The Relationship Between Problematic Social Media Use and Time Spent on Social Media: Exploring Neuroticism as a Moderator

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Abstract

A growing body of research shows that social media use is positively correlated with depression, anxiety, low self-esteem, and neuroticism. Problematic social media use (PSMU), for the purpose of this study, was characterized by behaviors similar to those displayed in gambling and addiction such as shame, guilt, and loss of control. This study explored the relationship between PSMU and the amount of time spent on social media. It was predicted that the number of hours spent on social media would be positively correlated with PSMU and that an individual's neuroticism score would have a moderating effect on this relationship. Data were collected from college students across the United States through an online survey as part of the Psi Beta National Research Project (N = 1,422). The survey included questions regarding PSMU, hours spent using social media, and personality. Results found a moderate correlation between problematic social media use and hours of daily media use. Neuroticism did not appear to have a moderating effect on the relationship. This study aimed to offer supporting data to further the understanding of the effects of social media on mental health. Our results can help provide a guide in which future studies can focus on improving social media use outcomes for all people.

Keywords: social media, neuroticism, mental health, screen time, personality

The use of social media networking sites has grown exponentially over the last ten years (Ortiz-Espinoza, 2019). With approximately 3.8 billion users worldwide, about half of the world’s population uses social media in some way. People rely on social media to stay in contact with friends and family, promote small businesses, and stay updated on current events. Businesses use social media to recruit candidates for jobs and employees may be required to have an online presence (Segal, 2018), so even those who prefer not to use social media may have no choice. Social media has become deeply integrated into the everyday lives of its users. When shutdowns due to Coronavirus disease 2019 (COVID-19) began, many people were forced to depend on virtual interactions for work, school, and the majority of their social connections. COVID-19 was the first global pandemic since the
advent of social media, and the world saw an unprecedented rise in social media use: Internet use increased by 50-70%, and half of that increase was reflected in the time spent on social media (Pandya & Lodha, 2021). The increased prevalence of social media usage warrants research into the way it impacts people.

This study aimed to further the current understanding of the relationship between social media use and mental health to identify potential risk factors and variables within a user’s control that could mitigate negative impact. Existing work shows a strong positive correlation between social media use and negative mental health consequences such as depression, anxiety, and low self-esteem (Woods & Scott, 2016). A study by Twenge and Farley (2021) of 11,453 adolescents showed that participants who spent more time on social media had worse mental health and were at a higher risk for self-harm and suicidal thoughts. Another study of 207 participants in the United States found that those scoring higher in neuroticism were significantly more likely to exhibit social media addiction (Blackwell et al., 2017). A systematic review of 56 articles examining the relationship between neuroticism and internet addiction also found that neuroticism was a predictor of social media addiction (Marciano, et al., 2022). The researchers found that people scoring high in neuroticism were more likely to act impulsively, be more sensitive to criticism, and be less likely to expand their existing social circles. Due to the overlapping nature between neuroticism, social media addiction, and frequency of social media use, this study aimed to bridge the gap between these variables and identify potential factors of negative mental health outcomes. This study aimed to determine whether neuroticism acted as a moderator between hours spent on social media and PSMU. These factors were assessed using survey responses to measure the relationship between time spent on social media and problematic behavior regarding social media. Additionally, statistical analyses were conducted to determine how a person’s level of neuroticism possibly influenced the relationship. The research team hypothesized that PSMU would be positively correlated with hours per day of social media use and that neuroticism would be positively correlated with hours per day of social media use. The team also hypothesized that neuroticism would have a moderating effect on the relationship between PSMU and hours per day of social media use.

**Method and Procedure**

**Participants**

The research study contained an original sample of ($N = 1,422$) community college students but retained ($N = 1,370$) participants who specified the number of hours per day they spent on social media. Participants were between the ages of 18-65, ($M = 23.80$, $SD = 7.80$). Students under the age of 18 as well as those who did not clearly indicate their age were excluded. Genders included were female ($n = 979; 71.5%$), male ($n = 347; 25.3%$), non-binary/non-conforming ($n = 19; 1.4%$), other ($n = 17; 1.2%$), and prefer not to answer ($8; 0.6%$). Of the 1,370 participants, 25 did not indicate race, of those who did: White ($532; 38.8%$), Hispanic/Latino ($411; 30.0%$), Asian/Asian American ($181; 13.2%$), Mixed race ($99; 7.2%$), Black/African American ($77; 5.6%$), Middle Eastern/Arab ($21; 1.5%$), Other ($15; 1.1%$), Native American/Indigenous ($9; 0.7%$).

**Materials**

**Social Media Use Questionnaire**

Problematic social media use was measured using the Social Media Use Questionnaire (SMUQ; Xanidis & Brignell, 2016). This scale was developed to assess dependence on social network sites. The SMUQ questions were initially generated based on the gambling addiction symptoms described in the 5th edition of the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 2013), the Internet Addiction Test (Young, 2017), and the Fagerstrom Test for Nicotine Dependence (Heatherton, et al., 1991). There were nine questions formatted on a 5-point Likert scale such as: “I lose track of time when I...”
use social media,” and “I feel guilty about the time that I spend on social network sites.”

**Hours Per Day**

An hours-per-day metric was based on the average time spent on a participant's preferred social media platform on their phone. Users were directed to their phone settings and instructed to record the screen time listed.

**10 Item Personality Inventory**

The Ten-Item Personality Inventory (TIPI) was used to measure neuroticism scores (Gosling, et al., 2003). The TIPI serves as a brief measure of personality using the Big-Five Inventory (BFI) personality dimensions (John, et al., 1991). The inventory uses ten 7-point Likert scale questions. Neuroticism was measured using two items, scoring opposite directions, on the TIPI in which they rated to the extent the description matched their personality. The two items consisted of the following descriptions: “Anxious, easily upset” and “Calm, emotionally stable.”

**Procedure**

**Recruitment**

Psi Beta’s National Research Committee designed the national research project questionnaire (Psi Beta, 2021) used for this study and sent out the study materials to participating chapters in the United State after meeting IRB requirements on their local campuses. Participants were recruited through convenience sampling via faculty and chapter members. Data were collected from October 10, 2021, to February 15, 2022.

**National Research Project Online Questionnaire**

The questionnaire consisted of 117 questions. After informed consent was obtained at the start of the questionnaire, participants answered 40 questions pertaining to social communication, college connectedness, and the number of semesters completed in college. Next, participants answered ten personality questions adapted from the TIPI. Then, participants were asked eight questions about shyness, and 30 questions about social media usage aims, followed by 11 questions from the social media use questionnaire. Next, one question asked participants to identify their most preferred social media platform, then another question sought the average time spent daily on social media. Finally, the rest of the questionnaire asked nine demographic questions.

**Data Collection**

This survey was administered through a Google forms link, participants under 18 years were removed from the dataset, and no identifiable information was collected.

**Results**

**Primary Analysis**

Hierarchical regression was conducted to predict problematic social media use from time spent on social media and neuroticism scores. The final model did not account for a significant amount of variance in problematic social media use, $F(3,1366), p < .001, R^2 = .165$. The coefficients for each step are shown in Table 1. Entered on model 1, time spent on social media accounted for a significant amount of variance in problematic social media use, $F(1,1368), p < .001, R^2 = .122$, supporting the hypothesis. Entered on the second model, neuroticism was unable to significantly improve the variance accounted for, $ΔF(2,1367), p < .001, ΔR^2 = .165$; therefore, not supporting the hypothesis. We were unable to conclude that interaction between time and neuroticism was significantly related to problematic social media use, $b = -.002 (β = -.001), p > .05$.

**Secondary Analysis**

Individual regression analyses were conducted to assess the individual relationships between PSMU, time, and neuroticism. We found that PSMU was significant and positively correlated with hours per day ($r = .349, p < .001$) (Figure 1). Additionally, we were able to conclude that the relationship between PSMU and neuroticism was significant with a positive correlation ($r = .235, p < .001$) (Figure 2).

**Discussion**

Valid measurements of neuroticism may have been a limiting factor in this study. The Big Five Inventory originally uses eight questions to measure
neuroticism while this questionnaire only used two questions. Other limitations include those typical with self-report studies such as the possibility of socially desirable, but inaccurate responses. The data for hours spent on social media was collected using self-report and could be inaccurate so it could be better to use a program that specifically monitors social media use. Further research using a more thorough assessment of neuroticism and a more reliable measurement of time spent on social media would be valuable to expose or rule out neuroticism as a moderating variable in the relationship between time spent on social media and PSMU.

In this study, neuroticism did not appear to be a moderating factor, however, the findings do support research by Blackwell and colleagues (2017) and Marciano and colleagues (2022), which found neuroticism to be a predictor of social media addiction. In the current study, the relationship between neuroticism and PSMU appears to be distinct from the relationship between hours of social media use and PSMU, meaning that individuals who spend a great deal of time on social media, even those scoring low in neuroticism, are susceptible to PSMU and may experience a negative psychological impact.

Table 1
Hierarchical Regression Results for Problematic Social Media Use

<table>
<thead>
<tr>
<th>Variable</th>
<th>$b$</th>
<th>$SE_b$</th>
<th>$\beta$</th>
<th>$R^2$</th>
<th>$\Delta R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td>0.122</td>
<td>0.122</td>
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<tr>
<td>Constant</td>
<td>21.429**</td>
<td>0.206</td>
<td>0.206</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>1.049**</td>
<td>0.076</td>
<td>0.349</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td>0.165</td>
<td>0.043</td>
</tr>
<tr>
<td>Constant</td>
<td>21.433**</td>
<td>0.201</td>
<td>0.201</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>0.983**</td>
<td>0.075</td>
<td>0.327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>1.164**</td>
<td>0.139</td>
<td>0.208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Model 3</td>
<td></td>
<td></td>
<td></td>
<td>0.165</td>
<td>0.000</td>
</tr>
<tr>
<td>Constant</td>
<td>21.434**</td>
<td>0.202</td>
<td>0.202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time</td>
<td>0.983**</td>
<td>0.075</td>
<td>0.327</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neuroticism</td>
<td>1.163**</td>
<td>0.139</td>
<td>0.208</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Time × Neuroticism</td>
<td>-0.002</td>
<td>0.049</td>
<td>-0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p < .05, **p < .01
Figure 1
Scatterplot of Problematic Social Media Use and Hours Per Day

Note. PSMU range is 9-45; calculated by the sum of responses to nine questions, each measured on a five-point Likert scale.

Figure 2
Scatterplot of Problematic Social Media Use and Neuroticism

Note. Neuroticism was measured by calculating the mean of responses to two questions on a seven-point Likert scale. The values shown in this figure are mean centered. PSMU range is 9-45; calculated by the sum of responses to nine questions, each measured on a five-point Likert scale.
Analyses in this study showed that hours per day of social media use was a significant predictor of PSMU. This indicates a potentially negative impact on an individual's mental health and well-being. This research supports findings in previous studies claiming that social media use can have significant associations with negative consequences such as depression (Lin et al., 2016), poor sleep quality, and low self-esteem (Woods & Scott, 2016). In the context of prior research and the characteristics of PSMU, the current study suggests that more time on social media could translate to more negative mental health outcomes.

Less time on social media may lead to fewer negative mental health outcomes. This idea could be explored through experimental research using interventions that limit participants’ social media use. A mixed design study comparing the mental health outcomes of the treatment group to the control group and changes of all participants over time could reveal more about the effects of reducing social media use. In the meantime, we should consider the relationship between time spent on social media use and PSMU, as well as its relationships with mental health shown in previous research. It may be valuable for people to monitor their social media use, assess both the benefits and harms they experience and implement strategies to use social media in ways and frequencies that enhance their wellbeing.

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