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Does Taking a Short Break from Social Media Have a Positive Effect on Well-being? Evidence from Three Preregistered Field Experiments

Andrew K. Przybylski[1,2] · Thuy-vy T. Nguyen[3] · Wilbert Law[4] · Netta Weinstein[1,5]

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Abstract

Concerns about the consequences of social media use on well-being has led to the practice of taking a brief hiatus from social media platforms, a practice known as "digital detoxing." These brief "digital detoxes" are becoming increasingly popular in the hope that the newly found time, previously spent on social media, would be used for other, theoretically more rewarding, activities. In this paper, we test this proposition. Participants in three preregistered field experiments (n_{tot} = 600) were randomly assigned to receiving each of two conditions on each of two different days: a normal-use day or an abstinence day. Outcomes (social relatedness, positive and negative affect, day satisfaction) were measured on each of the two evenings of the study. Results did not show that abstaining from social media has positive effects on daily well-being (in terms of social relatedness, positive and negative affect, day satisfaction) as suggested by the extant literature. Participants reported similar well-being on days when they used social media and days when they did not. Evidence indicated that abstinence from social media had no measurable positive effect on well-being, and some models showed significant deficits in social relatedness and satisfaction with one's day. We discuss implications of the study of social media hiatus and the value of programmatic research grounded in preregistered experimental designs.

Keywords Social media · Digital detox · Social media abstinence · Psychological well-being · Relatedness · Self-determination theory

The majority of North Americans now regularly use forms of social media on a daily basis (Smith & Anderson, 2018), and concerns are widespread that the time spent in these online social spaces might have negative consequences for their users and their relationships (Brown, 2018). In particular, these concerns center on users' psychological well-being, how people experience and evaluate the quality of their emotional and social aspects of their lives (Diener & Emmons, 1984). In a bid to promote well-being, commentators have advocated people practice short-term periods of abstinence from social media and technology use, a practice known informally as a "digital detox" (BBC News, 2018), but little work has examined the effectiveness of taking time off of social media.

The displacement hypothesis (Neuman, 1988)—the idea that time devoted to digital interactions necessarily crowds opportunities for more enriching analogue ones (e.g., because these offer richer interpersonal experiences)—provides a possible explanation for why these interventions might impact well-being (Diener & Emmons, 1984). Because time use presents a zero sum tradeoff, each "dose" of social media time takes the place of other, more psychologically enriching pursuits such as getting together in a face to face interaction (Lenhart et al., 2015; Neuman,

✉ Netta Weinstein
n.weinstein@reading.ac.uk

Andrew K. Przybylski
andy.przybylski@oii.ox.ac.uk

Thuy-vy T. Nguyen
thuy-vy.nguyen@rochester.edu

Wilbert Law
wlaw@eduhk.hk

1 Oxford Internet Institute, University of Oxford, Oxford, UK

2 Department of Experimental Psychology, University of Oxford, Oxford, UK

3 Department of Psychology, Durham University, Durham, UK

4 Department of Psychology, The Education University of Hong Kong, Ting Kok, Hong Kong

5 School of Psychology and Clinical Language Sciences, University of Reading, Reading, UK

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1988; Powers et al., 2013). Following this line of argument to its conclusions, one could accept that social media could reduce well-being (Lenhart et al., 2015).

An intriguing and contrasting view is that rather than supplanting other, theoretically more rewarding activities, time devoted to digital interactions can *support* beneficial social functioning. Earlier studies suggest social networks might be part of the social fabric, such that disengaging from social media could reduce both support-seeking (Pew Internet Society results) and relatedness, defined as closeness and connection (Sheldon et al., 2011). Additional evidence for this comes from survey research showing that 83% of adolescents say social media makes them feel more connected to their friends, and 68% who say they have received social support using these technologies in tough or challenging times (Lenhart et al., 2015). Taking these literatures together, there is good reason to think acute social media disengagement might have positive effects on well-being but present a detriment to relatedness. These conflicting effects further complicate our understanding of the role of social media use in daily well-being, since relatedness should be key to promoting well-being at a between-person level (Deci & Ryan, 2008) and on a daily level (Reis et al., 2000).

To date, studies that test the effects of taking a hiatus from online communication have shown mixed effects (Smith & Anderson, 2018). A number of studies suggest naturally occurring increases in social media use are associated with lower psychological well-being (Kross et al., 2013; Sagioglou & Greitemeyer, 2014), and that taking a break from social media might boost affective processing (Uhls et al., 2014), but such effects are not consistently positive. Results from Internet-based experiments suggest life satisfaction and positive emotions might be higher among those who intentionally quit Facebook (Tromholt, 2016), whereas evidence from carefully controlled experiments indicates ceasing social media use for brief periods of time can lead to reduced feelings of relatedness with others (Sheldon et al., 2011). One recent study found life satisfaction is lower among those who reduce their social media platform use (Vanman et al., 2018), and correlational data suggest that low versus moderate rates of technology use, including social media use, are not beneficial to mental well-being (Przybylski & Weinstein, 2017a). Thus, as this literature has developed, directly conflicting findings frequently arise in the psychological study of technology effects.

The goal of the present research was to systematically test the idea that a brief break from social media has meaningful effects on psychological well-being and relatedness, such that they can be felt by the individuals being studied. To this end, we recruited three samples of young adults from the United Kingdom (UK), the United States (US), and Hong Kong (HK), and conducted a series of within-person field experiments. These experiments were pre-registered prior to data collection, meaning that the authors laid out their reasoning, research hypotheses, and methodological and analytic plans before conducting each of the three studies. This approach to open and reproducible research practices (Wagenmakers et al., 2012) means that many of the analyses tested are "confirmatory" in that they test a priori, registered hypotheses, whereas others are "exploratory," in that they test models that were selected after data had been collected. This strategy is important for reducing researcher degrees of freedom that lead to biased results shaped by the researcher's own worldview and personal attitudes toward the topic under study (Nosek et al., 2015).

Our aim was to rigorously test five hypotheses concerning the effects of social media abstinence. We focused on subjective well-being (i.e., positive and negative affect, day satisfaction) based on work suggesting links between social media use and lower standing on such constructs (Kross et al., 2013; Sagioglou & Greitemeyer, 2014). Further, we examined self-esteem based on work suggesting that social media use negatively impacts self-esteem, in part because it makes upward social comparisons more salient (Valkenburg et al., 2006; Vogel et al., 2014). Finally, we focused on social relatedness—feeling close and connected to others—because experimental work has suggested that social media use may *increase* relatedness (Sheldon et al., 2011). First, in line with the concerns guiding the literature, we hypothesized that young adults would report higher levels of *positive emotions* (H1), lower levels of *negative affect* (H2), higher levels of *self-esteem* (H3), and higher levels of *day satisfaction* (H4) on days that they abstain from social media use. Second, in line with motivational theory reviewed above, we expected to observe lower levels of *social relatedness* among participants on days they did not use social media platforms (H5).

Method

Participants and Design

Participants in all three studies were undergraduate student volunteers recruited through pools run by each of their three psychology departments where the researchers taught, and compensated with course credit (US and UK) or payment (HK, through an internal grant to W.L. from The Educational University of Hong Kong; num. 04290). A total of 248 participants were recruited in the UK, 199 participants were recruited in the US, and 203 participants were recruited in HK. The total sample sizes, those who completed both days of the study were smaller (UK, $n = 205$; US, $n = 198$; HK, $n = 197$). These participants ranged in age from 18 to 56 years ($M = 20.06$, $SD = 4.62$) in the UK, from 17

to 32 years ($M = 20.36$, $SD = 1.71$) in the US, and 18 to 35 years ($M = 21.13$, $SD = 2.26$) in HK. Further, samples were primarily comprised of women, who made up 82.0% of the sample within the UK, 69.5% of the sample within the US, and 82.7% of the sample within HK. While some analyses focused on the subsample that completed both days of the study, the majority of preregistered analyses focused on those who fully abstained from using social media on the appropriate day. Of the UK sample, 91 individuals (44%) fully abstained as instructed, in the US, 110 individuals (56% of the sample) abstained, and in HK 96 individuals (49%) abstained as instructed.

Participants took part in a two condition randomized controlled study. However, we used a within-subjects design where all participants participated in an experimental condition (social media abstinence) and a control condition (normal use) on two consecutive days. Depending on the condition assigned to that day, participants were instructed to abstain from all social media use (abstinence days) or use social media as normal (normal use days). Instructions are available as supplemental materials (Przybylski et al., 2020). The order of condition was counterbalanced to test for carry-over effects, namely, whether exposure to one condition would affect responding to the alternate condition.

Open Practices

In line with best practices the data, code, and materials (Przybylski et al., 2020), as well as the time-stamped preregistrations for the UK (Przybylski & Weinstein, 2017b), HK (Przybylski et al., 2018a), and US (Przybylski et al., 2018b) studies, are available for download on the Open Science Framework.

Practical Significance

Not all statistically significant results are of practical importance when it comes to technology effects, meaning they have real-world relevance (Ferguson, 2009). To speak to the practical importance of statistically significant findings, researchers can understand findings in terms of a smallest effect size of interest (SESOI), in part because digital media engagement measures are imperfect (Ellis et al., 2018). The medical literature, focused on *minimally important differences* (MID; Miller, 1956; Norman et al., 2003), yokes the cutoff for a meaningfully significant effect to a patient's ability to make subjective judgments about their mental health. Research indicates the MID to be equivalent to a SESOI of a Cohen's d of 0.50 ($\eta^2 = 0.059$): the smallest difference individuals are able to reliably distinguish in pain, functioning, and mental health outcomes. The MID can, therefore, provide an empirically grounded gauge of the extent to which digital screen time has a meaningfully significant effect. Alongside making a convention-based judgment based on $p < 0.05$ of whether the effect of screen time has a meaningfully significant effect, we can use MID cutoffs to calculate the point at which abstinence from social media could be said to have meaningfully significant effects on well-being; we interpret both in the current study.

Sensitivity Analysis

In the study preregistration, we set the target-adhering sample size for all three experiments ($n = 102$) on the basis of an a priori power analyses aiming for high sensitivity ($\alpha = 0.05$, $1\text{-}\beta = 0.99$) for a relatively small effect ($\eta^2 = 0.05$), but although we only fully met this sample size in the US, we achieved an acceptable minimum observed power level at 95% within each country. We further specified in the preregistration that we would collect up to 350 participants for each experiment to ensure we would have power to detect the MID. In line with the confirmatory hypothesis testing detailed in the results section we interpreted smaller, though statistically significant effects, as falling below this sensitivity threshold. Given the expectation was conservative and the size attained demonstrated acceptable power, we do not anticipate results would have changed had we achieved it.

Measures

Criterion Variables—Psychological Well-Being

Positive and Negative Affect. The Positive Affect Negative Affect Schedule (Watson & Clark, 1999) asked participants to rate 20 emotion adjectives, e.g., "interested" and "distressed," with respect to how they felt that day using a scale that ranged from 1 = "very slightly or not at all" to 5 = "extremely". Positive affect showed high reliability for participants in the UK (control day, $\alpha = 0.88$; abstain day, $\alpha = 0.88$), US (control day, $\alpha = 0.88$; abstain day, $\alpha = 0.91$), and HK samples (control day, $\alpha = 0.87$; abstain day, $\alpha = 0.89$). Negative affect scores were also computed for participants in the UK (control day, $\alpha = 0.87$; abstain day, $\alpha = 0.88$), US (control day, $\alpha = 0.88$; abstain day, $\alpha = 0.87$), and HK (control day, $\alpha = 0.92$; abstain day, $\alpha = 0.91$) samples. For this and other surveys, materials were translated to Chinese by an expert fluent in both Chinese and English.

Self-Esteem. A 10-item version of the Rosenburg Self-Esteem scale (Rosenberg, 1979) asked participants to rate ten items, e.g., "On the whole, I am satisfied with myself" using a 4-point scale that ranged from 1 = "Strongly Disagree" to 4 = "Strongly Agree." Self-esteem scores were computed for participants in the UK (control day, $\alpha = 0.91$; abstain day, $\alpha = 0.90$), US (control day, $\alpha = 0.91$; abstain

day, α = 0.91), and HK samples (control day, α = 0.86; abstain day, α = 0.84).

Day Satisfaction. Since we were examining social media use effects at the within-person level, we focused on day satisfaction in the place of life satisfaction as this could vary within persons as a function of daily experiences (e.g., Sagioglou & Greitemeyer, 2014). This single-item measure asked participants: "In general, how good or bad was today?" using a scale that ranged from 1 = "Very Bad" to 7 = "Very Good." Individual satisfaction scores based on this response were considered for participants in all countries. This brief method for assessing satisfaction produces similar results to multi-item measures in past research (Cheung & Lucas, 2014).

Relatedness Need Satisfaction. Participants were asked to rate three items based on the relatedness satisfaction subscale of the basic psychological needs scale (Chen et al., 2015). These items were also used to test the effects of social media use in previous research (Sheldon et al., 2011). Items included "I felt close and connected with other people who are important to me" with respect to "How much do you agree with these statements with respect to how you have felt TODAY?, and participants responded using an agreement scale that ranged from 1 = "not at all true" to 9 = "very true." Relatedness scores were computed for participants in the UK (control day, α = 0.90; abstain day, α = 0.89), US (control day, α = 0.89; abstain day, α = 0.92), and HK samples (control day, α = 0.93; abstain day, α = 0.94).

Explanatory Variable—Social Media Abstinence

The explanatory variable in these studies was an experimental manipulation of social media abstinence. All participants were randomly assigned to either abstain from social media use on their first day of participation in the study or on the second day of the study. Thus, the experiment comprises two within-subject conditions.

Social Media Use as a Manipulation Check. At the end of each day, participants were asked if they had used one of ten social media platforms as well as three other communication forms: face-to-face time, telephones, and emails. In Hong Kong, participants were also asked whether they had engaged each of four other social media platforms (WeChat, QQ, Weibo, Line) which are used in HK but not in the US or UK. Participants were provided with an option of responding that they had or had not used each of these separately. If selecting they had used a particular form of communication, they were in a following page prompted to respond about the frequency of use with a scale ranging from 1 (*infrequently*) to 5 (*frequently*). Overall use was computed in terms of frequency multiplied by the unique number of these social media platforms which we preregistered we would target. Use scores ranged from 0 to 27 in the UK, 0–33 in the US, and 0–32 in HK in typical use days, and on abstinence days, they still showed a high range (though not as high) of 0–15 in the UK, 0–12 in the US, and 0–19 in HK. Unrelated to our preregistered analyses but considered later in exploratory analyses, we also asked using the same 1–5 scale how much face-to-face (across days, UK: $M = 4.24$, $SD = 0.94$; US: $M = 4.09$, $SD = 1.05$; HK: $M = 3.58$, $SD = 1.13$), email (across days, UK: $M = 2.72$, $SD = 1.18$; US: $M = 3.28$, $SD = 1.11$; HK: $M = 2.58$, $SD = 1.11$), and telephone conversations (across days, UK: $M = 2.20$, $SD = 1.10$; US: $M = 2.09$, $SD = 1.00$; HK: $M = 1.98$, $SD = 0.97$) people had on the day.

Results

Data, Materials, and Analytic Strategy

All study materials, preregistrations, and data are available for download using the Open Science Framework. There were two noteworthy deviations from our analysis plans. The first concerned the theoretical basis for using the MID as our SESOI. We truncated the MID value in our preregistration document when converting from Cohen's d to η^2. This resulted in our using the value of $\eta^2 = 0.05$ instead of $\eta^2 = 0.059$. We conducted our analyses with both thresholds, and although the results remain unchanged throughout, we present our analyses using the $\eta^2 = 0.059$ threshold. The second deviation concerned final sample sizes; those who completed both days of the study and followed instructions to abstain on one of those days. Two of these samples were somewhat smaller (UK $n = 92$, HK $n = 96$) than the target size we set in our preregistrations ($n = 102$), whereas the third met the target sample for fully abstaining participants (US $n = 110$).

Preliminary Analyses

Preliminary analysis of participants compiling both days of the studies indicated they found it difficult to give up social media use for a single day. In the UK, 44.8% followed instructions and were included, and adherence rates were 55.3% for US participants and 48.7% for HK participants. Overall, the weighted compliance rate, the total sample divided by the final sample size with the study instructions, was 49.5%. In line with our analysis plan, two sets of preliminary analyses were conducted to test for order effects and data missing not at random. These are available as supplementary documents (Przybylski et al., 2020).

Table 1 Main effects, unadjusted, of condition on each of five outcomes tested

		Control Day			Abstinence day			Main effect		
Sample	Outcome	*M* (*SD*)	LL 95% CI	UL 95% CI	*M* (*SD*)	LL 95% CI	UL 95% CI	*F*	*p*	η_p^2
UK ($n = 91$)	Positive affect	2.72 (0.81)	2.55	2.89	2.70 (0.75)	2.54	2.86	0.09	0.77	0.001
	Negative affect	1.65 (0.63)	1.52	1.78	1.73 (0.69)	1.59	1.88	1.44	0.23	0.02
	Self-esteem	2.96 (0.51)	2.85	3.06	2.92 (0.53)	2.81	3.03	1.44	0.23	0.02
	Day satisfaction	4.91 (1.34)	4.62	5.19	4.41 (1.34)	4.13	4.70	8.71	0.004	0.09
	Relatedness	6.46 (1.76)	6.09	6.83	5.95 (1.65)	5.61	6.30	5.61	0.02	0.06
US ($n = 110$)	Positive affect	2.90 (0.77)	2.76	3.05	2.88 (0.87)	2.71	3.04	0.12	0.73	0.001
	Negative affect	1.72 (0.67)	1.60	1.85	1.71 (0.67)	1.58	1.84	0.04	0.83	0.00
	Self-esteem	3.14 (0.55)	3.04	3.25	3.17 (0.57)	3.07	3.28	1.05	0.31	0.01
	Day satisfaction	4.91 (1.10)	4.70	5.12	4.78 (1.20)	4.55	5.01	0.93	0.34	0.01
	Relatedness	6.59 (1.51)	6.30	6.87	6.10 (1.79)	5.77	6.44	8.54	0.004	0.07
HK ($n = 96$)	Positive affect	2.71 (0.76)	2.55	2.86	2.59 (0.80)	2.43	2.75	1.65	0.20	0.02
	Negative affect	1.77 (0.76)	1.61	1.92	1.98 (0.76)	1.83	2.14	6.41	0.01	0.06
	Self-esteem	2.94 (0.40)	2.86	3.02	2.89 (0.41)	2.81	2.97	2.57	0.11	0.03
	Day satisfaction	5.01 (1.13)	4.78	5.24	4.28 (1.29)	4.02	4.55	20.23	0.001	0.18
	Relatedness	6.21 (1.39)	5.93	6.49	5.33 (1.94)	4.94	5.73	15.99	0.001	0.14

Confirmatory Analyses

Effects of Social Media Abstinence on Positive Affect (Hypothesis 1). In line with the preregistered analysis plan, a pair of analyses tested the idea that acute abstinence from social media would be associated with higher levels of positive affect. Table 1 presents an overview of the results of unadjusted models and corresponding means for each country. Results from the first, a repeated-measures ANOVA, indicated no significant differences in positive affect levels in the UK sample ($F(1, 89) = 0.09$, $p = 0.77$, $\eta_p^2 = 0.001$), in the US sample, ($F(1, 109) = 0.12$, $p = 0.73$, $\eta_p^2 = 0.001$), or in the HK sample ($F(1, 95) = 1.65$, $p = 0.20$, $\eta_p^2 = 0.017$). Results from the second planned analysis, an ANCOVA model holding variability in participant age and gender constant, was also non-significant in the UK ($F(1, 87) = 0.001$, $p = 0.98$, $\eta_p^2 = 0.00$), US ($F(1, 107) = 0.69$, $p = 0.41$, $\eta_p^2 = 0.006$), and HK ($F(1, 93) = 0.13$, $p = 0.72$, $\eta_p^2 = 0.001$). From this, we conclude the first hypothesis was not supported.

Effects of Social Media Abstinence on Negative Affect (Hypothesis 2). Following the approach used for positive affect, repeated-measures ANOVAs were used to test the idea that those abstaining from social media use would report lower levels of negative affect. Results from a repeated-measures ANOVA indicated no significant differences in negative affect levels in the UK ($F(1, 89) = 1.44$, $p = 0.23$, $\eta_p^2 = 0.016$) and the US ($F(1, 109) = 0.04$, $p = 0.83$, $\eta_p^2 = 0.000$) samples, although higher negative affect was in evidence in the HK sample on abstinence days ($F(1, 95) = 6.41$, $p = 0.01$, $\eta_p^2 = 0.063$). Results from the second test, an ANCOVA model holding variability in participant age and gender constant, was also non-significant in the UK ($F(1, 87) = 1.37$, $p = 0.25$, $\eta_p^2 = 0.015$), or US ($F(1, 107) = 1.28$, $p = 0.26$, $\eta_p^2 = 0.012$), and no longer significant in HK ($F(1, 93) = 2.74$, $p = 0.10$, $\eta_p^2 = 0.029$). From this, we conclude the second hypothesis was not supported.

Effects of Social Media Abstinence on Self-esteem (Hypothesis 3). To examine the effects of abstinence on self-esteem, ANOVA and ANCOVA models were used to test the prediction that levels of self-esteem would be higher on days that participants abstained from social medial. Results from a repeated-measures ANOVA indicated no significant differences in self-esteem in the UK ($F(1, 89) = 1.44$, $p = 0.23$, $\eta_p^2 = 0.016$), US ($F(1, 109) = 1.05$, $p = 0.31$, $\eta_p^2 = 0.01$), or HK ($F(1, 95) = 2.57$, $p = 0.11$, $\eta_p^2 = 0.026$) samples. Results from an ANCOVA model holding variability in participant age and gender constant was also non-significant in these countries: UK ($F(1, 87) = 0.24$, $p = 0.63$, $\eta_p^2 = 0.003$), US ($F(1, 107) = 1.81$, $p = 0.18$, $\eta_p^2 = 0.017$), HK ($F(1, 93) = 1.11$, $p = 0.29$, $\eta_p^2 = 0.012$). From this, we conclude that the third hypothesis was not supported.

Effects of Social Media Abstinence on Day Satisfaction (Hypothesis 4). We also tested the relationship between social media abstinence and day satisfaction as a more proximal measure of the day's experience. Contrary to what was expected, we found lower day satisfaction on abstinence days in the UK ($F(1, 86) = 8.71$, $p = 0.004$, $\eta_p^2 = 0.092$), and HK ($F(1, 94) = 20.23$, $p < 0.001$, $\eta_p^2 = 0.177$), but this was not significant in the US ($F(1,$

108) = 0.93, $p = 0.34$, $\eta_p^2 = 0.009$). Results from the second model controlling for age and gender showed that this effect became non-significant in the UK ($F(1, 84) = 0.11$, $p = 0.74$, $\eta_p^2 = 0.001$), and HK ($F(1, 92) = 0.29$, $p = 0.59$, $\eta_p^2 = 0.003$), and remained non-significant in the US ($F(1, 106) = 0.37$, $p = 0.55$, $\eta_p^2 = 0.003$). From this, we conclude the fourth hypothesis was not supported.

Effects of Social Media Abstinence on Relatedness (Hypothesis 5). We also tested the relationship between social media abstinence and relatedness. In line with expectations and findings by Sheldon et al. (2011), we found lower day relatedness on abstinence days in the UK ($F(1, 89) = 5.61$, $p = 0.02$, $\eta_p^2 = 0.059$), US ($F(1, 109) = 8.54$, $p = 0.004$, $\eta_p^2 = 0.073$), and HK ($F(1, 95) = 15.99$, $p < 0.001$, $\eta_p^2 = 0.144$). Yet, when controlling for age and gender, this effect became non-significant in the UK ($F(1, 87) = 0.001$, $p = 0.97$, $\eta_p^2 = 0.00$), US ($F(1, 107) = 0.41$, $p = 0.52$, $\eta_p^2 = 0.004$), and HK ($F(1, 93) = 1.63$, $p = 0.21$, $\eta_p^2 = 0.017$). From this, we conclude that the hypothesis was partially supported: in models that did not hold constant variability linked to individual differences in gender and age, participants in all three countries showed statistically significantly lower levels of social relatedness. In the UK and HK samples, this effect was in excess of the MID. These differences were not in evidence when we included controls in the model.

Exploratory Analyses

How Does Typical Engagement with Social Media on a Day Relate to Well-being on that Day? Exploratory analyses were conducted by combining data from all countries. The combined sample ($n = 600$) included participants who completed both days of the study, including those who followed instructions to abstain and those who did not. Pearson correlations were used to explore the basic relations between social media use on a typical use day and our outcome measures on that day. Findings showed that on a typical use day, more social media use related to more negative affect, $r = 0.09$, $p = 0.03$, but also more day satisfaction, $r = 0.10$, $p = 0.02$, and relatedness, $r = 0.10$, $p = 0.01$ (there were no relations with positive affect, $r = 0.06$, $p = 0.16$, or self-esteem, $r = 0.02$, $p = 0.69$), but none of these effects were above the MID threshold, and these small correlations may reflect background statistical noise in the data.

How Does Abstinence Influence More Traditional Forms of Communication? If the displacement hypothesis (Neuman, 1988) is correct, we might expect to see an increase in face-to-face time engagement on a day when participants eliminate their social media use. Alternatively, we may see that individuals engage in other forms of communications to replace connections typically made through social media. A secondary set of exploratory analyses was aimed at testing the displacement hypothesis, and the possibility that other, but less rewarding forms of engagement would replace social media use. Only participants who followed instructions to abstain were considered following practices for primary analyses. Condition effects were in evidence, $F(1, 296) = 29.36$, $p < 0.001$, $\eta_p^2 = 0.090$ but went counter to displacement hypothesis expectations: participants engaged in *less* face-to-face interaction on abstinence days ($M = 2.73$, $SD = 2.03$) as compared to the typical use days ($M = 3.32$, $SD = 1.73$). Further, condition effects were apparent for phone use, $F(1, 296) = 46.85$, $p < 0.001$, $\eta_p^2 = 0.137$, and as was the case for face-to-face interactions, we found that participants engaged in *less* phone calls on abstinence days ($M = 0.93$, $SD = 1.21$) as compared to the typical use days ($M = 1.52$, $SD = 1.31$). Finally, a condition effect was present predicting frequency of email use, $F(1, 296) = 192.59$, $p < 0.001$, $\eta_p^2 = 0.39$, and once again participants engaged in *less* emails on abstinence days ($M = 1.76$, $SD = 1.54$) as compared to the typical use days ($M = 3.09$, $SD = 1.32$).

Discussion

The idea that we can significantly improve our psychological well-being by taking a short break from social media is a view many hold. In this study, we aimed to directly test the extent to which abstaining from social media has a substantive and measurable positive impact on the ways people feel. Across three preregistered field experiments we did not find compelling evidence that this intuition is, in fact, true. Instead, we derived a number of more interesting findings which inform both our understanding of the practice of "digital detox" as well as the growing literature concerned with studying its effectiveness.

Contrary to our expectations based on literature linking lower social media use with higher well-being (Kross et al., 2013), we did not find any evidence that abstaining from social media for one day had significant positive impacts on psychological well-being. Stopping social media for one day—a form of "digital detox"—did not have a measurable impact on positive affect, negative affect, self-esteem, or participants' satisfaction with their day in our pre-registered analyses. When abstinence *did* have an effect—that is, in analyses unadjusted for controls, "digital detox" was found to *decrease* well-being. This pattern was most clear in the case of day satisfaction, the outcome which asked most directly about participants' quality of life on the day. We did observe partial support for one of our hypotheses—a finding first reported by Sheldon and colleagues (2011), which indicated that suspending Facebook use was associated with lower levels of relatedness need satisfaction. Data from all three

experiments indicated that participants reported their levels of social relatedness were both significantly (i.e., $p < 0.05$) and meaningfully (i.e., $\eta^2 > 0.059$) lower on days they successfully cut themselves off from social media. That said, it is noteworthy these effects were no longer in evidence when we held variability in gender constant. This result inspired a number of exploratory analyses.

In addition, based on the displacement hypothesis and the subsequent literature, we expected that in the absence of social media mediums for interactions, individuals would use other (and perhaps richer) forms of communication. In an exploratory analysis we tested the expectation that individuals would report more varied forms of communications during social media abstinence days. Again, interestingly, we found that participants reported significantly *lower* levels of face-to-face, voice, and email interactions on days they abstained from social media. That is, participants did not replace social media time, often thought of as time better spent in other ways, with other forms of socializing. Said differently, this set of results suggests the displacement account provides a poor fit for predicting what people will do when they forgo digital opportunities. Analogue and digital modes of socializing may be as inseparable as qualitative researchers have long argued (Jurgenson, 2011).

Limitations and Avenues for Future Research

The present study presents a number of limitations which continued research should address to deepen our understanding of social media effects. First, our sample recruited was slightly smaller than we had aimed for, and the sample recruited found it difficult to give up social media, even for a brief period of time. We observed sufficient power in our final 'adhering' subsamples and drew conclusions from multiple samples, yet we must be cautious in interpreting effects in these studies and others facing similar challenges. Observational studies suggest 40% of adults balk at the prospect of giving up social media (Smith & Anderson, 2018), and the fact that only half ($n = 297$) of the 600 participants recruited across three field experiments and three countries complied with the protocol speaks to the reality of this challenge. Perhaps more worryingly, because many studies examining abstinence interventions do not report their noncompliance rates (e.g., Tromholt, 2016), it is possible that this methodological challenge is not being taken seriously enough by interested researchers. Although it might seem like common sense, this finding underlines the importance of quality control checks in field experiments and avoiding incentivizing participants to deceive researchers regarding their technology use**.**

Second, the time scope of these experiments was necessarily narrow as we were concerned about participant compliance and retention. The short-term effects observed in our studies might not generalize to longer periods of social media abstinence. Arguably, individuals may become increasingly creative in their pursuit of social interactions when faced with prolonged withdrawal from social media and over time would find richer social pursuits. Third, in these studies, we as experimenters used random assignment to determine when participants were instructed to either use or abstain from using social media. Personal motivation likely plays a large role in the decision to try social media abstinence, and research investigating personal autonomy—choosing to "detox"—should be conducted. Third, as a matter of experimental design, we determined which social media platforms participants were asked not to use on abstinence days. These manipulations might not map well onto real world settings if people opt for graded exposure, using some platforms but not others, for brief periods of time. Experimental studies conducted with cooperation from social media platforms are needed to tease apart how specific social affordances and unique patterns of engagement shape user emotions and psychological well-being.

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