

ORIGINAL ARTICLE

Social comparisons, social media addiction, and social interaction: An examination of specific social media behaviors related to major depressive disorder in a millennial population

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Abstract

Although studies have shown that increases in the frequency of social media use may be associated with increases in depressive symptoms of individuals with depression, the current study aimed to identify specific social media behaviors related to major depressive disorder (MDD). Millennials ($N = 504$) who actively use Facebook, Twitter, Instagram, and/or Snapchat participated in an online survey assessing major depression and specific social media behaviors. Univariate and multivariate analyses were conducted to identify specific social media behaviors associated with the presence of MDD. The results identified five key social media factors associated with MDD. Individuals who were more likely to compare themselves to others better off than they were ($p = 0.005$), those who indicated that they would be more bothered by being tagged in unflattering pictures ($p = 0.011$), and those less likely to post pictures of themselves along with other people ($p = 0.015$) were more likely to meet the criteria for MDD. Participants following 300 + Twitter accounts were less likely to have MDD ($p = 0.041$), and those with higher scores on the Social Media Addiction scale were

significantly more likely to meet the criteria for MDD ($p = 0.031$). Participating in negative social media behaviors is associated with a higher likelihood of having MDD. Research and clinical implications are considered.

KEYWORDS

major depressive disorder, social comparison, social interaction, social media, social media addiction

1 | INTRODUCTION

Depression is a mood disorder that can cause severe symptoms, which affect how individuals feel and think, and often presents around young adulthood (Hankin et al., 1998). Depression has been linked to an increased chance of morbidity and mortality, and has been associated with poor health outcomes (Kessler et al., 2010; Primack et al., 2017). While there are many known factors that contribute to depression, researchers have become increasingly interested in the influence that social media use may have on psychological adjustment (Lin et al., 2016). Young adults are using social media at an increasing rate (Primack et al., 2017), and it can be speculated that this increase is due to a surge in accessibility of social media platforms and an increase in the number of social media platforms available for use.

Social media refers to various Internet or online applications through which individuals are able to share information (e.g., blogs, articles, pictures, and memes) and easily network with others. Scholars have offered multiple definitions of “social media,” but most conceptualizations explain social media as “a way for individuals to maintain current relationships, to create new connections, to create and share their own content, and, in some degree, to make their own social networks observable to others” (Treem, Dailey, Pierce, & Biffel, 2016). Despite these varying definitions of social media, individuals use social media primarily for entertainment, social interaction, to seek information, and to pass time (Whiting & Williams, 2013). In addition, few studies have assessed specific behaviors associated with particular social media platforms. Piwek and Joinson (2016) found that Snapchat users primarily share selfies and typically embed text and or drawings with photos they share. The authors also found that Snapchat was primarily used to communicate with a single person rather than a group of people. Furthermore, roughly 90% of young adults in the U.S. use social media, and the majority of these users visit these sites at least once a day (Pew Research Center, 2015). Platforms such as Snapchat, Twitter, Instagram, and Facebook provide opportunities to participate in positive social interactions among family, friends, and other sources of social support, which can alleviate depressive symptoms (Bessière, Pressman, Kiesler, & Kraut, 2010). Additionally, these platforms may help people form connections with other individuals suffering from stigmatized health conditions such as depression (Merolli, Gray, & Martin-Sanchez, 2014).

Despite what appears to be evidence for a positive association between social media and reduced depression, other studies have found that social media use can have detrimental effects on individuals with depression. Studies have shown that frequent use of social media may be associated with declines in subjective well-being and life satisfaction, and an increase in depressive symptoms (Kross et al., 2013; Lin et al., 2016). Additionally, studies have been conducted to examine the specific social media behaviors that may be associated with depression. Radovic, Gmelin, Stein, and Miller (2017) conducted a qualitative study on social media usage in 23 adolescents diagnosed with depression. The authors found that depressed adolescents' social media use included negative behaviors such as comparing themselves to others, sharing risky behavior,

and posting negative content or using social media in other negative ways in order to cope. Positive behaviors such as searching for positive content (i.e., for entertainment, humor) or for social connection were also identified. Additionally, a study conducted by Reece and Danforth (2017) attempted to identify markers of depression through Instagram. The authors found that depressed individuals posted photos that were bluer, darker, and grayer, and they were also less likely to apply filters to their photos. In an assessment of language use, it was found that individuals with increased symptoms of depression use more first person singular pronouns (e.g., me, myself, I) and fewer second and third person pronouns (e.g., they, them) (Al-Mosaiwi & Johnstone, 2018). The authors speculated that this pattern of pronoun use suggests that people with depression are primarily focused on themselves and have fewer connections with others (Al-Mosaiwi & Johnstone, 2018).

Taken together, the aforementioned studies suggest that individuals with depression may behave differently on social media than individuals without depression. The current study aimed to systematically identify which specific social media behaviors may be related to major depressive disorder (MDD) in young adults. This study extended previous research by including quantitative measures of social media habits across four platforms (i.e., Facebook, Twitter, Instagram, and Snapchat) and by focusing on a large, diverse group of college students categorized as “Millennials” (birth years 1980–2000), a population that was raised in a more digital age than other generations (Smith & Nichols, 2015). This distinction between “Millennials” and other generations (e.g., baby-boomers) is particularly important in that specific generations may not use social media the same way. Furthermore, it has been found that as a generation matures it develops characteristics that differentiate it from other generations (Smola & Sutton, 2002). The present study compares social media behaviors of individuals characterized as “Millennials” who meet criteria for MDD and “Millennials” without MDD. When comparing social media behaviors of individuals with and without MDD, it is hypothesized that individuals with MDD will have higher levels of social media addiction, will make more social comparisons, and will have fewer social interactions on social media than individuals without MDD.

2 | METHODS

2.1 | Participants

The participants in this study included 504 undergraduate students recruited from general Psychology and Mass Communication courses at a large, public university. Participants were at least 18 years old and indicated use of at least one of the following social media platforms: Facebook, Twitter, Instagram, or Snapchat. The participants who completed the survey were compensated in the form of course credit or extra credit. This study was approved by the participating university's Institutional Review Board.

The demographic breakdown of the sample showed that 82.1% were female and the mean age was 20.4 years ($SD = 3.7$). The ages of all of the participants in this study ranged between 18 and 38, which classifies this sample as from the Millennial generation. For race/ethnicity, 56.5% of the sample reported being Caucasian, 10.9% reported being African American, and 29.0% reported being Latino/Hispanic.

2.2 | Procedure

The participants were invited to complete an anonymous online survey. After reading the consent form, the participants provided consent and verified that their age was 18 or greater. For the survey, the participants were asked to provide responses to a series of questions regarding demographic and social media behaviors. Additionally, participants were asked to respond to items on several validated psychosocial questionnaires. The participants were able to skip any questions they were uncomfortable answering.

2.3 | Measures

The participants were asked to respond to questions regarding their gender identification, age, and race/ethnicity. Social media behaviors were assessed using both validated questionnaires and specific items that were created for this study.

The Social Media Intensity scale (N.B. Ellison, Steinfield, & Lampe, 2007) was used to assess the intensity of social media use for each of the four platforms (Facebook, Twitter, Instagram, and Snapchat) separately. This measure includes six questions each assessed on a 5-point Likert scale that ranged from *Strongly disagree* to *Strongly agree*. Examples include, "Twitter is part of my everyday activity" and "I am proud to tell people I'm on Snapchat." The psychometrics for each of the four platforms are: Facebook (mean = 2.49, $SD = 0.31$) obtained an alpha reliability of 0.88, Snapchat (mean = 3.76, $SD = 0.35$) obtained an alpha reliability of 0.91, Instagram (mean = 3.38, $SD = 0.25$) obtained an alpha reliability of 0.92, and Twitter (mean = 3.44, $SD = 0.21$) obtained an alpha reliability of 0.94.

The Need for Participating in Social Media scale (Park, Kee, & Valenzuela, 2009) was used to assess motivations for use of any social media platform. This measure includes 16 statements to which the participant indicated their level of agreement on a 6-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree*. An example of a statement for this measure is, "I use social media to get peer support from others." The overall scale obtained an alpha reliability of 0.85, with a mean = 3.69, $SD = 0.93$.

The Bergen Social Media Addiction scale (Andreassen, Torsheim, Brunborg, & Pallesen, 2012) was used to assess overall social media addiction by evaluating the frequency with which participants reported negative life situations in the past year attributed to social media use. This measure uses a 5-point Likert scale, with responses ranging from *Very rarely* to *Very often*, and asks participants to respond to statements such as, "How often during the last year have you become restless or troubled if you have been prohibited from using social media?" The overall scale obtained an alpha reliability of 0.85, with a mean = 2.63, $SD = 0.45$.

Social comparisons, focusing on upward and downward comparisons, were assessed using two statements, each assessed on a 5-point Likert scale with responses ranging from *Not at all* to *A great deal*. (Vogel, Rose, Okdie, Eckles, & Franz, 2015). 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?" The participants' upward comparisons responses had a mean of 2.81 ($SD = 1.23$) and the responses for the participants' downward comparisons had a mean of 2.18 ($SD = 1.06$).

Social Media versus Offline Identity Overlap (adapted from Shamir & Kark, 2010) presents a display of seven rectangles each containing two circles (one shaded and one white) progressing from no overlap of the two circles in rectangle 1 to complete overlap of the two circles in rectangle 7. The participants are asked to identify the rectangle that best matches the extent of overlap in their online and offline identities. The smaller the value, the greater the difference between their online and offline identities.

Other questions related to social media behaviors were developed specifically for this study. The research team worked with a focus group of college students to identify key behaviors observed on various social media platforms and to determine the different types of questions that would be appropriate to include in the study. These questions assessed the number of friends/followers/following on the specified social media platforms and the reasons for using social media. Participants were asked to indicate the level of agreement on a 5-point Likert scale (*Strongly disagree* to *Strongly agree*) on various statements regarding censoring themselves on social media, being bothered if unfriended/unfollowed, feeling safe and noticed, and participating in online debates. Additionally, the participants were asked to specify a percentage (0%-100%), using a sliding scale, to indicate the proportion of their pictures posted for which they use filters and include other people, and the proportion of the groups they follow that match their personal beliefs. Lastly, the participants were asked to indicate how likely they were, using a 5-point Likert scale, to "like," react, or comment on others' posts and how likely they were to post while under the influence of alcohol or marijuana.

Finally, MDD was assessed using the Patient Health Questionnaire (PHQ-9), which has been validated against the PRIME-MD (Spitzer, Kroenke, & Williams, 1999). The PHQ-9 is used to evaluate specific symptoms related to

depression, including depressed mood, anhedonia (inability to feel pleasure), sleep problems, excessive tiredness, appetite and weight changes, feelings of worthlessness, concentration problems, excessive worry, and suicidal thoughts. The MDD subscale includes nine items asking the extent to which the participant has been bothered by certain problems in the last two weeks, ranging from *Not at All* to *Nearly Every Day*. Examples of the problems include, "Little interest or pleasure in doing things" and "Feeling down, depressed, or hopeless." Using the scoring protocol, this assessment can determine if an individual meets the criteria for MDD (Kroenke, Spitzer, Williams, & Löwe, 2010).

2.4 | Statistical analysis

Univariate comparisons were conducted to assess differences in demographics and social media behaviors between individuals who met the criteria for MDD ($n = 82$, 16.3%) and those who did not meet the criteria for MDD ($n = 422$, 83.7%). For comparisons of categorical variables, chi-square tests of independence were used. For comparisons of continuous variables, independent t -tests were used. A Cohen's d effect size measure is stated for comparisons of continuous variables. A binary logistic regression model was developed to determine the key social media behaviors associated with MDD. Listwise deletion was used to account for missing data in the regression model. Only variables significant at the univariate level were included in the model. To determine significance, two-tailed tests with an alpha level = 0.05 was used. A Holm–Bonferroni step-down procedure was used to correct for multiple comparisons at the univariate level. 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 ($1-\beta = 0.91$). All analyses were conducted using SPSS version 24.0 (IBM Corp, Armonk, NY).

3 | RESULTS

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

3.1 | General social media behaviors

Table 2 shows the data for the comparisons of the validated social media scales and general social media behaviors. When comparing individuals with and without MDD on their levels of Social Media Intensity, there were no significant differences found comparing the participants on Facebook, Instagram, Snapchat, or Twitter. Overall,

TABLE 1 Demographic comparisons

	MDD N = 82	No MDD N = 422	Statistical significance
Age	20.4 (2.7)	20.4 (3.8)	NS
Gender, %			
Male	11.4	18.3	NS
Female	88.6	81.7	
Race/Ethnicity			
Caucasian	63.3	57.7	NS
African American	7.6	12.0	
Latino/Hispanic	29.1	30.2	

TABLE 2 Relationship between MDD groups and general social media measures

	MDD	No MDD	Statistical significance
Social media intensity			
Facebook	14.1 (6.2)	15.1 (6.1)	NS
Instagram	18.8 (7.0)	20.6 (6.7)	NS
Snapchat	22.6 (7.2)	22.6 (6.1)	NS
Twitter	20.5 (8.8)	20.7 (7.8)	NS
Number of Friends/Followers (categorical)			
Facebook	Same	Same	NS
Instagram followers	Less	More	$p = 0.012$
Instagram following others	Less	More	$p = 0.053$
Snapchat	Same	Same	NS
Twitter followers	Same	Same	NS
Twitter following others	Less	More	$p = 0.023$
Percent know offline	71.6 (22.3)	73.1 (21.0)	NS
Reasons for social media today			
Write Post	46.3%	37.4%	NS
Find Events	34.1%	25.8%	NS
Share own pics/videos	65.9%	64.2%	NS
Share Memes/Gifs	50.0%	38.2%	$p = 0.045$
Someone contacted me	76.8%	63.3%	$p = 0.018$
Read Posts	79.3%	78.2%	NS
See others' pics/videos	78.0%	78.2%	NS
News	56.1%	51.4%	NS
Message Others	64.6%	63.3%	NS
Community Group Pages	14.6%	18.5%	NS
Profile Surfing	53.7%	45.7%	NS
Boredom	90.2%	84.8%	NS
Need for Social Media Scale	44.9 (12.0)	44.1 (10.8)	NS
Social comparisons of others			
Better than me	3.52 (1.3)	2.67 (1.2)	$p < 0.001$; $d = 0.68$
Worse than me	2.54 (1.2)	2.11 (1.0)	$p = 0.003$; $d = 0.39$
Bergen Social Media Addiction Scale	18.5 (6.3)	15.3 (5.2)	$p < 0.001$; $d = 0.55$
Online-Offline Identity (higher value = greater match)	4.93 (1.4)	5.40 (1.3)	$p = 0.004$; $d = 0.35$

this sample displayed the highest rates of Social Media Intensity using Snapchat, and lowest rates of Social Media Intensity on Facebook. When comparing the number of friends/followers/following on each the platforms, individuals with MDD had significantly fewer followers on Instagram ($p = 0.012$) and were following fewer accounts on Twitter ($p = 0.023$). The comparison for the number of accounts being followed on Instagram showed marginal significance with the trend indicating that individuals with MDD followed fewer accounts on Instagram ($p = 0.053$).

In the comparisons regarding participants' reasons for using social media on that particular day, there was a significant difference between the MDD and No MDD groups, such that a greater proportion of those with MDD

indicated they used social media to share memes/gifs ($p = 0.045$) and because someone contacted them via social media ($p = 0.018$). When comparing the results of the Need for Social Media scale, no differences were found between those with and without MDD ($p > 0.05$).

When evaluating social comparisons on social media, including both upward and downward directions of comparisons, individuals with MDD were significantly more likely to focus both on others they deemed “better than me” ($p < 0.001$), and on others they deemed “worse than me” ($p = 0.003$). The comparisons of social media addiction, using the Bergen Social Media Addiction Scale, showed that those with MDD had significantly higher addiction scores than those without MDD ($p < 0.001$). For the Online-Offline Identity comparison, the MDD group had a significantly lower mean score, indicating that there was a greater difference between their online and offline identities as compared to individuals without MDD ($p = 0.004$).

3.2 | Specific social media behaviors

Table 3 depicts comparisons between individuals with and without MDD on specific social media motivations and behaviors. Based on general social media behaviors, there were no significant differences between those with and without MDD for feeling safe on social media, hoping to “go viral” on social media, and likelihood of blocking others (all $ps > 0.05$). However, individuals with MDD were significantly more likely to be bothered if tagged in an unflattering picture ($p < 0.001$). There were no differences between the two groups for being bothered if unfriended or unfollowed on any of the social media platforms (all $ps > 0.05$).

When asked about censoring themselves on social media, there were no differences between those with and without MDD regarding censoring because of friends and family or prospective employers or schools accessing their online posts. There was, however, a significant difference on censoring to avoid judgment. Individuals with MDD were significantly more likely to censor themselves on social media to avoid judgment as compared to individuals without MDD ($p = 0.011$).

Specific questions were asked about posting directly to individuals or to the “Story” on Snapchat. There were no significant differences between those with and without MDD regarding posting unflattering pictures to either their Snapchat Story or directly to individuals ($p > 0.05$). There was a significant difference regarding “feeling noticed” when their story is viewed, such that those with MDD were significantly more likely to “feel noticed” when their Snapchat Story was viewed as compared to those without MDD ($p = 0.003$).

When asked about the types of pictures posted on social media, there was no significant difference between those with and without MDD on the percentage of pictures posted depicting only themselves and on the percentage of pictures posted using filters ($ps > 0.05$). Compared to individuals with MDD, those without MDD were significantly more likely to report posting pictures of themselves with other people ($p = 0.008$).

Table 4 depicts the results for actions and behaviors on social media. The participants were asked the degree to which they debated topics online, ranging from friendly debates to trolling. There were no significant differences between those with and without MDD for any of the questions regarding debating online (all $ps > 0.05$). When asked about responding to other posts, individuals with MDD were significantly more likely to comment on positive posts ($p = 0.039$), and marginally more likely to “like” or react to others’ posts ($p = 0.079$). There were no differences between those with and without MDD regarding commenting on sad posts or commenting on posts with which they disagree ($ps > 0.05$).

When asked about the social media groups that the participants join or follow online, there were no differences between individuals with and without MDD in the proportions of groups they follow that match their personal beliefs, nor in the likelihood of commenting on posts in groups, regardless if the group matches or does not match their personal beliefs (all $ps > 0.05$). When asked about the frequency for which the participants post on social media while under the influence of alcohol, there were no differences between those with and without MDD. However, individuals with MDD reported significantly greater frequency of posting while smoking marijuana ($p = 0.023$) and reported marginally higher likelihood of posting while high ($p = 0.063$).

TABLE 3 Relationship between MDD groups and specific social media behaviors

	MDD	No MDD	Statistical significance
Social media general			
Feel safe	3.01 (1.1)	3.17 (1.0)	NS
Hope to go viral	2.18 (1.3)	2.00 (1.1)	NS
Bothered if tagged in unflattering pic	3.82 (1.3)	3.09 (1.4)	$p < 0.001$; $d = 0.54$
Likely to block others	4.27 (0.9)	4.17 (0.9)	NS
Bothered if unfriended/unfollowed			
Facebook	1.77 (1.2)	1.75 (1.1)	NS
Instagram	2.47 (1.5)	2.60 (1.4)	NS
Snapchat	2.65 (1.5)	2.46 (1.3)	NS
Twitter	2.50 (1.6)	2.24 (1.3)	NS
Censor self because of...			
Friends/Family	3.79 (1.3)	3.73 (1.2)	NS
Employer/School	4.09 (1.1)	4.14 (1.0)	NS
Avoid judgment	3.29 (1.3)	2.9 (1.2)	$p = 0.011$; $d = 0.31$
Snapchat posts			
Feel noticed when story viewed	3.81 (1.3)	3.34 (1.3)	$p = 0.003$; $d = 0.36$
Post unflattering pics To story	2.47 (1.4)	2.30 (1.3)	NS
Send unflattering pics to individuals	3.96 (1.4)	3.92 (1.3)	NS
Post to story more than individuals	2.69 (1.5)	2.61 (1.5)	NS
Social media pictures posted			
% Pics of only me	42.2 (25.9)	38.7 (27.0)	NS
% Pics of me and others	50.8 (26.8)	59.5 (26.8)	$p = 0.008$; $d = 0.32$
% Pics use filters	53.4 (37.5)	49.4 (35.2)	NS

3.3 | Multivariate analysis

The prior univariate analyses compared individuals with and without MDD on various social media behaviors to determine whether those behaviors differed between the two comparison groups. A multivariate binary logistic regression model was developed to determine the key social media behaviors most associated with individuals who meet the criteria for MDD. As seen in Table 5, individuals following more than 300+ accounts on Twitter were 2.3 times less likely to meet the criteria for MDD ($p = 0.041$). Those with higher likelihood of making upward social comparisons ($p = 0.005$) and those with higher social media addiction scores ($p = 0.031$) were significantly more likely to meet the criteria for MDD. With respect to specific social media behaviors, those who were more bothered by being tagged in unflattering pictures were significantly more likely to meet the criteria for MDD ($p = 0.011$) and those who post more pictures of themselves with others were less likely to meet the criteria for MDD ($p = 0.015$). The correlation matrix for all of the variables considered for the regression model is shown in Table 6.

4 | DISCUSSION

The current study used a systematic approach to evaluate both general and specific social media behaviors associated with the presence of major depressive disorder (MDD) in a population of young adults. The findings from

TABLE 4 Relationship between MDD groups and specific social media behaviors (continued)

	MDD	No MDD	Statistical significance
Social media online debates			
Friendly debates	2.23 (1.5)	2.04 (1.4)	NS
Debate to educate others	2.28 (1.4)	2.08 (1.4)	NS
Debate to change minds	1.40 (1.3)	1.41 (1.2)	NS
Debate to irritate/upset others	0.51 (0.8)	0.62 (1.0)	NS
Debate with intent to troll	0.53 (1.0)	0.56 (1.1)	NS
Social media activity—likelihood to...			
Like/React others' posts	2.85 (0.9)	2.65 (0.9)	$p = 0.079$
Comment on positive posts	2.78 (0.9)	2.55 (0.9)	$p = 0.039$; $d = 0.26$
Comment on sad posts	1.70 (1.0)	1.60 (0.9)	NS
Comment on posts you disagree with	0.98 (1.0)	0.88 (0.9)	NS
Groups joined/followed			
Percent match personal beliefs	59.8 (29.1)	57.9 (27.1)	NS
Likely to comment on match groups	36.5 (31.1)	32.9 (27.7)	NS
Percent do not match personal beliefs	27.5 (25.2)	25.2 (20.7)	NS
Likely to comment on non-match groups	17.2 (23.4)	16.3 (21.5)	NS
Posting under influence			
Frequency posting while drinking	1.26 (1.3)	1.18 (1.2)	NS
Frequency posting while drunk	1.09 (1.2)	1.13 (1.3)	NS
Frequency posting while smoking pot	0.83 (1.3)	0.49 (1.0)	$p = 0.023$; $d = 0.29$
Frequency posting while high	0.94 (1.4)	0.64 (1.1)	$p = 0.063$

this study highlight three main types of social media behaviors that are distinguishable between individuals who meet criteria for MDD and those who do not: social comparisons, social media addiction, and social interactions. These results suggest that negative social media behaviors such as increased social comparisons and addiction on social media are more associated with individuals who meet the criteria for MDD, whereas, positive social media behaviors, such as social interaction with others, are more associated with individuals without MDD. Not only do these findings support our hypotheses and are in line with previous research but our results also extend previous studies and provide greater detail regarding specific social media behaviors associated with MDD.

Previous research indicates that social comparison on social media negatively impacts one's mental well-being (Liu et al., 2017), and this is supported by the current study, which revealed a significant difference in both upward and downward social comparisons on social media between those who met criteria for MDD and those without. Participants with MDD showed higher scores toward both upward and downward social comparisons, and the upward comparisons indicated a greater effect. This finding supports the existing literature on social comparison on social media and depressive symptoms. Feinstein et al. (2013) found that social comparisons on social media and rumination were associated with an increase in depressive symptoms. The authors suggest that if an individual ruminates on their perceived inferiority following a downward comparison, the individual is actively engaging in regulatory strategy that maintains and provokes stress (Feinstein et al., 2013). Other authors have suggested that the amount of time spent on social media is related to the likelihood of making social comparisons, which is associated with an increase in depressive symptoms (Steers, Wickham, & Acitelli, 2014).

Moreover, many individuals who post on social media users tend to portray themselves as overly positive by posting mainly positive aspects of their lives (Kross et al., 2013), so comparing oneself to an exaggerated

TABLE 5 Multivariate regression determining key social media factors related to MDD, based on significant univariate comparisons

	Beta	SE	Wald χ^2	p-value	Odds ratio	95% CI lower	95% CI upper
Instagram followers							
None (reference)			0.386	0.825			
Less than 300	0.073	0.625	0.014	0.907	1.076	0.316	3.666
300+	-0.131	0.607	0.046	0.830	0.877	0.267	2.884
Following others on Twitter							
None (reference)			8.687	0.013			
Less than 300	0.130	0.360	0.129	0.719	1.138	0.562	2.307
300+	-0.851	0.416	4.184	0.041	0.427	0.189	0.965
Compare myself to...							
Others better than me	0.369	0.133	7.753	0.005	1.446	1.115	1.875
Others worse than me	0.044	0.134	0.109	0.741	1.045	0.804	1.358
Social media addiction (BSMAS)	0.067	0.031	4.639	0.031	1.069	1.006	1.136
Social media behaviors:							
Bothered if tagged in unflattering picture	0.295	0.116	6.495	0.011	1.343	1.070	1.685
Censor self to avoid judgment	0.023	0.116	0.038	0.845	1.023	0.815	1.285
Feel noticed when story viewed on Snapchat	0.001	0.132	0.000	0.996	1.001	0.773	1.296
Likely to comment on positive posts	0.278	0.167	2.764	0.096	1.321	0.951	1.834
Post pictures of myself with others	-0.013	0.005	5.946	0.015	0.987	0.977	0.997
Constant	-4.881	0.898	29.541	0.000			

online persona of a person deemed better off may result in depressive symptoms or envy (Park & Baek, 2018). Interestingly, comparing oneself to a person deemed worse off may also produce negative emotions like worry or sympathy (Park & Baek, 2018). Relatedly, being bothered by being tagged in a unflattering picture is also associated with a higher likelihood of meeting the criteria for MDD. Therefore, the fear of being perceived as worse off may also contribute to negative emotions.

Furthermore, we found that higher levels of social interaction such as following 300+ people on twitter and posting pictures with others is associated with a reduced likelihood of having MDD. Previous studies have found that intentionally sharing one's emotions with others helps decrease depressive symptoms in times of high stress (Zhang, 2017). Additionally, studies have shown that individuals who use Facebook as a means to enable perceived social support and connection also reported lower depressive symptoms (Grieve, Indian, Witteveen, Tolan, & Marrington, 2013; Mota Pereira, 2014; Wright et al., 2013). Individuals with MDD may follow fewer people in an effort to limit their potential online exposure. Therefore, it can be speculated that promoting more positive social interaction through social media may help alleviate some of the symptoms associated with depression.

In addition, our results are consistent with previous research on social media addiction suggesting a negative spiral in which individuals with a greater number of depressive symptoms may turn to multiple social media platforms for support (Primack et al., 2017), which may result in an increased need to use social media. In addition, it has been found that those with low self-esteem and a high level of depressive symptoms spend the most time on

TABLE 6 Pearson correlation matrix for predictors of MDD

	A	B	C	D	E	F	G	H	I	J
A. Instagram followers 300+	1.000									
B. Following others on Twitter 300+	-0.240	1.000								
C. Compare to others better than me	-0.048	-0.034	1.000							
D. Compare to others worse than me	-0.049	-0.061	-0.232	1.000						
E. Social media addiction	-0.057	-0.134	-0.192	-0.092	1.000					
F. Bothered if tagged in unflattering picture	0.058	-0.014	-0.157	-0.042	-0.055	1.000				
G. Censor self to avoid judgment	0.006	0.094	-0.078	-0.055	-0.205	-0.020	1.000			
H. Feel noticed when story viewed on Snapchat	-0.015	0.039	-0.146	-0.112	-0.285	-0.043	-0.104	1.000		
I. Likely to comment on positive posts	-0.078	-0.059	0.043	0.099	-0.125	0.027	0.014	-0.122	1.000	
J. Post pictures of myself with others	-0.124	-0.012	0.000	-0.006	-0.009	0.040	-0.099	0.014	-0.107	1.000

the Internet and social media in comparison to individuals with higher self-esteem and low levels of depressive symptoms (Bányai et al., 2017). One explanation of this phenomenon may be that individuals with MDD use social media as a crutch to shield themselves from the anxiety of face-to-face interactions. On the contrary, Allen, Ryan, Gray, McInerney, & Waters (2014) suggested that an “obsessive” social media focus is merely a new manifestation of normal social contact. Thus, increased social media use may be an adaptive response for individuals who perceive their social support as low and are prone to being emotionally reactive (Babkirk, Dennis-Tiway, & Luehring-Jones, 2015), which are characteristics of individuals with MDD. Further research is needed to determine if social media addiction manifests differently in those with and without MDD.

Social science is at a very early stage in what will eventually become the history of social media research. The current study provides important insight into how individuals with MDD use social media in comparison to those who do not. Although our findings contribute to a better understanding of the complex relationship between social media and mental health, it should be noted that our study relied exclusively on self-report data and the sample had a large proportion of female participants. While the PHQ has been validated against the structured clinical interview to assess the presence of MDD (Spitzer et al, 1999), the results of the self-reports may or may not translate into a diagnosis of MDD as made by a clinician. Further, the current study focused exclusively on Millennial college students. Future research should seek to include a clinical diagnosis of MDD and also include more male participants and participants of varying age groups, who may use social media in different ways. Furthermore, future research should investigate substances other than alcohol and marijuana that might influence certain behaviors on social media.

The overall findings of this study highlight key social media behaviors associated with young adults who meet the criteria for MDD. A number of negative social media behaviors were related to MDD, such as making social comparisons and increased social media addiction. However, benefits of social media use for individuals with MDD were also identified. Increasing social interaction, whether face-to-face or through social media, may buffer feelings of loneliness and isolation often associated with depression. Rather than recommending that individuals limit their use of social media, it is suggested that individuals with MDD or depressive symptoms should develop an awareness of the specific negative social media behaviors that may exacerbate their depressive symptoms and acquire an understanding of positive social media behaviors that may reduce those symptoms.

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