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Facebook use, envy, and depression among college students: Is facebooking depressing?

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ABSTRACT

It is not—unless it triggers feelings of envy. This study uses the framework of social rank theory of depression and conceptualizes Facebook envy as a possible link between Facebook surveillance use and depression among college students. Using a survey of 736 college students, we found that the effect of surveillance use of Facebook on depression is mediated by Facebook envy. However, when Facebook envy is controlled for, Facebook use actually lessens depression.

1. Introduction

For young adults, the transition to college life can be daunting. It can mean gaining unprecedented freedom, moving far from home, making new platonic and romantic relationships, and enduring a large amount of homework and exams. Because of these factors and others, college students have been found to be particularly prone to depression (Mahmoud, Staten, Hall, & Lennie, 2012; Moreno et al., 2011; Moreno, Jelenchick, Koff, & Eickhoff, 2012; Neighmond, 2011; Wright et al., 2012). Individuals between 18 and 24 years old were specifically found likely to suffer from depressive disorder symptoms, according to the Centers for Disease Control and Prevention (CDC., 2011). Studies also found an increasing incidence of depression among college students in recent years (AP., 2010; Neighmond, 2011). A study in 2010 discovered that "five times as many high school and college students are dealing with anxiety and other mental health issues as youth of the same age who were studied in the Great Depression era" (AP, 2010).

Multiple factors likely contribute to the increase in incidence of depression including better diagnostics and attention paid by higher education health professionals to student wellbeing. However, policy makers and scholars have hypothesized that heavy use of online social networks such as Facebook and mobile technologies may contribute to the phenomenon (Chou & Edge, 2012; Jelenchick, Eickhoff, & Moreno, 2013; Moreno et al., 2011; Soo Jeong et al., 2013). Facebook allows college students to express themselves by posting status updates, links, and photos. It also allows them to observe others' online presence by keeping track of regular updates about their family, friends, classmates, and acquaintances (Ellison, Steinfield, & Lampe, 2007; Smock, Ellison, Lampe, & Wohn, 2011). But while Facebook has been shown to elicit happiness (Kim & Lee, 2011), it is also prone to problematic use, such as when young users post photos of them drinking or in sexually suggestive poses (Karl, Peluchette, & Schlaegel, 2010). Facebook also raises questions about privacy and deception (Carlson, George, Burgoon, Adkins, & White, 2004; Christofides, Muise, & Desmarais, 2009; Debatin, Lovejoy, Horn, & Hughes, 2009; Hong, Tandoc, Kim, Kim, & Wise, 2012) and new studies argue whether or not heavy Facebook use can lead to depression (Jelenchick et al., 2013; Moreno et al., 2012; Wright et al., 2012).

The link between Facebook use and depression among college students is starting to attract scholarly attention, but scholars disagree about the nature of the relationship. Some have questioned whether the relationship exists at all. A study found a weak statistical association between internet use and depression, although the researchers concluded the relationship was unlikely to have major clinical significance (Moreno et al., 2012). Another study discovered that the number of hours students spend on Facebook was positively correlated with depression (Wright et al., 2012). However, another study found no link between Facebook use and depression, concluding that "advising adolescent patients or parents on the risks of 'Facebook depression' may be premature" (Jelenchick et al., 2013, p. 130). The present study aims to contribute to this growing area of important research by examining

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whether or not heavy Facebook use leads to depression among college students.

2. Literature review

2.1. Social rank theory

Depression, a condition that affects a growing number of college students, has attracted the attention of many psychologists seeking to understand its causes. The field of psychology has developed numerous theories to explain depression (see, for example, Sloman, Gilbert, & Hasey, 2003). In this study, we apply social rank theory.

Social rank theory, as a theory of depression, concerns itself with competition. Humans, just like animals, compete for food, mates, and various resources (Gilbert & Allan, 1998; Sloman et al., 2003). For humans, competition is not so much about domination, but about exerting "social control over resources in contexts where others are going after the same resources" (Sloman et al., 2003, p. 115). Social competition can refer to competition for power or attractiveness, among other things. Those who do not succeed, or those who perceive they have not succeeded, feel subordinated. "Those who perceive themselves as subordinates are not necessarily depressed, but are vulnerable to depression" (Sloman et al., 2003, p. 116). For example, Gilbert and Allan (1998) found that a self-report measure of defeat that they created was strongly associated with depression. Social rank theory is particularly appropriate for examining depression among young people who are in a stage when they are acutely attuned to and affected by status. They place greater importance on popularity than on other social factors (Lansu & Cillessen, 2012) and the changes that come with the transition to young adulthood "enhance interpersonal vulnerability" (Abela & Hankin, 2008, p. 81).

But how does this theoretical framework translate to the Facebook ecosystem? Facebook is largely about achieving a positive self-presentation (Hogan, 2010; Hong et al., 2012; Walther, 2007; Walther, Van Der Heide, Hamel, & Shulman, 2009). Conceived this way, we can refer to image, a measure of social attractiveness, as a form of resource (Hong et al., 2012). But on Facebook, users do not just manage their own self-presentations. When navigating Facebook, users are exposed to what others say about them (Hong et al., 2012; Schau & Gilly, 2003; Walther et al., 2009), and also to what other users share about themselves. Thus, users also develop perceptions of other users' social attractiveness. Social media sites function as a community of users (e.g. Gruzd, Wellman, & Takhteyev, 2011), with individuals identifying themselves as parts of particular networks. The resource of social attractiveness is therefore shared within a group context. Thus, if Facebook users perceive their social attractiveness as lower than that of other users, they will feel subordinated and therefore outranked, consistent with the assumption of social rank theory. This feeling, which we will operationalize in this study as *envy*, can lead to depression.

2.2. Facebook

Facebook has grown to become the most popular social networking site (SNS) with more than a billion users worldwide (Fowler, 2012). Since starting as a website devoted to just one \university some nine years ago, Facebook is now available in more than 70 languages (Facebook., 2012) and its popularity cuts across countries, cultures, and even generations. College students are among its most active users who use the website for a variety of purposes, such as communication, self-expression, and even fostering relationships (Urista, Qingwen, & Day, 2009). Facebook and other SNSs have also attracted scholarly attention. For example, studies have sought to understand who uses SNSs, finding that females are more likely users than males (Hargittai, 2007; McAndrew & Jeong, 2012); younger people are heavier users than older generations (McAndrew & Jeong, 2012; Quan-Haase & Young, 2010); and that extroverted individuals are more likely to create Facebook accounts than introverts (Glynn, Huge, & Hoffman, 2012; Ross et al., 2009). Scholars have also sought to understand why people use SNSs (e.g. Baek, Holton, Harp, & Yaschur, 2011; Peluchette & Karl, 2010; Quan-Haase & Young, 2010; Raacke & Bonds-Raacke, 2008; Ross et al., 2009; Smock et al., 2011). For example, Quan-Haase and Young (2010) found that pastime and social information gratifications predicted frequency of Facebook use. Self-presentation and self-disclosure motivations are also strong motivators for the use of SNSs (e.g. Ellison et al., 2007; Gibbs, Ellison, & Heino, 2006; Hogan, 2010; Hong et al., 2012; Ledbetter et al., 2011; Peluchette & Karl, 2010; Zhao, Grasmuck, & Martin, 2008).

SNSs, particularly Facebook, have become staple activities among an ever-increasing number of people, and scholars have also sought to understand the effects of Facebook use, particularly on college students. This is understandable, considering that college students are among the most active Facebook users. One study found that having a large number of friends on Facebook and being able to project a positive self-presentation could lead to higher levels of happiness (Kim & Lee, 2011). Another found that viewing one's own Facebook profile increases one's level of self-esteem (Gonzales & Hancock, 2011). Studies have also examined the impact of Facebook use on college students' school performance. For example, a study found that while time spent on Facebook positively predicted time spent participating in co-curricular activities, playing games on Facebook was a negative predictor (Junco, 2012). Facebook users were also found to have lower grade point averages (GPA) than did nonusers (Kirschner & Karpinski, 2010). Users also tend to spend fewer hours per week studying than those who do not use Facebook (Kirschner & Karpinski, 2010).

2.3. Depression

The mental health of college students is important to look at because "young adult students are faced with numerous developmental challenges and tasks related to their college life" (Mahmoud et al., 2012, p. 150). The Centers for Disease Control and Prevention considers depression as a medical and mental condition that affects an estimated 10% of American adults (CDC, 2011). Finding a uniform definition of depression is difficult, but what many studies have done is enumerate symptoms associated with it. For example, the CDC differentiated between "major depression," which is prevalent among persons aged 45–64, and "other depression," which affects persons aged 18–24. The so-called "other depression" refers to cases with fewer symptoms than major depression, but "still meet the criteria for a depressive disorder" (CDC, 2011). What are these symptoms?

The Center for Epidemiologic Studies Depression (CES-D) Scale is one of the most commonly used measures of depression. The scale consists of 20 items asking questions about symptoms associated with depression. Radloff (1991) was among the first to examine the scale's reliability and validity by comparing results of the scale from representative samples of adults and young adults, high school students and depressed patients. Radloff (1991) concluded that the "CES-D Scale is acceptable and reliable in all the groups studied" (p. 149). Subsequent studies in the United States also tested the internal consistency of the scale. These studies found the scale to be reliable when dealing with student samples (Van Dam & Earleywine, 2011; Wright et al., 2012), older adults (Lewinsohn, Seeley, Roberts, & Allen, 1997; Lyness et al.,

Table 1
Descriptives.

	Mean	SD
Age	19.09	2.50
Hours spent on Facebook	2.07	1.99
Number of Facebook friends	629	542
Facebook envy	2.66[a]	.66
Depression	15.30[b]	9.67

[a] Note: This was measured in a 5-point Likert scale.
[b] Note: This was an additive index with a maximum score of 60.

1997; Van Dam & Earleywine, 2011), and even with samples from other countries, such as a study that involved more than 10,000 respondents in Taiwan (Cheng, Yen, Ko, & Yen, 2012). Thus, in this study we decided to use the CES-D scale to measure depression (see Table 2 for the items).

Scholars have started investigating the link between Facebook use and depression among college students, but findings remain inconsistent. Using an experience sampling method (ESM) to collect real-time data from 375 college students via text messaging, Moreno et al. (2012) found a "weak U-shaped association between internet use and mild symptoms of depression that was of statistical significance, but unlikely to represent major clinical difference" (p. 747). Wright et al. (2012) conducted a survey of 361 college students to test an elaborate model examining paths leading to depression. They found, among others, that "the number of hours that students spent using Facebook was positively correlated with depression" (Wright et al., 2012, p. 52). They argued, however, that what mattered was what people did while using Facebook rather than the amount of time spent. They also found that both face-to-face and Facebook support network satisfaction reduced self-reported depression scores, but the former had a larger effect on reducing depression than the latter (Wright et al., 2012). However, Jelenchick et al. (2013) found no link between Facebook use and depression. The study, which involved 190 undergraduate students, concluded: "Using a real-time assessment of Internet use and a validated clinical screening instrument for depression, we found no association between SNS use and depression in a sample of older adolescents" (Jelenchick et al., 2013, p. 129). These studies, however, used different scales to measure depression. Two of these studies used the Patient Health Questionnaire (PHQ-9) scale for their online surveys to measure depression (Jelenchick et al., 2013; Moreno et al., 2012). In contrast, Wright et al. (2012) used the CES-D Scale, which we are also using in this study. Because there remains no consensus on the link between Facebook use and depression, we ask the following research question:

RQ1. What is the relationship between frequency of Facebook use and depression among college students?

2.4. Facebook envy

The term envy can mean different things to different individuals. Russell (1996) argued that envy is one of the most innate and instinctive emotions that humans experience. In the Bible, envy is one of the seven deadly sins and often leads to catastrophic circumstances or hostile actions (Schoeck, Glenny, & Ross, 1969). However, envy is often mistaken for something more benign such as jealousy, admiration or longing (Glick, 2002; Smith & Kim, 2007). Because of semantic overlap, people often think of envy and jealousy as the same emotion, but this is not true; envy occurs when someone else has something we want but cannot have, while jealousy concerns losing something to a rival (Smith & Kim, 2007). Envy is a hostile emotion that often begets aggressive behavior and occurs in people of all ages, cultures, and genders without prejudice (Smith & Kim, 2007). When an individual envies another, he or she is likely to act in a malevolent manner (Berke, 1988; Parks, Rumble, & Posey, 2002). Envy can lead to numerous personal vices as well as volatile and hostile actions toward the target of envy (Schoeck et al., 1969).

Scholars have found that one of the causes of envy can be consumption of social information on SNS such as Facebook (for an example, see Burke, Marlow, & Lento, 2010). In fact, Chou and Edge (2012) discovered that envy is one of the most common consequences of consuming others' personal information on Facebook. Krasnova et al. (2013) also found that "envy feelings are often triggered by following information of others on Facebook" (p. 7). Heavy users are likely to have more friends than light users (Ellison et al., 2007) and because a larger network would mean more points of comparison, number of friends on Facebook might also lead to Facebook envy. Thus, we test the following hypotheses:

H1. Heavy Facebook users tend to feel higher levels of Facebook envy than light Facebook users.
H2. Facebook users with a big network of friends tend to feel higher levels of Facebook envy than users with a small network of friends.

Jordan et al. (2011) established that envy is extensive in SNS environments because users often compare themselves with others who may have a higher social position. While social position may seem like a subjective standard, Chou and Edge (2012) found that individuals who consistently use Facebook were more likely to agree that others had better lives. This reference to comparing oneself with another user with perceived higher social position is similar to the idea of subordination, the feeling of loss or defeat, as outlined in the social rank theory of depression (Gilbert & Allan, 1998; Sloman et al., 2003; Sturman, 2011).

Krasnova et al. (2013) found that Facebook use resulted in envy and that this envy could lead to negative life satisfaction among college students. When these college students experience envy from Facebook over a long period of time, it might lead to depression. Smith and Kim (2007) concluded that "efforts to cope [with envy] may also lead to a chronic focus on their inferiority, which might exacerbate shame and ultimately lead to depression" (p. 56). In another experiment, Smith et al. (1999) found that depression was correlated with feelings of envy. O'Keeffe and Clarke-Pearson (2011) also found that envy could occur in adolescents exposed to Facebook over long periods and subsequently result in depression. Because envy resulting from exposure to Facebook can lead to such negative health issues, Krasnova et al. (2013) coined the term "Facebook envy," which describes the envy felt after spending time consuming others' personal information on Facebook. Therefore, we also test the following hypothesis:

H3. Those who report feeling higher levels of Facebook envy tend to report more symptoms of depression than those who feel lower levels of Facebook envy.

Facebook use, however, is about more than just logging in. It performs a variety of functions (Smock et al., 2011) from passively reading what other users post to posting different types of content: text, photos and even videos. It is possible that different uses of Facebook lead to varied outcomes. For example, spending time on Facebook is positively linked to participating in co-curricular activities but playing games on Facebook is negatively associated with participation (Junco, 2012). Studies also found an association between different Facebook uses and different motivations for social media use (e.g. Baek et al., 2011; Lee & Ma, 2012; Smock et al., 2011). Thus, we also ask:

RQ2. What specific uses of Facebook predict Facebook envy?
RQ3. Does Facebook envy mediate the relationship between Facebook use and depression among college students?

2.5. Synthesis

Concern about the effects of Facebook use on college students have resulted in scholarly work that examined how Facebook use could lead to feelings of envy (e.g. Burke et al., 2010; Krasnova, Wenninger, Widjaja, & Buxmann, 2013) and depression (e.g. Jelenchick et al., 2013; Moreno et al., 2012; Wright et al., 2012). However, these streams of studies have not yet intersected. We attempt to facilitate this intersection through the framework of the social rank theory of depression (Gilbert & Allan, 1998; Junco, 2012; Sloman et al., 2003) that outlined the feeling of subordination as the mechanism that can trigger depression. Individuals compete for resources, and when they perceive themselves as outranked in terms of a particular resource, they feel subordinated, which can lead to depression (Gilbert & Allan, 1998; Sloman et al., 2003). This process of feeling subordinated is similar to feelings of envy (Chou & Edge, 2012; Jordan et al., 2011). Thus, our assumption, based on this theoretical framework, is that Facebook use can lead to depression when it triggers the feeling of envy among users.

3. Method

This study is based on an online survey of 736 college students recruited from a large Midwestern university. Since this study explores relationships among Facebook use, envy, and depression, the survey method is appropriate. Survey research "collects information by asking people questions" and coding their responses in numerical form "suitable for statistical analysis" (Shoemaker & McCombs, 2003, p. 231). Statistical analyses allow us to test the potential links between concepts.

3.1. Sample

An *a priori* power analysis using the *G-Power* software showed that for the study to be able to detect effects as small as .02, while maintaining a power of .80 within a 95% confidence interval in a regression analysis, the study needed at least 485 participants. Thus, we invited participants from four sections of introduction to journalism courses by coming to their classes and sending email invitations. Out of a total of 854 students invited to participate, 736 students participated in the survey (after excluding invalid responses), for an 86% participation rate. The total sample ($n = 736$) meets the required statistical power for the study. Some 68% of the participants were females and the average age was about 19 years (SD = 2.51 years). Some 78% identified themselves as White Americans. The participants used Facebook for an average of two hours per day (SD = 1.99). Please refer to Table 1 for the descriptive statistics.

3.2. Variables

3.2.1. Facebook use

We asked participants to report the average number of hours per day that they devote to using Facebook. But since Facebook is also a toolkit of different uses (Smock et al., 2011) and in order to answer our second research question, we also asked participants to rate in a 5-point scale, from very frequently (5) to never (1), how often they: "write a status update; post your photos; comment on a friend's post; read the 'newsfeed;' read a friend's status update; view a friend's photo; and browse a friend's timeline." We ran an exploratory factor analysis (EFA) using oblique rotation (Promax) *(KMO = .812, Bartlett's Test of Sphericity, X^2 (21) = 2444.07, $p < .001$)* and found that the last four items clustered into one factor. We called this factor as "surveillance use" of Facebook. A subsequent analysis found the scale to be reliable, *Cronbach's alpha = .88*.

3.2.2. Envy

We reviewed the different ways envy has been operationalized (Chou & Edge, 2012; Krasnova et al., 2013; Parks et al., 2002; Smith & Kim, 2007; Smith, Parrott, Diener, Hoyle, & Kim, 1999). We integrated the items used in these different studies to develop a scale of Facebook envy. We generated eight items that participants rated in a 5-point Likert scale. We asked participants to rate how much they agreed with each of the following statements: "I generally feel inferior to others; it is so frustrating to see some people always having a good time; it somehow doesn't seem fair that some people seem to have all the fun; I wish I can travel as much as some of my friends do; many of my friends have a better life than me;

Table 2
Depression scale.

	Rarely or none of the time	Some or a little of the time	Occasionally or a moderate amount of time	Most or all of the time
1. I was bothered by things that usually don't bother me				
2. I did not feel like eating; my appetite was poor				
3. I felt that I could not shake off the blues even with help from my family or friends				
4. I felt that I was just as good as other people				
5. I had trouble keeping my mind on what I was doing				
6. I felt depressed				
7. I felt that everything I did was an effort				
8. I felt hopeful about the future				
9. I thought my life had been a failure				
10. I felt fearful				
11. My sleep was restless				
12. I was happy				
13. I talked less than usual				
14. I felt lonely				
15. People were unfriendly				
16. I enjoyed life				
17. I had crying spells				
18. I felt sad				
19. I felt that people disliked me				

Note: This study used the Center for Epidemiologic Studies Depression (CES-D) Scale, one of the most commonly used measures of depression, as found reliable and valid by Radloff (1991). We used the scale as an additive index.

many of my friends are happier than me; my life is more fun than those of my friends; and life is fair." The last two sentences were reversed. However, we had to drop the last statement to achieve a reliable scale, *Cronbach's alpha = .78*.

3.2.3. Depression

This study used the Center for Epidemiologic Studies Depression (CES-D) Scale, one of the most commonly used measures of depression, as found reliable and valid by Radloff (1991). The reliability of the scale was confirmed by subsequent studies (e.g. Cheng et al., 2012; Lewinsohn et al., 1997; Lyness et al., 1997; Van Dam & Earleywine, 2011). The scale consists of 20 items asking questions about symptoms associated with depression (see Table 2 for the 20 items). We used the scale as an additive index, based on a formula Radloff (1991) discussed.

4. Results

RQ1 asked about the relationship between frequency of Facebook use and depression among college students amid differing findings by previous studies that explored the link between Facebook use and depression among college students. Based on correlation analysis, we found no significant direct relationship between frequency of Facebook use and depression among college students, $r(727) = .01$, $p > .70$.

H1 predicted that heavy Facebook users would report feeling higher levels of Facebook envy than light Facebook users would. H2 predicted that users with a large network of friends would also report feeling higher levels of Facebook envy than users with a small network. To test these hypotheses, we ran a two-way analysis of variance. The first grouping variable was time spent on Facebook (light vs. heavy users). The second was size of network (large vs. small network). We controlled for the effects of age and gender, neither of which was a significant predictor. The two-way ANOVA found that H1 is supported, $F(1,582) = 8.78$, $p < .01$. The analysis found that heavy Facebook users indeed experienced stronger feelings of envy ($X = 2.74$, $SD = .04$) than did light Facebook users ($X = 2.57$, $SD = .04$). However, H2 is not supported, $F(1,582) = 1.16$, $p > .10$. Size of network did not matter.

H3 predicted that those who report feeling higher levels of Facebook envy would also report more symptoms of depression than those who feel lower levels of Facebook envy. For this hypothesis, we ran regression analysis. We controlled for the effects of age and gender. Then, we included time spent on Facebook, number of Facebook friends, and Facebook envy in the model. H3 is supported.

Table 3
Predicting depression.

	β	t
Gender	−.010	−.294
Age	−.046	−1.339
Time spent on Facebook	−.038	−1.094
Number of Facebook friends	−.018	−.531
Facebook envy	.539	15.532*

* Note: $p < .001$; The model is significant, $F(5,601) = 49.421$, $p < .001$, explaining more than 28% of the variance in depression.

Facebook envy was the only significant and positive predictor of depression among college students, $\beta = .54$, $t = 15.53$, $p < .001$. The model is significant, $F(5,601) = 49.42$, $p < .001$, explaining more than 28% of the variance in depression (see Table 3).

Since Facebook offers an array of services and functions, RQ2 asked what specific uses of Facebook features are associated with feelings of envy. We developed a scale that we referred to as "surveillance use" of Facebook. This referred to activities where a user keeps track of other people's post, such as photos and other elements reported in the newsfeed. We tested three other uses that did not load on the surveillance use factor separately. Partial correlations analysis, controlling for age and gender, found that only surveillance use of Facebook, $r(604) = .14$, $p < .01$ was positively associated with envy.

Finally, RQ3 asked if Facebook envy mediated the relationship between Facebook use and depression among college students. We ran *bootstrapping* analysis to test for mediation, consistent with social rank theory and using the SPSS process macro that Hayes (2013) developed. A few alternatives have been proposed, but simulation research found bootstrapping to be among the most powerful methods to detect mediation (Hayes, 2009, 2013; Preacher & Hayes, 2008). The process of bootstrapping creates a large sample from the original data (5000 for this study) through a sampling with replacement strategy. It constructs a confidence interval (95% in this study) around the indirect effect, and the interval must not contain a zero to assume a significant indirect effect (Dubreuil, Laughrea, Morin, Courcy, & Loiselle, 2009; Knoll, Schramm, & Schallhorn, 2013). It has been used to study mediation and moderation effects involving media messages (Hautz, Füller, Hutter, & Thürridl, 2013; Knoll et al., 2013; Yang, Salmon, Pang, & Cheng, 2013). In the following presentation of the results, the coefficients we report are unstandardized, consistent with Hayes' (2013) argument that unstandardized coefficients are the preferred metric when reporting results of causal modeling.

The bootstrapping analysis, controlling for age and gender, found that the total effect of surveillance use of Facebook on depression was not significant, $B = .01$, $t = .03$, $p > .05$. However, surveillance use of Facebook exerts an indirect effect on depression through Facebook envy. Facebook surveillance predicts Facebook envy ($B = .10$, $t = 3.38$, $p < .01$), which then predicts depression ($B = 7.79$, $t = 15.78$, $p < .01$). Facebook envy is a significant mediator, *95% confidence interval (CI) = .2609 to 1.2726*. The model is significant, $F(4,602) = 62.91$, $p < .01$ and it explains about 30% of the variance.

What is interesting is when Facebook envy is entered as a mediator, Facebook surveillance actually exhibits a direct and negative effect on depression, ($B = -.77$, $t = -2.12$, $p < .05$). What this means is that surveillance use of Facebook can lessen depression when it does not trigger feelings of envy. However, surveillance use of Facebook can lead to depression when it triggers Facebook envy (see Fig. 1).

5. Discussion

This study found that Facebook use on its own does not directly lead to depression, echoing findings by Moreno et al. (2012), even if we used a different depression scale and a different study design.

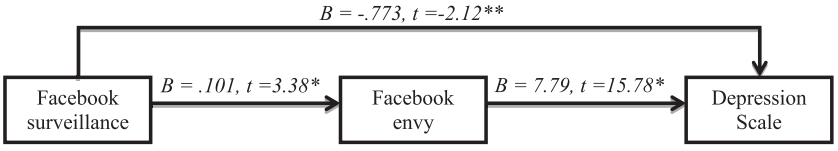

Fig. 1. Mediation model. Note. *$p < .001$; **$p < .05$; The model is significant, $F(4,602) = 62.91$, $p < .01$, explaining about 30% of the variance.

Moreover, using Facebook can even actually lessen depression. A more complete picture, however, considers that Facebook is a platform of multiple uses that might lead to different outcomes. By using the framework of social rank theory of depression, we treated Facebook envy as a possible mechanism that could link particular uses of Facebook—or in our study, the use of Facebook for surveillance—with depression among college students. The theory predicted the relationships we found in the data: The effect of surveillance use of Facebook on depression is mediated by Facebook envy. In the following discussion, we explain each of our findings leading up to the explanation of our main assumption.

First, we found no direct association between Facebook use and depression, but when Facebook envy is accounted for in the equation, using Facebook for surveillance actually negatively predicts depression. This makes sense in the context of what previous studies have found. Many users use Facebook and other SNS to post photos, communicate with their friends, and extend their social circles. Some of these uses have been found to increase happiness and self-esteem (Gonzales & Hancock, 2011; Kim & Lee, 2011). Facebook can be entertaining and can help ease boredom or even loneliness.

Second, we found that heavy Facebook users have higher levels of Facebook envy than light users. The more an individual uses Facebook, the more likely they are to engage in certain behaviors that lead them to consume others' personal information. In doing so, they are confronted with more instances when they are prone to comparing themselves with others (Chou & Edge, 2012). In other words, the longer an individual is on Facebook, the more information they are likely to consume. They will see other users' news, photos and profiles. Chou and Edge (2012) also found that the more people consume others' personal information on Facebook, the more likely they are to become envious, so that a person with a larger network of friends will also be more likely to feel envious than a person with a smaller network. This seems logical, because a heavy Facebook user tends to have more friends than a light user (Ellison et al., 2007). A user with a lot of Facebook friends will be inundated with others' personal information. This will lead her to compare herself with others, which could directly result in feelings of envy. However, we did not find this relationship. Number of friends was not associated with feelings of envy. A plausible explanation for this is that while it is logical to assume that heavy users will have more friends and will have more frequent exposures to what others are sharing on Facebook, the site itself allows users to control what and who they can see on Facebook. They can hide posts by a friend, or even block someone. Thus, a large network no longer guarantees constant exposure to what everyone is sharing.

Third, we found that the specific use of surveillance on Facebook leads to feelings of envy. This result coincides perfectly with what previous studies found that the more users consume others' personal information, the more likely they are to experience feelings of envy (Jordan et al., 2011; Krasnova et al., 2013). Surveillance use refers to using Facebook to keep track of what others are doing. College students using Facebook for surveillance purposes are purposely utilizing SNS to consume others' personal information. They are far more likely to come across details that will trigger feelings of envy. These findings also inform our understanding of Facebook as a toolkit of uses, since other activities on Facebook—such as posting one's own photo or updating one's status—are not correlated with feeling envious.

Fourth, we found that Facebook envy predicts depression symptoms. Our regression model even accounted for more than 28% of the variance in depression. Studies have previously found that general feelings of envy can lead to depression (O'Keeffe and Clarke-Pearson, 2011; Smith & Kim, 2007). Our findings suggest this link is also true even with Facebook envy (Krasnova et al., 2013). This finding got us thinking: Our analysis found that Facebook use is linked to Facebook envy, and that Facebook envy is linked to depression. College students who use Facebook heavily have higher levels of envy because they are exposed to a lot of personal information from users in their networks. Since users of SNS strive for a positive self-presentation (Schau & Gilly, 2003; Walther, 2007; Zhao et al., 2008), Facebook users are exposed to successes, material goods, positive relationships, and other information that other users share on Facebook. Exposure to these pieces of positive information about others can lead to feelings of envy, as information consumers can feel subordinated to others who seem to publish positive experiences all the time. The irony, of course, is that users rarely post negative experiences, which might contradict the aim of positive self-presentation. Thus, when users feel envious constantly, they might develop depression symptoms over time.

Based on the language of social rank theory, we tested a possible mediation relationship between surveillance use, Facebook envy, and depression. This is exactly what we found. Controlling for age and gender, using Facebook for surveillance leads to Facebook envy which leads to depression. What was equally noteworthy was the direct and negative relationship between Facebook surveillance use and depression symptoms after Facebook envy was accounted for. Thus, while using Facebook for surveillance can actually make people less depressed, it can also lead to depression when users start feeling envious of others.

6. Conclusion

This study offers social rank theory as a useful framework to understand the complex process of depression among college students. The link between envy and depression has been established in many studies about offline communication. In this study, we hope to contribute to this stream of research by applying the theoretical link to online interactions, particularly on Facebook. Today's college students spend a considerable amount of time online, especially on Facebook. But by just blaming Facebook as a cause for depression, we miss a complex but important process that points to perceptions of subordination. We fail to acknowledge that for many people, using Facebook is a gratifying experience that can even lessen depression. In order to address depression among college students, we must understand the complex process to be able to better devise an intervention.

If college students are aware of the potential hazards resulting in time spent on Facebook, they may curb their usage or become more cognizant of the negative feelings of envy resulting in exposure to others' personal information. If an individual can more quickly identify a negative feeling as envy, they may react and find some form of help swiftly enough to avoid symptoms of depression. Support networks such as friends, parents and teachers can also better help people deal with depression armed with the knowledge that a possible underlying cause is the feeling of subordination. Strategies such as affirmation or offering words of encouragement might work to ease feelings of subordination that underlie depression. These interventions might even be in the form of encouraging Facebook posts (Moreno et al., 2011; Soo Jeong et al., 2013; Wright et al., 2012) that can help lessen depression. It is not the social medium itself that is to blame for depression but the feelings that it might trigger, particularly Facebook envy, something that cannot be sweepingly expected of all Facebook users. Our findings point to the important factor of how communication platforms and individual dispositions intersect.

This study is constrained by several limitations. First, we have not accounted for other explanations of depression among college students, with our final mediation model accounting for only about 30% of the variance in depression. Other factors, such as personality types and offline situations, also contribute to depression

among college students. Second, envy takes on many forms and is influenced by a multitude of factors. Facebook use is just among the many factors that contribute to feelings of envy. Considering that envy significantly predicts depression—consistent with social rank theory—future studies should also look into other possible predictors of envy. Third, survey method has its limitations as it relies heavily on self-reports. Though we used a reliable and validated depression scale (Radloff, 1991), some participants might not have reported the actual extent to which they experienced the depression symptoms, probably out of social desirability bias that usually affects survey research. Finally, while we sought out all students for an introductory level journalism class, our findings are not generalizable to the entire population of college students. However, our primary goal in this exploratory study is to test the theoretical relationships between the variables of interest. Our sample of 736 students had enough statistical power to establish the relationships we found.

Constrained by these limitations, we still hope that our findings can contribute to a better understanding of the intricate pathways from online social interactions to bouts with depression that plague our college students. This is an important discourse, and we hope we have contributed something useful to address this ongoing problem, no matter how modest.

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