Upward social comparisons and posting under the influence: Investigating social media behaviors of U.S. adults with Generalized Anxiety Disorder

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ABSTRACT

Introduction: The use of social media has been steadily increasing among U.S. adults, and while time spent on social media has been linked to certain mental health difficulties, it remains unclear precisely which social media behaviors may be damaging to mental well-being. The current study aimed to identify specific social media behaviors related to Generalized Anxiety

Disorder (GAD). *Methods:* U.S adults (n = 1,314) aged 18 to 82 (*M* = 35.74) who actively use social media were recruited to participate in an online survey assessing specific social media behaviors. The Patient Health Questionnaire was included to assess the presence of GAD. Univariate analyses were conducted to identify specific social media behaviors associated with GAD. A stepwise binary multivariate logistic regression was developed to determine the key social media behaviors most strongly associated with GAD. *Results:* Analyses at the univariate level showed a trend, such that individuals with GAD endorsed behaviors associated with social media addiction and censorship. Other behaviors associated with GAD included a greater likelihood of participants comparing themselves to others who are better off than they are, being bothered if unfriended/unfollowed, and being more likely to post under the influence. The multivariate logistic regression model identified two key social media factors most strongly associated with GAD: participants comparing themselves to others better off ($p < .001$) and posting while drinking alcohol ($p = .044$).*Conclusion:* Upward social comparisons and alcohol use while on social media are significantly associated with GAD in an adult population.

Keywords: Anxiety Disorder; Social Media; Upward Comparisons; Alcohol Use

Introduction

Anxiety disorders represent some of the most prevalent disabilities among all psychiatric disorders (Vannucci, Flannery, & Ohannessian, 2017; Whiteford et al., 2013), with 19.1% of U.S. adults reporting an anxiety disorder in the past year, and 31.1% lifetime prevalence for U.S. adults (Harvard Medical School, 2007). These conditions typically have an onset in young adulthood (Primack et al., 2017; World Health Organization, 2016) and are associated with increased morbidity and mortality (Kessler, Chiu, Demler, Merikangas, & Walters, 2005; Mathers & Loncar, 2006; Primack et al., 2017). While numerous factors may promote anxiety, researchers have recently shifted their focus to social media use as a potential contributor to psychological maladjustment (Lin et al., 2016).

Social media, which includes online websites and applications that allow individuals to connect with others (e.g., Twitter) (Kaplan & Haenlein, 2010; Vannucci et al., 2017), appears to be a fundamental entity in the lives of today's adults regardless of age, gender, race, or socioeconomic status (Pew Research Center, 2019). Estimates suggest that about 70% of adults in the U.S. use some type of social media (Pew Research Center, 2019). The increased engagement in social media use among adults (Pew Research Center, 2019; Primack et al., 2017) and the rapid development of

new telecommunication technology, have revolutionized the way people communicate with one another (Chang & Jianling, 2018). Because of social media's significance in the lives of U.S. adults, and its influence on identity development and social interactions (Moreno & Whitehill, 2014), it is important to understand social media in terms of psychological well-being. While the enhanced identity development and improved social interactions afforded by social media may have a positive effect on psychological well-being (Vannucci et al., 2017), research suggests that there is still potential for negative psychological adjustments to be associated with social media use.

For instance, increased time on social media has been linked to increased anxiety symptoms and decreased psychological well-being (Andreassen et al., 2016; Primack et al., 2017; Vannucci et al., 2017). Additionally, if individuals have less constructive experiences with social media, such as engaging in social comparisons or receiving negative feedback from others, then social media use may increase levels of stress, or reinforce negative self-evaluations (Nesi & Prinstein, 2015; Vannucci et al., 2017). Previous research suggests that receiving negative feedback from others, learning about the stressful events happening in other people's lives, and feeling pressured to maintain updates on social media sites all elicit

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anxiety in social media users (Vannucci et al., 2017). Another study consisting of undergraduates in the U.S. found that approximately 17% of participants reported feelings of anxiety when using Facebook and almost half report delaying friend request responses because of anxiety (Campisi et al., 2012). Taken together, these studies suggest that social media use has the potential to increase anxiety in some users. The present study was designed to identify specific social media behaviors that are related to Anxiety Disorder and anxiety symptoms in U.S. adults.

Methods

Participants and Procedure

The participants in this study included 1,314 U.S adults, who were recruited online via mTurk and were compensated for their time. The demographic breakdown of the sample showed that 48.2% of participants were female and the mean age of the sample was 35.74 years (sd = 11.70; range = 18 to 82). For race, 68.6% of the sample identified as Caucasian, 7.2% identified as African American, 10.3% identified as Asian/Pacific Islander, 3.3% identified as Native American/Alaskan Native, 7.2% identified as South Asian/Middle Eastern, and 3.3% identified as more than one race. For ethnicity, 12.3% of the sample identified as Hispanic.

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Participants completed validated psychosocial questionnaires and responded to questions regarding demographic factors and specific social media behaviors. All participants included in subsequent analyses endorsed the use of either Facebook or Twitter. This study was approved by the participating university's Institutional Review Board (#5165, 02/2019).

Measures

The demographic data included gender identification, age, race, and ethnicity. Social media behaviors were assessed using both validated questionnaires and individual items developed specifically for this study.

General social media behaviors

The Social Media Intensity Scale (Ellison, Steinfield, & Lampe, 2007) was used to assess separately participants' intensities of social media use for Facebook and Twitter. This measure included six questions each assessed on a five-point Likert scale that ranged from *Strongly disagree* to *Strongly agree.* Examples include, "I feel out of touch when I haven't logged onto Facebook for a while" and "Twitter is part of my everyday activity." In the current participant sample, the mean intensity score for Facebook was 19.83 (SD = 6.56), and the mean intensity score for Twitter was 17.40 (SD = 7.18). The Social Media Intensity Scale demonstrated excellent reliability for Facebook (Cronbach's α = 0.90) and Twitter (Cronbach's α = 0.92).

The Need for Participating in Social Media Scale (N. Park, Kee, & Valenzuela, 2009) was used to assess motivations for use of any social media platform. This measure included 16 statements to which participants indicated their level of agreement on a 6-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*. Examples of need for participating in social media include, "I use social media to meet interesting people" and "I use social media because it is entertaining, funny, and exciting." In the current participant sample, the overall scale demonstrated excellent reliability (Cronbach's α = 0.90) and the mean Need for Social Media score was 3.58 (SD = 1.13).

The Bergen Social Media Addiction Scale (Andreassen, Torsheim, Brunborg, & Pallesen, 2012) was used to assess overall social media addiction by assessing the six core features of addiction, including salience, mood, modification, tolerance, withdrawal, conflict, and relapse attributed to social media use in the past year. This measure used a 5-point Likert scale, with responses ranging from *Very rarely* to *Very often*. Participants were asked to respond to statements such as, "How often during the last year have you felt an urge to use social media more and more?" The mean social media addiction score in our sample was 42.95 (SD = 13.62). The overall scale demonstrated excellent reliability (Cronbach's α = 0.90).

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Social comparisons were assessed using two statements, which focused on participants' upward or downward comparisons of themselves to others on social media. Each statement was rated on a 5-point Likert scale with responses ranging from *Not at all* to *A great deal* (Vogel et al., 2014). The statements included were, "When comparing yourself to others on social media, to what extent do you focus on people better off / worse off than you?" In the current sample, participants' mean upward comparisons score was 2.40 (SD = 1.29), and the mean downward comparisons score was 2.09 (SD = 1.19).

The survey item for Social Media vs. Offline Identity Overlap (Shamir & Kark, 2004) consisted of a display of seven rectangles, each containing two circles (one shaded and one white) progressing from no overlap of the two circles in rectangle one to complete overlap of the two circles in rectangle seven. Participants were asked to identify the rectangle that best matched the extent of overlap in their online and offline identities. The smaller the value, the greater the difference between their online and offline identities. The average identity score for our participant sample was 4.75 (SD = 1.74).

Specific social media behaviors

Further, using a focus group, the research team developed additional survey items consisting of statements related to specific social media

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behaviors that were common practices not yet reflected in validated scales. For Facebook and Twitter, items measured the participants' numbers of friends and followers, as well as individuals that the participants followed. In addition, single-item 5-point Likert scales from *Strongly disagree* to *Strongly agree* were used to assess reasons for participants' self-censorship on social media, the degree to which participants were bothered if unfriended/unfollowed by others, and the extent to which participants felt safe online and felt that they were noticed online. Single-item questions were also included to address reasons for posting online. Examples of reasons include, "post to aggravate or annoy," and "to debate to educate others." Lastly, using a 5-point Likert scale, participants were asked to indicate how likely they were to post while drinking alcohol, while drunk, while smoking marijuana, and while high on marijuana.

Anxiety disorder assessment

Finally, Anxiety Disorder was assessed using the Patient Health Questionnaire- Anxiety subscale (PHQ-Anxiety) (Spitzer, Kroenke, & Williams, 1999). The PHQ-anxiety subscale evaluates specific symptoms related to Anxiety including worrying, restlessness, and feeling nervous, anxious, or on edge. The Anxiety subscale uses an algorithm to assess whether or not an individual meets the criteria for GAD and this scale

includes seven items asking the extent to which participants have been bothered by certain problems in the previous two weeks with response options ranging from *Not at all* to *More than half the days*. Examples of problems include, "Not being able to stop or control worrying" and "Being so restless that it's hard to sit still." The PHQ has been widely used in research to determine if an individual meets the criteria for Anxiety Disorder (Kroenke, Spitzer, & Williams, 2010).

Statistical Analysis

All analyses were conducted using SPSS version 24.0 (Armonk, NY: IBM Corp). Univariate comparisons were conducted to assess differences in demographics and social media behaviors between individuals who met criteria for GAD ($n = 69$, 5.28%) and those who did not meet criteria for GAD ($n = 1,237$, 94.72%). For comparisons of categorical variables, chi-square tests of independence were used. For comparisons of continuous variables, independent t-tests were used. Because there was a difference in age between the two comparison groups, all univariate comparisons controlled for age. A Holm-Bonferroni step-down procedure was used to correct for multiple comparisons at the univariate level.

A stepwise binary logistic regression model was developed to determine the key social media behaviors associated with GAD. Listwise

deletion was used to account for missing data in the regression model and only variables significant at the univariate level were included in the model. To determine significance, an alpha level of 0.05 was used for all analyses.

A post-hoc power analysis was conducted based on an independent t-test, with alpha = 0.05 and a small-to-moderate effect size ($d = 0.4$), which exhibited sufficient obtained power ($1-\beta = 0.90$).

Results

All data were screened for missing values and outliers. Univariate comparisons were conducted to assess differences in demographics and social media behaviors between participants that met criteria for GAD and those who did not meet the criteria for GAD. When comparing age, gender, and race/ethnicity, there were no significant differences identified between the two comparison groups (all $p > 0.05$; See Table 1) with the exception of age ($p < .001$). All subsequent univariate analyses were adjusted for differences in age.

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Table 1. Demographic Comparisons between those with and without Anxiety Disorder

	Anxiety Disorder	No Anxiety Disorder	Statistical Significance
Age	30.99 (8.2)	36.03 (11.8)	p < .001
Gender			
Male	55.2%	51.2%	NS
Female	44.8%	48.8%	
Race/Ethnicity			
Caucasian	72.1%	68.3%	NS
African American	2.9%	7.4%	NS
Latino/Hispanic	25.0%	24.3%	NS

General social media behaviors

Table 2 shows results from the group comparisons on the validated social media scales and social media behaviors. When comparing individuals with GAD to individuals without GAD, there were no significant differences for intensity of Facebook use or Twitter use (all $p > .05$). Additionally, there were no significant differences between the two groups on number of followers, hours spent on social media per day, need for social media, or online-offline identity overlap (all $p > .05$).

When evaluating both upward and downward social comparison on social media, individuals with GAD were significantly more likely to compare themselves to people they perceived as being "better than I am" ($p < .001$). In terms of their responses to the Bergen Social Media Addiction Scale, participants with GAD had significantly higher addiction scores than those

without GAD ($p = .018$).

Table 2. Relationship between Anxiety Disorder and General Social Media Behaviors

	Anxiety Disorder	No Anxiety Disorder	Statistical Significance
Social Media Intensity			
Facebook	3.4 (1.2)	3.3 (1.1)	NS
Twitter	2.9 (1.3)	2.9 (1.2)	NS
Number of Friends/Followers			
Facebook	394.6 (599.5)	436.9 (594.8)	NS
Twitter Followers	271.8 (715.5)	256.2 (944.2)	NS
Twitter Following Others	380.2 (753.7)	281.4 (893.3)	NS
Hours per Day			
Facebook	5.8 (6.2)	4.9 (5.9)	NS
Twitter	3.8 (6.3)	2.8 (4.8)	NS
Need for Social Media	3.7 (1.2)	3.6 (1.1)	NS
Comparisons of Others…			
Better than me	3.4 (1.3)	2.4 (1.3)	$p = <.001$
Worse than me	2.4 (1.3)	2.1 (1.2)	NS
SM Addiction	2.7 (1.2)	2.2 (1.0)	$p = .018$
Online-Offline Identity (higher value = greater match)	4.7 (1.6)	4.8 (1.8)	NS

Specific social media behaviors

Table 3 shows specific social media behaviors for participants with and without GAD. There were no significant differences between those with GAD and those without GAD for posting to annoy or aggravate and feeling safe on any type of social media (all $p > .05$). Additionally, individuals with GAD were significantly more likely to feel bothered if they were tagged in a post or picture in general ($p = .030$), or in an unflattering post, specifically ($p = .001$). In terms of reasons for self-censoring on social media, participants with and without GAD did not differ on censoring because of family or friends, prospective employers or schools, or to avoid judgment (all $p > .05$).

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Table 3. Relationship between Anxiety Disorder and Specific Social Media Behaviors

	Anxiety Disorder	No Anxiety Disorder	Statistical Significance
Social Media General			
Post to annoy or aggravate	2.3 (1.4)	2.1 (1.3)	NS
Bothered if tagged in posts or pics	3.1 (1.4)	2.7 (1.3)	p = .030
Bothered if tagged in unflattering pics	3.8 (1.3)	2.8 (1.3)	p = .001
Bothered if tagged in unflattering posts	3.8 (1.3)	3.2 (1.4)	p = .001
Unfollow people because of posts	3.6 (1.3)	3.1 (1.3)	p = .005
Feel safe on social media	3.1 (1.3)	3.2 (1.1)	NS
Bothered if unfriended (Facebook)	2.89 (1.5)	2.57 (1.3)	NS
Censor self because of…			
Friends/Family	3.42 (1.4)	3.19 (1.4)	NS
Employer/School	3.48 (1.4)	3.20 (1.4)	NS
Avoid Judgment	3.20 (1.4)	2.86 (1.3)	NS

Table 4 shows participants' endorsements of posting while under the influence of alcohol or drugs. When compared to those without GAD, participants with GAD were more likely to report that they had a history of posting while drinking alcohol (p = .001), while drunk (p = .004), while smoking marijuana (p = .007), and while high on marijuana (p = .029).

Table 4. Relationship between Anxiety Disorder and Posting Under the Influence

	Anxiety Disorder	No Anxiety Disorder	Statistical Significance
Posting Under the Influence	1.65 (1.3)	1.03 (1.2)	p = .001
Drinking Alcohol	1.16 (1.5)	0.63 (1.1)	p = .007
Smoking Marijuana	1.16 (1.3)	0.69 (1.2)	p = .029
While High	1.43 (1.3)	0.87 (1.2)	p = .004
While Drunk			

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Multivariate analysis

A multivariate binary logistic regression model was developed to determine which of the key social media behaviors were most strongly associated with GAD. The overall model was significant, ($X_2(3) = 49.917$, $p < .001$), with the Nagelkerke R-Square = .113. As outlined in Table 5, individuals who compared themselves on social media to those they deemed "better off" were significantly more likely to meet criteria for GAD ($p < .001$). Additionally, those who posted while drinking alcohol were significantly more likely to meet the criteria for GAD ($p = .044$).

Table 5. Stepwise Multivariate Regression determining key social media factors related to Anxiety Disorder, based on significant univariate comparisons

	Beta	SE	Wald X$_2$	p-value	Odds Ratio	95% CI Lower	95% CI Upper
Comparisons to others Better Off	.485	.113	18.300	.000	1.625	1.301	2.029
Bothered if Tagged in Unflattering Posts	.236	.121	3.789	.052	1.266	.998	1.605
Post While Drinking Alcohol	.225	.112	4.058	.044	1.252	1.006	1.559
Constant	-5.406	.548	97.184	.000			

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Discussion

The current study evaluated potential associations between social media behaviors and GAD in U.S. adults. Findings suggested that two specific social media behaviors may be distinguishable between individuals who meet criteria for GAD and those who do not: comparing oneself to other perceived as "better off," and posting on social media while drinking alcohol.

Previous research has suggested that comparing oneself to others on social media may negatively impact one's psychological well-being (Liu et al., 2017; Robinson et al., 2019). The results of the current study support this finding. Participants with GAD showed higher levels of upward social comparison, meaning that they were more likely to compare themselves to others on social media which they perceived to be "better off" than themselves. However, it is important to note that participants' perceptions of (and their distresses resulting from) these upward comparison may be linked to others' distortions of their own online personas by posting only the good or positive aspects of their day-to-day lives (Kross et al., 2013). Thus, not only are individuals comparing themselves to those whom they perceive as better off, but they are also comparing themselves to the exaggerated online personas of those who may artificially appear to be better off (S. Y. Park & Baek, 2018).

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A notable finding of this study is the positive relationship between posting while drinking alcohol and meeting criteria for GAD. Interestingly, the same relationship was not seen for marijuana use. Previous research has indicated that the comorbidity of anxiety disorders and substance use disorders is common (Turner, Mota, Bolton, & Sareen, 2018). Researchers have explained this relationship with the "self-medication hypothesis," which posits that individuals with an anxiety disorder may tend to use substances in order to cope with their symptoms (Sarvet et al., 2018). However, due to their pharmacological differences, not all substances have an equal impact on anxiety. Among other actions, alcohol decreases anxiety through facilitation of γ-aminobutyric acid-ergic (GABA-ergic) neurotransmission in the central amygdala (Gilpin, Herman, & Roberto, 2015; Roberto, Gilpin, & Siggins, 2012). Thus, it is possible that alcohol (to a greater extent than marijuana) may have differentially decreased anxiety among GAD-positive (versus GAD-negative) participants, leading to a decrease in inhibition that facilitated participants' posting on social media. It is also possible that the widespread legality of alcohol, versus marijuana, may have also contributed to its more significant associations in the current study.

Although the present study had a number of strengths including a large representative sample of U.S. adults, it is not without limitation. First, our

study relied exclusively on self-report data. Although the PHQ is a psychometrically valid way to assess for the presence of GAD, the results of the self-reports may not translate into a clinical diagnosis of GAD. Future research should consider either using a clinical interview or include several validated measures for anxiety to increase reliability. In addition, some studies have found that mTurk users may have some fundamental differences from the general population. For example, Goodman, Cryder, and Cheema (2013) found that mTurk workers are more educated, less religious, and more likely to be unemployed than the general population. Future research should replicate these results using other community samples.

Conclusions

The overall findings of this study highlight specific social media behaviors in U.S. adults that are associated with meeting criteria for GAD. These two specific behaviors included upward social comparison and posting while drinking alcohol. Previous research suggests increasing social interaction, whether face-to-face or online, may buffer psychological distress symptoms (Robinson et al., 2019). However, social media use may also increase anxiety for some people (Andreassen et al., 2016; Primack et al., 2016; Vannucci et al., 2017). Thus, it is important for individuals to

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understand and become aware of the negative social media behaviors that might provoke anxiety symptoms, and to also identify more positive ways of engaging on social media which may alleviate symptoms.

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