RUNNING HEAD: SOCIAL MEDIA DISPLACEMENT

Where Does the Time Go?

An Experimental Test of What Social Media Displaces and Displaced Activities' Associations with Affective Well-being and Quality of Day

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Acknowledgement: This research was supported by University of Kansas intramural funding GRF# 2177080.

An earlier version of this manuscript was presented to the National Communication Association Conference, Salt Lake City, UT 2018.

Abstract

Drawing from media displacement theory, this manuscript explores which activities are displaced when individuals spend time on social media. Community and undergraduate participants (N = 135) were randomly assigned to five conditions: no change in social media use, or abstinence from social media for one week, two weeks, three weeks, or four weeks. Participants completed a daily diary measuring how they spent time each day, affective well-being, and quality of day for 28 days. Results indicate that abstinence from social media increased time spent engaged in seven activities, primarily browsing the internet, working, childcare, and cooking/cleaning. Additionally, associations among psychosocial outcomes and the displaced activities were examined. Time spent working, sleeping, and cooking/cleaning were negatively associated with affective well-being and quality of day. On days participants used social media, minutes of use were negatively associated with quality of day. Results suggest that social media primarily displaces unpleasant or neutral activities.

Keywords

diary study, media displacement, social media use, time, well-being

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Throughout the 20th century, researchers have sought to understand what activities are displaced during periods of rapid media adoption (Bryant and Fondren, 2009; Williams and Handford, 1986). Although there is recent evidence of increasing social media use in terms of number of minutes (*The Economist*, 2016), there is no evidence regarding from where that time is borrowed. One way of answering this question is to examine how users allocate their time when they abstain from using social media.

To contribute to this important international conversation, the present investigation reports on the results of an experimental test of social media abstinence. The primary question of the present investigation is, how do daily users of social media use their time when they abstain from using social media? Second, this investigation will examine the associations among social media use, the displaced activities, and two psychosocial outcomes – all measured at the daily level. This analysis answers the second research question, how are the activities displaced by social media associated with affective well-being and quality of day?

To answer these questions, the study employed a combined experimental and daily diary design. For 28 days, participants (N = 135) were randomly assigned to five experimental conditions: abstain from using social media for one week, two weeks, three weeks, or four weeks, or assigned to a no change in social media use condition. At the end of each day, participants reported their time use in four 4-hour blocks throughout the day as well as their daily affective well-being and quality of day. Finally, some respondents provided voluntary qualitative feedback about the experience of social media abstinence. These data are used in combination

with quantitative results to offer a more complete understanding of participants' experience during periods of social media abstinence. This investigation is the first of its kind to test displacement through social media abstinence using an experimental and time diary design.

Media Displacement Theory

There is a robust research tradition of studying displacement in the context of new media adoption (Bryant and Fondren, 2009; Robinson, 2011; Tokunaga, 2016). Widespread TV adoption inspired early displacement research, which subsequently lead to the development of the four principles of displacement: transformation, proximity, functional similarity, and marginal fringe activities (Bryant and Fondren, 2009). Transformation is the process by which users adjust to new media adoption and proximity refers to the perception of new media and old media occupying similar positions physically or psychologically. The principles most pertinent to the present investigation are functional similarity and marginal fringe activities. Functional similarity suggests that older activities that are most functionally similar the new medium (i.e. they serve similar purposes or needs) are the activities most likely to be displaced by a new technology. In the 1950s, cinema attendance greatly declined in response to increased TV viewing. During that same time period, increased TV viewing by children typically displaced similar forms of in-home entertainment, such as reading comic books and listening to the radio (Bryant and Fondren, 2009). In both cases, a new medium (i.e. TV) displaced similar activities (e.g. watching movies) serving a similar function (i.e. entertainment). Marginal fringe activities refers to the concept that new media replaces what is generally understood as free or leisure time. Unstructured time is more likely to be displaced by a new medium compared to time that media users have less control over, such as working or attending school. This principle also suggests that when displacement occurs, the new medium likely borrows time from various unstructured

activities rather than one single activity (Bryant and Fondren, 2009; Robinson, 2011).

Dimmick and colleagues' theory of the niche (Dimmick et al., 2011; Dimmick et al., 2000; Ramirez et al., 2008) offers a complementary perspective to media displacement theory. Niche theory suggests that media compete with one another to serve particular needs or gratifications (Dimmick et al., 2000). Interpersonal communication, particularly keeping in touch with relational partners who are not geographically co-present, is a core purpose of communication technologies. As such, any technology that allows for person-to-person communication (e.g. telephone, text, email) serves a similar need (Dimmick et al., 2011). Like the principle of functional similarity, niche theory suggests a medium must differentiate itself among competing media to survive. Where there is greater overlap in the gratifications that two media serve, there is greater potential for displacement. However, some patterns of media use are associated with particular relational partners in particular places and at particular times (Dimmick et al., 2011). This specificity of purpose allows for several media to coexist. When instant messaging became widely used, for example, it was distinct from voice calls and email and it offered opportunities for gratifying the need of passing the time in a way other media did not (Ramierez et al., 2008). The theory of the niche would suggest that the needs satisfied by social media will be satisfied by other media serving similar needs during periods of abstinence.

Another critical question of displacement theory is, what are the psychosocial effects of media displacement? Bryant and Fondren (2009) note that throughout the 20th century there was a reoccurring fear that new media would displace positive, pro-social activities. The social displacement hypothesis, which developed during the rapid adoption of internet technologies in the late 1990s, offers an illustrative example. During that period, there was a widespread belief that social displacement via internet use was prevalent and harmful (Nie, 2001). It was thought

that as individuals spent more time on the internet, they were spending less time having face-to-face interactions with close friends and family (Kraut et al., 1998). These claims were heavily caveated by subsequent empirical investigations by the authors themselves (e.g. Kraut et al., 2002; Nie and Hillygus, 2002) and by independent researchers (e.g. Tokunaga, 2016). The anxiety accompanying the internet age suggests that although people may fear that social media displaces valued activities, such fears are likely misplaced.

Rather than forming hypotheses from common, cyclical anxieties accompanying new media adoption, media displacement theory offers a more nuanced perspective. In their research on TV displacement, Williams and Handford (1986) argued that media displacement may be negative in some cases and positive in others, but the effect is a function of what is displaced. For example, whether TV viewing has a negative or positive effect depends on (i) how that time would be spent otherwise, and (ii) the positive or negative influence of watching TV itself (Bryant and Fondren, 2009). The present investigation is the first to explore both displacement effects in the context of social media use.

Displacement by Social Media

Although there is no single agreed-upon definition of social media, it is typically identified by a set of platform affordances, specifically peer-to-peer communication that is searchable and scalable (Ellison and Vitak, 2015). Social networking sites (SNS), particularly Facebook, are the most ubiquitous and identifiable form of social media (Ellison and Vitak, 2015). Other commonly used social media platforms include Instagram, Twitter, and Snapchat. Nationally representative samples demonstrate that many individuals have accounts on several different social media platforms (Lenhart, 2015).

Consistent with past periods of new media adoption, the rapid rise of time spent on social

media has inspired widespread concern about what it is displacing. The primary motivation for social media use in general, and Facebook in particular, is maintaining relationships and keeping in touch with friends (Smock et al., 2011). It is consistent with the principle of functional similarity in that time spent on social media may replace time spent communicating with friends using some other medium (Endestad et al., 2011). Before the rise of social media, information shared with friends/followers through status updates, snaps, or posts would have required mass emails or individual text messages, IM chats, or voice calls. Proponents of the social displacement hypothesis (e.g. Dunbar, 2016) point to a negative association between social media use and the number of interactions with friends and family in cross-sectional research, which suggests that social media use leads to social displacement.

Recent research has cast doubt on the central premise of social displacement via social media. Using a nationally representative sample of American adults surveyed from 2009 to 2011 (i.e. Longitudinal Study of American Youth; Miller, 2015), Hall, Kearney, and Xing (in press) found little evidence of social displacement and some evidence of the benefit of social media use. Although adoption of social media in 2009 was associated with a decline in future direct social contact in 2011, it was unassociated with frequency of direct social contact in both 2009 and 2010. The authors suggest that this finding was likely spurious given the large sample size and lack of associations within the same year. Using a sample of German participants, Dienlin, Masur, and Trepte (2017) found that active SNS communication was positively associated with face-to-face communication six months later – a conclusion in contrast to social displacement. In a second study using experience sampling over five days, Hall et al. (in press) found no evidence of social displacement via social media use within the same day. Social media use neither predicted fewer face-to-face interactions nor predicted more interactions with less emotionally

close others. Across these recent studies at three distinct time periods (i.e. three years, six months, one day), the evidence of social displacement through social media is weak.

Functional Similarity and Marginal Fringe Activities

From the point of view of media displacement theory, there are several limitations to these prior investigations. First, because social displacement has been the specific focus, little attention has been paid to the fundamental question, from where is social media time borrowed? Since social media use is a social activity, it presumably displaces other social behaviors. Although relationship maintenance may be an important purpose for social media use (Smock et al., 2011), individuals spend considerable time on social media without directly engaging with friends/followers (Tosun, 2012). In fact, only a small portion of time spent on social media is spent in social interaction, and as the time spent on social media increases, the portion of time spent browsing – rather than interacting – increases as well (Hall, 2018). In addition to socializing, SNSs are also commonly used for the purpose of seeking information and entertainment (Smock et al., 2011). Given the principle of functional similarity, if social media is displacing activities, it stands to reason that other mediated informational and entertainment activities are displaced (Robinson, 2011). Thus:

H1: Time spent engaging in mediated informational and entertainment activities (e.g. internet use, video games, TV watching) will increase when users abstain from using social media.

The other possibility is that social media use is associated with social displacement, but not with close friends and family. A recent meta-analysis suggests that social media use is associated with engagement with less emotionally close partners (Liu and Yang, 2016). Social media is more commonly used for the purpose of communication with acquaintances, rather than close friends and family (Dienlin et al., 2017), and mobile communication can be used to

promote weak tie relationships (Chan, 2015a). Only 40% of Facebook friends are actual friends, and close friends and family constitute approximately 20% of one's online social network (Dunbar, 2016). It stands to reason that social media use could displace communication with less emotionally close others. While abstaining from social media, individuals might communicate with less close friends and family through other means (Chan, 2015b). Thus:

H2: Time spent communicating with less close relationship partners offline will increase when users abstain from using social media.

Given the paucity of research that directly tests displacement by social media, there is insufficient guidance how else individuals might use their time when abstaining from social media. Prior to the age of smartphones, Robinson (2011) reviewed the association between internet use and a variety of activities using several publicly available datasets, including the American Time Use Survey from 2003-2007. Heavy internet use was associated with less time spent on a variety of non-social activities, including housework, driving, and working. A nationally representative sample of Swedes from 2010-2011 also suggest that heavy internet use is associated with less time in child care, prepping meals, driving, and at work (Vihelmson et al., 2017). Indeed, 77% of American adults report using social media while at work (Olmstead et al., 2016), which suggests work is one such source of displacement by social media. The principle of marginal fringe activities suggests that time spent using social media is likely diffused across several behaviors and relationship partners (see also Chan, 2015b). Without clear guidance from prior research, we pose the following:

RQ1: How will abstaining from social media influence time spent on other activities?

The Psychosocial Correlates of Social Media Use and Displaced Activities

Displacement studies rarely explore the comparative value of engaging in the new media

activity with displaced activities (Bryant and Fondren, 2009). Studies of social displacement by social media often focus on the benefits to face-to-face interactions with close others compared to social media use. Yet, these analyses presume that social interaction is functionally similar to social media use. If social media use is not social interaction, then it is inappropriate to compare social media use to face-to-face interactions in regard to psychosocial outcomes (Hall, 2018). Following the principle of psychological proximity in media displacement theory (Bryant and Fondren, 2009), it is critical to both compare the effect of using the medium with the effect of engaging in the *actually* displaced activities, rather than the presumably displaced ones.

Research suggests a negative association between social media use and positive psychosocial outcomes. A meta-analysis of studies collecting Facebook use and loneliness reported in cross-sectional data, including over nine thousand Facebook users, reported a positive association between use and loneliness (r = .13) (Song et al., 2014). Among studies using experience sampling methods, retrospective Facebook use is associated with greater loneliness and diminished affective well-being in the moment (Kross et al., 2013). Short breaks from Facebook are associated with increased life satisfaction (Hinsch and Sheldon, 2013). Yet, there is little evidence regarding which activities are displaced by social media. Thus, social media could be no worse of a use of time than displaced activities on a daily level. Two outcomes that focus on daily life will be used to answer this question:

RQ2: How are the activities displaced by social media associated with end-of-day affective well-being and quality of day?

METHODS

The present investigation used a dataset that was originally collected to answer hypotheses that were pre-registered in August 2017 (pre-registration ID: osf.io/ze74g) and

reported elsewhere (Author, 2018). The results of the present investigation are unique to this manuscript and are not reported elsewhere. The sponsoring university's human subjects committee approved all procedures.

Recruitment

Participants who were daily social media users were recruited through Facebook, social networks, fliers, and a student research pool. Potential participants were told they may be asked to change their social media habits (e.g. Facebook, Twitter, Snapchat, Instagram), but the entirety of the study design was not revealed. The study purpose was reported to be "how people spend their time each day" to reduce the demand characteristic and disguise the purpose of the study for the control group. Although experimental participants may have inferred that one of the purposes of the study was to explore the effects of abstinence from social media, the focus on the time component of the study was meant to reduce their attention to that purpose.

On September 7, 2017, the study began with five groups. New participants were added to two of the groups during the first week of data collection to increase sample size. The length of abstinence varied between groups to answer one of the study's pre-registered questions. These varying lengths of abstinence did not affect pre-registered study outcomes (Author, 2018), and do not pose any problems for the present research. The five groups were as follows: i) control (no social media usage change); ii) 7 days social media abstention; iii) 14 days abstention; iv) 21 days abstention; v) 28 days abstention.

Interested participants were emailed a consent form, a request for demographic information, and their social media account identities. Participants allowed a study-specific account created on each of the four named social media platforms to 'friend' or 'follow' them. Once this information was provided, participants were considered enrolled in the study. The

study began with 211 participants, and 21 more participants were added to groups two and three in the first week. Participants were added to these two groups because they were smaller groups initially due to random assignment. They only completed diaries for 21 days of the study.

Study reminders and manipulation checks. Participants were told when to begin and end social media abstention. If participants failed to complete end-of-day surveys for five consecutive days, they were dropped from the study. Participants with less than a week's worth of data in total were removed from the final data set, leaving 181 participants and 4,288 daily diary reports. Several attention checks were conducted. Fifteen participants were responsible for 49% of the attention check fails and were removed. All participants' social media usage was observed for the study duration to determine if they broke protocol. Thirty-one participants in the abstention conditions did not abstain from social media more than four days and were removed.

Specific to the present investigation, the daily diary records were checked for social media use. Days when participants failed to stay off social media when they were assigned to abstain and days when participants who could have used social media chose not to were both removed (n = 228). This final data cleaning procedure ensured that social media was used on days in the no change condition and social media was not used on days in the abstinence condition.

Participants

The final sample included 135 participants and 3,026 observations. On average, each participant had 22 daily diaries passing screening procedures. Most participants were female (79.5%) and Caucasian (75.5%). Participants could identify with as many racial and ethnic categories as they wished. They self-identified as: 8% Asian-American, 7% Mixed Race, 6% Latino/Hispanic, 6% African-American, and 2% Native American. Participants were 26.4 years

of age on average (*SD* = 11.6, *mdn* = 20, *range* 18-68). Participants currently resided in Kansas (60%), Utah (13%), and Oklahoma (7%), but also in 16 other unique states. Participants reported their occupation: full time student (37%), full time employed (24%), part time work (19%), full time parent (6%), unemployed (6%), retired (4%), and other (4%). Most participants did not have children (69%), and the remainder reported having between 1-6 children. For those who were not full time students, the mode and median highest level of education was some college.

Instrumentation and Measures

The time diaries were separated into two sections. In the first section, participants were asked to apportion 16 hours of their waking time in four 4-hour blocks (i.e. morning, mid-day, late afternoon, evening). In each section, they had to allocate 240 minutes between 19 categories. Fifteen categories represented the most common use of time (e.g. eating, cooking/cleaning, working, driving, watching TV/movies/streaming, sleeping) as reported by the American Time Use Survey (US Department of Labor, 2015). Two new categories measuring media use not measured in the American Time Use Survey were developed as they were thought to be most functionally similar to social media use: internet use and playing video games. Social media use was also measured. Finally, the instrument included an 'other' category. Participants did not need to add up their time use, the online survey kept track of and summed their allocation of 240 minutes within each block. Participants could neither exceed 240 minutes nor report less than 240 minutes per four-hour block.

The second section of the time diary asked eight questions in a random order measuring two psychosocial outcomes: quality of day and affective well-being. *Quality of day* was measured using three items adapted from the quality of life measure (Diener et al., 1985): "If I could live this day over, I wouldn't change a thing," "In most ways, today was close to ideal," "I

am satisfied with my life today," and one additional item: "Today was an awful day" (reverse coded). *Affective well-being* was measured using four items from the SF-36 (Ware and Sherbourne, 1992): "I felt calm and peaceful today," "I felt worn out today" (reverse coded), "I felt happy today", and "I felt downhearted and blue today" (reverse coded).

A multilevel confirmatory factor analysis was conducted to confirm the factorial structure of the two outcome variables. Two latent factors composed of four items each were included in one model. The intraclass correlations of quality of day ranged from .223-.350 and for affective well-being ranged from .281-.397. The global fit of the model was very good: RMSEA = .055, CFI = .961, TLI = .943, SRMR: within-subjects = .026; between-subjects = .076. Both measures were reliable: quality of day α = .86, affective well-being α = .81.

RESULTS

To answer the H1, H2, and RQ1, a MANOVA tested whether participants who abstained from social media differed in their use of time compared to participants who used social media as much as they wished (Table 1). This included both participants in experimental conditions who shifted between being on and off of social media during the study, and participants in experimental conditions who were able to use or required to abstain from social media. During the study period, participants reported using social media for 72 minutes a day on average (*SD* = 58 minutes). Multivariate *F* test indicated that time used for 18 activities (not including time spent on social media) differed by sample: $F(18,3007) = 61.35$, $p < .001$, $\eta^2_p = .269$. The amount of time engaged in the following activities increased when abstaining from social media (listed in order of effect size): browsing the internet, working, cooking/cleaning, taking care of children (or other family members), driving/commuting, and sleeping (Table 1). The only activity that

significantly *decreased* when abstaining from social media was socializing with people at work or school.

The MANOVA ignored the nested structure of the data (i.e. days nested within individuals) to avoid inflating Type 1 error and to prevent a substantial loss of information if average daily minutes on each activity were analyzed at the participant level. To confirm the results of Table 1, the activities that were found to significantly differ by experimental condition were tested one-by-one in seven multilevel models (MLMs) in Mplus, which controlled for the non-independence of samples. The activities that significantly differed in the MANOVA also significantly differed in the MLMs.

A second MANOVA was conducted with the 69 participants who switched between being on and off of social media within the study duration (i.e. groups 2, 3, 4). This analysis evaluated whether the same pattern of displacement could be detected for participants whose time allocation during periods of abstinence could be compared to their *own* periods of regular social media use. Multivariate *F* test indicated that periods of abstinence from social media affected how participants used their time, $F(18,1494) = 27.5$, $p < .001$, $\eta^2_p = .250$. With slightly more than half the sample size, two significant differences were detected. During periods of abstinence from social media, participants reported more time at work, $M = 132$, $SD = 117$, $F(1,1494) = 12.0$, $p < .001$, $\eta^2_p = .008$, compared to days when participants could use social media, $M = 100$, $SD = 157$. During periods of abstinence from social media, participants reported more time at browsing the internet, $M = 33$, $SD = 45$, $F(1,1494) = 7.6$, $p = .006$, $\eta^2_p = .005$, compared to days when participants could use social media, $M = 27$, $SD = 37$.

Taken together, there was partial support for H1 in that browsing the internet was an activity that was displaced when using social media, but time watching TV/streaming and time

spent playing video games was unchanged during social media abstinence. There was no support for H2 in that there was no evidence of social displacement for time spent socializing at work or at school. Consistent with past research (e.g. Dienlin et al., 2017; Hall et al., in press), there was also no evidence of displacement of time with close friends or family. Instead, individuals who used social media were *more* likely to spend time socializing at work or school.

Psychosocial Outcomes

To answer RQ2, the activities that showed differences between abstinence and regular social media use conditions were examined for their associations with affective well-being and quality of day. See Table 1 for the zero-order correlations between 19 activities and psychosocial outcomes for the entire sample. Due to the non-independence of observations, MLM was used to explore the associations between the seven activities that were displaced and both psychosocial outcomes. All estimates are within-person centered at Level 1 and between-person centered at Level 2. Four MLMs were estimated: two predicting affective well-being and two predicting quality of day. The first and third columns of Table 2 included the association between the seven displaced activities and the outcome for all participants and all observations. The second and fourth columns of Table 2 included observations where participants were free to use social media.

Results indicate that one of the most consistently displaced activities, working, is associated with less affective well-being and having a worse quality of day. There was evidence that sleeping at the within-person level and cooking/cleaning at the between-person level were associated with lower psychosocial outcomes at the end of the day. When the participants who were free to engage in social media use were analyzed in conjunction with the seven displaced activities, social media use was negatively associated with quality of day but not affective well-

being. These results suggest that the displaced activities (e.g. working) and the displacing media (i.e. social media) are both associated with having a worse day, affectively speaking.

Qualitative Results

During the study debrief, participants were asked two optional, open-ended questions: 1) "In keeping track of how you spent your time each day, did you notice anything interesting or noteworthy you'd like to share?" and if they were in one of the social media abstinence groups, they were asked: 2) "How do you think you spent your time that you would have been spending on social media?" Because responses to these questions were voluntary, there was a low response rate. After removing responses such as "nothing to add", there were 89 usable responses for both questions combined. From that list, 56% of responses were pertinent to the issue of displacement. From those responses, two independent coders identified two prominent themes (kappa = .82). The first theme (35% of responses) regarded how stopping using social media affected feeling connected and socializing. The second theme focused on social media ameliorating boredom and without it inspiring productivity (42% of responses).

Although two-thirds of participants reported increased communication with others after abstaining from social media, the final third mentioned that periods of abstinence corresponded with feeling less in contact with friends and family. During periods of abstinence, respondents said, "I spend a lot more time taking care of my baby," "Texting friends instead of scrolling," and "I had to actually go out and interact with people or call them up to get the my social 'fix.'" These quotes point to how time spent using social media might be redirected both in time and attention toward other channels of communication. One quote confirms the significant difference in time spent caring for children found in the quantitative results. When respondents pointed to the loss of social media reducing their sense of connection, they mentioned not being able to

"see" and "keep tabs" on their friends and family: "I did miss seeing the friends I normally see daily via Snapchat," "When I was able to use social media, I felt as if I knew what was going on with friends more." Another respondent pointed to the relative efficiency of social media: "It is easier to keep tabs with someone via Facebook than to try to find when both you and them might be available to have a phone conversation."

The second theme broadly focused on the habitual dynamics of social media. Many described social media as habitual: "Checking my social media on my phone is second nature," "especially at work" others added. Several pointed to the "weird" impulse to open up social media and it not being there:

> "The hardest part was when I would be sitting on the bus, in class and I wasn't wanting to pay attention to the lecture, or even at home, when I finally finished all my homework and house chores. These moments always drove me to reach into my pocket, pull out my phone, only to realize that I didn't have social media. It was creepily instinctual, once I realized what I was doing."

Once this instinct was in check, participants reported "reading the news online" instead. This comment confirms quantitative findings about spending more time browsing the internet during periods of abstinence. A notable minority of participants reported feeling "less distracted" in general and spent "more time studying" without social media.

DISCUSSION

The present investigation sought to answer the question, what do people do with their time when they abstain from using social media? Participants who were free to use social media on all four platforms reported using it for an average of 72 minutes a day, which is about 50% more minutes than estimates of Facebook use alone (*The Economist*, 2016). When abstaining

from social media, participants spent more time browsing the internet and working. Both within-subject comparisons (i.e. those who switched on and off of social media during the study) and between-subject comparisons (i.e. including complete abstinence and no change conditions) confirmed changes in time spent on these two activities. Supporting the principle of functional similarity and the theory of the niche, browsing the internet likely provides for similar entertainment and information retrieval uses and gratifications as social media. Perhaps social media is displacing time spent using the internet, just as internet use displaced time using other media (Vihelmson et al., 2017). This also speaks to the concept of physical proximity in displacement theory (Bryant and Fondren, 2009). Once participants in abstinence conditions opened their mobile or computer, it was probably just as easy to click on a web browser rather than a social media application.

The second most displaced activity in terms of effect size, working, had the largest change in terms of number of minutes. This is consistent with past studies that suggest heavy internet use is associated with less time working (Robinson, 2011; Vihelmson et al., 2017), and the finding that most American adults use social media at work (Olmstead et al., 2016). Pointing to ongoing trends toward connectivity, this finding is inconsistent with 20th century research that suggests time spent at work is rarely displaced by new media (Bryant and Fondren, 2009). Social media mobility creates a fundamentally different media landscape than that of the 20th century. Whether or not an employee is *allowed to* use their personal mobile at work, Americans consistently use social media at work (Olmstead et al. 2016). Although this is not exactly "free" time (at least from the employer's perspective), social media likely fills gaps between cycles of work. For example, 54% of Americans claim to use social media to 'recharge' at work

(Olmstead et al., 2016). Qualitative results suggest that checking social media at work is "second nature," especially when participants were bored or wanted to take a mental break.

The second research question of the present investigation – a question unique to this study – focused on whether social media use was a better or worse use of time compared to displaced activities. Confirming past research, time spent using social media was negatively associated with quality of day. Yet, the most consistently displaced activity, working, was also associated with less affective well-being and a worse quality of day. More time engaged in other displaced activities, such as sleeping and cooking/cleaning, were also associated with more negative outcomes. Social media use, while weakly and negatively associated with the quality of day, seems to displace other affectively unpleasant activities. This is directly in contrast with the typical (but fallacious) assumption of social displacement, which assumes that positive behaviors, like socialization with close friends and family, are displaced when people use new media. However, it is consistent with Sagioglou and Greitemeyer (2014) who argue that Facebook users make an affective forecasting error. That is, social media users *expect* that using it will result in a more positive mood than they actually experience after using it. Users may turn to social media (and away from work or household chores) because they expect that social media use will be enjoyable (Meier et al., 2016), but that benefit might not actually come to pass -- at least at the daily level, according to the results of the present investigation.

Media Habits

The present investigation speaks to research on media habits. Although the design of this investigation is consistent with past research on displacement, studying abstinence cannot truly account for what is displaced when adopting new media and forming new habits. Thus, it is an important caveat to the present investigation that reordering activities when existing patterns of

media use are disrupted probably do not align with the activities that were originally displaced back when participants started using social media. Additionally, this study required participants to abstain from a daily behavior, and the non-adherence rates (17% of participants who completed more than 7 days of the study) suggest that participants may have struggled to break their social media habit. The inclusion criteria of being a daily social media user lined up with the present study's design and focus on the day as the unit of analysis. Yet, the results are likely more applicable to heavy (72 min. a day on average) rather than casual users.

Attending to these limitations, an interpretation of the results based on habit disruption rather than media displacement would interpret findings about workplace use and qualitative commentary about use being "creepily instinctual" in a different way. Namely, activities displaced by social media may be due to insufficient self-regulation rather than intentional uses of time (Meier et al., 2016; Schnauber-Stockmann et al., in press). Once established, habits are activated automatically with little awareness or attention (Schnauber-Stockmann et al., in press) and Facebook use is highly habitual (Meier et al., 2016). So, rather than taking a break at work to recharge their batteries, users may be procrastinating or using social media due to low self-control in the presence of a well-formed habit (Meier et al., 2016). This leads to an important direction for future research; a greater attention to the psychological mechanisms that drive social media habits could advance research on displacement. Although unable to speak to these particular mechanisms (as no pertinent data were collected from participants), the results of the present study may be valuable for future work on media habits.

Domestic Duties and Redirecting the Flow of Communication

The final three activities that increased in frequency during periods of abstinence were domestic in nature: taking care of children, sleeping, and cooking/cleaning. Interestingly, all

three activities appeared to be displaced by heavy internet use (Robinson, 2011; Vihelmson et al., 2017), which again suggests that social media use is functionally similar to internet use. In the present study, a mother reported spending more time taking care of her baby during periods of social media abstinence, but no other open-ended response offered insight as to why time spent sleeping or cooking or cleaning the house might have been displaced by social media. MLM results suggest that participants who spent more time cooking/cleaning in general were more likely to report lower quality days and lower affective well-being in general. Sleeping was also negatively associated with both outcomes at the daily level. As this study asked participants to only report on their 16 waking hours, participants who slept during the day might have been stressed, tired, or unwell. Taken together, perhaps theses activities are things people want to avoid doing, which again speaks to the procrastination perspective (Meier et al., 2016). Like taking a mental break at work, it stands to reason that individuals may seek a mental break from childcare or avoid cleaning by using social media.

Against the prediction of H2, the only activity that *decreased* when abstaining from social media was socializing with people at work or school. This curious finding suggests that individuals socialize more at work or school when they were able to use social media. As this finding was not located in the more narrow analysis of groups who switched on and off of social media, it may be spurious. Another interpretation is that while on social media, participants felt that they were more aware of their co-workers' or classmates' activities and socialized with them to catch up about events posted on social media itself. Indeed, 17% of Americans report that using social media at work helps to strengthen personal relationships with coworkers (Olmstead et al., 2016). Perhaps more social media use at work inspires face-to-face socialization with coworkers, but further study is needed.

Finally, the most common theme from the qualitative data was that participants felt that staying off of social media increased other forms of communication, such as texting, calling, or talking face-to-face. This supports the argument that social media is part of the personal media landscape of multi-modal connectedness (Chan, 2015b). Interestingly, these reports, unsupported by quantitative results partly due to the use of an undifferentiated measure of time spent socializing, suggest that part of the challenge of testing the social displacement hypothesis is that evidence against displacement runs up against public perceptions (Hall et al., in press). Qualitative results also point to the importance of social media in maintaining relationships, primarily through seeing, keeping tabs on, and watching friends and family. As others have argued (e.g. Hall, 2018), social media use is more akin to people watching than social interaction. Thus, the primary loss of sociability when abstaining from social media is the loss of ambient awareness of the goings-on of others (Levordashka and Utz, 2016). With this loss of awareness, individuals may feel compelled to turn to other media to connect (Chan, 2015b).

Limitations and Directions for Future Research

The biggest limitation of the present investigation is the reliance on the self-report of daily activities. The activity categories and methods herein were modeled after the US Department of Labor's Time Use Survey, and have been recommended as a best practice for studying media displacement by Robinson (2011). Yet, there were no attempts to ensure that participants' time estimates were valid indicators of actual apportionment of time. Future research could monitor online communication and social media use through programs installed on mobile devices, but these would both not be able to report time spent on the 18 other activities. Furthermore, the present investigation did not include eight hours of the day, which were presumably spent sleeping and other bedtime activities. Thus, if social media use displaced

sleep at night, this study would be unable to detect it.

The present study used a manipulation check designed to ensure participants stopped actively using the four most common social media. Yet, participants may have found ways to circumvent these checks (e.g. use a friend's social media account) or turned to less common forms of social media that were not explicitly monitored but were implicitly forbidden (e.g. Tumblr). Passive use of social media (e.g., browsing) and brief habitual checks were not recorded, which limited the present investigation's commitment to adherence.

This investigation speaks to a cautionary comment of Bryant and Fondren (2009: 510): "it may be inaccurate or even naïve to view displacement effects as being content irrelevant." By identifying what activities were increased when individuals abstained from social media and exploring which of and how those activities were associated with psychosocial outcomes, this investigation acknowledged that activities are not all equivalent in terms of their association with affective well-being. Furthermore, qualitative results suggest that social media abstinence both increases attention to the present environment (e.g. taking care of an infant) and leads to a feeling of disconnect with friends/family on social media.

Echoing the cautionary note of Bryant and Fondren (2009), future research needs to attend to *how* people use social media to understand displacement, social interaction, and multi-modal processes (Chan, 2015b; Hall, 2018). Whether displacement by social media has a positive or negative effect likely depends on *how* it is used, not just *how much* it is used. This issue points to a limitation to the current study's measurement of other media (i.e. internet use, streaming/watching movies, gaming). Unfortunately, the lack of specificity about how people use the internet or what counts as streaming, social media, or internet use (e.g. YouTube) does not resolve particular details of social media displacement. To truly advance the study of

displacement, precise and continuous monitoring of media use over time is needed.

Greater attention needs to be paid to daily hedonic well-being, such as measured in this study, in conjunction with eudaimonic well-being, such as having a sense of accomplishment and competence. An appreciation of both forms of well-being in the same study, can explore the effects of social media use and abstinence both in the course of a day and over time. This could put into context both the potential value of working for eudaimonic well-being as well as the potential long term benefits of feeling that one has maintained important relationships.

Finally, the present investigation suggests that although social media use is negatively associated with quality of day, the activities it displaces are negatively associated with the psychosocial outcomes as well. Individuals may simply be trading out somewhat unpleasant activities for others, which supports both the principle of marginal fringe activities from displacement theory and past internet displacement research (Robinson, 2011; Vihelmson et al., 2017). As the qualitative results suggest, social media is a means of confronting boredom or avoiding duties during downtime at work or home. Therefore, even if it is true that social media use *causes* negative psychosocial outcomes (which other research has called into question, Hall, 2018), the present study suggests it is merely displacing other activities that are no less or more beneficial to individuals' daily affective well-being.

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Table 1
Mean minutes for experimental and control groups, mean differences, and zero-order correlations

Activity	Use SM *n* = 1654 M	SD	Abstain *n* = 1372 M	SD	Mean Diff.	η^2_p	Quality of Day	Affective Well-Being
Dressing/Grooming	45	29	45	29	0		.13	.00
Cooking/Cleaning	36	49	47	62	-11	.009	-.05*	-.03
Eating/Drinking	69	41	67	38	2		.07**	.10**
Child care	33	98	52	104	-19	.009	.01	-.01
Driving	60	63	66	69	-6	.003	.02	.03
Working	99	164	133	187	-34	.009	-.12**	-.08**
Class/Studying	144	181	137	182	7		.01	-.07**
Socializing work/ school	29	54	22	43	7	.005	.03	.01
Socializing close Friends/Family	113	110	108	104	5		.22**	.23**
Attending church	108	136	101	139	7		.00	-.07
Household/ Lawn	4	26	5	25	-1		-.01	-.02
Exercise, play, Active sport	19	45	21	42	-2		.05*	.05*
TV/Streaming Movies	85	92	55	102	-3		-.05*	-.02
Internet use	24	36	33	44	-9	.012	-.00	.03
Video games	19	48	21	50	-2		-.03	.00
Shopping	11	30	14	44	-3		.05*	.03
Sleeping	38	73	47	82	-9	.003	-.06**	-.08**
Other	41	77	44	77	-3		-.02	-.02

Note: * $p < .05$, ** $p < .01$, *** $p < .001$; All significant differences confirmed in MLM analyses

Table 2: Multilevel Model of Two Outcomes Predicted by Displaced Activities in Hours

	Affective Well-Being		Quality of Day	
Level 1 Effects	Model 1	Model 2	Model 1	Model 2
Intercept	4.773***	4.738***	4.820***	4.764***
Cooking/cleaning	.023	.009	.002	.027
Child care	-.038	-.010	-.014	.025
Driving/commuting	.037*	.038	.047*	.068*
Working	-.053***	-.060***	-.058***	-.065***
Socialize at work	.026	.003	.045	.047
Internet use	-.035	.008	-.059	.023
Sleeping	-.122***	-.138***	-.121***	-.145***
Social media use		.003		-.076*
Level 2 effects				
Cooking/cleaning	-.277*	-.306*	-.334**	-.335*
Child care	.031	.052	.054	.027
Driving/commuting	-.034	.036	-.093	-.049
Working	-.019	-.021	-.044	-.050
Socialize at work	-.023	.036	-.025	.024
Internet use	.152	.085	.051	-.074
Sleeping	-.085	-.201	-.061	-.145
Social media use		.154		.095
Variance Components				
Level-1 Residual	1.034***	.963***	1.134***	1.061***
Level-2 Residual	.653***	.667***	.556***	.595***
Goodness-of-fit				
AIC	9050.3	4914.6	9298.0	5040.0
BIC	9152.4	5017.3	9400.2	5121.8
Loglikelihood	-4508.13	-2438.3	-4632.0	-2501.0

Note. Model 1 $N = 135$, $N_{observations} = 3{,}014$; Model 2 $N = 110$, $N_{observations} = 1{,}646$; Model 1 includes all participants, Model 2 only includes participants who used social media. Activities are within-person centered at Level-1 and between-person centered at Level-2. All minutes were divided by 60; coefficients are per hour; * $p < .05$, ** $p < .01$, *** $p < .001$

Table 1

Mean minutes for experimental and control groups, mean differences, and zero-order correlations

	Use SM		Abstain					
	n = 1654		*n* = 1372				Quality	Affective
Activity	M	SD	M	SD	Mean Diff.	η^2_p	of Day	Well-Being
Dressing/Grooming	45	29	45	29	0		.13	.00
Cooking/Cleaning	36	49	47	62	-11	.009	-.05*	-.03
Eating/Drinking	69	41	67	38	2		.07**	.10**
Child care	33	98	52	104	-19	.009	.01	-.01
Driving	60	63	66	69	-6	.003	.02	.03
Working	99	164	13	187	-34	.009	-.12**	-.08**
Class/Studying	144	181	137	182	7		.01	-.07**
Socializing work/ school	29	54	22	43	7	.005	.03	.01
Socializing close Friends/Family	113	110	108	104	5		.22**	.23**
Attending church	108	136	101	139	7		.00	-.07
Household/ Lawn	4	26	5	25	-1		-.01	-.02
Exercise, play, Active sport	19	45	21	42	-2		.05*	.05*
TV/Steaming Movies	85	92	55	102	-3		-.05*	-.02
Internet use	24	36	33	44	-9	.012	-.00	.03
Video games	19	48	21	50	-2		-.03	.00
Shopping	11	30	14	44	-3		.05*	.03
Sleeping	38	73	47	82	-9	.003	-.06**	-.08**
Other	41	77	44	77	-3		-.02	-.02

Note: * $p < .05$, ** $p < .01$, *** $p < .001$. ; ; Drive at .005, sleep at .002 – Confirmed by MLM

Table 2

Multilevel Model of Two Outcomes Predicted by Displaced Activities in Minutes

	Affective Well-Being		Quality of Day	
Parameter	Model 1	Model 2	Model 1	Model 2
Level 1 Fixed Effects				
Intercept	4.773***	4.738***	4.820***	4.764***
Cooking/cleaning	.023	.009	.002	.027
Child care	-.038	-.010	-.014	.025
Driving/commuting	.037*	.038	.047*	.068*
Working	-.053***	-.060***	-.058***	-.065***
Socialize at work	.026	.003	.045	.047
Internet use	-.035	.008	-.059	.023
Sleeping	-.122***	-.138***	-.121***	-.145***
Social media use		.003		-.076*
Level 2 Fixed effects				
Cooking/cleaning	.277*	-.306*	-.334**	-.335*
Child care	.031	.052	.054	.027
Driving/commuting	-.034	.036	-.093	-.049
Working	-.019	-.021	-.044	-.050
Socialize at work	-.023	.036	-.025	.024
Internet use	.152	.085	.051	-.074
Sleeping	-.085	-.201	-.061	-.145
Social media use		.154		.095
Variance Components				
Level-1 Residual	1.034***	.963***	1.134***	1.061***
Level-2 Residual	.653***	.667***	.556***	.595***
Goodness-of-fit				
AIC	9050.3	4914.6	9298.0	5040.0
BIC	9152.4	5017.3	9400.2	5121.8
Loglikelihood	-4508.13	-2438.3	-4632.0	-2501.0

Note. Model 1 $N = 135$, $N_{observations} = 3{,}014$; Model 1 $N = 110$, $N_{observations} = 1{,}646$;

* $p < .05$, ** $p < .01$, *** $p < .001$; IVs are person centered at level 1 and centered (MORE HERE) at level 2. All minutes were divided by 60 so each estimate is per hour of the day.

THE MODEL ESTIMATION TERMINATED NORMALLY

Loglikelihood

H0 Value -4508.130

Information Criteria

Akaike (AIC) 9050.260
Bayesian (BIC) 9152.447
Sample-Size Adjusted BIC 9098.432
(n* = (n + 2) / 24)

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
WELL ON				
COOK	0.023	0.027	0.841	0.400
CARE	-0.038	0.026	-1.466	0.143
DRIVE	0.037	0.020	1.836	0.066
WORK	-0.053	0.009	-5.644	0.000
SOCIAL	0.026	0.027	0.988	0.323
INTERNET	-0.035	0.034	-1.007	0.314
SLEEP	-0.122	0.017	-7.094	0.000
Residual Variances				
WELL	1.034	0.027	37.942	0.000
Between Level				
WELL ON				
COOK_D	-0.277	0.143	-1.934	0.053
CARE_D	0.031	0.055	0.563	0.574
DRIVE_D	-0.034	0.146	-0.237	0.813
WORK_D	-0.019	0.038	-0.513	0.608
SOCIAL_D	-0.023	0.175	-0.133	0.894
INTERNET_D	0.152	0.192	0.788	0.430
SLEEP_D	-0.085	0.119	-0.713	0.476
Intercepts				
WELL	4.773	0.072	66.089	0.000
Residual Variances				
WELL	0.653	0.085	7.640	0.000

THE MODEL ESTIMATION TERMINATED NORMALLY

Loglikelihood

H0 Value -4631.994

Information Criteria

Akaike (AIC) 9297.988
Bayesian (BIC) 9400.176
Sample-Size Adjusted BIC 9346.160
(n* = (n + 2) / 24)

MODEL RESULTS
Two-Tailed

	Estimate	S.E.	Est./S.E.	P-Value
Within Level				
QOD ON				
COOK	0.002	0.028	0.062	0.950
CARE	-0.014	0.027	-0.498	0.619
DRIVE	0.047	0.021	2.243	**0.025**
WORK	-0.058	0.010	-5.909	**0.000**
SOCIAL	0.045	0.028	1.617	0.106
INTERNET	-0.059	0.036	-1.641	0.101
SLEEP	-0.121	0.018	-6.714	**0.000**
Residual Variances				
QOD	1.134	0.030	37.937	0.000
Between Level				
QOD ON				
COOK_D	-0.334	0.134	-2.501	0.012
CARE_D	0.054	0.051	1.055	0.291
DRIVE_D	-0.093	0.136	-0.684	0.494
WORK_D	-0.044	0.035	-1.244	0.214
SOCIAL_D	-0.025	0.163	-0.152	0.880
INTERNET_D	0.051	0.179	0.283	0.777
SLEEP_D	-0.061	0.111	-0.548	0.584
Intercepts				
QOD	4.820	0.067	71.588	0.000
Residual Variances				
QOD	0.556	0.074	7.467	0.00

N = 110
1646 observations

Loglikelihood H0 Value -2501.010

Information Criteria
Akaike (AIC) 5040.020
Bayesian (BIC) 5142.736
Sample-Size Adjusted BIC 5082.376
(n* = (n + 2) / 24)

MODEL RESULTS

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
QOD ON				
COOK	0.027	0.042	0.637	0.524
CARE	0.025	0.038	0.655	0.513
DRIVE	0.068	0.030	2.244	**0.025**
WORK	-0.065	0.014	-4.550	**0.000**
SOCIAL	0.047	0.034	1.393	0.164
INTERNET	0.023	0.052	0.431	0.667
SLEEP	-0.145	0.025	-5.866	**0.000**
SM	-0.076	0.040	-1.888	**0.059**
Residual Variances				
QOD	1.061	0.038	27.724	0.000
Between Level				
QOD ON				
COOK_D	-0.335	0.157	-2.134	**0.033**
CARE_D	0.027	0.064	0.420	0.675
DRIVE_D	-0.049	0.164	-0.298	0.765
WORK_D	-0.050	0.043	-1.158	0.247
SOCIAL_D	0.024	0.180	0.133	0.894
INTERNET_D	-0.074	0.218	-0.337	0.736
SLEEP_D	-0.145	0.146	-0.994	0.320
SM_D	0.095	0.116	0.822	0.411
Intercepts				
QOD	4.764	0.092	51.746	0.000
Residual Variances				
QOD	0.595	0.093	6.430	0.000

Loglikelihood H0 Value -2438.313

Information Criteria

Akaike (AIC) 4914.627
Bayesian (BIC) 5017.343
Sample-Size Adjusted BIC 4956.983
(n* = (n + 2) / 24)

N = 110
1646 observations

	Estimate	S.E.	Est./S.E.	Two-Tailed P-Value
Within Level				
WELL ON				
COOK	0.009	0.040	0.235	0.814
CARE	-0.010	0.036	-0.278	0.781
DRIVE	0.038	0.029	1.327	0.185
WORK	-0.060	0.014	-4.391	**0.000**
SOCIAL	0.003	0.032	0.095	0.925
INTERNET	0.008	0.050	0.166	0.868
SLEEP	-0.138	0.024	-5.883	**0.000**
SM	0.003	0.039	0.082	0.934
Residual Variances				
WELL	0.963	0.035	27.719	0.000
Between Level				
WELL ON				
COOK_D	-0.306	0.173	-1.768	**0.077**
CARE_D	0.052	0.071	0.730	0.466
DRIVE_D	0.036	0.182	0.198	0.843
WORK_D	-0.021	0.048	-0.450	0.653
SOCIAL_D	0.036	0.200	0.180	0.857
INTERNET_D	0.085	0.240	0.354	0.723
SLEEP_D	-0.201	0.162	-1.246	0.213
SM_D	0.154	0.129	1.191	0.233
Intercepts				
WELL	4.738	0.102	46.300	0.000

MLM of 2 repeated measures: well-being and quality of day

SUMMARY OF DATA

Number of missing data patterns	1
Number of clusters	135
Average cluster size	22.333

Intraclass Intraclass Intraclass
X1 0.129 X2 0.188 X3 0.178 X4 0.196
Y1 0.210 Y2 0.197 Y3 0.202 Y4 0.126

Chi-Square Test of Model Fit

Value	237.071
Degrees of Freedom	38

RMSEA (Root Mean Square Error Of Approximation)

Estimate	0.042

CFI/TLI

CFI	0.921
TLI	0.884

Chi-Square Test of Model Fit for the Baseline Model

Value	2590.364
Degrees of Freedom	56
P-Value	0.0000

SRMR (Standardized Root Mean Square Residual)

Value for Within	0.046
Value for Between	0.094

Model fits better within the person than between