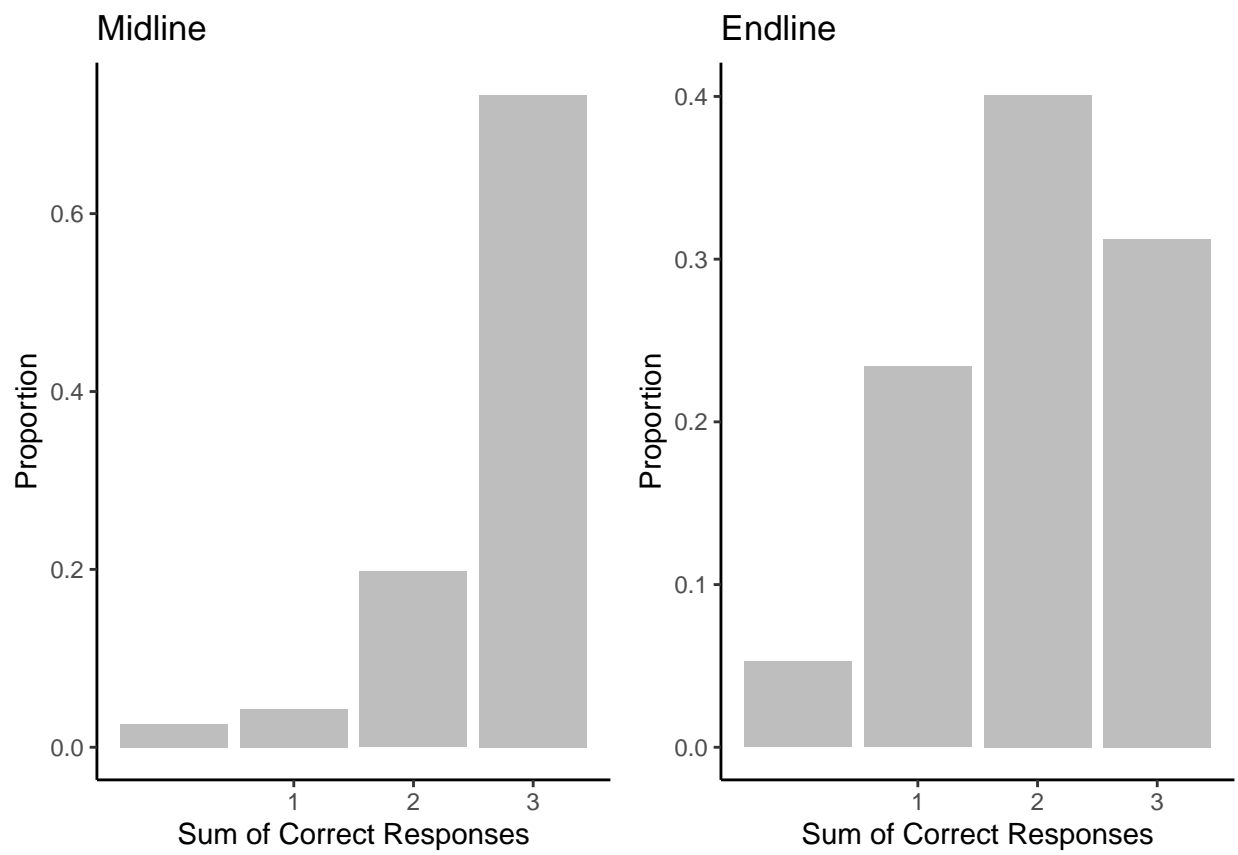


Figure 5: Distribution of Correct Responses for the False Political News Items

1. Les gens qui votent pour La République En Marche !
2. Les gens qui votent pour le Rassemblement national (ex Front National)

Ideological Polarization

1. Les gens de gauche
2. Les gens de droite

Social Polarization

1. Les gens issus de l'immigration maghrébine et africaine
2. Les gens qui ne sont pas issus de l'immigration

English Translation: We would like to know how you feel about these different groups: please indicate how you feel about these groups using a scale from 0 to 10. A score of 10 means that you feel very warmly towards this group, a score of 0 means that you don't like them at all. A score of 5 means that you have no particular liking or disliking for that group. The intermediate scores help to qualify your feelings.

Party Polarization

1. People who vote for La République En Marche !
2. People who vote for the Rassemblement National (formerly Front National)

Ideological Polarization

1. People from the political left
2. People from the political right

Social Polarization

1. People of North African and African descent
2. People who do not have an immigrant background

Table 4 shows summary statistics for affective polarization for the midline and endline surveys.

Table 4: Summary Statistics

Variable	N	Mean	Std. Dev.	Min	Pctl. 25	Pctl. 75	Max
Midline.Partisan	1955	0.13	4.4	-10	-2	2	10
Endline.Partisan	2246	0.24	4.2	-10	-2	2	10
Midline.Ideological	1955	-0.19	3.4	-10	-1.5	0	10
Endline.Ideological	2246	-0.053	3.4	-10	-1	0	10
Midline.Social	1955	1.2	2.5	-10	0	2	10
Endline.Social	2246	1.2	2.5	-10	0	2	10

4 Full Model Results

4.1 Manipulation Check

Table 5 shows the manipulation check.

Table 5: Manipulation Check

	<i>Dependent variable:</i>	
	Midline (1)	Endline (2)
Deactivation + Information	-1.058*** (0.067)	-0.733*** (0.053)
Deactivation Only	-1.116*** (0.068)	-0.779*** (0.054)
Baseline Facebook Use	0.588*** (0.036)	0.591*** (0.028)
Constant	2.249*** (0.114)	2.282*** (0.090)
Observations	1,955	2,246
R ²	0.239	0.235
Adjusted R ²	0.238	0.234
Residual Std. Error	1.217 (df = 1951)	1.030 (df = 2242)
F Statistic	204.785*** (df = 3; 1951)	229.879*** (df = 3; 2242)

Note:

*p<0.1; **p<0.05; ***p<0.01

4.2 Subjective Well-being

For the midline survey results, Table 6 shows the results for the positive affect items, Table 7 shows the results for the negative affect items, and Table 8 shows the results for life satisfaction and the well-being index that sums positive affect, negative affect, and life satisfaction together. For the endline survey, the regression results are shown in Tables 9 (positive affect), 10 (negative affect), and 11 (life satisfaction and index).

Table 6: Subjective Well-being: Positive Affect (Midline)

	<i>Dependent variable:</i>	
	Joy (1)	Fulfillment (2)
Deactivation + Information	0.392*** (0.121)	0.362*** (0.132)
Deactivation Only	0.474*** (0.122)	0.445*** (0.134)
Constant	6.112*** (0.070)	5.484*** (0.076)
Observations	1,955	1,955
R ²	0.010	0.007
Adjusted R ²	0.009	0.006
Residual Std. Error (df = 1952)	2.192	2.397
F Statistic (df = 2; 1952)	9.673***	7.037***
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01	

Table 7: Subjective Well-being: Negative Affect (Midline)

	<i>Dependent variable:</i>				
	Anxiety (1)	Bored (2)	Loneliness (3)	Isolated (4)	Depressed (5)
Deactivation + Information	0.302* (0.166)	0.237 (0.157)	0.413** (0.167)	0.080 (0.164)	0.178 (0.165)
Deactivation Only	0.196 (0.168)	0.207 (0.158)	0.151 (0.169)	-0.051 (0.165)	-0.009 (0.166)
Constant	4.522*** (0.096)	3.615*** (0.091)	3.454*** (0.097)	3.258*** (0.095)	2.877*** (0.095)
Observations	1,955	1,955	1,955	1,955	1,955
R ²	0.002	0.002	0.003	0.0002	0.001
Adjusted R ²	0.001	0.001	0.002	-0.001	-0.0003
Residual Std. Error (df = 1952)	3.019	2.841	3.029	2.966	2.985
F Statistic (df = 2; 1952)	1.823	1.506	3.055**	0.243	0.677

Note:

*p<0.1; **p<0.05; ***p<0.01

4.3 News Knowledge

Table 12 shows the regression results for the news knowledge for the midline survey (for all items and broken out by political, non-political, true, and false items). Table 13 shows the results for the endline survey.

Table 8: Subjective Well-being: Life Satisfaction and Index (Midline)

	<i>Dependent variable:</i>	
	Life Satisfaction (1)	Well-being Index (2)
Deactivation + Information	0.206*** (0.080)	-0.035 (0.105)
Deactivation Only	0.132 (0.081)	0.069 (0.106)
A_life_satisfaction	0.707*** (0.016)	
Constant	1.822*** (0.106)	6.239*** (0.061)
Observations	1,955	1,955
R ²	0.500	0.0004
Adjusted R ²	0.499	-0.001
Residual Std. Error	1.445 (df = 1951)	1.909 (df = 1952)
F Statistic	650.963*** (df = 3; 1951)	0.378 (df = 2; 1952)

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 9: Subjective Well-being: Positive Affect (Endline)

	<i>Dependent variable:</i>	
	Joy (1)	Fulfillment (2)
Deactivation + Information	0.390*** (0.104)	0.297*** (0.111)
Deactivation Only	0.319*** (0.105)	0.248** (0.112)
Lagged Dependent Variable	0.533*** (0.019)	0.517*** (0.019)
Constant	2.563*** (0.133)	2.482*** (0.122)
Observations	1,955	1,955
R ²	0.292	0.284
Adjusted R ²	0.291	0.283
Residual Std. Error (df = 1951)	1.877	2.001
F Statistic (df = 3; 1951)	268.083***	258.572***

Note: *p<0.1; **p<0.05; ***p<0.01

Table 10: Subjective Well-being: Negative Affect (Endline)

	<i>Dependent variable:</i>				
	Anxiety (1)	Bored (2)	Loneliness (3)	Isolated (4)	Depressed (5)
Deactivation + Information	0.025 (0.137)	0.207 (0.134)	-0.263** (0.133)	-0.080 (0.132)	0.066 (0.123)
Deactivation Only	-0.319** (0.138)	-0.204 (0.135)	-0.293** (0.135)	-0.155 (0.133)	-0.224* (0.124)
Lagged Dependent Variable	0.570*** (0.019)	0.553*** (0.019)	0.604*** (0.018)	0.599*** (0.018)	0.645*** (0.017)
Constant	1.891*** (0.115)	1.465*** (0.104)	1.418*** (0.099)	1.312*** (0.097)	1.020*** (0.086)
Observations	1,955	1,955	1,955	1,955	1,955
R ²	0.327	0.298	0.366	0.356	0.430
Adjusted R ²	0.326	0.297	0.365	0.355	0.429
Residual Std. Error (df = 1951)	2.478	2.423	2.413	2.391	2.224
F Statistic (df = 3; 1951)	316.012***	276.321***	375.188***	359.841***	490.082***

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 11: Subjective Well-being: Life Satisfaction and Index (Endline)

	<i>Dependent variable:</i>	
	Life Satisfaction	Well-being Index
	(1)	(2)
Deactivation + Information	0.225*** (0.071)	0.124* (0.069)
Deactivation Only	0.109 (0.072)	0.217*** (0.070)
Lagged Dependent Variable	0.764*** (0.014)	0.781*** (0.015)
Constant	1.416*** (0.096)	1.329*** (0.100)
Observations	1,955	1,955
R ²	0.595	0.590
Adjusted R ²	0.594	0.589
Residual Std. Error (df = 1951)	1.294	1.247
F Statistic (df = 3; 1951)	955.439***	934.767***

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 12: News Knowledge (Midline)

	<i>Dependent variable:</i>				
	All Items (1)	Political (2)	Non-political (3)	True (4)	False (5)
Deactivation + Information	0.121 (0.085)	0.189*** (0.059)	-0.068 (0.055)	0.157*** (0.050)	0.031 (0.038)
Deactivation Only	-0.057 (0.086)	-0.035 (0.059)	-0.022 (0.055)	-0.023 (0.051)	-0.011 (0.038)
Constant	8.318*** (0.049)	4.579*** (0.034)	3.740*** (0.032)	1.946*** (0.029)	2.633*** (0.022)
Observations	1,952	1,952	1,952	1,952	1,952
R ²	0.002	0.007	0.001	0.006	0.001
Adjusted R ²	0.001	0.006	-0.0002	0.005	-0.0005
Residual Std. Error (df = 1949)	1.548	1.066	0.994	0.911	0.689
F Statistic (df = 2; 1949)	1.717	6.666***	0.762	6.153***	0.520

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 13: News Knowledge (Endline)

	<i>Dependent variable:</i>				
	All Items (1)	Political (2)	Non-political (3)	True (4)	False (5)
Deactivation + Information	-0.170* (0.090)	-0.138** (0.062)	-0.032 (0.058)	-0.066 (0.048)	-0.072 (0.048)
Deactivation Only	-0.232** (0.091)	-0.185*** (0.062)	-0.047 (0.059)	-0.144*** (0.048)	-0.041 (0.049)
Constant	7.827*** (0.052)	3.864*** (0.036)	3.963*** (0.034)	1.863*** (0.028)	2.001*** (0.028)
Observations	1,949	1,949	1,949	1,949	1,949
R ²	0.004	0.005	0.0004	0.005	0.001
Adjusted R ²	0.003	0.004	-0.001	0.004	0.0002
Residual Std. Error (df = 1946)	1.625	1.114	1.059	0.862	0.870
F Statistic (df = 2; 1946)	3.889**	5.307***	0.363	4.566**	1.189

Note:

*p<0.1; **p<0.05; ***p<0.01

4.4 Political Engagement

Tables 14 and 15 shows the regression results for online political engagement and time spent following the news on the midline and endline surveys, respectively.

Table 14: Political Engagement (Midline)

	<i>Dependent variable:</i>	
	Online (1)	Time (2)
Deactivation + Information	-0.045** (0.021)	-0.250*** (0.070)
Deactivation Only	-0.078*** (0.021)	-0.355*** (0.071)
Lagged Dependent Variable	0.482*** (0.024)	
Constant	0.182*** (0.013)	3.495*** (0.041)
Observations	1,955	1,955
R ²	0.179	0.015
Adjusted R ²	0.177	0.014
Residual Std. Error	0.378 (df = 1951)	1.277 (df = 1952)
F Statistic	141.411*** (df = 3; 1951)	14.478*** (df = 2; 1952)

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 15: Political Engagement (Endline)

	<i>Dependent variable:</i>	
	Online (1)	Time (2)
Deactivation + Information	-0.078*** (0.019)	-0.122** (0.057)
Deactivation Only	-0.056*** (0.019)	-0.092 (0.058)
Lagged Dependent Variable	0.529*** (0.019)	0.573*** (0.018)
Constant	0.130*** (0.012)	1.231*** (0.072)
Observations	1,955	1,955
R ²	0.303	0.340
Adjusted R ²	0.301	0.339
Residual Std. Error (df = 1951)	0.343	1.038
F Statistic (df = 3; 1951)	282.139***	334.890***

Note: *p<0.1; **p<0.05; ***p<0.01

4.5 Affective Polarization

Table 16 shows the results for affective polarization on the midline survey and Table 17 shows the results for the endline survey.

Table 16: Affective Polarization (Midline)

	<i>Dependent variable:</i>		
	Party (1)	Ideology (2)	Social (3)
Deactivation + Information	0.370 (0.243)	0.180 (0.187)	-0.012 (0.139)
Deactivation Only	0.184 (0.245)	-0.041 (0.189)	-0.076 (0.141)
Constant	-0.010 (0.140)	-0.221** (0.108)	1.231*** (0.081)
Observations	1,955	1,955	1,955
R ²	0.001	0.001	0.0002
Adjusted R ²	0.0002	-0.0004	-0.001
Residual Std. Error (df = 1952)	4.402	3.397	2.528
F Statistic (df = 2; 1952)	1.198	0.623	0.150
<i>Note:</i>	*p<0.1; **p<0.05; ***p<0.01		

Table 17: Affective Polarization (Endline)

	<i>Dependent variable:</i>		
	Party (1)	Ideology (2)	Social (3)
Deactivation + Information	-0.079 (0.134)	-0.043 (0.123)	-0.094 (0.107)
Deactivation Only	-0.159 (0.135)	-0.069 (0.124)	-0.025 (0.108)
Lagged Dependent Variable	0.780*** (0.012)	0.741*** (0.015)	0.643*** (0.017)
Constant	0.195** (0.077)	0.095 (0.071)	0.498*** (0.066)
Observations	1,955	1,955	1,955
R ²	0.667	0.562	0.412
Adjusted R ²	0.667	0.562	0.411
Residual Std. Error (df = 1951)	2.426	2.221	1.943
F Statistic (df = 3; 1951)	1,304.827***	835.370***	456.381***

Note:

*p<0.1; **p<0.05; ***p<0.01

5 Heterogenous Treatment Effects

5.1 Cognitive Reflection

Our measurement of individual differences in the willingness to engage in reflection drew on existing versions of the Cognitive Reflection Task, discussed in the text of the paper. Below is the question wording that we included on the midline survey. Participants' responses were open-ended.

5.1.1 CRT 1

French Version: Veuillez fournir une réponse à la question suivante : Une batte de baseball et une balle valent au total 1,10 euros. La batte vaut 1 euro de plus que la balle. Combien coûte la balle ?

English Translation: Please provide a response to the next question: A baseball and a ball costs 1.10 euros. The bat costs 1 euro more than the ball. How much does the ball cost?

- Correct response: 0.05 euro.
- Intuitive response: 1.00 euro.

5.1.2 CRT 2

French Version: Veuillez fournir une réponse à la prochaine question : Un lac est recouvert de nénuphars dont l'étendue double chaque jour. Si les nénuphars mettent 48 jours à couvrir toute la surface du lac, en combien de temps en couvriraient-ils la moitié ?

English Translation: Please provide a response to the next question: In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake?

- Correct response: 47 days.
- Intuitive response: 24 days.

5.1.3 CRT 3

French Version: Veuillez fournir une réponse à cette dernière question : Si vous participez à une course et que vous dépassez la personne en deuxième position, à quelle place vous situez-vous ?

English Translation: If you're running a race and you pass the person in second place, what place are you in?

- Correct response: second place.
- Intuitive response: first place.

We coded responses such that correct responses received 1 point, intuitive responses received -1 point, and incorrect non-intuitive responses received 0 points. We then summed the responses so that the resulting Cognitive Reflection Task measure could range from -3 (all intuitive responses) to +3 (all correct responses). The mean was -0.62 (SD = 1.74).

Table 18 shows the treatment effects for news knowledge moderated by cognitive reflection, and Table 19 shows the same for affective polarization.

Table 18: News Knowledge by Cognitive Reflection (Midline)

	<i>Dependent variable:</i>		
	All News	Political News	Non-political News
	(1)	(2)	(3)
Deactivation + Information	0.174* (0.089)	0.222*** (0.062)	-0.047 (0.058)
Deactivation Only	-0.017 (0.092)	0.007 (0.063)	-0.024 (0.059)
Cognitive Reflection Task (CRT)	0.017 (0.029)	-0.004 (0.020)	0.022 (0.019)
CRT*Deactivation + Information	0.106** (0.048)	0.062* (0.033)	0.044 (0.031)
CRT*Deactivation Only	0.061 (0.050)	0.065* (0.034)	-0.003 (0.032)
Constant	8.330*** (0.053)	4.576*** (0.036)	3.754*** (0.034)
Observations	1,952	1,952	1,952
R ²	0.009	0.012	0.005
Adjusted R ²	0.007	0.009	0.003
Residual Std. Error (df = 1946)	1.543	1.064	0.993
F Statistic (df = 5; 1946)	3.560***	4.564***	2.070*

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 19: Affective Polarization by Cognitive Reflection (Midline)

	<i>Dependent variable:</i>		
	Party	Ideology	Social
Deactivation + Information	0.283 (0.255)	0.107 (0.197)	-0.047 (0.147)
Deactivation Only	0.214 (0.262)	-0.033 (0.202)	-0.051 (0.151)
Cognitive Reflection Task (CRT)	-0.024 (0.082)	-0.035 (0.063)	-0.023 (0.047)
CRT*Deactivation + Information	-0.173 (0.137)	-0.147 (0.106)	-0.072 (0.079)
CRT*Deactivation Only	0.047 (0.142)	0.012 (0.109)	0.038 (0.081)
Constant	-0.026 (0.150)	-0.243** (0.116)	1.216*** (0.086)
Observations	1,955	1,955	1,955
R ²	0.003	0.003	0.001
Adjusted R ²	0.0004	0.001	-0.001
Residual Std. Error (df = 1949)	4.402	3.395	2.528
F Statistic (df = 5; 1949)	1.153	1.246	0.571

Note: *p<0.1; **p<0.05; ***p<0.01

5.2 Education

Table 20 shows the affective polarization effects moderated by education.

Table 20: Affective Polarization by Education (Midline)

	<i>Dependent variable:</i>		
	Party (1)	Ideology (2)	Social (3)
Deactivation + Information	0.704** (0.294)	0.101 (0.230)	-0.096 (0.171)
Deactivation Only	0.657** (0.293)	0.047 (0.229)	0.034 (0.170)
College Educated	-1.104*** (0.301)	-0.547** (0.236)	-0.393** (0.175)
College*Deactivation + Information	-0.751 (0.506)	0.310 (0.396)	0.299 (0.295)
College*Deactivation Only	-1.345*** (0.518)	-0.221 (0.406)	-0.302 (0.302)
Constant	0.321* (0.165)	-0.057 (0.129)	1.349*** (0.096)
Observations	1,955	1,955	1,955
R ²	0.035	0.006	0.007
Adjusted R ²	0.032	0.004	0.004
Residual Std. Error (df = 1949)	4.330	3.389	2.521
F Statistic (df = 5; 1949)	14.099***	2.517**	2.698**

Note:

*p<0.1; **p<0.05; ***p<0.01

5.3 Pre-study Use

Table 21 shows the wellness index and political news knowledge results as moderated by pre-study Facebook use. Table 22 shows the same for affective polarization.

Table 21: Well-being and Political Knowledge Treatment Effects by Pre-study Use (Midline)

	<i>Dependent variable:</i>	
	Well-being (1)	Political News Knowledge (2)
Deactivation + Information	-0.029 (0.133)	0.222*** (0.074)
Deactivation Only	0.023 (0.134)	0.002 (0.075)
College Educated	-0.137 (0.132)	0.032 (0.074)
College*Deactivation + Information	0.018 (0.220)	-0.090 (0.123)
College*Deactivation Only	0.149 (0.222)	-0.100 (0.124)
Constant	6.280*** (0.073)	4.569*** (0.041)
Observations	1,955	1,952
R ²	0.001	0.007
Adjusted R ²	-0.001	0.005
Residual Std. Error	1.910 (df = 1949)	1.066 (df = 1946)
F Statistic	0.459 (df = 5; 1949)	2.865** (df = 5; 1946)

Note:

*p<0.1; **p<0.05; ***p<0.01

Table 22: Affective Polarization Treatment Effects by Pre-study Use (Midline)

	<i>Dependent variable:</i>		
	Party	Ideology	Social
	(1)	(2)	(3)
Deactivation + Information	0.219 (0.306)	0.059 (0.237)	0.0004 (0.176)
Deactivation Only	0.052 (0.309)	-0.049 (0.238)	-0.053 (0.178)
College Educated	0.408 (0.305)	-0.066 (0.235)	0.027 (0.175)
College*Deactivation + Information	0.280 (0.506)	0.319 (0.391)	-0.038 (0.291)
College*Deactivation Only	0.241 (0.512)	0.035 (0.396)	-0.065 (0.294)
Constant	-0.135 (0.168)	-0.201 (0.130)	1.223*** (0.097)
Observations	1,955	1,955	1,955
R ²	0.005	0.001	0.0002
Adjusted R ²	0.002	-0.002	-0.002
Residual Std. Error (df = 1949)	4.397	3.399	2.530
F Statistic (df = 5; 1949)	1.919*	0.398	0.070

Note:

*p<0.1; **p<0.05; ***p<0.01