AN EXAMINATION OF THE RECIPROCAL RELATIONSHIP OF LONELINESS AND FACEBOOK USE AMONG FIRST-YEAR COLLEGE STUDENTS

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ABSTRACT

College students are using social network sites such as Facebook to communicate with their families and friends. However, empirical evidence is needed to examine whether there exists a reciprocal relationship between students' use of social network sites and their psychological well-being. The present study focused on two reciprocally-related research questions: (a) Is there an impact of loneliness on Facebook intensity and motive for using Facebook among first-year college students? (b) Is there an impact of Facebook intensity and motive for using Facebook on loneliness? Data were collected from a sample of 340 first-year college students and were analyzed through structural equation modeling. No reciprocal relationship was found in the study: Facebook intensity had a positive impact on loneliness and, motive for using Facebook did not have any impact on loneliness, whereas loneliness influenced neither Facebook intensity nor motive for using Facebook.

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INTRODUCTION

First-year college students transitioning from high school to college have been found to be at high risk of loneliness when faced with the stresses of living away from their families and lacking their previous social support system (Oswald & Clark, 2003). With the advent of the Internet, including social networking sites (SNSs), some researchers have studied the impact of Internet use on loneliness (Brenner, 1997; Livingstone, 2008), while others have addressed lonely individuals' preference for the use of the Internet (McKenna, Green, & Gleason, 2002). While Facebook is among the largest and most heavily used SNSs in the world (Alexa.com, 2011), empirical evidence is needed to examine whether there really exists a reciprocal relationship between first-year college students' Internet use and their psychological well-being. Investigating the existence of the reciprocal relationship empirically will advance the current knowledge about the complexity of psychological effects of SNSs (e.g., Does loneliness and use of SNSs really interact with each other sequentially or simultaneously?) and suggest effective strategies to help first-year college students adjust to their new life and reduce their potential loneliness (e.g., Should we encourage or limit college students to use SNSs?).

Reciprocal Relationship between Loneliness and Internet Use

Loneliness has been defined as initial social relationships being less than desired or achieved, including uneasy feelings, distress, and perceptions of deficiencies in one's social relations (Russell, 1996). Some researchers have found that Internet use leads to negative outcomes for the individual user, such as reduced interactions with families and friends, increased depression and loneliness, and neglect of existing close relationships (Brenner, 1997; Livingstone, 2008). Brenner (1997) surveyed young Internet users who spent an average of 19 hours per week online and found that they reported feeling more isolated from society when surveyed than before using the Internet. He attributed the feeling of isolation of these Internet users to their reduced personal interactions with family members and friends. The feeling of isolation could worsen due to the option to reject or ignore a request to "friend" someone in SNSs (Livingstone, 2008).

In contrast, other researchers found that social networking enhanced self-disclosure and communication, thereby decreasing loneliness and depression (Steinfield, Ellison, & Lempe, 2008; Valkenburg, Peter, & Schouten, 2006). Interpersonal communication through SNSs can provide necessary social support, which may positively influence mental health and well-being. Additionally, communication on SNSs is also related to an enhanced sense of self-esteem and improved life satisfaction (Valkenburg et al., 2006).

Additionally, some researchers studied how lonely people use the Internet to connect with other strangers in order to reduce their loneliness. McKenna and her

colleagues (1999, 2002) conducted a series of studies and found that lonely people were more likely to use online communications to form close relationships with those they met online. Online communication often does not reveal visible shyness and social anxiety, which help individuals who are less socially skilled foster online friendship. McKenna and her colleagues affirmed the specific relationship between Internet use and difficulty in interactions, isolation, and loneliness. They found that lonely people eventually brought this kind of online friendship into their real lives, through telephone conversations, exchange of letters and pictures, and face-to-face meetings. Internet acquaintanceship could and did develop into close and even intimate relationships.

Loneliness and Internet Use among First-Year College Students

Environmental change or transition might trigger individuals' loneliness due to the shift of social ties and friendship. For youth, attending college represents an important transition. Approximately 60% of high school seniors go directly to college after graduation from high school each year, and many of them leave their parents' home for the first time to attend residential colleges (Hamilton & Hamilton, 2006). It is a time marked by instability, a lack of adult responsibilities, and commitments that afford individuals the opportunity and time to explore prospective life courses related to identity, work, and worldviews (Arnett, 2000, 2006).

In addition, over the course of the first year of college, approximately half of high school best friendships diminish in closeness, satisfaction, and commitment (Jackson, Soderlind, & Weiss, 2000; Oswald & Clark, 2003). These changes often lead to various health and psychosocial problems, such as alcohol and drug abuse (e.g., Capone, Wood, Borsari, & Laird, 2007; Walters, Vader, & Harris, 2007), distress (Pritchard, Wilson, & Yannitz, 2007), and loneliness (Nicpon, Huser, Blank, Sollenberger, Befort, & Kurpius, 2006).

Among the above-mentioned problems, loneliness has been shown to be particularly prevalent in college students. In fact, it was one of the most common complaints of students reporting to health and counseling centers (Nicpon et al., 2006). Experiencing loneliness as a youth might be more detrimental than at other times of life as it might impede personal growth, identity resolution, and intimacy issue resolution.

With the advent of the Internet, college students might use different online communication tools to communicate with their families, high school friends, and other social groups. As one of rapidly emerging Internet applications, SNSs have been used widely by college students to communicate with their families and friends. Among a variety of SNSs, Facebook is preferred by most first-year college students to meet people, develop relationships, and maintain friendship (Holtgren, 2007). Freshmen may use Facebook to maintain their relationship with

their high school friends as well as forming and building new relationships with their classmates in college. Furthermore, Facebook supports loose social ties, allowing users to create and maintain larger, diffuse networks of relationships from which students might potentially draw resources (Donath & Boyd, 2004). MySpace, however, was seldom visited by most new members (Parks, 2011). They did little to personalize their profiles, and did not list friends or receive comments from others. Hence, our study focused on Facebook, which has been the most popular and heavily used SNS in the world since 2008 (Alexa.com, 2011).

Present Study

Through the study of the first-year college students, we intended to examine whether there exists a reciprocal relationship between Facebook use and loneliness. Theoretically, the study provided evidence to further understand the relationship between SNS use and well-being. The study focused on two reciprocally related research questions:

1. Is there an impact of loneliness on Facebook intensity and motive for using Facebook among first-year college students (see Figure 1)?
2. Is there an impact of Facebook intensity and motive for using Facebook on loneliness among first-year college students (see Figure 2)?

METHOD

Participants

A total of 340 first-year students from two universities in the southern United States participated in the study during the 2008 fall semester. Among 340 students, 118 students did not use Facebook and were used to compare their level of
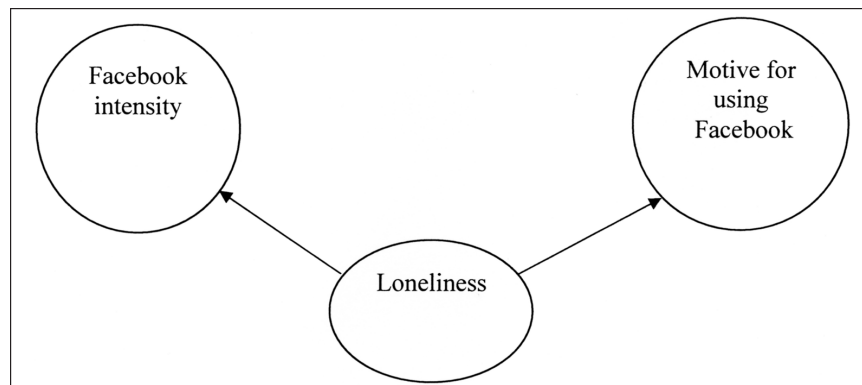

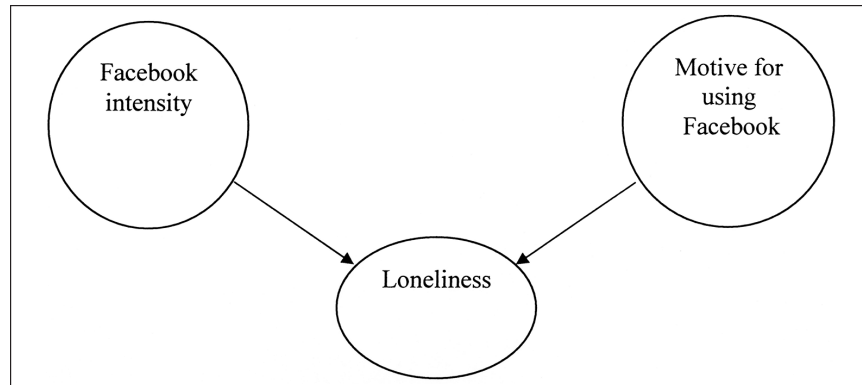Figure 1. Hypothesized model of research question 1.

Figure 2. Hypothesized model of research question 2.

loneliness with the 222 students who used Facebook. Among the 222 Facebook users, 90% of the participants were 18- or 19-years-old, 67% female students, and 23% African American, 34% Asian American, 20% Hispanic, 21% White, and 2% other racial/ethnic background. It should be noted that 58% of the Facebook users also used MySpace.

Instrument

The instrument used in this study was the College Student Facebook Use Questionnaire. It included four components: demographic information, the UCLA Loneliness Scale, the Facebook Intensity Scale, and the Motive for Using Facebook Scale.

Demographic Information

The data collected in the study included gender, age, ethnicity, education level, type of Internet use to communicate, and usage of Facebook.

Loneliness

Russell's 20-item UCLA Loneliness Scale (1996) was used to measure students' level of loneliness. Questions regarding loneliness such as "Do you always feel part of a group of friends?" and "Do you always feel that you have a lot in common with the people around you?" were used in the scale. In the scale, responses could range from 1 as *strongly disagree* to 7 as *strongly agree,* a higher score indicating students suffered less from loneliness while a lower score indicating students had loneliness.

Principal component extraction with the rotation of varimax was used to validate the measurement variable of loneliness. Exploratory factor analysis was used to reduce data and analyze all the variance, while varimax was used to minimize factor covariation to produce factors which were uncorrelated (Tabachnick & Fidell, 2001) Using .40 as a cutting point, items 1, 5, 6, 9, 10, 15, and 20 were retained. These items explained 52.59% of the variance, with factor loadings ranging from .51 to .82. Reliability of these seven items was .84.

Facebook Intensity

This scale was created for the study to measure: (a) the number of Facebook "friends" and the amount of time spent on Facebook on a typical day, (b) the extent to which the participants were actively engaged in Facebook activities, and (c) their attitudes toward Facebook (Ellison, Steinfield, & Lampe, 2007). Seven questions, such as "Facebook has become part of my daily activity" and "I like to communicate with my friends via Facebook," were asked. Response options ranged from 1 as *strongly disagree* to 7 as *strongly agree*, a higher score indicating students had favorable attitudes toward Facebook and Facebook usage, and a lower score indicating students had less favorable attitudes toward Facebook and Facebook usage. The reliability of the scale was .85. Exploratory factor analysis was performed to reduce the number of factors. All seven items were loaded in one factor, with factor loadings ranging from .59 to .87. All items explained 53.37% of the variance.

Motive for Using Facebook

This eight-item scale was also developed for the study to measure participants' motive for using Facebook. Questions such as "I use Facebook to keep contact with friends" and "I use Facebook to share my ups and downs with other friends" were used in the scale. The response options ranged from 1 (*strongly disagree*) to 7 (*strongly agree*), a higher score indicating students had higher motive for using Facebook whereas a lower score indicating students had lower motive for using Facebook to communicate with friends. The Cronbach's alpha was .83. Exploratory factor analysis was used and the results indicated that all eight items were loaded on one factor. This explained 75.24% of the variance, with factor loadings ranging from .83 to .89.

Procedure

After obtaining approval from the university Institutional Review Board (IRB), the researcher sent an e-mail to instructors who taught undergraduate introductory courses (e.g., Introduction to Psychology, Introduction to Politics) in six universities or colleges in the southern part of the United States to ask for their permission to administer the College Student Facebook Use Questionnaire in

their respective classes. One instructor from one large public university and two instructors from one community college consented. The IRB protocol was subsequently filed with the public university and the community college instructors accepted the researcher's university IRB approval. One instructor from the community college forwarded the e-mail request to other instructors who taught undergraduate classes, which led to the recruitment of five more instructors who gave permission for data collection in their classes.

From October 14 to November 20 of 2008, the questionnaire was administered in 18 classes at the university and community college. Students took 10-20 minutes to finish the questionnaire and returned it to the researcher during each class. The return rate of the in-class administrated survey was 100% according to Jaeger (1984). Additionally, three instructors in the community college who taught seven online courses posted the questionnaire and recruitment script in their course websites and their students e-mailed the completed questionnaires to the researcher. As students voluntarily downloaded the survey from their course websites, the returning rate was not estimated (Fan & Yan, 2009).

RESULTS

Descriptive Results

As shown in Table 1, students who used Facebook had a lower loneliness score of $M = 2.94$ ($SD = 1.12$) than those who did not use Facebook ($M = 3.30$, $SD = 1.07$), $t(388) = 2.88$, $p < .01$. Students who used Facebook had favorable

Table 1. Means, Standard Deviations of Loneliness, Facebook Intensity, and Motive for Using Facebook

Variables	Mean	SD	Minimum	Maximum
1. Loneliness ($N = 118$ non-Facebook users)[a]	3.30	1.07	1	7
2. Loneliness ($N = 222$ Facebook users)	2.94	1.12	1	7
3. Facebook Intensity ($N = 222$)	4.16	1.46	1	7
4. Motive for using Facebook ($N = 222$)	3.87	1.27	1	7

[a]Significant difference was found in the loneliness scores between Facebook users and non-Facebook users, $t(388) = 2.88$, $p < .01$.

feelings toward Facebook, with M = 4.16 and SD = 1.46 on a 7-point Likert scale of Facebook intensity. On average, students had moderately high scores in motive for using Facebook, with M = 3.87 and SD = 1.27.

Pearson correlation coefficients were calculated to examine the intercorrelations among Loneliness, Facebook Intensity, and Motive for Using Facebook, respectively. The correlation coefficient between Loneliness and Facebook Intensity was significant (r = –.15, p < .05), as was the correlation between Facebook Intensity and Motive for Using Facebook (r = .50, p < .01). In contrast, the relationship between Loneliness and Motive for Using Facebook was not significant (r = –.09, p > .05),

Goodness of Fit of Measurement Models

Structural equation modeling was used to examine the two hypothesized models depicted in Figures 1 and 2. Normality of the data was first examined by checking univariate skewness and kurtosis.

The measurement model of Loneliness represented a goodness of fit, χ^2 (14, N = 222) = 30.72, p < .01, the normed chi-squared test statistic (χ^2/df) = 2.19, CFI = 0.97, TLI = 0.95, GFI = 0.96, and RMSEA = 0.07. All indices were desirable in values, except for the chi-square, for which it is common to be significant for relatively large sample sizes (Bollen, 1989). All standardized factor loadings were satisfactory and significant, ranging from .43 to .79.

The measurement model of Facebook Intensity represented a goodness of fit, χ^2 (12, N = 222) = 37.76, p < .05, the normed chi-squared test statistic (χ^2/df) = 3.15, CFI = 0.96, TLI = 0.93, GFI = 0.96, and RMSEA = 0.09. All indices were desirable in values, except for the chi-square. All standardized factor loadings were excellent, ranging from .47 to .83 at the significant level of .001.

The measurement model of Motive for Using Facebook represented a goodness of fit with χ^2 (15, N = 222) = 15.70, p > .05, the normed chi-squared test statistic (χ^2/df) = 1.05, CFI = 0.99, TLI = 0.99, GFI = 0.98, and RMSEA = 0.01. All fit indices were desirable and all standardized factor loadings were satisfactory and significant, ranging from .41 to .83.

Impact of Loneliness on Facebook Intensity
and Motive for Using Facebook

After the measurement models were found to be acceptable in measuring all three latent constructs, the hypothesized structural model of research question 1 was estimated. The chi-square test of model fit was statistically significant, χ^2 (200, N = 222) = 404.05, p < .001, the normed chi-square test statistic was 2.02, CFI was 0.89, TLI was 0.87, GFI was 0.87, and RMSEA was 0.07. Hence, the hypothesized structural model of research question 1 did not fit the data well. This suggested that loneliness neither predicted the first-year college students' Facebook use nor their increased motive for using Facebook.

Following Byrne's (2001) suggestions, the bootstrap procedure was used to validate the model fit and parameter estimation of the data with moderate sample size. The results of using the model of research question 1 to fit 1000 bootstrap samples indicated that all of the fit indices and parameter estimates with the 1000 bootstrap samples matched well those with the original sample, confirming the robustness of the model fit and parameter estimation in model of research question 1.

Impact of Facebook Intensity and Motive for Using Facebook on Loneliness

The hypothesized structural model of research question 2 represented a good fit to the data. The chi-square test of model fit was statistically significant χ^2 (199, $N = 222$) = 343.63, $p < .001$, normed chi-square statistic (χ^2/df) was 1.73, CFI was 0.92, TLI was 0.91, GFI was 0.88, and RMSEA was 0.06. The bootstrap procedure was repeated to validate the model fit and the results were consistent with the original sample.

Based on the fitted hypothesized structural model, there was a significant path from Facebook Intensity to Loneliness ($\beta = -.21$, $p < .05$), whereas there was not any significant path from Motive for Using Facebook to Loneliness ($\beta = .02$, $p > .05$). The results indicated that every one standardized unit increase in Facebook Intensity was associated with .21 standardized unit of decrease in students' loneliness. Results suggested that Facebook intensity reduced students' loneliness, but motive for using Facebook did not significantly impact students' loneliness.

DISCUSSION

Facebook intensity had a positive impact on loneliness, but motive for using Facebook did not have any impact on loneliness, whereas loneliness did not have an impact on Facebook intensity or motive for using Facebook. No reciprocal relationship was found in the present study. We present the three explanations for this major finding.

First, the finding of Facebook intensity had a positive impact on loneliness is consistent with views that using the Internet as a communication tool augments one's familial activities and social lives (Rubin, 2002). In our study, similarly, more time spent on Facebook as a communication tool increased Facebook users' social networks of relatives and friends offline, and reduced their loneliness. From the perspective of Communication and Information Technology theory, social network sites are the latest computer-mediated-communication (CMC) environments that comprise two functions (Antheunis, Valkenburg, & Peter, 2010): (a) social network sites are cue-richer applications in that they not only provide visual and auditory cues, but also audiovisual cues; and (b) CMC

environments vary in their openness. For example, Instant Messaging is predominantly used for dyadic, one-to-one communication, whereas social network sites encourage more open, one-to-many communication. Cue-rich and open CMC environments attract college students to use social network sites like Facebook. Thus, college students have more favorable attitude toward Facebook and spend more time on it, reducing their perceived level of loneliness.

Second, motive for using Facebook, referring to one's intention of using Facebook to communicate with friends with strong ties (e.g., high school best friends) and with weak ties (e.g., friends newly known in a class) does not have a significant effect on loneliness. It is possible that Facebook serves as a surface structure platform (Hartup & Stevens, 1997) to simply keep contact with friends, as opposed to being used to primarily develop a deep structure of friendship in which people offer one another emotional support (i.e., strong ties). Hsu and her colleagues (2011) found that users gain more familiarity with new friends and acquaintances. They confirmed that Facebook seems to be a mechanism for new friends to become more acquainted as opposed to a communication mechanism for close friends.

Third, our finding that loneliness did not influence first-year college students' Facebook intensity and their motive for using Facebook is in disparity with important findings of McKenna and her colleagues (1999, 2002), that lonely people have a propensity to use social network sites to make friends with strangers. One explanation of this disparity may be that there are differences between using chatrooms and using Facebook. McKenna and her colleagues studied lonely participants whose motives were to find strangers in a chatroom and, ultimately, to make new friends. In contrast, Facebook users generally communicate with their acquaintances to maintain an established relationship. Facebook gives its users power to communicate at their own available time but not necessarily simultaneously, and thus might not be the first place for lonely students to look for friends and relatives.

Implications for Education

This study is one of the earliest examining the reciprocal relationship between the use of Facebook and psychological well-being among first-year college students, while there exists extensive literature regarding Internet use and psychological well-being. Given that a wide variation of Internet applications (e.g., e-mail and SNSs) exist and various SNSs (e.g., Facebook and MySpace) exist, the findings might have two educational implications specifically related to the use of Facebook. First, one of the findings of the study indicates that students who used Facebook reduced their loneliness. Based on this finding, education policy makers may consider using social network sites for their own universities. For example, universities could provide professional development to their administrative staff, faculty, and students about how to use social

network sites creatively, effectively, and safely to reduce students' perceived level of loneliness.

Second, educators and school administrative staff can provide students with academic and emotional support after class by using social network sites. For example, under new education policy guidelines, teachers can recruit students from different classes to form a study group or an interest group like the Structural Equation Modeling Study Group and the Monthly Story Sharing Group in a social network site. Through sharing a common interest, students may get to know each other better and engage in expanded social networks with their friends. School counselors could also consider establishing a Companion Group in Facebook and invite students to participate. This may be a strong attraction to students with loneliness since this group of students tends to use online communication rather than face-to-face communication. By reading students' Facebook pages and looking at their networking friends, habits, and groups, counselors can develop in-depth understanding of students' psychosocial needs and provide specific one-to-one service to their student clients. Counselors can also advise students how to use their online profile safely and wisely.

In conclusion, Facebook intensity had a positive impact on loneliness, but motive for using Facebook did not have any impact on loneliness, whereas loneliness influenced neither Facebook intensity nor motive for using Facebook. Education policy makers may consider using social network sites for their universities. Educators and counselors may provide academic and emotional support to students by using social network sites.

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