



A biopsychosocial approach to understanding social media addiction

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Abstract

Despite the public's awareness of social media addiction, academic research in this realm remains limited. Filling this gap in the literature, the current study sought to understand predictors of social media addiction across four of the most popular social media platforms: Facebook, Twitter, Snapchat, and Instagram. Regression analyses showed support for a biopsychosocial approach, demonstrating that biological (age), social (including gender, intensity of use, need for social media, and social comparison), and psychological factors (specifically stress, empathic concern, conscientiousness, and depression) accounted for over 50% of the explained variance in social media addiction. Findings demonstrate that although younger individuals are highly susceptible to social media addiction, users who manifest empathy toward others may have an enhanced psychological resiliency against addiction.

KEY WORDS

biopsychosocial approach, mental health, problematic social media use, social media addiction, social media intensity

1 | INTRODUCTION

The addictive nature of social media has received newsworthy attention, with headlines warning that "Twitter is harder to resist than cigarettes" (Meikle, 2012) and calling social networking "as habit-forming as crack cocaine" (Elgan, 2015). As a result, therapists offer "social media dependency" packages (Kessler, 2016), and counselors recommend "social media diets" (Smith, 2014). Yet despite the public's awareness of social media addiction, academic research remains limited. Only recently have scholars demonstrated that individuals with major depressive disorder report significantly higher social media addiction scores (Robinson et al., 2019).

By definition, social media offer "a way for individuals to maintain current relationships, to create new connections, to create and share their own content, and, in some degree, to make their own social networks observable to others" (Treem, Dailey, Pierce, & Biffl, 2016, p. 770). According to the Pew Research Center, the most popular social media platforms include Facebook, Instagram, Pinterest, LinkedIn, and Twitter, and most people visit social media on a daily

basis (Pew Research Center, 2019). With the growth of social media use, therapists have reported an uptick in clients with social media addiction (Cohen, 2009), leading scholars to explore this construct.

"Social media addiction" encompasses three main attributes: (a) being overly concerned about social media, (b) being driven by a strong motivation to use social media, and (c) devoting so much time and effort to social media that it impairs other aspects of life, such as social activities, work or school, relationships, and overall well-being (Andreassen & Pallesen, 2014). Whereas intense social media users remain in control, those addicted to social media will continue to compulsively use social media even if their social media use results in unwanted consequences, such as lack of sleep or relational conflicts (Andreassen, 2015).

Although several studies have investigated individual factors that contribute to social media addiction, the literature is dispersed across various disciplines and foci. Thus, we lack a unifying, theoretically driven explanation of social media addiction. This study seeks to bridge this gap in research by examining how multiple factors influence social media addiction. Specifically, we draw upon a

biopsychosocial systems model of addiction (Griffiths, 2005; Marlatt, Baer, Donovan, & Kivlahan, 1988; McMurran, 1994) to suggest that biological, social, and psychological factors all influence social media addiction. This interdisciplinary approach conceptualizes addiction as a result of an individual's (a) "biological and/or genetic predisposition," or genetic vulnerability/susceptibility, (b) "social environment," and (c) "psychological constitution" (Griffiths, 2005, p. 15).

2 | BIOLOGICAL FACTORS

Previous research suggests that age is likely to influence social media addiction (Andreassen, Torsheim, Brunborg, & Pallesen, 2012). In general, younger people are more likely to engage in online activities (Hargittai, 2004) and increased exposure and use of social media is associated with risk for addiction (Hong, Huang, Lin, & Chiu, 2014; Koc & Gulyagci, 2013; Vishwanath, 2014). Andreassen et al. (2012, 2013) have confirmed an inverse relationship between age and social media addiction.

3 | SOCIAL FACTORS

Beyond biological reasons for social media addiction, scholarship suggests four social factors that likely play a role: gender, how intensely individuals use social media, the extent to which social media meet people's needs, and the social comparisons individuals make on social media.

First, gender differences in the nature of online activities have been noted in several studies. Compared to females, males have a greater tendency to become addicted to online gaming, cyber pornography, and online gambling, whereas, females are more likely to become addicted to social media, texting, and online shopping (Andreassen et al., 2013; Andreassen et al., 2016; Davenport, Houston, & Griffiths, 2012; Durkee et al., 2012; Ferguson, Coulson, & Barnett, 2011; Kuss, Griffiths, Karila, & Billieux, 2014; Maraz et al., 2015; Van Deursen, Bolle, Hegner, & Koomers, 2015).

Second, studies suggest a relationship between the intensity of use and social media addiction. Vishwanath (2014) discovered that individuals who frequently utilized Facebook were significantly more likely to be habitual Facebook users. Other work has confirmed a relationship between frequency of any social media use and Facebook addiction (Hong et al., 2014; Koc & Gulyagci, 2013) and similar constructs like problematic smartphone use (Wolniewicz, Rozgonjuk, & Elhai, 2020). Descriptive studies also suggest a relationship between the intensity of use and social media addiction (Cabral, 2011; Olowu & Seri, 2012).

Third, users' met needs for social media might be related to social media addiction. Sofiah, Omar, Bolong, and Osman (2011) noted a significant relationship between students' motives for Facebook use and Facebook addiction. In addition, Pelling and White (2009) found that social media users' need for belongingness significantly predicted addictive tendencies toward social media.

Fourth, we propose *social comparison* as another social predictor of social media addiction. Social comparison theory (Festinger, 1954) suggests that people are driven to assess themselves through comparison with others. We get a sense of our abilities and self-worth from comparing ourselves to those who are better than us, through upward comparison, as well as those who are worse than us, through downward comparison. Although scholars have yet to explore social comparisons social media addiction in particular, research has discovered relationships between social comparisons and social media use (de Vries, Möller, Wieringa, Eigenraam, & Hamelink, 2018; Lee, 2014; Vogel, Rose, Okdie, Eckles, & Franz, 2015).

4 | PSYCHOLOGICAL FACTORS

Finally, prior research lends us to believe there are four psychological predictors of social media addiction: stress, empathic concern, conscientiousness, and depression.

To begin, previous studies have demonstrated that stress might be connected social media addiction, as scholars have found a relationship between stress and Internet addiction in general (Tang et al., 2014; Yan, Li, & Sui, 2014; Yoo, Cho, & Cha, 2014). Because of the relationship between stress and Internet addiction, stress likely influences social media addiction. In a study regarding the association of perceived stress and problematic social media use, Hou et al. (2017) found that as perceived stress increases, so does problematic social media use.

In addition to stress, individual differences in empathy might also affect social media addiction. Although studies have not investigated how a lack of empathy might be related to social media addiction in particular, the literature clearly shows a relationship between low empathy and Internet addiction (Jiao, Wang, Peng, & Cui, 2017; Melchers, Li, Chen, Zhang, & Montag, 2015). As these authors have suggested, people who lack empathy are less socially competent, which has been linked to people's Internet use (Engelberg & Sjöberg, 2004). Scholars have distinguished between various facets of empathy, including *perspective-taking* (spontaneously adopting others' points of view), *empathic concern* (experiencing sympathy and compassion for unfortunate others), and *personal distress* (feeling discomfort in response to others' extreme distress) (Davis, 1983). If social media users do not exhibit the ability to share and understand others' emotions, they might be more inclined to use social media rather than in-person contact for their social interactions and, which could lead to social media addiction.

Next, research has demonstrated a significant relationship between low *self-esteem* and social media addiction. Several studies have suggested that individuals with weak self-esteem risk social media addiction (Andreassen, Pallesen, & Griffiths, 2017; Bánya et al., 2017; Hawi & Samaha, 2017; Wilson, Fornasier, & White, 2010). People with low self-esteem tend to rely on social media to enhance their self-image or social capital (Steinfield, Ellison, & Lampe, 2008), which may lead to social media addiction. When a person who feels

unlikable or socially incompetent turns to social media and Facebook "friends" to enhance their self-evaluation, that individual is likely to become addicted to social media (Andreassen et al., 2017).

Previous literature has also considered personality aspects predictive of social media addiction. Specifically, scholars have found that a person's *conscientiousness*, or one's ability to be organized and prompt, has been negatively associated with social media addiction (Andreassen et al., 2012; Wilson et al., 2010). As these authors explain, people who are conscientious "give less priority to activities such as Facebook in order to fulfill other obligations and meet deadlines for tasks they have undertaken," and are less likely to be addicted to social media (p. 511).

Finally, scholarship has demonstrated a potential relationship between *depression* and social media addiction. In a recent survey of 1,749 Americans, Shensa et al. (2017) demonstrated a positive association between participants' depressive symptoms in the past week and social media addiction. Similarly, Koc and Gulyagci (2013) found that state depression positively predicted Facebook addiction.

5 | EXAMINING SOCIAL MEDIA ADDICTION THROUGH A BIOPSYCHOSOCIAL APPROACH

Although studies demonstrate several possible predictors of social media addiction, research has yet to demonstrate how all three of these factors explain social media addiction. Moreover, scholars have primarily focused on Facebook, ignoring other platforms, such as Twitter, Instagram, and Snapchat. To provide a more robust theoretical understanding of how these multiple aspects influence social media addiction, we propose that biological (age), social (including gender, intensity of use, need for social media, and social comparison) and psychological factors (specifically stress, empathic concern, conscientiousness, and depression) will all predict social media addiction.

6 | METHODS

6.1 | Participants

Participants included 290 undergraduate students recruited through Mass Communication and Psychology courses. To be included in the study, participants had to be at least 18 years old and indicate use of at least one of four social media applications (Facebook, Twitter, Snapchat, or Instagram). Participants received course credit and extra credit for completing this survey or others. On average, participants were 82.1% female, with a mean age of 20.4 years ($SD = 3.7$). The race/ethnicity breakdown for this study was 56.5% Caucasian, 10.9% African American, and 29.0% Latino/Hispanic.

6.2 | Procedures

This study was approved by the Institutional Review Board and informed consent was obtained for each participant. After providing consent, participants completed an anonymous online survey with the following measures.

6.3 | Biological factors

Participants were asked to identify their age. As demographic controls, participants were also requested to provide their race/ethnicity, average hours of sleep each night, and whether they were currently diagnosed with a physical health condition.

6.4 | Social factors

Participants were asked to which gender they identified. Intensity of social media use was measured by the Social Media Intensity Scale (Ellison, Steinfield, & Lampe, 2007). Participants completed the scale for each of the four social media outlets used: Facebook, Snapchat, Instagram, and Twitter. For example, one item from this measure stated, "Facebook is part of my everyday activity." The Facebook scale ($M = 2.49$, $SD = 0.31$) achieved an alpha reliability of .88, the Snapchat scale's ($M = 3.76$, $SD = 0.35$) alpha reliability was .91, the Instagram scale ($M = 3.38$, $SD = 0.25$) achieved an alpha reliability of .92, and the Twitter scale's ($M = 3.44$, $SD = 0.21$) alpha reliability was .94.

Need for social media was assessed with the Need for Participating in Social Media Scale (Park, Kee, & Valenzuela, 2009), which used a 6-point Likert scale ranging from 1 (*strongly disagree*) to 6 (*strongly agree*) to assess participants' motivations to use social media. This 16-item scale asked participants to report how they used social media, responding to statements like, "to get peer support from others" and "to get useful information about product/services." The scale's ($M = 3.69$, $SD = 0.93$) alpha reliability was .85.

To measure participants' upward and downward comparisons, participants were asked to respond to two statements on a 5-point Likert scale that ranged from 1 (*not at all*) to 5 (*a great deal*). These statements were, "When comparing yourself to others on social media, to what extent do you focus on people better off/worse off than you?"

6.5 | Psychological factors

To measure participants' stress, we used the Perceived Stress Scale (Cohen & Williamson, 1988), a 10-item scale assessing how often a particular thought or feeling occurred in the past month. Participants responded to statements on a 5-point Likert scale that ranged from 1 (*never*) to 5 (*very often*). A sample item from this measure asks, "In the last month, how often have you felt that you were unable to

control the important things in your life?" The overall scale ($M = 2.14$, $SD = 0.53$) achieved an alpha reliability of .80.

The Interpersonal Reactivity Index (Davis, 1983) was used to evaluate three subscales of empathy: Perspective-Taking (e.g., "I try to look at everybody's side of a disagreement before I make a decision"), Empathic Concern (e.g., "I often have tender, concerned feelings for people less fortunate than me"), and Personal Distress (e.g., "I sometimes feel helpless when I am in the middle of a very emotional situation"). The Perspective-Taking subscale ($M = 2.68$, $SD = 0.34$) achieved an alpha reliability of .76, the Empathic Concern subscale ($M = 2.89$, $SD = 0.23$) achieved an alpha reliability of .75, and the Personal Distress subscale ($M = 1.72$, $SD = 0.48$) achieved an alpha reliability of .71.

We measured participants' self-esteem with the Rosenberg Self-Esteem Scale (Rosenberg, 1965), which involved 10 items scored on a 4-point Likert scale from 1 (*strongly disagree*) to 4 (*strongly agree*). A sample item from this scale includes the statement, "I feel that I have a number of good qualities." The scale's ($M = 2.94$, $SD = 0.31$) alpha reliability was .89.

Conscientiousness was assessed with the Big Five Personality Inventory (John & Srivastava, 1999). Participants indicated the extent to which they agreed to statements on 5-point Likert scale ranging from 1 (*disagree strongly*) to 5 (*agree strongly*). One item from this measure states, "I see myself as someone who perseveres until the task is finished." The conscientiousness scale ($M = 3.50$, $SD = 0.71$) achieved an alpha reliability of .73.

Finally, we measured depression with the Patient Health Questionnaire (Kroenke, Spitzer, Williams, & Löwe, 2010), a validated instrument used to assess Axis I psychopathology (major depression, anxiety, somatization, and panic disorders). The Major Depression subscale is a 9-item measure measuring the extent to which the participant has been bothered by certain problems in the last 2 weeks, such as "little interest or pleasure in doing things." The overall scale ($M = 0.88$, $SD = 0.35$) achieved an alpha reliability of .90.

6.6 | Outcome variable

The outcome variable, social media addiction, was measured using the Bergen Social Media Addiction Scale, which is anchored in general addiction theory (Andreassen et al., 2012). To ensure content validity, the 6-item scale was created to reflect the six core components of addiction: salience, mood modification, tolerance, withdrawal, conflict, and relapse (Andreassen et al., 2012). The scale also aligns with the aforementioned conceptualization of social media addiction (Andreassen & Pallesen, 2014), since it measures people's concern about social media (e.g., "How often during the last year have you spent a lot of time thinking about social media or planned use of social media?"), motivation to use social media (e.g., "How often during the last year have you felt an urge to use social media more and more?"), and perception that social media has impaired other aspects of life (e.g., "How often during the last year have you used social media so much that it has had a negative impact on your

TABLE 1 Social media addiction: demographic comparisons

	Descriptives Means (SD) or Pearson r	Statistical significance
Race/ethnicity		
Caucasian	2.7 (0.9)	NS
African American	2.4 (0.8)	
Latino/Hispanic	2.6 (1.0)	
Sleep (average hours/night)	$r = -.004$	NS
Physical health condition		
Yes	2.4 (0.9)	NS
No	2.6 (0.9)	

job/studies?" This scale asked participants to think about their social media use broadly (across all platforms) and was scored on a 5-point Likert scale ranging from 1 (*very rarely*) to 5 (*very often*). The overall scale ($M = 2.63$, $SD = 0.45$) achieved an alpha reliability of .85.

6.7 | Statistical analyses

A hierarchical linear regression model was developed to determine to what degree biological, social, and psychological factors predict social media addiction. To determine significance, two-tailed tests with an alpha level = .050 was used. All analyses were conducted using SPSS version 24.0.

7 | RESULTS

All data were screened for missing values and outliers. Additionally, the participants who did not meet the age criteria or the criteria of using at least one of the social media outlets were excluded. Demographic comparisons (see Table 1) revealed no significant differences between race/ethnicity, average hours of sleep, or a physical health condition on the outcome variable (all $p > .050$). All relationships between the predictor variables—biological, social, and psychological factors—and the outcome variable, social media addiction, are reported in Table 2.

Table 3 presents the results from the hierarchical linear regression. The Variance Inflation Factor values ranged from 1.001 to 2.074, indicating no multicollinearity between the predictor variables. In Block 1 of the regression, we entered age as a biological variable. As expected, age was a significant predictor, $\beta = -.046$, $p < .010$, resulting in an R^2 of .026, $p < .010$.

In Block 2 of the regression, we entered social factors. Gender was not a significant predictor of social media addiction, $\beta = .104$, $p > .050$. Participants' intensity of use of Facebook, $\beta = .027$, $p < .001$, intensity of use of Snapchat, $\beta = .031$, $p < .010$, and intensity of use of Twitter, $\beta = .013$, $p < .050$, were all significant predictors of social media addiction. Participants' intensity of use of Instagram, $\beta = .004$,

TABLE 2 Social media addiction: biological, social, and psychological factors

	Descriptives Means (SD) or Pearson/Spearman <i>r</i>	Statistical significance
<i>Biological factors</i>		
Age	<i>r</i> = -.214	<i>p</i> < .001
<i>Social factors</i>		
<i>Gender</i>		
Males	2.3 (0.8)	<i>t</i> = -3.403
Females	2.7 (0.9)	<i>p</i> = .001
Need for social media	<i>r</i> = .470	<i>p</i> < .001
<i>Social comparisons</i>		
Upward	<i>r</i> = .429	<i>p</i> < .001
Downward	<i>r</i> = .285	<i>p</i> < .001
<i>Psychological factors</i>		
Stress	<i>r</i> = .391	<i>p</i> < .001
<i>Empathy</i>		
Perspective-taking	<i>r</i> = -.137	<i>p</i> = .002
Empathic concern	<i>r</i> = -.102	<i>p</i> = .024
Personal distress	<i>r</i> = .326	<i>p</i> < .001
Self-esteem	<i>r</i> = -.290	<i>p</i> < .001
Conscientiousness	<i>r</i> = -.293	<i>p</i> < .001
<i>Depression</i>		
Yes	3.1 (1.0)	<i>t</i> = -4.446
No	2.5 (0.9)	<i>p</i> < .001

p > .050, was not a significant predictor of social media addiction. In addition, participants' need for social media was a significant predictor, β = .018, *p* < .001, along with participants' upward comparisons, β = .142, *p* < .001, and downward comparisons, β = .106, *p* < .050. The block of social factors resulted in a significant R^2 change = .408, *p* < .001, with a model of $F(8, 280)$ = 27.746, *p* < .001, R^2 = .434.

In the final block, we added the psychological factors. As expected, past-month perceived stress was a significant predictor of social media addiction, β = .027, *p* < .050. Of the facets of empathy, only empathic concern was a significant predictor, β = -.020, *p* < .050. Self-esteem was also not a significant predictor of social media addiction, β = .011, *p* > .050, whereas conscientiousness, β = -.023, *p* < .01, and depression, β = .283, *p* < .050, were significant predictors of social media addiction. The block of psychological factors resulted in a significant R^2 change = .095, *p* < .001, with a model of $F(7, 273)$ = 7.906, *p* < .001, R^2 = .529.

8 | DISCUSSION

The purpose of this study was to present a comprehensive, biopsychosocial model of social media addiction. Whereas previous scholarship focused heavily on Facebook use (Andreassen et al., 2012; Hong et al., 2014; Koc & Gulyagci, 2013; Sofiah et al., 2011), this study

explains factors influencing social media addiction across multiple platforms, including Facebook, Twitter, Instagram, and Snapchat. The present study extended research by uniquely demonstrating how biological, social, and psychological factors predict social media addiction.

Specifically, there was a significant inverse relationship between age and social media addiction, such that older adults were associated with lower levels of addiction. Positive relationships were noted between people's intensity of use of Facebook, Twitter, Instagram, and Snapchat and social media addiction, individuals' need for social media and social media addiction, and both upward and downward comparisons and social media addiction. We also found that people who are more stressed are more likely to be addicted to social media. Empathy may be a protective factor, as both perspective-taking and empathic concern were negatively correlated with social media addiction. The study also demonstrated inverse relationships between self-esteem and social media addiction, as well as conscientiousness and social media addiction. Finally, individuals with a greater number of depressive symptoms were more likely to experience social media addiction. These findings make a significant contribution to theory and practice in several ways.

To begin, our findings show that being young plays an important role in becoming addicted to social media. Although consistent with previous reports of social media addiction (Andreassen et al., 2012), scholars should continue to monitor biological factors as the demographics of social media use evolve. For example, older adults' usage has increased in recent years, and depending on the social media platform, usage statistics for age (e.g., LinkedIn) can vary dramatically (Pew Research Center, 2019).

Furthermore, this study found that intensely using Facebook, Snapchat, and Twitter predicts social media addiction. Scholars have contended that excessive use does not necessarily equate with addiction, particularly in the context of online gaming (Griffiths, 2010). However, the current study makes an important distinction between frequency and intensity of use. Rather than measuring "use" as frequency (e.g., number of hours on Facebook), in the same way as previous social media addiction studies (Hong et al., 2014; Koc & Gulyagci, 2013), we utilized an intensity scale, which was created to obtain a better measure of usage than frequency or duration indices (Ellison et al., 2007). Beyond the extent to which participants are actively engaged in social media, intensity captures the extent to which people are emotionally invested in social media and whether social media has become part of their identity. In line with social identity theory (Tajfel & Turner, 1986), intense social media users use Facebook, Snapchat, or Twitter to define themselves in social terms, using social media as systems of self-reference. Interestingly, social identity theory notes that our identities "need not depend upon the frequency of intermember interaction... the essential criteria... are that the individuals concerned define themselves" through the social system, which are social media, in this case (Tajfel & Turner, 1986, p. 15). Furthermore, note that intensity does not necessarily mean activity. Participants might score highly on the social media intensity scale even if they do not actively post to social media, but rather consume passively (lurking or observing) more than contributing. Merely, when

Predictors	β_1	β_2	β_3	R^2	ΔR^2
Block 1: Biological factors				.026**	
Age	-.046**	.001	.000		
Block 2: Social factors				.434***	.408***
Gender		.104	.068		
<i>Social media intensity</i>					
Facebook		.027***	.025***		
Snapchat		.031**	.032**		
Instagram		.004	.006		
Twitter		.013*	.010*		
Need for social media		.018***	.019***		
<i>Social comparisons</i>					
Upward		.142***	.078*		
Downward		.106**	.080*		
Block 3: Psychological factors				.529***	.095***
Stress			.027**		
Empathy					
Perspective-taking			-.006		
Empathic concern			-.020*		
Personal distress			.019		
Self-esteem			.011		
Conscientiousness			-.023**		
Depression			.283**		

* $p < .050$; ** $p < .010$; *** $p < .001$.

users connect their identities to social media, the more likely they are to become addicted. Social identity theory also suggests that identities are maintained through both positive and negative social comparisons, which also influenced social media addiction.

This becomes particularly concerning when we consider one of the primary functions of social media: to express and maintain our identities. Social media provides an outlet for people's intrinsic drive for self-exposure (Tamir & Mitchell, 2012), which can lead to addiction when our selves are tied to social media. To complicate the issue, many of the online identities people portray via social media are not accurate representations of their offline identities (Ellison, Heino, & Gibbs, 2006). Our finding that social media intensity predicts social media addiction might be more complicated when people's offline and online identities may not align. Future research should explore whether this offline/online identity congruency might influence the relationship between intensity of use and social media addiction.

Beyond intensity of use and social comparisons, our analysis also shows that when social media meets people's needs, they are more likely to become addicted. In the last twenty years, the affordances of social media continue to expand in scope—from simple profiles on SixDegrees.com in 1997 to the ability to now post live videos, play interactive games, and raise funds on Facebook (Boyd & Ellison, 2007). Arguably, as social media expand to support a wider range of interests and practices, the potential for social media addiction will also grow, because social media will meet more people's needs.

TABLE 3 Hierarchical regression analysis predicting social media addiction ($N = 290$)

Finally, our analysis shows the role that psychological factors play beyond biological and social factors in the process of social media addiction. Specifically, the regression model provides insight that being stressed and depressed play an important role in social media addiction. Stress and depression are both associated with negative emotion and physical symptoms, but while there is some degree of overlap in the symptoms associated with stress and depression (e.g., changes in sleeping or eating habits), the symptoms of depression tend to be more intense (e.g., feelings of worthlessness and recurrent thoughts of death) and persistent (i.e., at least a 2-week period) (American Psychiatric Association, 2013). Although scholars have investigated the relationship between depression and social media addiction (Koc & Gulyagci, 2013; Shensa et al., 2017), and previous studies have shown a positive relationship between perceived stress and overall Smartphone addiction (Samaha & Hawi, 2016), to our knowledge, no previous research has demonstrated stress as a predictor of social media addiction, specifically. What is known, however, is that when individuals turn to Internet use as a coping mechanism to deal with negative emotion, they tend to do so at the expense of healthier coping mechanisms, and this strategy may ultimately increase the risk of developing Internet addiction (McNicol & Thorsteinsson, 2017; Muller, Glaesmer, Brahler, Woelfling, & Beutel, 2013). Thus, it is not surprising that stress and depression predicted social media addiction in the current study. Additional studies are needed to determine whether the promotion

of healthier coping strategies could effectively enhance resilience to social media addiction.

In addition to stress and depression, we found that lower scores of empathic concern and conscientiousness predict social media addiction. Our analysis demonstrates that people who feel less sympathy and compassion for unfortunate others may become more addicted to social media than individuals who are more empathetic. In line with the phenomenon of negativity bias, research has demonstrated that most social media content, particularly political posts, are negative (Rosenstiel, Mitchell, & Jurkowitz, 2012), and that users like, share, and comment on more negatively valenced social media posts than positively valenced posts (Mayshak, Sharman, Zinkiewicz, & Hayley, 2017). While the plethora of negative information on social media might lead users with empathic concern to log off, individuals with low empathic concern are more susceptible to social media addiction. Future research can investigate interventions to increase empathy (Kelm, Womer, Walter, & Feudtner, 2014), which might build resilience to social media addiction.

Some limitations apply to this study. First, the sample hinders generalizability of the results, since all participants were American college students. Subsequent studies should explore these factors in other cultures, as certain variables, like self-esteem is significantly more important for Americans than other nationalities (Lee, Lee, Choi, Kim, & Han, 2014). Also, because were data obtained through self-reported measures, future research should investigate predictors of social media addiction in a more representative sample, using external measures or clinical diagnoses of psychosocial variables. Additional work can also extend the construct of social media addiction by measuring the extent to which individuals may be addicted to one type of social media platform (e.g., Instagram) versus another (e.g., Facebook). Despite these limitations, the current study makes great headway in scholars' understanding of social media addiction through a biopsychosocial approach. Moreover, by exploring multiple social media platforms, rather than just Facebook or the Internet in general, this project provides a more complete understanding of social media addiction and factors that influence it.

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REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Andreassen, C. S. (2015). Online social network site addiction: A comprehensive review. *Current Addiction Reports*, 2, 175–184. <https://doi.org/10.1007/s40429-015-0056-9>
- Andreassen, C. S., Billieux, J., Griffiths, M. D., Kuss, D. J., Demetrovics, Z., Mazzoni, E., & Pallesen, S. (2016). The relationship between addictive use of social media and video games and symptoms of psychiatric disorders: a large-scale cross-sectional study. *Psychology of Addictive Behaviors*, 30, 252–262. <https://doi.org/10.1037/adb0000160>
- Andreassen, C. S., Griffiths, M. D., Gjertsen, S. R., Krossbakken, E., Kvam, S., & Pallesen, S. (2013). The relationship between behavioral addictions and the five-factor model of personality. *Journal of Behavioral Addictions*, 2, 90–99. <https://doi.org/10.1556/JBA.2.2013.003>
- Andreassen, C. S., & Pallesen, S. (2014). Social network site addiction: An overview. *Current Pharmaceutical Design*, 20, 4053–4061. <https://doi.org/10.2174/13816128113199990616>
- Andreassen, C. S., Pallesen, S., & Griffiths, M. D. (2017). The relationship between addictive use of social media, narcissism, and self-esteem: Findings from a large national survey. *Addictive Behaviors*, 64, 287–293. <https://doi.org/10.1016/j.addbeh.2016.03.006>
- Andreassen, C. S., Torsheim, T., Brunborg, G. S., & Pallesen, S. (2012). Development of a Facebook addiction scale. *Psychological Reports*, 110, 501–517. <https://doi.org/10.2466/02.09.18.PRO.110.2.501-517>
- Bányai, F., Zsila, Á., Király, O., Maraz, A., Elekes, Z., Griffiths, M. D., ... Demetrovics, Z. (2017). Problematic social media use: Results from a large-scale nationally representative adolescent sample. *PLoS One*, 12, e0169839. <https://doi.org/10.1371/journal.pone.0169839>
- Boyd, D. M., & Ellison, N. B. (2007). Social network sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication*, 13, 210–230. <https://doi.org/10.1111/j.1083-6101.2007.00393.x>
- Cabral, J. (2011). Is generation Y addicted to social media? *The Elon Journal of Undergraduate Research in Communications*, 2, 5–14. <https://www.elon.edu/docs/e-web/academics/communications/research/vol2no1/01Cabral.pdf>
- Cohen, E. (2009). Five clues that you are addicted to Facebook. Retrieved from <http://www.cnn.com/2009/HEALTH/04/23/ep.facebook.addict/>
- Cohen, S., & Williamson, G. (1988). Perceived stress in a probability sample of the United States. In S. Spacapan & S. Oskamp (Eds.), *The social psychology of health*. Newbury Park, CA: Sage.
- Davenport, K., Houston, J., & Griffiths, M. D. (2012). Excessive eating and compulsive buying behaviors in women: An empirical pilot study examining reward sensitivity, anxiety, impulsivity, self-esteem, and social desirability. *International Journal of Mental Health and Addiction*, 10, 474–489. <https://doi.org/10.1007/s11469-011-9332-7>
- Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of Personality and Social Psychology*, 44, 113–126. <https://doi.org/10.1037/0022-3514.44.1.113>
- de Vries, D. A., Möller, A. M., Wieringa, M. S., Eigenraam, A. W., & Hamelink, K. (2018). Social comparison as the thief of joy: emotional consequences of viewing strangers' Instagram posts. *Media Psychology*, 21, 222–245. <https://doi.org/10.1080/15213269.2016.1267647>
- Durkee, T., Kaess, M., Carli, V., Parzer, P., Wassermann, C., Floderus, B., ... Wasserman, D. (2012). Prevalence of pathological internet use among adolescents in Europe: Demographics and social factors. *Addiction*, 107, 2210–2222. <https://doi.org/10.1111/j.1360-0443.2012.03946.x>
- Elgan, M. (2015). Social media addiction is a bigger problem than you think. Retrieved from <https://www.computerworld.com/article/3014439/internet/social-media-addiction-is-a-bigger-problem-than-you-think.html>
- Ellison, N., Heino, R., & Gibbs, J. (2006). Managing impressions online: Self-presentation processes in the online dating environment. *Journal of Computer-Mediated Communication*, 11, 415–441. <https://doi.org/10.1111/j.1083-6101.2006.00020.x>
- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook "friends:" Social capital and college students' use of online social

- network sites. *Journal of Computer-Mediated Communication*, 12, 1143–1168. <https://doi.org/10.1111/j.1083-6101.2007.00367.x>
- Engelberg, E., & Sjöberg, L. (2004). Internet use, social skills, and adjustment. *Cyberpsychology & Behavior*, 7, 41–47. <https://doi.org/10.1089/109493104322820101>
- Ferguson, C. J., Coulson, M., & Barnett, J. (2011). A meta-analysis of pathological gaming prevalence and comorbidity with mental health, academic and social problems. *Journal of Psychiatric Research*, 45, 1573–1578. <https://doi.org/10.1016/j.jpsychires.2011.09.005>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations*, 7, 117–140. <https://doi.org/10.1177/001872675400700202>
- Griffiths, M. D. (2005). The biopsychosocial approach to addiction. *Psyke & Logos*, 26, 9–26 <https://tidsskrift.dk/psyke/article/download/8200/6784/0>
- Griffiths, M. D. (2010). The role of context in online gaming excess and addiction: Some case study evidence. *International Journal of Mental Health and Addiction*, 8, 119–125. <https://doi.org/10.1007/s11469-009-9229-x>
- Hargittai, E. (2004). Internet access and use in context. *New Media and Society*, 6, 137–143. <https://doi.org/10.1177/1461444804042310>
- Hawi, N. S., & Samaha, M. (2017). The relations among social media addiction, self-esteem, and life satisfaction in university students. *Social Science Computer Review*, 35, 576–586. <https://doi.org/10.1177/0894439316660340>
- Hong, F.-Y., Huang, D.-H., Lin, H.-Y., & Chiu, S.-L. (2014). Analysis of the psychological traits, Facebook usage, and Facebook addiction model of Taiwanese university students. *Telematics and Informatics*, 31, 597–606. <https://doi.org/10.1016/j.tele.2014.01.001>
- Hou, X.-L., Wang, H.-Z., Guo, C., Gaskin, J., Rost, D. H., & Wang, J.-L. (2017). Psychological resilience can help combat the effect of stress on problematic social networking site usage. *Personality and Individual Differences*, 109, 61–66. <https://doi.org/10.1016/j.paid.2016.12.048>
- Jiao, C., Wang, T., Peng, X., & Cui, F. (2017). Impaired empathy processing in individuals with Internet Addiction Disorder: An event-related potential study. *Frontiers in Human Neuroscience*, 11, 1–10. <https://doi.org/10.3389/fnhum.2017.00498>
- John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (Vol. 2, pp. 102–138). New York, NY: Guilford Press.
- Kelm, Z., Womer, J., Walter, J. K., & Feudtner, C. (2014). Interventions to cultivate physician empathy: A systematic review. *BMC Medical Education*, 14, 219–230. <https://doi.org/10.1186/1472-6920-14-219>
- Kessler, S. (2016). What I learned in 12 weeks of therapy for social media addiction. Retrieved from <https://www.fastcompany.com/3055149/what-i-learned-in-12-weeks-of-therapy-for-social-media-addiction>
- Koc, M., & Gulyagci, S. (2013). Facebook addiction among Turkish college students: The role of psychological health, demographic, and usage characteristics. *Cyberpsychology, Behavior and Social Networking*, 16, 279–284. <https://doi.org/10.1089/cyber.2012.0249>
- Kroenke, K., Spitzer, R. L., Williams, J. B., & Löwe, B. (2010). The patient health questionnaire somatic, anxiety, and depressive symptom scales: A systematic review. *General Hospital Psychiatry*, 32, 345–359. <https://doi.org/10.1016/j.genhosppsych.2010.03.006>
- Kuss, D. J., Griffiths, M. D., Karila, L., & Billieux, J. (2014). Internet addiction: A systematic review of epidemiological research for the last decade. *Current Pharmaceutical Design*, 20, 4026–4052. <https://doi.org/10.2174/1381612811319990617>
- Lee, H. R., Lee, H. E., Choi, J., Kim, J. H., & Han, H. L. (2014). Social media use, body image, and psychological well-being: A cross-cultural comparison of Korea and the United States. *Journal of Health Communication*, 19, 1343–1358. <https://doi.org/10.1080/10810730.2014.904022>
- Lee, S. Y. (2014). How do people compare themselves with others on social network sites?: The case of Facebook. *Computers in Human Behavior*, 32, 253–260. <https://doi.org/10.1016/j.chb.2013.12.009>
- Maraz, A., Eisinger, A., Hende, B., Urbán, R., Paksi, B., Kun, B., ... Demetrovics, Z. (2015). Measuring compulsive buying behaviour: Psychometric validity of three different scales and prevalence in the general population and in shopping centres. *Psychiatry Research*, 225, 326–334. <https://doi.org/10.1016/j.psychres.2014.11.080>
- Marlatt, G. A., Baer, J. S., Donovan, D. M., & Kivlahan, D. R. (1988). Addictive behaviors: Etiology and treatment. *Annual Review of Psychology*, 39, 223–252. <https://doi.org/10.1146/annurev.ps.39.020188.001255>
- Mayshak, R., Sharman, S. J., Zinkiewicz, L., & Hayley, A. (2017). The influence of empathy and self-presentation on engagement with social networking website posts. *Computers in Human Behavior*, 71, 362–377. <https://doi.org/10.1016/j.chb.2017.02.026>
- McMurran, M. (1994). *The psychology of addiction*. London: Taylor and Francis.
- McNicol, M. L., & Thorsteinsson, E. B. (2017). Internet addiction, psychological distress, and coping responses among adolescents and adults. *Cyberpsychology, Behavior and Social Networking*, 20, 296–304. <https://doi.org/10.1089/cyber.2016.0669>
- Meikle, J. (2012). Twitter is harder to resist than cigarettes and alcohol, study finds. Retrieved from <https://www.theguardian.com/technology/2012/feb/03/twitter-resist-cigarettes-alcohol-study>
- Melchers, M., Li, M., Chen, Y., Zhang, W., & Montag, C. (2015). Low empathy is associated with problematic use of the Internet: Empirical evidence from China and Germany. *Asian Journal of Psychiatry*, 17, 56–60. <https://doi.org/10.1016/j.ajp.2015.06.019>
- Muller, K. W., Glaesmer, H., Brahler, E., Woelfling, K., & Beutel, M. E. (2013). Prevalence of Internet addiction in the general population: Results from a German population-based survey. *Behaviour & Information Technology*, 33, 757–766. <https://doi.org/10.1080/0144929X.2013.810778>
- Olowu, A. O., & Seri, F. O. (2012). A study of social network addiction among youths in Nigeria. *Journal of Social Science and Policy Review*, 4, 62–71.
- Park, N., Kee, K. F., & Valenzuela, S. (2009). Being immersed in social networking environment: Facebook groups, uses and gratifications, and social outcomes. *Cyberpsychology & Behavior*, 12, 729–733. <https://doi.org/10.1089/cpb.2009.0003>
- Pelling, E. L., & White, K. M. (2009). The theory of planned behavior applied to young people's use of social networking web sites. *CyberPsychology & Behavior*, 12, 755–759. <https://doi.org/10.1089/cpb.2009.0109>
- Pew Research Center. (2019). Social media fact sheet. Retrieved from <https://www.pewinternet.org/fact-sheet/social-media/>
- Robinson, A., Bonnette, A., Howard, K., Ceballos, N., Dailey, S., Lu, Y., & Grimes, T. (2019). Social comparisons, social media addiction, and social interaction: An examination of specific social media behaviors related to major depressive disorder in a millennial population. *Journal of Applied Biobehavioral Research*, 24, e12158. <https://doi.org/10.1111/jabr.12158>
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Rosenstiel, T., Mitchell, A., & Jurkowitz, M. (2012). *Winning the media campaign 2012*. Washington, D.C: Pew Research Center. Retrieved from <http://assets.pewresearch.org/wp-content/uploads/sites/13/legacy/Winningthemediacampaign2012.pdf>
- Samaha, M., & Hawi, N. S. (2016). Relationships among smartphone addiction, stress, academic performance, and satisfaction with life. *Computers in Human Behavior*, 57, 321–325. <https://doi.org/10.1016/j.chb.2015.12.045>
- Shensa, A., Escobar-Viera, C. G., Sidani, J. E., Bowman, N. D., Marshal, M. P., & Primack, B. A. (2017). Problematic social media use and depressive symptoms among US young adults: A nationally-representative study. *Social Science & Medicine*, 182, 150–157. <https://doi.org/10.1016/j.socscimed.2017.03.061>
- Smith, M. (2014). The social media diet. Retrieved from <http://allparenting.com/my-me-time/articles/969837/the-social-media-diet>

- Sofiah, S., Omar, S. Z., Bolong, J., & Osman, M. N. (2011). Facebook addiction among female university students. *Revista De Administratie Publica Si Politici Sociale*, 3(7), 95–109. <http://revad.uvvg.ro/files/nr7/10.20sharifah.pdf>
- Steinfield, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology*, 29, 434–445. <https://doi.org/10.1016/j.appdev.2008.07.002>
- Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. In S. Worchel & W. G. Austin (Eds.), *Psychology of intergroup relations* (2nd ed., pp. 7–24). Chicago, IL: Nelson-Hall.
- Tamir, D. I., & Mitchell, J. P. (2012). Disclosing information about the self is intrinsically rewarding. *Proceedings of the National Academy of Sciences of the United States of America*, 109, 8038–8043. <https://doi.org/10.1073/pnas.1202129109>
- Tang, J., Yu, Y., Du, Y., Ma, Y., Zhang, D., & Wang, J. (2014). Prevalence of internet addiction and its association with stressful life events and psychological symptoms among adolescent internet users. *Addictive Behaviors*, 39, 744–747. <https://doi.org/10.1016/j.addbeh.2013.12.010>
- Treem, J., Dailey, S. L., Pierce, C., & Biffle, D. T. (2016). What we are talking about when we talk about social media: A framework for study. *Sociology Compass*, 10, 768–784. <https://doi.org/10.1111/soc4.12404>
- Van Deursen, A. J. A. M., Bolle, C. L., Hegner, S., & Kommers, P. A. M. (2015). Modeling habitual and addictive smartphone behavior: The role of smartphone usage types, emotional intelligence, social stress, self-regulation, age, and gender. *Computers in Human Behavior*, 45, 411–420. <https://doi.org/10.1016/j.chb.2014.12.039>
- Vishwanath, A. (2014). Habitual Facebook use and its impact on getting deceived on social media. *Journal of Computer-Mediated Communication*, 20, 83–98. <https://doi.org/10.1111/jcc4.12100>
- Vogel, E. A., Rose, J. P., Okdie, B. M., Eckles, K., & Franz, B. (2015). Who compares and despairs? The effect of social comparison orientation on social media use and its outcomes. *Personality and Individual Differences*, 86, 249–256. <https://doi.org/10.1016/j.paid.2015.06.026>
- Wilson, K., Fornasier, S., & White, K. M. (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior, and Social Networking*, 13, 173–177. <https://doi.org/10.1089/cyber.2009.0094>
- Wolniewicz, C. A., Rozgonjuk, D., & Elhai, J. D. (2020). Boredom proneness and fear of missing out mediate relations between depression and anxiety with problematic smartphone use. *Human Behavior and Emerging Technologies*, 2(1), 61–70. <https://doi.org/10.1002/hbe2.159>
- Yan, W., Li, Y., & Sui, N. (2014). The relationship between recent stressful life events, personality traits, perceived family functioning and internet addiction among college students. *Stress and Health*, 30, 3–11. <https://doi.org/10.1002/smj.2490>
- Yoo, Y. S., Cho, O. H., & Cha, K. S. (2014). Associations between overuse of the internet and mental health in adolescents. *Nursing & Health Sciences*, 16, 193–200. <https://doi.org/10.1111/nhs.12086>

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Sinjin Roming graduated with a bachelor's degree in psychology from Brigham Young University. He then pursued a master's degree in Psychological Research from Texas State University. His master's thesis focused on stress management in college students and was completed under the direction of Dr. Krista Howard. His primary research interest is in the field of health psychology, where he focuses on stress management. He also has research interests in social media addiction and pediatric abnormal psychology. He currently resides in Missoula, Montana and works for a mental health center which cares for mentally ill adult patients residing in group home settings or in the community. He also currently teaches psychology research methods courses as an online adjunct faculty member for Brigham Young University Idaho.



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