



## Social media use, personality characteristics, and social isolation among young adults in the United States



Erin O. Whaite<sup>a,b</sup>, Ariel Shensa<sup>a,c</sup>, Jaime E. Sidani<sup>a,c</sup>, Jason B. Colditz<sup>a,c</sup>, Brian A. Primack<sup>a,c,d,\*</sup>

<sup>a</sup> Center for Research on Media, Technology, and Health, University of Pittsburgh, 230 McKee Place, Suite 600, Pittsburgh, PA 15213, USA

<sup>b</sup> University of Pittsburgh School of Medicine, 3550 Terrace St., Pittsburgh, PA 15261, USA

<sup>c</sup> Division of General Internal Medicine, Department of Medicine, University of Pittsburgh School of Medicine, 3459 Fifth Ave., Pittsburgh, PA 15213, USA

<sup>d</sup> Division of Adolescent Medicine, Department of Pediatrics, University of Pittsburgh School of Medicine, 3420 Fifth Ave., Pittsburgh, PA 15213, USA

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### ABSTRACT

Although increased social media use (SMU) has been linearly associated with increased real-life social isolation (SI), it is unknown whether these associations differ by personality characteristics. With a nationally-representative sample of 1768 U.S. young adults aged 19–32, we assessed SI using a 4-item Patient-Reported Outcomes Measurement Information System scale, and personality using the 10-item Big Five Inventory. Using ordered logistic regression, we evaluated multivariable associations between SMU, personality characteristics, and SI. Extraversion and agreeableness were associated with lower odds of SI, while neuroticism was associated with higher odds. A significant interaction term demonstrated that the association between SMU and SI differed by conscientiousness. Among those with low conscientiousness, compared with the lowest quartile of SMU, those in the highest quartile had more than three times the odds (AOR = 3.20, 95% CI = 1.99, 5.15) for increased SI, but there was no significant association among the high conscientiousness group. Interaction terms between SMU and the other four personality characteristics were not significant. Conscientious individuals may approach social media in a way that helps maintain good face-to-face social interactions, reducing perceived SI.

### 1. Introduction

Social isolation (SI) is associated with negative health outcomes, including increased mortality (Holt-Lunstad, Smith, Baker, Harris, & Stephenson, 2015). SI results in disturbances including increased sympathetic tone and glucocorticoid signaling, resulting in decreased immunity, poor sleep, and poor cognitive functioning (Cacioppo & Hawkey, 2009; Cacioppo, Hawkey, Norman, & Bertson, 2011). Other research suggests SI increases vascular disease risk, such as coronary heart disease and stroke, and can influence gene expression in such a way as to negatively impact mental health (Dang et al., 2015; Valtorta, Kanaan, Gilbody, Ronzi, & Hanratty, 2016).

SI can refer to objective or subjective SI (i.e., one could feel socially isolated but still have numerous social ties). Objective SI refers to physical isolation or a lack of social interaction (Holt-Lunstad et al., 2015). Subjective SI refers to the perception of isolation or disconnectedness (Holt-Lunstad et al., 2015). Our study focused on subjective, perceived SI, as it has been linked to poor mental health outcomes and increased mortality (Cacioppo & Hawkey, 2009).

Up to 90% of U.S. young adults use social media, from 12% in 2005 (Perrin, 2015). Because the goal of social media platforms is connecting

people, one might expect that increased social media use (SMU) would be associated with less SI and greater emotional support. However, the largest nationally-representative study to date counter-intuitively found that increased SMU—both in terms of time per day and frequency of site visits—was associated with low emotional support in a linear fashion (Shensa, Sidani, Lin, Bowman, & Primack, 2016). This result suggests that SMU might not be as effective as hoped in reducing SI and increasing emotional support. However, all individuals interact with social media differently. Personality differences explain some variance in the types of updates users post, leading to responses that may be socially rewarding or exclusionary (Marshall, Lefringhausen, & Ferenczi, 2015). Additionally, certain personality characteristics—extraversion, neuroticism, and openness—have been associated with increased SMU (Correa, Hinsley, & de Zúñiga, 2010; Mark & Ganzach, 2014).

It is not clear how the behaviors described by personality factors may influence the association between SMU and SI. For example, extraversion describes highly engaged, energetic, sociable behavior (McCrae & John, 1992). If these behaviors transfer online, extraverted individuals might form stronger ties due to increased volume and intensity of communication (Correa et al., 2010; Mark & Ganzach, 2014).

\* Corresponding author at: 230 McKee Place Suite 600, Pittsburgh, PA 15213, USA.  
E-mail address: [bprimack@pitt.edu](mailto:bprimack@pitt.edu) (B.A. Primack).

Alternatively, increased online interaction could increase hazards encountered, including misinterpretation of comments, which may be associated with increased SI.

According to the Big Five theory of personality, there are four other personality traits: neuroticism, conscientiousness, openness to experience, and agreeableness (McCrae & John, 1992). Neuroticism describes anxious behaviors, negative affect, and self-consciousness, which may foster overreaction to negative online situations, leading to increased SI (McCrae & John, 1992). Alternatively, social media may allow neurotic individuals to form bonds that may be more difficult offline (Chan, 2014).

Conscientiousness describes diligence, impulse control, and organized behaviors, which may allow individuals to maintain greater control over emotions and impulses, thereby navigating social media more smoothly (McCrae & John, 1992). Openness to experience describes behaviors that tend toward intellectualism, creativity, and appreciation for the arts, which may be less relevant to associations between SMU and SI (McCrae & John, 1992). Finally, agreeableness describes altruistic behavior, consideration, and caring which may allow individuals to form strong ties online that decrease perceived SI (McCrae & John, 1992).

While evidence suggests that SMU is associated with emotional support and SI, and that personality characteristics are associated with SMU, interactions between personality characteristics and SMU in relation to SI have not been assessed (Correa et al., 2010; Shensa et al., 2016). This is an important gap in the literature, because understanding how personality-related behaviors may influence the association between SMU and SI may help develop targeted interventions and recommendations.

Therefore, in a nationally representative sample of U.S. young adults, we aimed to assess (1) associations between personality characteristics and SI and (2) interactions between personality characteristics and SMU as they relate to SI.

We focused on young adults because of the particular increase of social media use among this group, and because this group is at higher risk for SI, when individuals are leaving comfortable environments such as home or school, and experiencing rapid changes in romantic relationships and work (Arnett, Zukauskienė, & Sugimura, 2014). The Big Five personality theory complements and extends prior research (Hughes, Rowe, Batey, & Lee, 2012; Lee, Ahn, & Kim, 2014). Based on the literature, we hypothesized extraversion would be associated with decreased SI (H1a), and extraverted behavior would not affect the association between SMU and SI (H1b). Neuroticism, we hypothesized, would be associated with increased SI (H2a), and neurotic behavior would amplify the association between SMU and SI (H2b). We hypothesized conscientiousness would be associated with decreased SI (H3a), and conscientious behavior would dampen the association between SMU and SI (H3b). We hypothesized that openness (less of a social construct) would not have a direct association with SI (H4a), nor an indirect one through interaction with SMU (H4b). Similarly, we hypothesized that agreeableness would not be directly (H5a) or indirectly (H5b) associated with SI (McCrae & John, 1992).

## 2. Methods

### 2.1. Design, participants, and setting

We surveyed a nationally-representative sample of U.S. young adults aged 19–32, who answered questions about SMU, personality, and SI. This sample came from a panel maintained by Growth from Knowledge (GfK), a survey research organization (GfK KnowledgePanel®, 2013). GfK recruits participants by address-based sampling and random digit dialing, maintaining a sampling frame across 97% of the U.S. population (GfK KnowledgePanel®, 2013). GfK continuously recruits participants, a sampling strategy shown to be statistically valid for surveying health indicators (Baker et al., 2010;

GfK KnowledgePanel®, 2013). Researchers access GfK panels at negotiated costs based on sampling complexity, number of participants, and target demographics.

October–November 2014 our Web-based survey was sent to a random sample of 3048 non-institutionalized young adults. These individuals consented to an 18-month prior study wave for which the only criterion was that participants be ages 18–30 at baseline. We used the follow-up study data because SMU items were not asked at baseline. Thus, although age 32 is often not considered “young adult,” we will use that term here. Though the survey was part of a longitudinal study, the data for this study were collected at one time point. Responses were received from 1796 participants (59%), representing a very strong response rate because many baseline respondents were likely no longer in the panel, which turns over participants every two years to prevent survey fatigue.

GfK employs several data quality improvement strategies. They screen all data sets for patterns suggesting lack of participant effort. GfK minimizes survey length to reduce scrolling and avoids long grids. Participants were not forced to answer any items, but prompted once for unanswered questions.

Median survey completion time was 15 min, and participants received \$15. This study was approved by the [blinded for review] Institutional Review Board and was granted a Certificate of Confidentiality from the National Institutes of Health.

### 2.2. Participant demographics

Of 1796 individuals who responded, our final sample included 1768 individuals with complete responses. There were no differences between individuals included and those with missing responses on key study variables with respect to age ( $F[1.9, 3416.9] = 1.2, p = 0.30$ ), sex ( $F[1.0, 1795] = 0.01, p = 0.94$ ), or race ( $F[2.6, 4634.1] = 2.7, p = 0.06$ ). In addition, our survey weight accounted for non-response in addition to over- and under-coverage.

The weighted sample was 50.3% female, 57.5% White, 13.0% Black, 20.6% Hispanic, and 8.9% biracial/multiracial/other. In the sample 55.6% were married or in a committed relationship, and 35.6% lived with a significant other. For household income, 22.9% responded “Under \$30,000” and 38.7% responded “\$75,000 and above.” For education, 36.0% had high school or less, and 25.7% had a bachelor's degree or more (Table 1).

### 2.3. Measures

Participants completed online survey items including SI, SMU, personality, and covariates.

#### 2.3.1. Social isolation

We assessed SI using a 4-item Patient-Reported Outcomes Measurement Information System (PROMIS) scale. The scale has been correlated with and validated against other commonly used measures of SI and assesses perceptions of being avoided, excluded, disconnected from, or unknown by others (Johnston et al., 2016; Stacciarini, Smith, Garvan, Wiens, & Cottler, 2015). For example, one item asks how frequently in the past 7 days respondents felt left out. Items were scored using a 5-point Likert scale. Summing the numerical score for the 4 items gave a raw score for SI between 4 and 20.

We collapsed the raw scores into tertiles of “low,” “medium,” and “high” SI for analysis to differentiate between conceptually distinct categories of SI. The large number of individuals who responded without SI resulted in a skewed distribution, making analyses requiring a continuous dependent variable unfavorable. A transformation to correct this was not feasible, because even with any transformation, the result was non-normal. The PROMIS scale aims to grade severity rather than providing a cut-off, and no established clinical cut-off for SI exists, so we approximated tertiles using Stata 12.1 (Stata Corp., College

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