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Research Report

Facebook: Social uses and anxiety

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ABSTRACT

Research has shown inconsistent relationships between social anxiety and time spent on Facebook, possibly because Facebook's many activities vary in degree of social interactivity. We examined the relationships between social anxiety, anxiety on Facebook, and social Facebook use. A multiple regression predicting social Facebook use revealed an interaction. Participants with high anxiety on Facebook and high social anxiety reported more frequent social Facebook use than those with high anxiety on Facebook and low social anxiety. A second multiple regression predicting social anxiety showed a suppression effect, indicating that social Facebook use predicts social anxiety only once anxiety on Facebook has been accounted for. These findings suggest that anxiety on Facebook clarifies the relationship between social anxiety and social Facebook use.

1. Introduction

Facebook may provide opportunities for improved social interaction for people with high social anxiety, who often struggle in face-to-face social interactions (Leary & Kowalski, 1995). The social compensation hypothesis predicts that individuals with high social anxiety may perceive Facebook as a less anxiety-provoking avenue to social interaction (Fernandez, Levinson, & Rodebaugh, 2012; Sheldon, 2008) and compensate for poor face-to-face interactions online. Previous researchers testing this hypothesis have often predicted that socially anxious Facebook users will spend more time on the site than users with low social anxiety (Fernandez et al., 2012; Murphy & Tasker, 2011). This line of thinking is based on the observation that Facebook allows for social interaction without many of the physical aspects of face-to-face social interaction that those with social anxiety may particularly fear (e.g., eye contact, blushing, trembling) (Fernandez et al., 2012; Murphy & Tasker, 2011; Sheldon, 2008).

Previous research provides mixed evidence for the social compensation hypothesis. Murphy and Tasker (2011) found that social anxiety was positively correlated with time spent on Facebook and with perceived ease of communication on the site, lending some support for the social compensation hypothesis. Fernandez et al. (2012) found that social anxiety was not correlated with reported frequency of Facebook use or frequency of use observed from participants' Facebook profiles, providing some evidence against the social compensation hypothesis. Similarly, Baker and Oswald (2010) investigated the relationship between amount of time spent on Facebook and friendship quality across different levels of shyness. Shyness was not related to amount of time spent on Facebook, providing some evidence against the social compensation hypothesis. However, shy participants who reported high Facebook use did not report feeling more comfortable interacting with others in person because of Facebook, which could indicate that this group was motivated to use Facebook in order to compensate for discomfort experienced in face-to-face interactions.

Notably, the social compensation hypothesis appears to refer to what *motivates* those with high social anxiety to use Facebook, yet the studies reviewed above uniformly test frequency of use rather than what is motivating that use. It does not necessarily follow that more use indicates *compensation* with Facebook use, which we interpret as using Facebook for purposes of social interaction rather than engaging in face-to-face interaction. For example, Facebook's many features vary greatly in how social they are. Facebook users who primarily use features that are low in social interactivity (e.g. looking at others' status updates) may spend much time on the site but interact with others very little. It is difficult to view such increased use as compensatory any more than reading books or pursuing hobbies would be compensatory for individuals who fear social interaction.

Other studies point out that to understand the relationship between social anxiety and Facebook use, a more detailed measure of Facebook use and a direct measure of motivation for Facebook use may be necessary (Selfhout, Branje, Delsing, ter Bogt, & Meeus,

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2009; Sheldon, 2008). Sheldon (2008) found that unwillingness to communicate in face-to-face interactions was not correlated with amount of time spent on Facebook, providing some evidence against the social compensation hypothesis. However, people with high anxiety were more likely than those with low anxiety to report using Facebook to pass the time and to feel less lonely, indicating that level of anxiety may affect motivations for Facebook use rather than amount of use. Selfhout et al. (2009) examined adolescent instant messaging and web surfing behaviors in relation to depression, social anxiety, and friendship quality over two time points. Adolescents who reported low friendship quality and high frequencies of instant messaging at Time 1 were less likely to be depressed at Time 2. Conversely, those with low friendship quality who used the Internet primarily for surfing rather than instant messaging at Time 1 were more likely to be depressed and socially anxious at Time 2. These findings suggest that if people high in social anxiety primarily use Facebook to pass time, they may later feel more anxious or depressed, whereas if they use it for social interaction purposes, they may later feel less anxious or depressed. These findings also highlight the possibility that a Facebook use measure that differentiates between socially interactive and socially passive use may help clarify the relationship between social anxiety and Facebook use.

1.1. The present study

In the present study, we elected not to focus on time spent on the site for several reasons. First, as highlighted by results of Sheldon (2008) and Selfhout et al. (2009), amount of time spent on Facebook does not reflect which features of Facebook individuals are using while they are logged on, nor their motivations for logging on. Furthermore, it is unclear if Facebook users are able to accurately report how much time they spend on the site. In one recent study, students reported logging onto Facebook many times throughout the day for brief periods of time—before they got out of bed, between activities (from their mobile devices), and while they worked on their computers (Bornoe & Barkhuus, 2011). Because Facebook logons can be frequent and brief, we are pessimistic about the likelihood of participants being able to report time spent on the site with any precision.

The present study was designed to test two hypotheses, via a specific measure of relative frequency of *social Facebook use* (use of specific, highly socially interactive features of the site). First, we predicted that those with high social anxiety would report less frequent social Facebook use than those with low social anxiety. That is, we expected that social anxiety would decrease use of the Facebook features that would most effectively compensate for face-to-face social interactions. This prediction was made in light of the mixed findings for the social compensation hypothesis and because several of the correlates of social anxiety could be elicited by social Facebook use, including fear of positive and negative evaluation (Rodebaugh, Weeks, Gordon, Langer, & Heimberg, 2012), anticipatory fear, and desire to avoid social situations (Leary & Kowalski, 1995).

Second, we predicted that those with high social anxiety would report higher *anxiety on Facebook* (i.e., anxiety associated with social Facebook use), than those with low social anxiety. To our knowledge, no previous studies have assessed social anxiety experienced when using Facebook to interact with others; accordingly, we developed a new measure to assess Facebook-centric social anxiety. Finally, we tested interactions between variables because a lack of zero-order relationship could mask significant interaction effects. Understanding the relationship between social anxiety experienced in person and on Facebook would help put into context the relationship between social anxiety and social Facebook use.

2. Materials and methods

2.1. Participants

Two hundred sixteen Facebook users participated in this study. All potential participants received an email that contained the link to an online survey on Surveymonkey.com and basic information about the study. Participants were recruited from the Washington University Volunteer for Health participant pool (164 invitations) via email and from the principal investigator's (PI's) email contact history (85 invitations). Individuals with prior knowledge about the study (e.g., its hypotheses) were not invited to participate. Participants were invited to forward the recruiting email to others who may be interested. Thus, some of these participants may have forwarded the email to others. The email containing the link to the online survey informed participants that they could enter into a drawing for $50 upon completion of the survey.

The sample consisted of 185 women and 31 men. The average age of the sample was 32.2 years (SD = 12.43), ranging from 18 to 69 years. The sample was 83.3% White, 6.5% Black, 3.7% Multiracial, 2.3% Hispanic, 1.9% Asian, .5% African, .5% American Indian or Alaskan Native, .5% Arab, and .5% Pacific Islander. The sample consisted of 31.5% undergraduate students, 12.0% graduate students, and 55.6% were not students. The average amount of schooling completed was 15.4 years (SD = 2.31), ranging from 11 to 23 years.

2.2. Material

2.2.1. Facebook Questionnaire (FBQ).

The FBQ was specifically designed to measure frequency of use of socially interactive features of Facebook (please see Table 1), rather than features that are non-social (e.g. looking at others' status updates). Three items that are less obviously social in nature (*I change/update/check my profile, I look at recently updated statuses,* and *I look through pictures of my friends*) have been previously shown to correlate highly with overall measures of Facebook use and were initially included to increase the reliability of this new measure (Fernandez et al., 2012). However, as the 10-item measure did not show improved internal consistency (α = .86) from the 7-item measure (α = .86), items 8–10 were excluded from further analysis. Participants rated frequency of use on a seven-point Likert scale (1 = *about once a month or less*, 7 = *many times per day*).

2.2.2. Social Interaction Anxiety Scale and social phobia scale-12 (SIAS-SPS-12).

The SIAS and SPS are designed to measure two closely related aspects of social anxiety, social interaction anxiety, and fear of public scrutiny (Mattick & Clarke, 1998). Whereas the SIAS measures anxiety experienced while initiating or maintaining social interactions, the SPS assesses anxiety experienced in performance situations in which the individual might be scrutinized (Peters, Sunderland, Andrews, Rapee, & Mattick, 2012). The SIAS-6 and SPS-6 are each 6-item shortened versions of the 20-item original scales. Items are rated on a 5-point Likert scale (0 = *Not at all characteristic or true of me*, 4 = *Extremely characteristic or true of me*). Peters et al. (2012) report high correlations between the short and long versions of the SIAS (r = .88, p < .01) and SPS (r = .92, p < .01) and good construct validity for these shortened versions as well. The SIAS-6 and SPS-6 were strongly correlated in the present study (r = .75, p < .001) and were combined to create the SIAS-SPS-12 to obtain an overall measure of social anxiety.

2.2.3. Facebook-Social Interaction Anxiety Scale (F-SIAS)

The F-SIAS is a seven-item scale designed to measure anxiety on Facebook, social anxiety symptoms experienced while using the

Table 1
The Facebook Questionnaire (FBQ).

1. I send messages to friends
2. I send chat messages to friends
3. I write on group or event walls
4. I write on friends' walls
5. I send friend requests
6. I post comments on friends' status updates, pictures, etc.
7. I update my status

Table 2
Facebook-Social Interaction Anxiety Scale (F-SIAS).

1. When sending someone a Facebook message, I worry that I will not get a reply
2. I feel tense communicating with someone on Facebook chat
3. I have difficulty coming up with what to say in a status update
4. I get nervous when writing on someone's Facebook wall
5. I feel uncomfortable posting on the wall of a Facebook group or event
6. I am unsure whether to send a friend request to someone I do not know very well yet
7. I have difficulty commenting on someone's status or other post

social interaction features of Facebook included in the FBQ (please see Table 2). The measure was modeled after the SIAS, a measure of social anxiety symptoms experienced in face-to-face interactions reviewed above (Mattick & Clarke, 1998). The items of the F-SIAS were rated on the same Likert scale as the SIAS. The F-SIAS showed good internal consistency in the current study ($\alpha = .86$).

2.3. Procedure

The online survey consisted of basic demographic questions, the FBQ, the SIAS-SPS-12, and the F-SIAS. The survey required 5–10 min to complete. Participants entered the drawing for $50 by providing their email addresses so that the winner could be contacted by email. Email addresses were collected in a separate survey so that they could not be linked to answers to the study. No other compensation was provided.

3. Results

3.1. Correlational analyses

As hypothesized, the SIAS-SPS-12 and the F-SIAS were significantly positively correlated ($r = .64$, $p < .001$). In contrast, the correlation between the SIAS-SPS-12 and the FBQ was not only not statistically significant, but also near zero ($r = .01$, $p = .840$). The hypothesis that social anxiety would negatively correlate with social Facebook use was therefore not supported.

3.2. Predicting social Facebook use

We also planned to test for interactions between these variables that might affect interpretation of the zero-order relationships specified in our two hypotheses. A multiple regression using social anxiety and anxiety on Facebook as the independent variables and social Facebook use as the dependent variable was significant $R^2 = .07$, $F(3,210) = 4.86$, $p = .003$. Both anxiety on Facebook ($\beta = -0.38$, partial $r = -.16$, $p < .001$) and the interaction between anxiety on Facebook and social anxiety ($\beta = 0.18$, partial $r = .14$, $p = .047$) significantly predicted social Facebook use. As shown in Fig. 1, among people with high anxiety on Facebook, people with high social anxiety engaged in social Facebook use more frequently than people with low social anxiety.

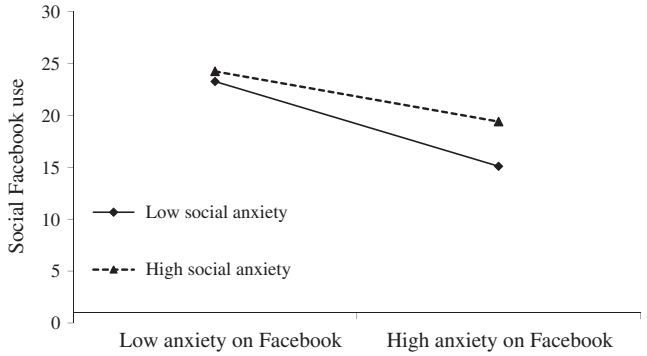

Fig. 1. Predicting social Facebook use. Associations between levels of anxiety on Facebook and amount of social Facebook use for individuals with high and low levels of social anxiety.

Table 3
Identifying a suppression effect in the prediction of social anxiety.

Predictor	Multiple regression			Zero-order correlations	
	Beta	Partial r	p-Value	Pearson's r	p-Value
Anxiety on Facebook	.67	.66	<.001	.64	<.001
Social Facebook use	.13	.17	.016	.01	.840
Anxiety on Facebook × social Facebook use	.10	.13	.053	.03	.635

3.3. Predicting social anxiety

The regression above specifies that social anxiety and anxiety on Facebook are primarily predictors of social Facebook use. However, it could instead be the case that social Facebook use and anxiety on Facebook primarily predict social anxiety. Thus, a second multiple regression used social Facebook use and anxiety on Facebook as predictors of social anxiety. The overall regression result was significant $R^2 = .44$, $F(3,210) = 54.66$, $p < .001$. As shown in Table 3, both anxiety on Facebook and social Facebook use predicted social anxiety. The interaction term was marginally significant. The resulting pattern of zero-order correlations that are smaller than their corresponding partial rs along with the non-significant interaction suggests a suppression effect, which is interpreted in the Discussion section.

4. Discussion

Results clearly supported the hypothesis that social anxiety would be positively correlated with anxiety experienced during social Facebook use, showing a statistically significant moderate correlation between these measures. Based on the hypothesis that people with high social anxiety would experience high anxiety on Facebook, we also hypothesized that social anxiety would be negatively correlated with social Facebook use. Initial results showed no correlation between these two variables. Previous studies report mixed findings on the relationship between social anxiety and simply spending time on Facebook, some finding a positive relationship (Murphy & Tasker, 2011), and others finding no relationship (Fernandez et al., 2012). The current study provides some clarification on these discrepant findings. As discussed below, the relationship between social anxiety and social Facebook for use was significant, but only in the context of moderation by levels of anxiety on Facebook.

Both an interaction and a suppression effect qualified our initial findings. A multiple regression using anxiety on Facebook and social anxiety to predict social Facebook use yielded a significant

interaction. Among people who reported high anxiety on Facebook, those with high social anxiety reported more frequent social Facebook use than those with low social anxiety. This result is consistent with a nuanced reading of the social compensation hypothesis, which specifies that people with high social anxiety are motivated to use Facebook to compensate for discomfort in face-to-face social interactions. Thus, high social anxiety may motivate social Facebook use even when people experience high anxiety during social Facebook use. In contrast, those who experience high anxiety on Facebook and low social anxiety may have lower motivation for social Facebook use. This finding may also help explain the inconsistent findings noted above concerning the relationship between social anxiety and general Facebook use. Just as Fernandez et al. (2012) found no correlation between social anxiety and general Facebook use, we found no correlation between social anxiety and social Facebook use. Whereas Murphy and Tasker (2011) found a positive correlation between social anxiety and Facebook use in general, we found a positive relationship between social anxiety and social Facebook use only among people with high anxiety on Facebook. When sampling from a population in which an interaction is present, random sampling will by necessity sometimes produce a main effect (i.e., when the sample happens to include more people at certain levels of the other variable in the interaction effect). Thus, knowledge of people's experiences of anxiety on Facebook may play a key role in understanding the relationship between social anxiety and social Facebook use.

A second multiple regression using social Facebook use and anxiety on Facebook to predict social anxiety indicated a suppression effect. Both predictors showed a stronger relationship in this regression than would be expected given their zero-order relationships with social anxiety, indicating that social Facebook use only relates to social anxiety when anxiety on Facebook is present. In statistical terms, such an effect indicates that the variables show a stronger predictive relationship when variance unrelated to social anxiety is accounted for (Howell, 2002).

Interpretation of suppression effects seems complicated, but we believe the effects found here can be comprehended when the nature of the predictors is kept in mind. Our results indicate that, on its own, anxiety on Facebook predicts social anxiety, but social Facebook use does not. However, social Facebook use does assist in predicting general social anxiety once anxiety on Facebook is accounted for. Take, for example, an individual who has relatively low anxiety on Facebook, yet relatively high social anxiety in general. This individual's experience is not well-predicted by the relationship between anxiety on Facebook and social anxiety. The suppression effect indicates that this individual's level of social Facebook use may help account for the unexpected level of social anxiety. More specifically, higher social Facebook use might help explain this person's high level of social anxiety in the absence of high levels of anxiety on Facebook. This provides evidence for a variant of the social compensation hypothesis. Zero-order correlation results suggested that people with high social anxiety did not compensate for discomfort in face-to-face interactions with high social Facebook use. However, the suppression effect suggests that when people's social anxiety is higher than expected given their anxiety on Facebook, they are more likely to engage in frequent social Facebook use. Thus, it could be that people compensate with social Facebook use primarily when they fear face-to-face interactions much more than they fear social interactions on Facebook.

This study was limited by a relatively small sample size in which ethnic minorities were underrepresented. Men were very underrepresented in this study, comprising of 14.4% of the total sample, compared to 51.2% in a March, 2011 Facebook demographics report (Burbary, 2011). One strength of the sample was the wide range of ages represented. This distribution of ages closely matches the distribution reported in one Facebook user demographic report from March, 2011 (Burbary, 2011). A further limitation is that 85 potential participants study from the PI's email contact history were contacted about the study. The survey did not collect personal identifiers; it is therefore unknown how many of the PI's acquaintances are included in the study's sample. However, it should be noted that acquaintances with any prior knowledge of the study were not invited to participate. This recruitment method might have contributed to the biased demographics of the sample, including the underrepresentation of men and the overrepresentation of Whites (i.e., because the PI is a white woman). However, it is not completely clear how this would have occurred without also biasing the age range, which includes many participants much older than the PI.

Two new measures were used in this study. Both the FBQ and F-SIAS showed good internal consistency (both $\alpha = .86$). Although these measures showed good psychometric properties so far as they were tested, the present study is limited by its reliance on online self-report measures and new measures without established psychometric qualities.

4.1. Future directions

One key objective for future research will be achieving a greater degree of consistency in measures of Facebook use. Many unique measures of Facebook use exist, making it more difficult to understand findings in the literature as a whole. As previously discussed, these measures should assess use of specific features of Facebook and motivations for Facebook use rather than time spent on the site. However, updates to the Facebook website may render established measures of Facebook use less appropriate for answering current research questions. Researchers should strive to keep these measures up-to-date as the interactive features of Facebook change over time, although this will place limits on consistent use of established measures. Another direction should be to identify patterns of Facebook use that may lead to increased social anxiety (e.g. the pattern of frequent, anxiety-provoking social Facebook use suggested by the current study). On the other hand, future research should also investigate whether social Facebook use benefits people with high social anxiety. Previous research suggests that general Facebook use does not help people with high social anxiety interact with others in person (Baker & Oswald, 2010), but that social Facebook use could help these individuals to feel less anxious interacting with others in person (Selfhout et al., 2009). Finally, the F-SIAS could potentially evaluate whether social Facebook tasks would be appropriate low-level social exposures for individuals with social anxiety. In conclusion, the present study has contributed to this developing body of literature by demonstrating that more specific measures of Facebook use and measures of social anxiety experienced on Facebook help explain the relationship between social anxiety and social Facebook use.

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