



Problematic social media use and depressive symptoms among U.S. young adults: A nationally-representative study



Ariel Shensa, MA ^{a, b, *}, César G. Escobar-Viera, MD, PhD ^{b, c}, Jaime E. Sidani, PhD, MPH ^{a, b}, Nicholas D. Bowman, PhD ^d, Michael P. Marshal, PhD ^e, Brian A. Primack, MD, PhD ^{a, b}

^a Division of General Internal Medicine, Department of Medicine, University of Pittsburgh School of Medicine, Pittsburgh, PA, United States

^b Center for Research on Media, Technology, and Health, University of Pittsburgh, Pittsburgh, PA, United States

^c Health Policy Institute, University of Pittsburgh, Pittsburgh, PA, United States

^d Department of Communication Studies, West Virginia University, Morgantown, WV, United States

^e Department of Psychiatry, University of Pittsburgh, Pittsburgh, PA, United States

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ABSTRACT

Rationale: Depression is the leading cause of disability worldwide. The suggested association between social media use (SMU) and depression may be explained by the emerging maladaptive use pattern known as problematic social media use (PSMU), characterized by addictive components.

Objective: We aimed to assess the association between PSMU and depressive symptoms—controlling for overall time and frequency of SMU—among a large sample of U.S. young adults.

Methods: In October 2014, participants aged 19–32 ($N = 1749$) were randomly selected from a nationally-representative U.S. probability-based panel and subsequently invited to participate in an online survey. We assessed depressive symptoms using the validated Patient-Reported Outcomes Measurement Information System (PROMIS) brief depression scale. We measured PSMU using an adapted version of the Bergen Facebook Addiction Scale to encompass broader SMU. Using logistic regression models, we tested the association between PSMU and depressive symptoms, controlling for time and frequency of SMU as well as a comprehensive set of socio-demographic covariates.

Results: In the multivariable model, PSMU was significantly associated with a 9% increase in odds of depressive symptoms (AOR [adjusted odds ratio] = 1.09; 95% CI [confidence interval]: 1.05, 1.13; $p < 0.001$). Increased frequency of SMU was also significantly associated with increased depressive symptoms, whereas SMU time was not ($AOR = 1.01$; 95% CI: 1.00, 1.01; $p = 0.001$ and $AOR = 1.00$; 95% CI: 0.999–1.001; $p = 0.43$, respectively).

Conclusion: PSMU was strongly and independently associated with increased depressive symptoms in this nationally-representative sample of young adults. PSMU largely explained the association between SMU and depressive symptom, suggesting that it may be how we use social media, not how much, that poses a risk. Intervention efforts aimed at reducing depressive symptoms, such as screenings for maladaptive SMU, may be most successful if they address addictive components and frequency—rather than time—of SMU.

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Depression is the leading cause of disability worldwide (World Health Organization, 2016). In the U.S., the economic burden of depression is over \$210 billion (Greenberg et al., 2015). Moreover, many individuals with depression also experience physical or psychiatric comorbidities that contribute to the overall disease

* Corresponding author. Center for Research on Media, Technology, and Health, 230 McKee Place Suite 600, Pittsburgh, PA 15213, United States.

E-mail address: shensaa@upmc.edu (A. Shensa).

burden (Greenberg et al., 2015). The incidence of depression generally peaks in early adulthood, which puts these individuals at greater risk of problematic interpersonal relationships, employment, and psychological functioning (Child Trends, 2015).

Depression is associated with a combination of biological, psychological, and social factors (World Health Organization, 2016). Prior research has identified media exposures, such as video games, television, movies, and the Internet, to be associated with the development of depression among adolescents (Bickham et al., 2015; González et al., 2016; Holfeld and Sukhawathanakul, 2017;

Liu et al., 2016; Primack et al., 2009). Other research has extended this by suggesting that use of social media is associated with depressive symptoms and a decline in well-being among both adolescents (Pantic et al., 2012) and adults (Kross et al., 2013; Lin et al., 2016; McDougall et al., 2016; Shensa et al., 2016).

Contradictory findings surrounding the association between SMU and depression may be attributed to the diversity of existing social media platforms and the difficulty characterizing the different types of usage associated with them. In this regard, problematic social media use (PSMU) has emerged as a maladaptive pattern of SMU. While current psychiatric nosology does not acknowledge PSMU as a diagnosis, there has been substantial research on the topic of PSMU (Andreassen, 2015; Andreassen et al., 2016b; Durak and Senol-Durak, 2014; Meena et al., 2012; Wang et al., 2015). Initial measurement of PSMU focused on Facebook only (Andreassen et al., 2012; Muench et al., 2015), coining the phrase, “Facebook addiction”. Subsequent studies found that Facebook addiction was indeed associated with depression among both high school (Hanprathet et al., 2015) and college students (Koc and Gulyagci, 2013). Furthermore, researchers have since addressed addictive characteristics of SMU more broadly, assessing addictive or problematic use of multiple social networking sites or across social media in general (Andreassen, 2015; Kuss and Griffiths, 2011; Meena et al., 2012). Thus, PSMU has been characterized by an excessive concern about social media, being driven by a strong motivation to use social media, and devoting so much time and effort to SMU that it impairs other social activities, studies/job, interpersonal relationships, and/or psychological health and well-being (Andreassen and Pallesen, 2014).

Research in U.S. and international populations has shown that the association between PSMU and depression is complex and likely influenced by both external and internal factors. For example, a study of teenagers in urban India concluded that excessive time spent on social media was associated with PSMU, which can negatively impact relationships, community involvement, and academic achievement (Meena et al., 2012). Indeed, external factors such as increased social isolation and decreased community engagement could lead to depression. Furthermore, results from a sample of German adolescent and young adults indicated that PSMU may be linked to depression via mediators such as self-regulation and use-expectation (Wegmann et al., 2015). This study suggests the association between PSMU and depression may be more of an internal process. In contrast, a recent large-scale Norwegian study of adults found that PSMU was associated with decreases in depressive symptoms, which may be attributable to social withdrawal often associated with depression (Andreassen et al., 2016a).

To our knowledge, no study has assessed whether there is an association between PSMU and depressive symptoms among a nationally representative sample of U.S. young adults, while controlling for overall SMU. Prior studies were conducted using small convenience samples, assessing the use of a single platform, such as Facebook, or focusing on older populations (Andreassen et al., 2016a; Hanprathet et al., 2015; Koc and Gulyagci, 2013). Examining this potential association more broadly could guide research and ultimately intervention. Therefore, the purpose of this study was to assess the association between PSMU and depressive symptoms while controlling for overall SMU and a comprehensive set of covariates among a nationally representative sample of young adults.

1. Methods

1.1. Participants and procedures

We conducted a survey among a nationally-representative

sample of U.S. adults aged 19 to 32. Participants were recruited from a probability-based online non-volunteer research panel via random digit dialing and address-based sampling. This is done by randomly selecting addresses from the U.S. Postal Service's Delivery Sequence File with a probability-based, without replacement sampling approach. Potential participants were sent emails inviting them to join, both in English and Spanish. Non-responders received additional invites via phone calls. This process generated a sampling frame that covers approximately 97% of U.S. households, and a panel consisting of approximately 55,000 members ages 18 and older maintained by Growth from Knowledge (GfK) (GfK KnowledgePanel®, 2013). Panel members are then invited to complete online surveys using a probability proportional to size weighted sampling approach.

In October 2014, as part of a longitudinal study of young adult health behaviors, GfK sent a survey including items on depression, PSMU, and SMU to 3048 panel members who had completed a baseline survey 18 months earlier. A total of 1796 individuals completed the follow-up survey (59% response rate). This study had no specific exclusion criteria except that participants were required to be aged 18–30 at baseline. Participants responded to questionnaire items using a computer-based interface; computers and internet access were provided to individuals who did not have them. Several strategies were used by GfK to assure good data quality (e.g. data was screened for patterns suggesting poor effort such as a high proportion of skipped responses). Median time for completion was 15 min, and participants received a \$15 cash-equivalent incentive. This study was approved by the University of Pittsburgh Institutional Review Board and was granted a Certificate of Confidentiality from the National Institutes of Health.

2. Measures

Depressive symptoms (dependent variable). We measured depressive symptoms using the four-item Patient-Reported Outcomes Measurement Information System (PROMIS) depression scale for adults. PROMIS, an initiative of the National Institutes of Health, is a set of standardized questionnaires to evaluate patient-reported outcomes across the domains of health—social, mental and physical. The goal of this initiative is to provide efficient, flexible, and precise measurement of commonly-studied health outcomes (Cella et al., 2010). There is strong evidence of construct validity for the PROMIS depression scale, which has been validated against the Center for Epidemiological Studies Depression Scale (CES-D), the Beck Depression Inventory (BDI-II), and the Patient Health Questionnaire (PHQ-9) (Choi et al., 2014; Pilkonis et al., 2014). We used the PROMIS four-item scale in this study to reduce respondent burden, while still obtaining a reliable and valid measure of depression. The items stated, “In the past 7 days ... I felt [hopeless, worthless, helpless, depressed]” ((Pilkonis et al., 2011). The response scale for each item was a five-point Likert-type scale ranging from one to five, corresponding to responses of *Never* (1), *Rarely* (2), *Sometimes* (3), *Often* (4), and *Always* (5). The resulting composite scale ranged from 4 to 20 and served as the dependent variable in our model.

Problematic social media use (PSMU) (independent variable). We assessed problematic social media use (PSMU) using a set of items adapted from the Bergen Facebook Addiction Scale (BFAS) (Andreassen et al., 2012). Each item represented one of six core elements of addiction (salience, mood modification, tolerance, withdrawal, conflict, and relapse) (see Table 1 for complete item wording). In the context of this study, we did not use this scale as a diagnostic tool but instead sought to characterize a pattern of maladaptive SMU. We asked participants to respond based upon past year frequency using a Likert-type response scale with anchors

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