The Effects of Facebook on Mood in Emerging Adults

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Social media usage is on the rise, with the majority of American adults using Facebook. The present study examined how Facebook activity affects mood in a subset of emerging adults, specifically undergraduates attending a private 4-year university. Participants ($N = 312$) were randomly assigned to one of the following 20-min activities: browse the Internet, passively browse others' Facebook profiles, actively communicate with others on Facebook via messages/posts, or update their own personal profile on Facebook. Participants also completed questionnaires assessing mood, feelings of envy, and perceived meaningfulness of their time online. The results demonstrated that using Facebook led to significantly worsened mood compared with browsing the Internet, especially when participants *passively* browsed Facebook. Furthermore, perceptions of meaningfulness, but not feelings of envy, mediated the relationship between online activity and mood. Overall, these findings add to the mounting evidence that social media use may, at times, adversely affect psychological well-being.

Public Policy Relevance Statement
College students reported lower mood when passively browsing Facebook compared with other online activities, possibly due in part to feelings of wasted time. Results suggest that repeated use of social media may adversely affect psychological well-being in some emerging adults.

Keywords: Facebook, social media, mood, envy

In the past decade, social media usage has grown dramatically. In fact, the proportion of American adults using social media rose from 7% in 2005% to 65% in 2015 (Perrin, 2015), an increase of nearly 1,000%. Although many social media sites are popular, Facebook (www.facebook.com) dominates (Duggan, Ellison, Lampe, Lenhart, & Madden, 2015), currently boasting over one billion daily and over 1.7 billion monthly users worldwide (Facebook, 2016). Furthermore, out of users of only one social media site, Facebook is the platform of choice for 79% (Duggan et al., 2015). Therefore, it is important to understand the potential psychological effects that using Facebook may have on its users.

Although not all individuals worldwide with a Facebook profile use it regularly, the majority appear to do so. Indeed, 70% of Facebook users logged in daily in 2014 (Duggan et al., 2015). In fact, most (87%; Perrin, 2015) are using Facebook multiple times a day, logging in an average of seven times per day (Junco, 2013) at all hours of the day (Pempek, Yermolayeva, & Calvert, 2009).

Most studies examining daily Facebook usage rates suggest an average of roughly 30 min of use per day (Jelenchick, Eickhoff, & Moreno, 2013; Pempek et al., 2009). Others report much higher average usage rates, ranging from roughly 60 min per day (Kalpidou, Costin, & Morris, 2011; Skues, Williams, & Wise, 2012) to 145 min per day (Junco, 2013).

Emerging adults, defined as individuals aged 18–29 (Arnett, 2000), are particularly frequent users of social media. In fact, in 2015, 90% of emerging adults used social media (Perrin, 2015), an increase from 84% in 2013 (Duggan et al., 2015). College students, a subset of emerging adults, are often studied for their social media usage, and their use of Facebook in particular has received considerable empirical attention. Ample empirical evidence suggests that Facebook is ingrained into college students' daily lives (Pempek et al., 2009; Wilson, Gosling, & Graham, 2012). This is particularly apparent in the staggering 94% of college students who have a Facebook profile (Ellison, Steinfield, & Lampe, 2007). With so many emerging adults logging on frequently, it is essential to understand how Facebook affects this population specifically.

An ample literature has investigated the emotional consequences of Facebook use in adults and adolescents. However, no clear answer has emerged; some studies have linked Facebook use with negative outcomes, (O'Keeffe & Clarke-Pearson, 2011; Skues et al., 2012), whereas others find no such link (Jelenchick et al., 2013). Some studies even point to positive outcomes associated with Facebook use (Gentile, Twenge, Freeman, & Campbell, 2012; Gonzales & Hancock, 2011).

Negative effects of Facebook use have been reported for many psychological constructs such as depression. Several studies have

shown that as time spent on Facebook increases, depressive symptoms also increase (Pantic et al., 2012). Experience sampling techniques have demonstrated that being on Facebook is linked to worsened mood later in that same day (Kross et al., 2013). In fact, some researchers have gone so far as to suggest that Facebook itself creates a form of depression termed "Facebook depression" (O'Keeffe & Clarke-Pearson, 2011). In other words, spending too much time on social media leads to increased depressive symptoms, which are in turn tied to other unhealthy behaviors such as substance abuse and risky sexual behaviors.

The relationship between Facebook use and depressive symptoms might not be as straightforward as these studies suggest, however. Several studies have reported no link between Facebook usage and negative consequences such as depression (Jelenchick et al., 2013) or well-being (Lee, Lee, & Kwon, 2011). Other studies found only indirect links between Facebook use and depression; for example, frequently using Facebook was associated with higher levels of envy, which in turn predicted depression (Tandoc, Ferrucci, & Duffy, 2015). Interestingly, Facebook users are not necessarily aware of their feelings of envy (Krasnova, Wenninger, Widjaja, & Buxmann, 2013). These findings suggest that several psychosocial processes, many of which are unknown, may mediate the causal relationship between Facebook use and depressed mood.

Sagioglou and Greitemeyer (2014) suggested that the emotional effects of using Facebook are determined by users' perception of the meaningfulness of the act of using Facebook. In their experiment, participants were assigned to one of three conditions: spend 20 min using Facebook, spend 20 min browsing the Internet (without accessing social media), or no additional Internet activity (control group). Participants then rated (a) how meaningful the past 20 min had been, and (b) their current mood levels on the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Results suggested that those who spent time on Facebook rated their time as being significantly less meaningful than those who did not spend time on Facebook. Also, the Facebook group reported a significantly lower mood compared with the other groups, which was mediated by perceived meaningfulness of activity. Thus, the authors concluded that if Facebook users believe their time spent on the platform was not meaningful, then detrimental links between Facebook use and mood are present.

However, two weaknesses of this study raise cause for interpreting these results with caution. First, the authors combined the distinct positive and negative scales of the PANAS by reverse scoring the negative affect items to create an aggregate measure of positive affect rather than assessing both dimensions of mood separately. Second, the study used Mechanical Turk, which does not monitor participant activity. Therefore, the authors could not observe whether participants actually completed their assigned tasks, such as using Facebook for 20 min. The authors themselves call for an experimental laboratory study in which oversight of the study tasks can take place to address this issue (Sagioglou & Greitemeyer, 2014).

An alternative explanation for the discrepant research findings regarding the effects of Facebook use might be due to the specific Facebook activities participants engage in. Facebook is a broad platform with many features that afford different types of use (Smock, Ellison, Lampe, & Wohn, 2011). For example, features include individual user profile pages (including a "Timeline" and "About Me" section) where one posts information about the self,

including hobbies, interests, photos, videos, and "status updates." In addition, users can post messages, photos, or videos to other people's profile pages. Another popular feature of Facebook is the News Feed, where information regarding online friends appears. This section includes friends' status updates, photos, and videos, as well as advertiser-sponsored links. Facebook has private functions as well, such as a messenger application allowing information to be shared privately between specific users.

Facebook users' behaviors can be classified as "passive" or "active" based on whether the user is actively posting information. For example, one could passively view the News Feed, or one could actively engage by posting photos and status updates or typing comments on others' profiles. Indeed, several studies confirm that users interact with Facebook in a myriad of ways (Ryan & Xenos, 2011) and engage with Facebook passively more often than actively (Pempek et al., 2009).

Many studies approach Facebook use and its subsequent effects in a global fashion rather than parsing out the effects of different features. However, perhaps Facebook researchers should conceptualize Facebook as a collection of separate tools rather than a global platform (Smock et al., 2011) and investigate the effects of various functions individually. It is possible that how users engage with this particular social media platform might dictate how it affects them. Specifically, perhaps whether one actively posts versus passively views information on Facebook will affect users in different ways (Nadkarni & Hofmann, 2012; Rosen, Whaling, Rab, Carrier, & Cheever, 2013).

Some evidence suggests that passive Facebook use can lead to increased envy and worsened mood due to upward comparison. Social comparison theory (Festinger, 1954) suggests that we obtain valuable information about ourselves through the process of comparison with others. Comparisons can take many forms. They can be upward (viewing another as better than the self), downward (viewing another as inferior to the self), or nondirectional. Time spent on Facebook has indeed been linked to increased social comparisons (Lee, 2014), particularly upward comparisons (Johnson & Knobloch-Westerwick, 2014). Social comparisons online have been tied to increased depressive symptomatology (Steers, Wickham, & Acitelli, 2014). Interestingly, the link between comparisons on Facebook and increased depressive symptoms holds regardless of the direction of the comparison, which is not the case in offline interactions.

Both envy and rumination potentially explain this link. When Facebook comparisons induce envy, depressive symptoms increase (Tandoc et al., 2015) and life satisfaction decreases (Krasnova et al., 2013). Also, engaging in comparisons on Facebook is significantly tied to rumination, which in turn significantly predicts depression (Feinstein et al., 2013). Therefore, it appears as though an indirect link between passive Facebook use and depression exists, but that link is mediated by several factors.

Not all evidence suggests that online interactions are detrimental to psychological health. In fact, recent literature has documented the supportive and positive effects of actively engaging with Facebook (Oh, Ozkaya, & LaRose, 2014). For those who are actively engaging with the platform (e.g., by posting messages), it appears that loneliness is reduced (Wilson et al., 2012) and self-esteem is enhanced (Gentile et al., 2012; Gonzales & Hancock, 2011). This effect extends to receiving comments from others (Greitemeyer, Mügge, & Bollermann, 2014). These results are

particularly meaningful given that the majority of Facebook users use Facebook "actively" at least some of the time (Duggan et al., 2015; Pempek et al., 2009), even if one's overall time on Facebook is more passive in nature.

It is also possible that the source of the information posted (e.g., a good friend vs. an acquaintance) or the valence of information viewed (e.g., positive news vs. negative news) might lead to the varying mood outcomes described above. Indeed, Facebook users have a variety of online "friends" including family members, current or former friends or romantic partners, work colleagues, and more (Duggan et al., 2015). Viewing information from these sources might differentially induce mood. Furthermore, the emotional tone of others' posts may be passed along to others through emotional contagion. A recent, albeit controversial, study by Facebook employees (Kramer, Guillory, & Hancock, 2014) manipulated users' news feeds to change the emotional tone of the majority of messages users were viewing. Completed without the knowledge of its users, this study assigned nearly 700,000 Facebook users to one of two conditions. One group's news feeds were manipulated to include more negative posts, whereas the second group was exposed to a higher proportion of positive posts. Experimenters then recorded the emotions present in participants' subsequent posts. Indeed, exposure to more positive posts increased positive posts and reduced negative posts, and exposure to more negative posts increased negative posts and reduced positive posts. Therefore, it appears as though emotional contagion occurs via online means, not just in offline or in-person contexts. This study provides a compelling counterargument that users are "catching" others' emotions, in contrast to the social comparison hypothesis regarding Facebook use.

A final issue exists regarding the literature addressing the effects of Facebook. Namely, the majority of studies investigating the effects of Facebook have been questionnaire-based and nonexperimental. As a consequence, it is difficult to determine what actually causes the differences that are present in the literature. Therefore, the present study sought to clarify several issues inherent in the Facebook literature using an experimental design. Specifically, we aimed to examine in college students (a) the effects of active versus passive Facebook use on mood, (b) potential mediators (e.g., envy, perceived meaningfulness) of Facebook's effect on mood, and (c) the relationship between type of information (i.e., source, valence) viewed on Facebook and mood. Participants with a Facebook account were randomly assigned to participate in one of the following 20-min activities: browse the Internet (control group), passively browse others' Facebook profiles, actively communicate with others on Facebook via messages and posts, or update their own personal profile on Facebook. At the end of their online activity, participants completed questionnaires assessing their mood, feelings of envy, and perceived level of meaningfulness of their online activity. Our hypotheses were as follows: (1) Using Facebook is associated with lower mood (i.e., lower positive affect, higher negative affect); (2) Actively posting on Facebook (e.g., messaging others or updating one's profile) results in higher mood compared with passively using Facebook; (3) Perceived meaningfulness of online activity mediates the relationship between online activity and mood; (4) Envy mediates the relationship between online activity and mood; (5) Viewing information posted by friends, family, or current romantic partner is associated with higher mood; (6) Viewing information posted by a former roman-

tic partner is be associated with lower mood; and (7) Viewing positive news posted by others is associated with lower mood (upward comparison).

Method

Participants

Three hundred twelve undergraduates (79% women), ranging in age from 18 to 25 ($M = 18.8$), were recruited from general psychology classes to participate in the study. Inclusion criteria included having an existing Facebook account. Those who met the criteria were randomly assigned to one of four conditions, which resulted in 88 participants in the *Surveillance* condition, 67 in the *Communicate* condition, 86 in the *Profile* condition, and 71 in *Control* condition.

The majority of participants were freshmen (70.5%), followed by sophomores (19.2%), juniors (5.4%), and seniors (4.8%). Most participants described their race as Caucasian (76.9%), followed by African American/Black (7.1%), Multiracial (6.7%), Asian/Pacific Islander (4.2%), Other (4.2%), and Native American (0.3%). Participants identified their ethnicity as Hispanic (17.6%) and Non-Hispanic (81.4%). Students earned extra edit for participating.

As for their social media usage, the majority of participants were frequent Facebook users and reported using the site several times a day (51%) or week (31%). Participants also reported visiting other social media sites several times a day: Instagram (77.6%), Twitter (44.9%), and YouTube (24%). Social media sites with fewer daily visits included Tumblr (9.0%), Pinterest (8.3%), Google Plus (7.7%), LinkedIn (0.6%), and Reddit (0.6%).

Measures

The Positive and Negative Affect Schedule. This widely established measure consists of 20 adjectives describing emotions (e.g., excited, irritable, ashamed; Watson et al., 1988). Participants indicate to what extent they are currently experiencing each emotion on a scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). The measure is divided into separate subscales for positive affect (PANAS-PA; $\alpha = .92$ for this sample) and negative affect (PANAS-NA; $\alpha = .82$ for this sample), with scores ranging from 10 to 50 for each subscale. In our study, participants completed this measure at two different points in time—baseline and directly after completing their assigned online activity.

Facebook Envy Scale. This is a seven-item composite scale that measures envy on a 5-point scale, ranging from 1 (*strongly agree*) to 5 (*strongly disagree*; $\alpha = .81$ for this sample; Tandoc et al., 2015). Sample items include "I wish I can travel as much as some of my friends do," and "Many of my friends have a better life than me."

Perceived Meaningfulness of Activity. After completing their randomly assigned online activities, participants were asked to reflect on the meaningfulness of these activities (Sagioglou & Greitemeyer, 2014). The measure consisted of the following three questions ($\alpha = .82$ for this sample): "How much do you feel like you have spent your time on something meaningful?"; "How much do you feel like you wasted your time?"; and "How much do you

feel like you have done something useful?" Responses were given using a scale from 1 (*not at all*) to 7 (*very much*).

Online Activity Questionnaire. Participants were asked to report on their online activities, which included the following: number of messages sent/posted, time (in minutes) spent viewing information posted by specific individuals (e.g., family members, friends, acquaintances, strangers, current romantic partner, former romantic partner), and time spent viewing positive, negative, and neutral information.

Procedure

The present study was approved by the university's institutional review board, and all participants provided informed consent. Participants visited a laboratory in small groups. To minimize bias, participants were told that the purpose of the study was to investigate college students' reactions to various websites. After consent was given, participants completed pretest measures (via *SurveyMonkey*) consisting of a demographic questionnaire, a questionnaire about frequency of social media use, and the PANAS. To mask the true purpose of the experiment, participants also completed distractor questions that queried preferences for website designs/icons of well-known web browsers, as well as the importance of specific website design elements (e.g., attractiveness, helpfulness, efficiency, controllability).

Next, participants were randomly assigned to one of the four conditions in which they participated in an online activity for 20 min. In the *Surveillance* condition, participants logged into Facebook and were instructed to browse and view material but refrain from posting pictures, sending messages, or "liking" posts. In the *Communicate* condition, participants logged into Facebook and were instructed to actively communicate with others by posting on others' timelines, commenting on others' posts, and sending messages. Participants assigned to the *Profile* condition were instructed to stay on their own profile pages and view, edit, or add content to their "About Me" section and own timeline, as well as to "like" or respond to others' posts on their own profile pages. In the *Control* condition, participants were instructed to browse the web but refrain from visiting e-mail sites, social networking sites, chatrooms, message boards, and dating sites.

At the conclusion of the 20-min activity period, participants were administered posttest measures (again via *SurveyMonkey*) consisting of the PANAS, Facebook Envy Scale, Perceived Meaningfulness of Activity, and the Online Activity Questionnaire. Participants were debriefed and thanked before dismissal.

Results

The overall goal of the present study was to investigate the psychological consequences of Facebook use experimentally. First, the preliminary analyses are presented. Then, the results of the main analyses are organized by hypothesis.

Preliminary Analyses

Of the 312 participants, seven were excluded from the analyses because they did not perform their assigned activity. These included four participants who did not write any messages in the *Communicate* condition (final $n = 63$), one participant who spent zero minutes on their profile page in the *Profile* condition (final $n = 85$), and two participants who spent their time working on their schoolwork online in the *Control* condition (final $n = 69$).

Preliminary analyses also revealed significant differences in baseline mood by condition, $F(3, 301) = 4.32$, $p = .01$. Participants in the *Communicate* condition reported significantly higher baseline positive mood than those in the *Surveillance* and *Control* conditions. Due to these baseline inconsistencies, all analyses pertaining to mood effects were conducted using analyses of covariance (ANCOVAs; with baseline mood as a covariate) rather than using pretest–posttest change scores. Research comparing the statistical validity of these two strategies has demonstrated the superiority of the former strategy under circumstances in which baseline values differ by condition (Van Breukelen, 2006).

We then conducted descriptive analyses on participants' online activities to identify patterns of behavior within each condition. Participants in the surveillance condition reported spending the most time (in minutes) viewing items posted by friends, followed by organizations, family members, acquaintances, strangers, current romantic partners, and then former romantic partners. Regarding the valence of information, participants spent the most time viewing "neutral" and positive information (Table 1).

For the communicate condition, participants spent the majority of their time actively communicating with friends, followed by family members, acquaintances, current romantic partners, organizations, strangers, and then former romantic partners. The overwhelming majority of messages/posts were private messages to one other person. Regarding the valence of information, they spent the most time viewing positive and neutral posts (Table 2).

Participants in the profile condition were most likely to report viewing/editing/adding to their timeline and/or photograph albums. The next commonly reported activity was viewing/editing/adding to their "About Me" section (Table 3).

Lastly, those participants in the control condition visited various websites. The types of websites most commonly visited, in order from most to least time spent, were as follows: search engines, commerce, entertainment, news, and other informational pages such as Wikipedia (Table 4).

Table 1
Reported Facebook Activity for the Surveillance Condition

Category	M (no. of mins)	SD
Source of viewed information		
Friends	5.12	3.40
Organizations	3.58	4.27
Family	2.55	2.72
Acquaintances	2.38	2.51
Strangers	0.94	1.48
Current romantic partners	0.65	1.77
Former romantic partners	0.59	2.17
Valence of viewed information		
Neutral information/news	7.20	5.40
Specific people's good news (e.g., posts, messages, and pictures)	5.46	3.69
General positive information	3.89	3.08
Specific people's bad news (e.g., posts, messages, and pictures)	2.06	2.51
General negative information	1.95	2.48

Table 2
Reported Facebook Activity for the Communicate Condition

Category	M	SD
Recipient of posts/messages	(No. of mins)	
Friends	7.25	4.13
Family	3.81	4.20
Acquaintances	1.85	2.39
Current romantic partners	1.76	3.34
Organizations	1.68	2.43
Strangers	0.69	1.53
Former romantic partners	0.11	0.66
Valence of viewed information	(No. of mins)	
Specific people's good news (e.g., posts, messages, and pictures)	5.28	3.81
Neutral information/news	2.90	3.45
General positive information	2.61	2.52
Specific people's bad news (e.g., posts, messages, and pictures)	1.47	2.28
General negative information	1.11	2.15
Type of messages/posts	(No. of posts/ messages)	
Private (to one other individual)	13.44	28.72
Public	1.78	2.13
Group	0.71	1.77

General Facebook Use and Mood

First we tested Hypothesis 1 that using Facebook is associated with lower mood compared with browsing the Internet. Specifically, we conducted an ANCOVA using a dichotomous condition variable (all Facebook groups combined vs. Internet browsing), and with post PANAS-PA as the dependent variable (DV) and pre PANAS-PA as the covariate. The results demonstrated that Facebook use led to significantly lower positive mood ($M = 23.26$, *Adj. M* = 22.95, $SD = 9.37$) compared with browsing the Internet ($M = 24.26$, *Adj. M* = 25.33, $SD = 9.04$), $F(1, 302) = 7.18$, $p = .01$, $\eta_p^2 = .02$ (Table 5).

To explore effects on negative affect, a similar analysis was conducted with post PANAS-NA as the DV and pre PANAS-NA as the covariate. No significant main effect of condition was found, $F(1, 302) = 1.02$, $p = .31$. Negative mood did not differ significantly between participants using Facebook ($M = 12.56$, $SD = 4.19$) and participants browsing the web ($M = 12.16$, $SD = 3.65$).

Active Versus Passive Facebook Use

To test Hypothesis 2 that actively posting on Facebook (i.e., *Communicate* and *Profile* conditions) results in higher mood compared with passively using Facebook (i.e., *Surveillance* condition), we conducted an ANCOVA, with post PANAS-PA as the DV,

Table 3
Reported Facebook Activity for the Profile Condition

Category	M (no. of mins)	SD
Viewing/editing/adding to personal timeline and/or photograph albums	13.41	6.26
Viewing/editing/adding to personal "About Me" section	5.04	5.22
Viewing nonprofile pages	1.49	3.70

Table 4
Reported Online Activity for the Control Condition

Category	M (no. of mins)	SD
Search engines	4.26	4.31
Commerce	3.22	5.73
Entertainment	3.09	6.00
News	2.66	4.38
Other informational webpages (e.g., Wikipedia)	2.21	4.45

condition (all four separated) as the independent variable, and pre PANAS-PA as the covariate. There was a significant main effect of condition, $F(3, 300) = 3.25$, $p = .02$, $\eta_p^2 = .03$. Simple contrasts revealed that participants in the *Surveillance* condition had a significantly lower positive mood compared with the control group, 95% confidence interval (CI) = $[-5.28, -1.19]$, $p < .01$. In other words, viewing Facebook pages passively lead to significantly lower positive mood compared with simply browsing the Internet. No other significant differences for positive mood were found ($p > .05$). A similar ANCOVA for negative mood revealed no significant effect, $F(3, 300) = 1.51$, $p = .21$. As a result, we found only partial support for our hypothesis that active and passive Facebook use differentially affect mood.

Perceived Meaningfulness of Activity as a Mediator

In addition to a significant effect on positive mood, univariate analyses yielded a significant effect of activity on perceived meaningfulness, $F(1, 303) = 26.51$, $p < .01$, $\eta_p^2 = .09$. Participants who used Facebook (regardless of the nature of usage) perceived the activity as significantly less meaningful ($M = 3.50$, $SD = 1.58$) than those who browsed the Internet ($M = 4.58$, $SD = 1.43$).

Next, we sought to test Hypothesis 3 that perceived meaningfulness of online activity mediates the relationship between online activity (using Facebook vs. browsing the Internet) and positive mood. The mediation model and results (with standardized coefficients) are presented in Figure 1. Multiple regression analyses (controlling for baseline positive mood) were conducted to assess each component of the model. In concordance with previous findings, condition was a significant predictor of meaningfulness, $B = -1.14$, $t(303) = -5.43$, $p < .01$. Also, condition [$B = -2.38$, $t(303) = -2.68$, $p = .01$] and meaningfulness [$B = 0.96$, $t(303) = 4.05$, $p < .01$] were significant predictors of positive mood, respectively. We then tested for mediation using the bootstrapping method with bias-corrected CIs (Hayes, 2009). The 95% CI for the indirect effect was obtained using 5,000 bootstrapped samples. The results (controlling for baseline mood) revealed that meaningfulness did indeed mediate the relationship between condition and positive mood, $B = -1.10$, CI = $[-1.90, -.50]$. Furthermore, the direct effect of condition on positive mood became nonsignificant when controlling for meaningfulness, $B = -1.29$, $p = .16$. In summary, Facebook usage (compared with browsing the Internet) was viewed as a less meaningfulness activity which, in turn, led to lowered positive mood.

Table 5
Means and Standard Deviations by Condition

DV	Surveillance		Communicate		Profile		Control	
	M	SD	M	SD	M	SD	M	SD
Positive mood (pre)	24.24	8.25	28.33	8.28	27.13	7.72	24.68	8.10
Positive mood (post)	20.67	8.44	25.52	10.04	24.26	9.26	24.26	9.04
Negative mood (pre)	14.11	4.84	14.43	5.05	14.24	4.89	14.25	4.92
Negative mood (post)	12.88	4.96	12.17	3.92	12.51	3.47	12.16	3.64
Meaningfulness	3.30	1.47	3.68	1.66	3.56	1.61	4.58	1.43
Envy	19.69	4.59	20.36	5.68	19.41	5.77	20.30	5.24

Envy as a Mediator

To test Hypothesis 4 that envy mediates the relationship between online activity and mood, we first conducted a one-way ANOVA to determine if Facebook envy differed between conditions. However, no significant effect was found, $F(1, 286) = 0.54$, $p = .46$. In addition, partial correlations did not find a significant relationship between envy and mood, $r = -.07$, $p = .25$. Therefore, a mediational analysis was not conducted.

Source of Viewed Information

We next tested Hypothesis 5 (viewing information posted by friends, family, or current romantic partner is associated with higher mood) and Hypothesis 6 (viewing information posted by a former romantic partner is associated with lower mood). A correlational analysis was conducted to look for relationships between mood and the number of minutes spent viewing information by various sources (e.g., friend, acquaintance, stranger, current romantic partner, former romantic partner) for the surveillance condition (Table 6). A partial positive correlation (controlling for baseline negative affect) was found between negative mood and viewing information posted by a *former* romantic partner, $r = .49$, $p < .01$. Hypothesis 5, that viewing information posted by a former partner is associated with lower mood, was supported.

A partial positive correlation (controlling for baseline positive affect) was also found between positive mood and viewing information posted by a *current* romantic partner, $r = .26$, $p = .02$. Viewing information posted by a current partner was associated with increased positive affect (higher mood), thus supporting Hypothesis 6. Interestingly, those with higher baseline negative affect were more likely to view information from one's current partner,

$r = .31$, $p < .01$. Viewing information posted by acquaintances was associated with decreased positive affect, $r = -.36$, $p < .01$. No other significant partial correlations between mood and source of information were found.

Valence of Viewed Information

We conducted another correlational analysis to test Hypothesis 7 that viewing positive news posted by others is associated with lower mood (upward comparison; Table 7). No significant partial correlations between mood and valence of information (e.g., time spent viewing specific individuals' good or bad news, general positive or negative information, or neutral information) were found.

Discussion

Of continuing interest to researchers is whether social media use, especially Facebook use, negatively impacts users' mood. The existing literature is mixed, with some studies finding an association between Facebook use and depressed mood, and other studies finding no link or even a relationship to positive well-being (see reviews by Appel, Gerlach, & Crusius, 2016; Steers, 2016). Furthermore, most studies were questionnaire based and did not use an experimental design, thus limiting causal conclusions. The present study investigated this unresolved question by using an experimental design to compare the effects of Facebook use and Internet browsing on mood among a subset of emerging adults. Differences in mood were explored for those who actively or passively engaged in Facebook. Also, special attention was paid to possible mediating factors (e.g., perceived meaningfulness) that potentially play a role in the Facebook–mood connection.
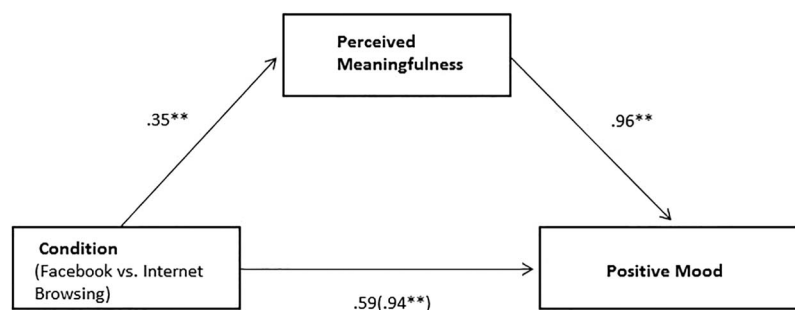

Figure 1. Standardized coefficients for the indirect effect of condition on positive mood through perceived meaningfulness. ** $p \leq .01$, all two-tailed.

Table 6
Correlation Between Mood and Source of Viewed Information

Source	Positive mood	Negative mood
Organization/Group	.09	−.17
Current romantic partner	.26*	.11
Former romantic partner	.14	.49**
Family members	−.09	−.04
Friends	.11	−.09
Acquaintances	−.36**	.01
Strangers	−.19	−.15

Note. $n = 86$.
* $p < .05$. ** $p < .01$.

Our findings indicate that Facebook use may have a detrimental effect on mood for some individuals. Specifically, Facebook use leads to lower positive affect compared with browsing the Internet, among emerging adults. Despite a small effect size, this is still concerning given that many emerging adults are heavy users of Facebook (Duggan et al., 2015); hence, cumulative negative effects on mood over time could be substantial. Indeed, over half of the participants in this study alone reported using Facebook several times a day, suggesting a possible elevated risk for lowered mood for these users.

Our study also addressed whether active (e.g., posting) versus passive (e.g., reading news feed) engagement in Facebook would affect users differently. Although no difference in mood was detected between active and passive Facebook users, the results did indicate that passive use of Facebook in particular led to decreased positive affect compared with browsing the Internet. However, contrary to our expectations, there was no evidence to suggest that feelings of envy mediated the relationship between Facebook activity and diminished mood (cf. Tandoc et al., 2015). Participants in the surveillance condition did spend more of their time passively looking at neutral content (compared with viewing other people's positive news), so there may have been less opportunity for envy-related feelings to form via upward comparison. Several other experimental studies that did find social comparison/ envy to underlie the relationship between Facebook use and lowered affect had participants view appealing "constructed SNS profiles" meant to induce such feelings (for a review, see Appel et al., 2016).

In contrast, the present experiment allowed participants to operate in a more genuine social media environment that included their own friends and family, exposure to other types of more general information (e.g., news articles from organizations), and the ability to apply filters to hide the content of certain individuals that they do not wish to view. It is plausible that the *everyday* Facebook experience may not necessarily conjure up these envy-related feelings, at least among emerging adults. Emerging adults (relative to adolescents whose self-identities are more underdeveloped) may spend less time engaged in social comparison, further explaining why no association was found in our study (Appel et al., 2016; Nesi & Prinstein, 2015). In addition, it is also possible that negative mood from social comparisons occurs more so when viewing the profiles of acquaintances rather than friends. Our study found that viewing information posted by acquaintances was associated with decreased positive affect; however, our participants spent more time viewing information posted by friends,

family, and organizations, which could explain why we did not find evidence for envy to mediate the relationship between Facebook use and mood. Interestingly, a recent review article (Appel et al., 2016) concluded that there is not yet enough evidence to support the theory that depressed mood from using Facebook is mediated by social comparison or feelings of envy.

Instead, we found that Facebook use in general (vs. browsing the Internet) is perceived as a less meaningful online activity, which, in turn, decreases positive affect. Currently, there seems to be only one other study (Sagioglou & Greitemeyer, 2014) that has investigated and found perceived meaningfulness to be a mediating factor. Furthermore, the present study addressed two important methodological issues present in this prior research. As mentioned previously, for example, Sagioglou and Greitemeyer (2014) used an aggregate measure of positive affect by combining the items from the PANAS-PA with reverse scored items from the PANAS-NA. However, as positive and negative affect have been found to be two separate constructs (Watson et al., 1988), we examined the negative and positive mood subscales separately. Moreover, we addressed a stated limitation/directive in the aforementioned study that concerned the need for participants' activities to be supervised in a laboratory setting. All of our participants were monitored throughout the duration of the experiment to ensure they complied with study protocol. These modifications help to bolster the supporting evidence for the underlying role of perceived meaningfulness in the connection between Facebook use and mood.

We agree with Sagioglou and Greitemeyer's (2014) assertion that it seems counterintuitive for young adults to involve themselves in an activity that they see little value in and that ultimately results in lowered mood. These researchers found that individuals may still use Facebook because they incorrectly anticipate that this activity will make them feel better. Although this may generally be the case, there could be special instances when anticipations ring true. For example, our study found that individuals who reported a lower affective state before using Facebook were more likely to look at information posted by their current significant other. Importantly, reading postings from one's existing partner was linked to elevated positive mood, so we can extrapolate that those who engaged in this particular Facebook activity correctly anticipated a mood-related boost. In contrast, viewing information posted by a former romantic partner was associated with increased negative affect.

It is also important to acknowledge that emerging adults are engaging in other types of social media in addition to Facebook. We found that many individuals in our sample (51%) reported

Table 7
Correlation Between Mood and Valence of Viewed Information

Valence	Positive mood	Negative mood
Specific people's good news (e.g., posts, messages, and pictures)	−.09	−.08
Specific people's bad news (e.g., posts, messages, and pictures)	.06	.06
General positive information (e.g., news article)	.19	−.13
General negative information (e.g., news article)	−.02	−.03
Neutral information/news	−.07	.11

Note. $n = 86$.

visiting Facebook several times a day, but far more (78%) reported visiting Instagram several times a day. According to a Pew Research Center survey administered in 2014, social media sites such as Instagram and Twitter are growing in popularity; among emerging adults who use the Internet, slightly over half (53%) now use Instagram and 37% use Twitter (Duggan et al., 2015). Could these more recent forms of social media better fit some emerging adults' preferences and/or lifestyle, hence making engagement on these other sites a more meaningful, constructive avenue for boosting mood? Emerging adults often turn to Instagram (a video/photo sharing mobile application) to connect with friends, to record their social activity and to become more popular within their peer group (Sheldon & Bryant, 2016). Therefore, it may benefit future researchers to investigate the differential effects of various types of social media on mood.

Limitations of our study include its reliance on self-report data and convenience sampling. It is conceivable that individuals may have misunderstood questions, provided socially desirable answers, and/or misremembered pertinent information. For example, participants reported the numbers of minutes they spent on specific Facebook activities based on memory. Also, the sample was chosen based on college students' willingness to volunteer, which may have limited the generalizability of our findings (Miller, 2013). It would be interesting to explore the effects of Facebook on mood with nonstudents in the emerging adult age-group who may view and experience this type of online activity differently; it is estimated that nonstudents account for about half of all emerging adults (Mitchell & Syed, 2015).

Future studies may also consider conducting a cross-cultural examination of the differential effects of social media on mood. Kim, Sohn, and Choi (2011) found that American college students are highly motivated to use social networking sites for entertainment purposes, whereas Korean students are more interested in receiving information and support from others. Perhaps these different motivations for using social media could influence how this activity is perceived (e.g., meaningfulness) and its potential impact on mood. Continued research into the many ways that using social media influences the emotional experiences of emerging adults will add to our understanding of adjustment and mental health issues during this important developmental time in life.

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