The Associations among Social Media Use, Young Adults' Wellbeing, and Mental Health During the COVID-19 Pandemic: The Moderating Roles of Motivation

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Abstract

The purpose of this study is to first test the impacts of the COVID-19 pandemic on Social Media Usage intensity and Social Media addiction problems among young adults by measuring two representative time stamps during the pandemic： when the pandemic had just broken out, most people were in some form of lockdown, and when all US universities resumed in-person classes 12 months later. Then our study will examine the bidirectional associations between SMU and mental health among young adults. We will also explore whether these associations will be mediated by particular motivations, such as social connectedness, entertainment, and self-expression. We hypothesize that the COVID-19 pandemic could lead to increase mental health problems. We also hypothesize that some of the mental health problems would be associated with particular patterns of social media use. We expected that there exist specific bidirectional associations between SMU and mental health, mediated by motivations.

Introduction

Until April 2020, the World Health Organization (WHO) had already reported over 555,581 cases of COVID-19 in 216 countries or territories, with almost 40,455 deaths. In response, governments worldwide introduced social-distancing policies, with more than half of the world's population on lock-down (Kirby et al., 2021). Specifically, strict quarantine policies aimed at restricting public movement and gatherings have been implemented worldwide. Countless individuals have suffered from the impact of coronavirus disease (COVID-19) on their mental health and well-being. Social media use (SMU), representing online electronic forums used for interacting with others, such as Facebook, Instagram, Twitter, and TikTok, has become an enormously prevalent tool for social interaction and identity presentation in the current society.

Because of the quarantine policies, individuals unprecedentedly rely on social media to connect with family and friends, enhance social support, and receive the latest updates about the pandemic (Zhao & Zhou, 2020). In addition, it is crucial to pay attention to young adults, who are the most frequent users of social media. Berryman et al. (2017) pointed out that SMU has become an essential element of their development process for interacting with peers and forming their identities. Due to the increasing access to social media among young adults during the pandemic, some scholars have expressed concern about potential adverse effects (Masciantonio et al., 2021; Zhao & Zhou, 2020; Boer et al., 2021). Will the pandemic impact young adults' social media use? What are groups of young adults likely to use social media in a more or less harmful way? What motivations are related to their social media use during the pandemic? And could certain type of social media influence young adults' mental health? Our current study addresses these questions in a median-sized sample of young adults.

Pandemics and SMU Addiction, Intensity, SMU Motives

Based on the above questions, the first aim of our present study is to investigate whether and how the pandemic changed young adults' SMUs. We will examine SMU here by splitting SMU into three dimensions: SMU intensity, SMU motivation, and SMU addiction. During the pandemic, many countries applied quarantine policies to avoid spreading the virus. For example, most US schools have asked their students to prevent in-person interactions and stay at home or in dormitories to take online courses since March 2020. On this account, many young adults were limited to what they could do in their homes or dorm rooms, which could vastly increase their reliance on social media to get connections with others. However, despite the positive aspects of social media use (SMU) during the pandemic, numerous studies have shown that SMU, especially disaster-relevant media exposure, may evoke lower mental health status. For example, people who were once exposed to 9/11 and Iraq War television reported higher levels of post-traumatic stress (PTS) symptoms. Meanwhile, Zhao & Zhou (2020) pointed out that disaster-related SMU was significantly related to mental health problems, such as depressive symptoms, STS, and anxiety disorders. Thus, our first goal is to investigate the pandemic influence on young adults' SMU intensity and SMU addiction and to explore their SMU motivation.

The second aim of the present study is to investigate the relationship between SMU and psychological outcomes among young adults. We distinguished SMU types, SMU intensity, and SMU addiction problems as three separate dimensions of SMU. Specifically, SMU intensity relates to how often people use social media. In contrast, SMU addiction problems indicate additional symptoms while using social media, such as losing control over SMU or neglecting other activities or hobbies as a result of SMU (Boer et al., 2021). Although young adults with

SMU addiction tend to have high SMU intensity, high SMU intensity does not always suggest loss of control over SMU or interfering with other living aspects. In other words, young adults who engage in high SMU intensity may be able to control their SMU and balance it with a healthy lifestyle (Masciantonio et al., 2021). On the other hand, young adults with low mental health may not increase their SMU intensity. Many young adults utilize social media extensively to maintain and strengthen their social engagement with peers (Boer et al., 2021).

Furthermore, research shows that both SMU intensity and SMU addiction problems are negatively associated with young adults' mental health, well-being, and other emotional problems (Boer et al., 2021; Twenge, Martin, & Campbel, 2018). Meanwhile, SMU types could positively or negatively relate to young adults' psychological outcomes mediated by particular motivation (Masciantonio et al., 2021). Given that these three SMU separate dimensions differ conceptually, they could have differential associations with psychological outcomes. In the following paragraphs, I will sequentially and theoretically elaborate on the relationships between SMU types and psychological outcomes, SMU addiction and psychological outcomes, and motivation effects as mediators.

Unfortunately, we know little about the directionality of these associations and the underlying mechanisms. Thus, the second aim of this study will address these gaps by investigating bidirectional associations between three dimensions of SMU and psychological outcomes, including well-being, mental health, and perceived stress, by managing motivation as mediators in these associations. As a result, this study intends to advance current information about the potential association between SMU behaviors and mental health, which is crucial considering the prominent role that social media plays in young adults' daily lives.

SMU Type and Mental Health, Well Being

The term "Social Media" is frequently used as an over-general term that ignores the variation between different types. Few studies investigated the specific effects of different social media types on young adults' well-being and mental health. Pittman and Reich (2016) indicated that using image-based platforms, such as Instagram, TikTok, and Snapchat, was positively correlated with well-being and negatively with loneliness. However, neither such positive nor negative associations appear on text-based platforms like Twitter. Furthermore, Masciantonio et al. (2021) addressed that the passive usage of Facebook was negatively related to well-being, mediated by social comparison; active use of Instagram was positively associated with life satisfaction but also harmed mental health, mediated by social support; the active usage of Twitter was associated with higher life satisfaction mediated by social comparison, but the passive use with upward social comparison was negatively correlated with general psychological outcomes. Thus, the above results demonstrate that in looking at the relations between SMU and well-being, it is essential to take into account both the nature of the platforms that are being used and the reasons why they are being used. We need to take the differences among SMU types into account to investigate how SMUs impact young adults' psychological outcomes accurately.

SMU Intensity and Mental Health, Well Being and Perceived

SMU intensity may not be associated with mental health, but its impact could be different under the pandemic influence. Several cross-sectional research suggested that adolescents' SMU intensity is associated with lower life satisfaction and more depressive symptoms, although there were small associations between SMU intensity and these psychological outcomes (Twenge, Martin, & Campbel, 2018a; Boer et al., 2021). For example, Twenge, Martin, & Campbel (2018a) pointed out that only if young adults are low in in-person social interactions and those

high in SMU reported significantly increased levels of depressive symptoms. This implies that SMU intensity doesn't seem to displace in-person social interaction among individuals but is more likely due to individual differences in sociability.

Nevertheless, SMU intensity may directly lead to less in-person social interaction due to the quarantine policy during the pandemic, which is less influenced by individual differences in personality or mental health status. Studies indicated that the associations between SMU intensity and mental health could be bidirectional: adolescents who spend much time on social media may be more vulnerable to mental health issues because they spend less time on face-to-face activities that are crucial for their mental health (Underwood & Ehrenreich, 2017). On the other hand, adolescents with more mental health problems may be more likely to use social media to seek emotional and social support for their problems (Radovic, Gmelin, Stein, & Miller, 2017). We assume this bidirectional association could be strengthened during the pandemic.

However, other research indicated non-significant bidirectional associations between SMU intensity and mental health. Results suggested that SMU intensity was not or only weakly related to lower mental health in some other studies that placed young adults' SMU intensity and SMU addiction problems with mental health in one model (Van den Eijnden, Koning, Doornwaard, Van Gurp, & Ter Bogt, 2018; Boer et al., 2022), which implies that previously observed negative associations between SMU intensity and mental health may be attributed to a confounding influence of SMU addiction problems.

Thus, these assumptions and findings hang over the impacts of SMU intensity on mental health, especially during the pandemic.

SMU Addiction Problems and Mental Health, Well Being, and Perceived Stress

As mentioned above, many studies have shown that more serious SMU addiction problems are related to more mental health problems, such as anxiety disorder, depressive symptoms, and other emotional problems (Shensa et al., 2015; Zhao & Zhou, 2020). Therefore, using SMU addiction to predict mental health may not be that noteworthy. Instead, we plan to compare whether people who are high vs. low on SMU addiction show different patterns of SMU and whether those different patterns are associated with better or poorer mental health. Compared with young adults who merely intensively use social media, those with SMU addiction problems could more easily have mental health issues. More specifically, young adults with higher SMU addiction may have more diminished ability to control their impulses; in other words, they are less likely to control their emotions, thoughts, and behaviors, making social media dominate their lives. Then, young adults could be harmed by this loss of agency, which may easily lead to mental health problems. Overall, an essential thing we want to investigate is whether specific patterns of SMU for particular purposes are supportive of mental health while other patterns are more debilitative.

Mediating Process

The proposed bidirectional pathways between SMU and mental health, well-being, and perceived stress may be driven by several underlying motivations, such as romance, social activity, and social connectedness. However, the corresponding detailed associations haven't received enough empirical attention (Kardefelt-Winther, 2014). To gain a better understanding of how SMU is related to mental health and well-being, numerous studies have suggested taking the potential intermediate variables into account. For example, Blau (2011) indicated that young adults with SMU problems might engage in high levels of self-disclosure on social media. Meanwhile, Pera (2018) shows that adolescents with SMU problems may perceive their peers'

appearance as better than their own, leading to upward social comparison on social media. Based on the Uses and Gratification theory, users actively choose a specific media type to meet their needs. Specifically, people make choices based on their evaluations of how their demands can be met. Then, gratifications obtained through a particular medium can lead to positive attitudes, influencing people's behaviors and continued usage (Shen & Wang, 2019).

MP-Motivation and SMU Intensity

Even though research stated small associations between SMU intensity and mental health, previous studies have established the relationship between motivation and excessive SMU intensity (Lee et al., 2014; Park, 2003). For instance, Park (2003) found that phone usage dependence significantly correlated with motivation variables such as loneliness, killing time, and escapism. Additionally, users may use media to cope with stress when they confront social and interpersonal stress, which could generate SMU dependence and increase SMU intensity as well (Shen & Wang, 2019). Such SMU intentions could be generalized into larger motivation categories like entertainment, social connection, and support. Meanwhile, based on the above findings, I assume that people tend to become more heavily reliant on phones to fulfill their inner needs.

MP-Motivation and SMU Type

Different types of social media can differ in their major functionalities to satisfy various needs and motivations of users (Buzeta et al., 2020). In other words, users tend to use particular platforms that best match their needs. For example, individuals use Facebook mainly for seeking social support and self-presentation; Instagram allows users to satisfy the needs of self-documentation, self-promotion, and see what others are doing; Twitter is primarily used for informational needs (Masciantonio et al., 2021). Meanwhile, after individuals use social media to

compensate for their needs, there exist different corresponding feelings and effects on their mental health and well-being. Based on the Uses and Gratifications (U&G) perspective, when people are motivated by killing time, and the types of social media they use are for entertainment and passive, they tend to have a reduced sense of meaningfulness (Cho et al., 2021). Thus, Masciantonio et al. (2021) mentioned the critical role of motivation as the mediator between different types of social media and well-being. More specifically, passive using Facebook was negatively associated with well-being, mediated by upward social comparison. In other words, when people keep browsing Facebook, they are inclined to compare themselves with people they perceive to be superior, which could harm their mental health. For example, they may compare profiles, posted photos, or interactions with friends and consider themselves not as distinctive as others. I will be detailing what has been observed from previous studies about these relations below.

Moreover, well-being was negatively correlated with social comparison, whereas Instagram and LinkedIn increased social comparison and Twitter decreased it (Chae, 2018). However, Masciantonio et al. (2021) held the opposite conclusion: there was no relationship between Instagram usage and upward social comparison, which generally makes how different types of social media influence well-being and mental health inconclusive. Thus, it is meaningful to see how different types of social media with various functionalities influence young adults' psychological outcomes, mediated by young adults' motivations.

MP-Motivation and Addiction

Kardefelt-Winther (2014) and Marino et al. (2018) stated that SMU problems can be better understood as "a coping strategy grounded in understandable, but not always healthy" motivations. Furthermore, understanding SMU problems are more about learning and the

interaction between the individuals, cultures, and environment instead of merely focusing on casual factors (Wood, 2008). For example, social comparison is a typical SMU motivation among young adults, while increased social comparison could lead to mental health problems (Boer et al., 2021). Specifically, young adults with social media addiction problems often place excessive value on social media, making them mistakenly believe the online world towards idealistic self-presentations as a kind of social reality. On this account, they may be unable to put others' overly flattering depictions into reality, which gradually traps young adults into the tendency to make upward social comparisons (Boer et al., 2021). More specifically, young adults may perceive their peers' figures, appearance, and abilities as superior to their own, making it easier to feel anxious and lower self-esteem and body evaluations (Faelens et al., 2021).

Meanwhile, SMU problems would lead to decreased motivation, which may reduce mental health. For instance, considering young adults with SMU addiction problems often treat SMU as one of the essential activities in their daily life, and abstaining from it could cause anxiety and stress. So they may displace SMU for face-to-face social activities with family and friends, which in the long run may come at the expense of offline contacts and academic accomplishment (Salmela-Aro et al., 2017). Thus, we anticipated first utilizing SMU addiction measures as a marker to sort problematic SMU. Then, I assume that decreased or increased different types of motivations may result from problematic SMU, which correspondingly reduce people's mental health and well-being and increase perceived stress.

Nevertheless, the relations are likely bidirectional, with problematic usage patterns undermining mental health but also with mental health issues leading to problematic usage. More specifically, young adults with poorer mental health may have negative self-perceptions after being exposed to their peers' idealized appearances on social media, which may reinforce their

social comparison with others (Boer et al., 2021). Meanwhile, young adults with poorer mental health and well-being may have less face-to-face interaction with their peers because peers may consider them less appealing to be friends with (Connolly et al., 1992). Thus, in order to compensate and find relief for these motivations, which may stem from either poor mental health or perceived stress, young adults may become more dependent upon and preoccupied with SMU.

Additionally, the Compensatory Internet Use theory pointed out that individuals with low psychological well-being may depend on SMU to alleviate their negative emotions and cope with life problems, which in turn implies that they were more likely to use social media based on particular motivations (Kardefelt-Winther, 2014). Meanwhile, Caplan et al. (2009) empirically indicated that the motivations of escapism and achievement mediate the relationship between well-being and online entertainment. On this account, I wanted to take a careful, in-depth look at how college students have been using social media during the pandemic, and I wanted to explore whether certain patterns of usage, with certain motivations, are differentially associated with poorer or better mental health.

Current Study

Using the longitudinal data representing two timestamps during the pandemic outbreak among US young adults, the present study will examine the impact of the pandemic on SMU and the bidirectional associations between young adults' SMU types and SMU intensity, as well as SMU addiction and psychological outcomes. We will focus on mental health, well-being, and perceived stress as representative variables of psychological outcomes. Drawing on the literature reviewed above, we hypothesized:

H_{1a}: Young Adults would report higher SMU intensity at the second timestamp than at the first timestamp.

H_{1b}: Young adults' responses would indicate more severe SMU addiction problems at the second timestamp than the first timestamp.

H_{2a}: We predicted that young adults who are high vs. low on SMU addiction show different patterns of SMU, and those different patterns are associated with better or poorer mental health. We did not advance specific predictions for specific SMU patterns but examined their relations in a more exploratory way.

H_{2b}: We also predicted that SMU intensity would be unrelated to mental health, physical health, well-being, and perceived stress in any direction among young adults.

H_{2c}: We hypothesized that lower well-being and mental health and higher perceived stress would increase SMU addiction problems.

H_3: Finally, we expected to explore if particular motivations mediated the hypothesized bidirectional associations.

Methods

Participants and Procedure

Participants were recruited from a large private university in the Central United States, beginning in the middle of November and ending in early December 2021. Students self-selected into the study by signing up for it in SONA to earn course credits. Most of them are undergraduates aged from 18 to 22, defined as young adults. The final sample was 244 participants, with 67 males and 137 females.

This study received the Vanderbilt University Institutional Review Board (VUIRB) approval in November 2021. The survey was 53 pages long. Participants read a consent form with a brief introduction to our study. If they indicated their agreement with the form, they clicked on the "I agree" button to begin the survey. The survey took approximately 60 minutes to

complete, and they were granted two credit hours for their participation. Participants were first asked to recall what they were doing and what they were like during September 2020 (during the Fall semester a year ago from when they answered the questions). They were first asked some questions about where and how they took classes. Then, they were asked about SMU intensity, SMU motivations, SMU addictions, well-being, mental health, and perceived stress respectively. All the participants complete the measures in the same order. After they finished the first part of the survey, they were led to focus on the past month of the time they answered the survey, which was October or November 2021. Then, they answered the same group of questions. At the end of the study, participants answered a series of demographic questions.

Design

The experiment used a correlational design. Participants were anonymously asked about their SMU types, SMU intensity, SMU addiction, SMU motivation, well-being, mental health, and perceived stress at two different time points (September 2020 and September 2021) since the start of the pandemic, with one year of the time interval. Participants were enrolled as they voluntarily signed up for this study and the survey is entirely anonymous. For both time points, participants were asked to recall what it was like or feeling for them at that time and answer related questions. The survey is 53 pages long and takes around 40 minutes to complete. Because this is an online survey, participants were instructed to complete the survey in their own space.

Materials

SMU Intensity and SMU types. We designed a scale to measure SMU intensity. We estimate this by asking the total amount of time used per day and each social media type usage frequency. The part measuring how much time per day is spent using social media provided 13 answers, ranging from 0 “less than 1 hour” to 12 “larger than 12 hours”. The part measuring the frequency

usage on a specific platform is a 20-item scale. All items were on a 7-point Likert-type scale anchored by 0 *I didn't use this platform* to 6 *5 or more times a day*. Example items include:" Facebook," "Twitter," "YouTube," "LinkedIn," and "Instagram." Participants indicated their frequency of use on each of the items like above.

SMU Motivation and SMU types. Participants' motivation for using social media was assessed using a modified and expanded version of the Scale of Motives for Using Social Networking Sites (SMU-SNS) that included 18 items (Pertegal et al., 2019). All items were on a 5-point Likert-type scale anchored by 1 *Not at all* to 5 *A great deal*. A sample item is "To get encouragement and support from others." The expanded part of the modified scale contains a follow-up question to ask participants to indicate which platforms they used for each purpose. It was the same items as used in the previous measure.

SMU Addiction Problem. The 8-item Social Media Addiction Questionnaire (SMAQ) was used to measure the intensity of addiction levels using social media (Hawi & Samaha, 2016). SMAQ, stemming from the Facebook intrusion Questionnaire, is a scale with great psychometric properties and includes behavioral addiction symptoms. All items were on a 5-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*) and summed to indicate higher levels of addiction. Sample items include "The thought of not being able to access social media made me feel distressed," "I lost track of how much I was using social media," and "I felt connected to others when I used social media."

Well-being. The 9-item Positive Affect & well-Being scale (NIH Toolbox, 2020; Salsman et al., 2014, $\alpha = .87$) was used to measure participants' life satisfaction and an overall sense of purpose. All items were on a 5-point Likert-type scale ranging from 1 (*never*) to 5 (*always*). Sample items include "I had a sense of well-being," "I felt hopeful," and "My life was satisfying."

Mental Health. Mental health was measured and elicited from the 10-item PROMIS Global Health Short Form (NIH Toolbox). This measure is generally scored as separate 4-item subscales for physical and mental health (Kirby et al., 2021). This led to 2 four-item scales for physical health ($\alpha = .74$) and mental health ($\alpha = .70$). The sample items include "In general, how would you rate your mental health, including your mood and ability to think?" and "How would you rate your satisfaction with your social activities and relationships?". These items are on a 5-point Likert scale anchored by 1 *Excellent* and 5 *Poor*, which is in the direction of decreasing health.

Perceived Stress. The 10-item Perceived Stress Scale (Cohen et al., 1983; $\alpha = .81$) measures how individuals' current circumstances are appraised as stressful (Kirby et al., 2021). We changed the time frame from the last month to the past week. All items were on a 5 Likert-type scale ranging from 1 *never* to 5 *very often*, which is in the direction of increased stress. Sample items include "How often have you been upset because of something that happened unexpectedly?" and "How often have you felt nervous or "stressed"?".

Demographics. We asked students about their Age (1 *under 20* to 7 *Above 21*), Gender (1 *male*, 2 *female*, and *Others*), Country, ethnic or racial background, home (*city*, *state*, and *country*), and political perspectives.

Data Reduction

Considering we measured 18 SMU motivations in total and we wanted to make our work more parsimonious, I conducted data reduction analyses using Jamovi, Python, and R packages, including Exploratory Factor Analysis, Clustering Analysis, and Principal Component Analysis. I first cleaned the data, generated the correlation matrix, and conducted correlation and regression analysis. I then conducted parallel analysis, oblique rotations, and goodness of fit based on the matrix to derive more parsimonious and specific factors.

Expected Results

To test the first hypothesis that young adults would report significantly higher SMU (SMU intensity and SMU addiction problems) at the second timestamp, we will conduct t-tests with the two timestamps of the COVID-19 pandemic as the independent variable. SMU intensity and SMU addiction as the dependent variable.

To test the second hypothesis, we would split the sample into high vs. low addiction groups (probably a median split) and then do a MANOVA looking for differences in SMU types as a function of addiction. Then following identifying different SMU patterns, we would test the relations of these patterns to mental health using regression analysis. We expected that young adults with and without SMU addiction symptoms would use SM differently. Those with addiction symptoms would use SM in ways that are positively correlated with poor mental health across the sample. We expected that there would also exist a significant correlation between certain SMU types and mental health problems. For example, we expected that increasing usage of Instagram would be positively associated with upward social comparison, which is negatively related to perceived stress. However, there won't exist a positively significant correlation between SMU intensity and mental health problems.

We will also conduct structural equation modeling to test the mediation process. We predict that the significant association is mediated by particular motivations such as higher upward social comparison and lower social connection.

Discussion

Whether the COVID-19 pandemic impacts young adults' SMU intensity and SMU addiction problems and whether SMU is responsible for mental health problems among young adults remain an area of contention in the existing literature. Thus, our study will explore the impacts of

the pandemic on SMU intensity and addiction among young adults by measuring two timestamps representing two statuses of the pandemic waves. Then, our study will examine bidirectional associations between SMU and mental health. We distinguished SMU as three separate dimensions: SMU type, SMU intensity, and SMU addiction problems. We will also examine whether particular motivations mediate the proposed bidirectional associations.

If the current study yields significant results, it will have practical implications and be a powerful stepping-stone for my follow-up study. More specifically, if we can understand what particular SMU types result in mental health problems, we can focus on selected SMU types and study various behavioral and emotional aspects of SMU at a more refined level. We can track the feature-level uses of selected SMU types based on results from the current study and track the change in young adults' dynamic emotional status based on what specific features they use in social media. Then, we can further understand how SMU results in mental health problems.

The current study has several limitations. First, our measured SMU intensity combines passive and active social media activities. However, studies indicated that disentangling these independent effects was necessary to examine further how SMU intensity influences mental health. Secondly, the data we collected for timestamp 1 relied on participants' retrospective memory, which may lead our results to bias based on each participant's memory accuracy.

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