

Passive and Active Social Media Use and Depressive Symptoms Among United States Adults

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Abstract

Social media allows users to explore self-identity and express emotions or thoughts. Research looking into the association between social media use (SMU) and mental health outcomes, such as anxiety or depressive symptoms, have produced mixed findings. These contradictions may best be addressed by examining different patterns of SMU as they relate to depressive symptomatology. We sought to assess the independent associations between active versus passive SMU and depressive symptoms. For this, we conducted an online survey of adults 18–49 of age. Depressive symptoms were measured using the Patient-Reported Outcomes Measurement Information System brief depression scale. We measured active and passive SMU with previously developed items. Factor analysis was used to explore the underlying factor structure. Then, we used ordered logistic regression to assess associations between both passive and active SMU and depressive symptoms while controlling for sociodemographic covariates. Complete data were received from 702 participants. Active and passive SMU items loaded on separate factors. In multivariable analyses that controlled for all covariates, each one-point increase in passive SMU was associated with a 33 percent increase in depressive symptoms (adjusted odds ratio [AOR] = 1.33, 95 percent confidence interval [CI] = 1.17–1.51). However, in the same multivariable model, each one-point increase in active SMU was associated with a 15 percent decrease in depressive symptoms (AOR = 0.85, 95 percent CI = 0.75–0.96). To inform interventions, future research should determine directionality of these associations and investigate related factors.

Keywords: social media, active use, passive use, depressive symptoms, United States adults

Introduction

SOCIAL MEDIA (SM) ENCOMPASSES websites and mobile applications that enable users to create content and participate in online social networking (e.g., YouTube, Tumblr, Facebook).¹ In 2016, over 90 percent of adults 18–49 of age reported using at least one SM platform over the last 12 months.² SM allows users to explore self-identity, express emotions or thoughts. This has led researchers to look into the association between social media use (SMU) and mental health outcomes, such as depression.

Depression is a prevalent condition and a public health concern³; in 2015, 16.1 million United States adults suffered at least one episode of depression, which is now one of the leading causes of disability worldwide.^{4,5} Initial studies found significant associations between time of SMU and depressive symptomatology,^{6–11} whereas others found no significant

associations.^{12–17} Subsequently, other research have addressed these contradictions by examining different patterns of SMU (other than time) as they relate to depressive symptomatology.^{18,19} For example, research has found increased odds of depression and related outcomes among individuals who used a greater number of SM platforms,²⁰ had a skewed distribution of their social network on SM,²¹ experienced negative interactions on SM sites,^{14,22,23} or exhibited problematic SMU.^{24,25}

Nevertheless, research is limited regarding whether passive and active SMU are associated with depressive symptoms. Active users share life experiences; create text, audio, or video content; and respond frequently to other users.^{26,27} These activities may increase social capital from acquaintances or emotional support from close friends and lead to improved well-being.²⁸ Conversely, passive users (or “lurkers”) tend to observe and maintain low engagement

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with other users.^{27,29} Passive SMU is the dominant activity on SM sites,³⁰ and it has been associated with decreased well-being^{31–33} and social anxiety.^{34,35} These opposing effects underline the importance of studying both the difference between and conjoint effect of active and passive SMU on depression symptoms.

Two previous studies suggested that increased Facebook passive use was associated with higher depression risk (envy mediated the association in one of them)^{17,36}; a third found that active use was negatively associated with depression, but only among women with neurotic personality traits.¹⁶ While these studies focused on a single SM platform, use of multiple platforms is prevalent and increasing. For example, use of two or more SM platforms recently increased by 10 percent within a single year.³⁷ Because of this, it would be useful to examine associations between both passive and active SMU and depression across SMU in general. While SM platforms differ in purpose and functional features, previous literature used platform-specific features to encompass constructs of passive and active SMU. For example, both Instagram browsing and Facebook newsfeed scrolling have been categorized as passive SMU,^{31,38} and broadcasting a video on Instagram and posting a status update on Facebook have been categorized as active SMU.^{28,38}

Therefore, we surveyed United States young adults to further assess associations between passive and active SMU across platforms and depressive symptoms with three aims. First, we aimed to examine the association between passive SMU and depressive symptoms. Our second aim was to assess the association between active SMU and depressive symptomatology. Finally, we examined the conjoint association between passive and active SMU and depressive symptoms. We hypothesized that passive SMU would be positively associated with depression (H1), while active SMU would be negatively associated with depressive symptoms (H2). For our third aim, we made no specific hypotheses about the directionality or magnitude of effects.

Materials and Methods

Design, participants, and setting

We conducted an online survey with adults 18 years of age and older between July and August 2016. Participants were recruited from Reddit, an online community of registered members or “redditors.” These tend to be more White, male, 18–49 years of age, and mid- or higher income.³⁹ Redditors may post, submit links, or upload pictures. Posts are organized and aggregated by topic or subreddits (e.g., image sharing, news, location, or community). Each subreddit behaves as a modular community and new or existing users who are exploring new topics are most likely to become active in each subreddit.⁴⁰ Redditors are able to discuss and rate posts within each subreddit, regardless of whether they are Reddit friends with the original poster. We chose Reddit for this study because it allows creating anonymous and “throw-away” accounts. Given the social stigma surrounding mental health concerns, we thought the feature of anonymity would help in attracting individuals with concerns about depression because of the disinhibition caused by anonymity.⁴¹

We conducted a search for “depression” on Reddit and identified 39 potential subreddits. Because many subreddits require approval from the moderator to post announcements,

we submitted requests to each subreddit for which a moderator could be identified. Seven depression-related and one local subreddit granted approval to us for posting the survey invitation ([/r/depression](#), [/r/EOOD](#), [/r/GFD](#), [/r/depressionregimens](#), [/r/PostPartum_Depression](#), [/r/trolldepression](#), [/r/mental-health](#), and [/r/MorgantownWV](#)). This was adequate because it allowed us to recruit participants directly from the community. However, we were not able to identify whether users in each subreddit, or those that chose to participate in the survey, had only a temporary interest in depression or were actually struggling with depression symptoms. Because trustworthiness and survey participation increase when researchers maintain an online presence,⁴² one of the authors was available on each subreddit to engage with and answer questions from the community.

Our posts contained a brief invitation to participate along with a link to a survey conducted through Qualtrics research software.⁴³ Survey materials can be found at: https://osf.io/48bsq/?view_only=bcdf31ed9b2b4b8bbb1ef8c445bcc5dd. Participants who clicked on the link were directed to an introduction explaining the study and an informed consent to participate in a 15-minute survey. Those who consented were entered into a drawing for a monetary incentive. A total of 848 individuals consented to participate. For this study, we used data from participants 18–49 years of age due to high rates of SMU and depression among this population.² Data collection procedures were approved by the West Virginia University Institutional Review Board.

Measures

Participants completed a questionnaire that asked about depressive symptoms, SMU, and demographic variables.

Depressive symptoms. We evaluated depressive symptoms using the four-item Patient-Reported Outcomes Measurement System (PROMIS) scale. PROMIS is a National Institutes of Health initiative that provides standardized, validated, and reliable self-reported measurement tools across several health domains.⁴⁴ The PROMIS four-item depression combines great screening precision while decreasing participant burden.⁴⁴ Items asked about frequency of experiencing feelings of hopelessness, helplessness, worthlessness, and depression over the last 7 days. Response options for each item ranged from 1 (“never”) to 5 (“always”). Total scores ranged from 4 to 20. Given that PROMIS scores use a *t*-score-based system,⁴⁴ we followed the American Psychiatric Association recommendations for cutoff points⁴⁵ and depressive symptoms were categorized as follows: “none to slight” (4–7), “mild” (8–10), “moderate” (11–16), and “severe” (17–20).

Passive and active SMU. We measured both passive and active SMU with seven items originally developed for general internet use^{29,46} and later validated for research.⁴⁷ Participants were asked how often they engage in a number of behaviors while using any SM site.⁴⁷ Items associated with passive SMU included “read discussions,” “read comments/reviews,” and “watch videos or view pictures.” Items associated with active SMU included “like/favorite/voting,” “share others’ content,” “comment on or respond to someone else’s content,” and “post your own content.” Response options were “never,” “less than once a week,” “once

a week," "2–6 times a week," "once a day," and "several times a day."

Demographic characteristics. Demographic variables were defined a priori and included participants' age, gender, race/ethnicity (Non-Hispanic White vs. Non-White), relationship status (single or in a committed relationship), living situation (living with family/living with friends or alone), and highest education level attained (high school or less, some college or two-year technical degree, and bachelor's degree or higher). To ensure robustness of statistical analyses, categorization of these variables was determined based on the distribution of each one. For example, given there were few Black, Asian, or Hispanic participants, it was preferable to treat the 'race/ethnicity' variable as dichotomous.

Data analyses

We examined the distribution of our seven SMU variables using the Shapiro-Wilk test of normality as well as graphical methods (e.g., histograms and Q-Q plots). Because there were substantial departures from normality (all p -values ≤ 0.001), we examined the pairwise correlation matrix of all SMU variables using Spearman's rank correlation coefficients (ρ ranging from 0.15 to 0.65). The Kaiser-Meyer-Olkin (KMO) test of sampling adequacy indicated that the sample was factorable ($KMO=0.75$).^{48–50} While previous research informed the latent constructs of passive and active SMU,^{28,47} to examine the underlying factor structure of our particular set of adapted items and create composite scales, we performed factor analysis using principal component analysis (PCA) with varimax rotation. We chose this simpler, orthogonal rotation because there is no prior work suggesting the factors are strongly correlated and varimax rotation yielded meaningful item groupings and strong, unambiguous factor loadings.⁵¹

Items were retained if they had minimum factor loading of 0.40, with the highest factor loading greater than 0.50–0.60 and the second highest smaller than 0.20–0.30, and if the difference between primary–secondary factor loadings is sufficiently large (i.e., 0.30–0.40).⁵² The item "like/favorite/voting" loaded onto both passive (0.47) and active (0.57) SMU, the difference between factor loadings was only 0.1 and the difference between them was not large enough (0.3–0.4).⁵² Thus, this item was removed from the analysis. Factor loadings for the remaining six items ranged from 0.57 to 0.86 and yielded a two-factor solution explaining 65 percent of the variance among items. Visual inspection of a scree plot confirmed a two-factor solution. Factor I ("active SMU") had an eigenvalue of 3.2 and explained 34 percent of the variance. Factor II ("passive SMU") had an eigenvalue of 1.4 and explained 30 percent of the variance. Internal consistency was good for both active ($\alpha=0.80$) and passive ($\alpha=0.72$) SMU items (Table 1).

Composite scales ranged from 0 to 5. Passive SMU was slightly skewed left with a mean of 3.9 (standard deviation [SD]=1.1) and a median of 4.0 (interquartile range [IQR]=3.0–5.0). Active SMU approached a normal distribution with a mean of 2.6 ($SD=1.3$) and median of 2.5 (IQR=1.8–3.5).

We computed percentages and means to describe all our variables. We operationalized the dependent variable as a

TABLE 1. FACTOR STRUCTURE AND SCALE DEVELOPMENT OF PASSIVE AND ACTIVE SOCIAL MEDIA USE

Complete item ^a	Factor loading I	Factor loading II
	"Active use"	"Passive use"
Read discussions	0.11	0.80
Read comments/reviews	0.14	0.86
Watch videos or view pictures	0.15	0.70
Share others' content (e.g., retweet, share posts or status updates)	0.81	0.07
Like/favorite/voting	0.57	0.47
Comment on, or respond to someone else's content	0.76	0.28
Post your own content (e.g., tweet, status update)	0.86	0.07
Cronbach's α ^b	0.80	0.72
Factor variance ^c	0.34	0.30

Note: ^aEach item asked participants to indicate how often they engage in the behavior on any social media platform; response scales ranged from never to several times a day.

^bMeasuring internal consistency of items.

^cMeasuring the percentage of explained common variance.

four-level categorical variable to correspond with the clinically relevant cut-points delineated above. Next, we determined bivariable associations between the dependent variable and each of the independent variables using chi-tests for categorical variables and analysis of variance for continuous variables.

We used ordered logistic regression to assess bivariable associations between depressive symptoms and passive SMU, active SMU, and each of the covariates. Then, we assessed the independent associations between depressive symptoms and each independent variable while controlling for all demographic variables (Models 1 and 2). Finally, we tested a third model (Model 3) that included both passive and active SMU in the same model while controlling for demographic variables. This was appropriate because, as described, these two modes of use may not be mutually exclusive of one another (Model 3).

Results

Univariable and bivariable analyses

We included data from 702 participants from whom we received complete information on both dependent and independent variables. Participants' mean age was 23.4 ($SD=6.2$), 56.1 percent identified as female, and 68.7 percent were single. In this sample, 75 percent of participants were White, non-Hispanic, 63.8 percent lived with either family or friends, and 55.3 percent had some college education (Table 2). Over one-third of participants reported no depressive symptoms (39.5 percent), whereas 23.5 percent, 30.1 percent, and 6.9 percent reported mild, moderate, and severe symptoms, respectively. In bivariable analyses, each one-point increase in passive SMU was significantly associated with increased odds of severe depressive symptoms (odds

TABLE 2. SOCIAL MEDIA USE AND SAMPLE CHARACTERISTICS WITH DEPRESSIVE SYMPTOMS BY SELF-REPORTED DEPRESSIVE SYMPTOMS (N=702)

Independent variable and covariates	Whole sample	Depressive symptoms				p-Value ^a
		No (n=277)	Mild (n=165)	Moderate (n=211)	Severe (n=49)	
Independent variable						
Passive SMU, M (SD)	3.9 (1.1) ^b	3.7 (1.1)	3.8 (1.1)	4.1 (1.1)	4.2 (1.0)	<0.001 ^c
Active SMU, M (SD)	2.6 (1.2) ^b	2.6 (1.2)	2.8 (1.2)	2.7 (1.3)	2.3 (1.1)	0.06 ^c
Covariates						
Age in years, M (SD)	23.4 (6.2) ^b	23.0 (6.2)	22.5 (5.4)	24.4 (6.5)	24.0 (7.0)	0.01 ^c
Sex						0.37
Female	56.1	59.6	50.9	55.9	55.1	
Male	43.9	40.4	49.1	44.1	44.9	
Race						0.24
White, non-Hispanic	75.0	71.6	80.4	74.8	76.6	
Non-White ^d	25.0	28.4	19.6	25.2	23.4	
Relationship status						0.01
Single ^e	68.7	68.9	72.7	61.6	83.7	
In a committed relationship ^f	31.3	31.1	27.3	38.4	16.3	
Living situation						0.61
With family or friends	63.8	65.0	65.5	60.2	67.4	
Alone ^g	36.2	35.0	34.5	39.8	32.6	
Education level						0.38
High school or less	29.6	31.1	30.3	24.6	40.8	
Some college or 2-year technical degree	55.3	54.8	53.9	58.3	49.0	
Bachelor's degree or higher	15.1	14.1	15.8	17.1	10.2	

Note: ^ap-Value derived using χ^2 analysis comparing proportion of users for each categorical variable.

^bMeasured in mean and standard deviation.

^cp-Value derived using ANOVA analyses comparing mean scores for each continuous variable.

^dIncludes multiracial.

^eIncludes engaged, married, and in a domestic partnership.

^fIncludes widowed.

^gDefined as not currently living with a parent/guardian or significant other.

SMU, social media use; ANOVA, analysis of variance; SD, standard deviation.

ratio = 1.34, 95 percent confidence interval [CI] = 1.18–1.52, $p \leq 0.05$). However, no significant association was found between active SMU and depression.

Multivariable analysis

For H1, we hypothesized that passive SMU would be positively associated with depression. In Table 3 Model 1, each one-point increase in passive SMU was associated with a 33 percent increase in odds of reporting severe depressive symptoms (adjusted odds ratio [AOR]=1.33, 95 percent CI=1.17–1.51). Thus, H1 was supported. Conversely, for H2 we hypothesized that active SMU would be negatively associated with depressive symptoms. Model 2, which used active SMU as the main independent variable, showed no significant results. Therefore, H2 was not supported.

Aim 3 was to examine the conjoint association between passive and active SMU and depressive symptoms. Model 3 showed that each one-point increase in passive SMU was associated with a 44 percent increase in odds of reporting severe depressive symptoms (AOR=1.44, 95 percent CI=1.25–1.66). Additionally, each one-point increase in active SMU was associated with a 15 percent decrease in odds of reporting severe depressive symptoms (AOR=0.85, 95 percent CI=0.75–0.96; Table 3).

Discussion

Among a convenience sample of adults 18–49 years of age, PCA identified six items distinctly useful to assess passive and active SMU constructs. While increased passive SMU was positively associated with depressive symptoms, active SMU showed no significant association. A composite third model showed that—when they were included in the same model—passive SMU was associated with increased depression, whereas active SMU was associated with lower depression.

Our PCA analysis showed that, except for how often participant engaged in “like/favorite/voting” (i.e., agreement with others’ post), items were brief, showed good psychometric properties, and were useful for identifying two SMU patterns. Although liking someone else’s posts implies directed action, it does not necessarily imply “seeking to, and interacting with the medium in order to manipulate or create new content,” a defining characteristic of active SMU.²⁹ Therefore, we suggest removing this item from future active and passive SMU scales.

Our results are consistent with previous research examining passive SMU and depression (Model 1).^{17,36} It might be that individuals with depressive symptoms use SM more passively due to depression features, such as anhedonia, which is the inability to find pleasure in things an individual used to enjoy. Conversely, passive SMU may trigger depressive

TABLE 3. MULTIVARIABLE ASSOCIATIONS BETWEEN PASSIVE AND ACTIVE SOCIAL MEDIA USE AND DEPRESSIVE SYMPTOMS

Independent variables and covariates	Depressive symptoms ^a		
	Model 1	Model 2	Model 3
	AOR ^b (95 percent CI)	AOR ^b (95 percent CI)	AOR ^b (95 percent CI)
Passive SMU ^c	1.33 (1.17–1.51)		1.40 (1.22–1.61)
Active SMU ^c		0.98 (0.88–1.10)	0.85 (0.75–0.96)
Age in years ^c	1.04 (1.01–1.07)	1.04 (1.01–1.07)	1.04 (1.01–1.07)
Sex			
Male (Reference)			
Female	0.96 (0.72–1.27)	0.92 (0.70–1.23)	1.04 (0.78–1.38)
Race			
White, non-Hispanic (Reference)			
Non-White ^d	0.91 (0.65–1.26)	0.83 (0.60–1.16)	0.88 (0.64–1.22)
Relationship status			
Single ^e (Reference)			
In a committed relationship ^f	0.85 (0.61–1.99)	0.90 (0.64–1.25)	0.84 (0.60–1.18)
Living situation			
With family or friends ^g (Reference)			
Alone	1.11 (0.83–1.48)	1.06 (0.80–1.42)	1.12 (0.83–1.50)
Education level			
High school or less (Reference)			
Some college or 2-year technical degree	0.87 (0.62–1.23)	0.90 (0.64–1.27)	0.85 (0.60–1.20)
Bachelor's degree or higher	0.71 (0.42–1.22)	0.72 (0.42–1.23)	0.68 (0.40–1.17)

Note: Bold values represent statistical significance ($p \leq 0.05$).

^aDepressive symptoms were treated as a four-level categorical variable.

^bAdjusted for all variables in the table.

^cAssociated odd ratios represent the odds for each one-unit increase on the scale.

^dIncludes multiracial.

^eIncludes separated, divorced, and widowed.

^fIncludes engaged, married, and in a domestic partnership.

^gIncludes parent/guardian, significant other, and friends.

AOR, adjusted odds ratio; CI, confidence interval.

symptomatology. For example, a person seeking social support may perceive not getting enough of it,⁵³ which could contribute to depression.

Contrary to previous research³⁶ and our H2, we found no significant association between active SMU and depression (Model 2). A few reasons could explain this discrepancy. While Frison and Eggermont studied Facebook use among high school adolescents (mean age 15 years), our study focused on adults 18–49 years of age.³⁶ Different patterns of active SMU between adolescents and adults could influence results. For example, while adolescents might have a more recreational and social approach, adults may have an information-seeking and opinion-exchange approach.⁵⁴ Longitudinal research on variation of SMU over time accounting for other social and behavioral factors may help to answer these questions.

Our third model estimated the odds of depressive symptoms with both passive and active SMU as main predictors. In this model, passive SMU still had a positive association with depression, whereas active SMU showed a significant, negative association, even when controlling for demographic characteristics. Furthermore, there was a noticeable difference in magnitude of effect sizes between passive and active SMU. In particular, each point on the passive SMU scale was associated with 44 percent increased odds of depression, whereas each point on the active SMU scale was associated with only 15 percent decreased odds of depression. Passive SMU had a

larger effect size when active SMU was added to the model. Two different perspectives may help explain these findings.

First, some forms of active SMU may generate different feedback.⁵⁴ For example, some active user may use SM mostly for recreational purposes, sharing content, but not as many opinions, eliciting less conflict and more positive feedback, making the person feel connected and included. Conversely, other active users may utilize SM primarily to exchange points of view and ideas, expecting conversation or debate, which could make users feel left out or marginalized.

On the other hand, from the statistical perspective this might be a case of suppression effect, where the inclusion of a third independent variable increases the effect of another on the outcome under study.⁵⁵ It could be that the magnitude increase of the association between passive SMU and depression occurred because active SMU explained some of the variability in passive use. Future research should disentangle the potential of active SMU in predicting variability of other constructs, such as passive SMU or problematic SMU.^{24,25}

Our findings suggest that, while it is still soon to determine the extent to which SMU may impact depression outcomes, it is appropriate for encouraging more active use when engaging with SM as opposed to passive lurking. Moreover, the magnitude increase of the effect of passive SMU when combined with active in the same model speaks to the likelihood of these SMU patterns being more intertwined than previously thought.

It may be useful to educate users in healthier ways to actively use SM, avoiding situations that could lead to users feeling more stressed and left out after the exchange, which could increase feelings of marginalization.

Our study had limitations. Survey participants were recruited from an online community. Thus, we cannot claim whether subreddit users or survey participants had only a temporary interest in depression or were clinically depressed. We partially addressed this limitation by using measures that were developed to identify depression risk among large, otherwise healthy population samples.⁴⁴ Our survey did not assess participants' employment status. Research has shown that unemployed persons have more leisure compared with employed individuals.^{56–59} Thus, future research should account for this variable. Our sample had limited representativeness; given the universality of SM, future research should consider a sampling frame that is more diverse and informative for both developed and developing societies.⁶⁰ It should be emphasized that our main independent variables assessed passive and active use in SM platforms in general. More nuanced approaches might help to isolate the impact of specific types of SM (e.g., social networking vs. location-based services) on mental health outcomes. In spite of these limitations, our results warrant further research to determine directionality of these associations and assess why passive and active SMU are so strongly associated with depression symptoms.

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Author Disclosure Statement

No competing financial interests exist.

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