

## The independent relationship between trouble controlling Facebook use, time spent on the site and distress

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*Background and Aims:* There is an emerging literature base on the relationship between maladaptive traits and “addiction” to social networking sites. These studies have operationalized addiction as either spending excessive amounts of time on social networking sites (SNS) or trouble controlling SNS use, but have not assessed the unique contribution of each of these constructs on outcomes in the same models. Moreover, these studies have exclusively been conducted with younger people rather than a heterogeneous sample. This study examined the independent relationship of a brief Facebook addiction scale, time spent on Facebook, and Facebook checking on positive and negative social domains, while controlling for self-esteem and social desirability. *Methods:* Participants were recruited using e-mail, SNS posts and through Amazon’s MTurk system. The sample included 489 respondents ages from 18 to approximately 70, who completed a 10–15 minute survey. *Results:* Results indicate that neither time spent on Facebook nor Facebook checking was significantly associated with either self-esteem, fear of negative social evaluation or social comparison, while SNS addiction symptoms were each independently associated with Facebook usage. Neither time spent on Facebook nor SNS addiction symptoms were associated with positive social relationships. *Discussion:* Overall results suggest that time on SNS and trouble controlling use should be considered independent constructs and that interventions should target underlying loss of control as the primary intervention target above ego syntonic time spent on the site.

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### INTRODUCTION

The pervasiveness of social networking sites (SNS) in our lives has sparked an emerging literature base on the characteristics of individuals who are frequent SNS users, with a special emphasis on those who may have trouble controlling their use. Recent research on SNS addiction, particularly Facebook addiction, reveals that approximately 20% of samples have difficulty controlling their Facebook use across studies, although significant methodological differences exist in how addiction is operationalized (Griffiths, Kuss & Demetrovics, 2014). Some of the symptoms used to define addiction to SNS are similar to those present in more traditional addictions (i.e., drugs and gambling), including loss of control (using more often than intended, i.e., difficulty stopping) and salience (time spent online, neglecting other activities). There is less evidence, however, for the presence of symptoms of tolerance and withdrawal (Charlton & Danforth, 2007). Several measures of Facebook addiction have been developed which assess these symptom clusters. They have revealed that scoring higher on these measures is associated with more time spent on SNS, and certain personality attributes, such as higher need for belongingness (Pelling & White, 2009), lower self-esteem, lower conscientiousness, higher extroversion and neuroticism (Andreassen, Torsheim, Brunborg & Pallesen, 2012) and higher loneliness (Lou, Yan, Nickerson & McMorris, 2012).

One of the hallmark features of SNS addiction is spending significant amounts of time on these sites. Several studies reveal that more time engaged on SNS is associated with less involvement in real-life communities (Nyland, Marvez & Beck, 2007), lower grade point averages (Kirschner &

Karpinski, 2010), lower social identity and less connection to peers (Barker, 2009), lower self-esteem (Kalpidou, Costin & Morris, 2011), lower conscientiousness (Wilson, Fornasier & White, 2010), higher depression (Pantic et al., 2012) and narcissism (Mehdizadeh, 2010; Ryan & Xenos, 2011). However, some studies find that more time spent on Facebook is associated with higher social capital, and individuals more likely to use SNS are also more likely to be extroverted and driven by social collective factors (Kim, Kim & Nam, 2010). Several other studies resulted in mixed findings between time on SNS and well-being (Kuss & Griffiths, 2011). One of the problems with these studies is that they look at SNS addiction and salience, or time spent using these sites, as the same construct rather than assessing the independent contribution of each when controlling for the other.

To our knowledge no studies have dismantled the independent effects of time on Facebook, Facebook checking, and Facebook addiction symptoms on measures of positive and negative social adjustment, social insecurity, and self-esteem. Only by examining the independent contribution of these domains can we more accurately determine whether the drive to use Facebook versus actual time on Facebook is associated with adaptive and maladaptive characteristics, such as positive and negative social well-being and self-esteem. Moreover, these studies have been conducted primar-

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ily with participants who are between 15 and 28 years of age limiting the generalizability and understanding of the role of SNS addiction across populations.

This study examined the independent relationship of a brief Facebook addiction scale, time spent on Facebook, and Facebook checking on positive and negative intra- and interpersonal domains while controlling for self-esteem and social desirability. The goal was to understand the unique contribution of each of these variables on well-being. Based on the previous literature it was hypothesized that both time spent on Facebook and Facebook addiction would be associated with negative social characteristics and self-esteem, while neither would be associated with positive social variables.

## METHODS

### Sample

The current sample included 489 respondents. 627 individuals completed at least one question in the survey. The primary reasons for exclusion from this analysis were refusal to give informed consent ( $N = 4$ ), inconsistent responding to reverse coded items ( $N = 37$ ) and/or completing the survey in too short a time-span to reliably answer the questions, which was deemed to be less than 3 minutes ( $N = 61$ ). Lastly, thirty-six (36) participants were removed because they did not have an active Facebook account at the time the survey was completed. Participants without a Facebook account will be discussed in a later paper. Since most of excluded participants were removed because the validity of their data was in question, no analyses were performed on this group. The majority of respondents (421) were not compensated; however, the individuals in the MTurk sample were given \$3.00 upon survey completion.

### Procedure

Respondents were recruited via two samples. First through snowball sampling e-mail blasts and social networking news feeds (i.e. Facebook and Twitter) among the researchers' networks. Second, Amazon.com, Inc.'s online labor market, Mechanical Turk (MTurk) was used to recruit an additional non-convenience sample. MTurk is a communication platform through which workers can be contracted to perform tasks that require human intelligence (e.g. consumer surveys) in exchange for compensation. Over the last few years, MTurk has been used for social sciences research with results similar to other sampling methods when certain validity checks were included in the design (Mason & Suri, 2012). Participants were asked to complete a 15-minute survey containing a series of Facebook usage questions and other measures of psychological well-being and distress. The survey itself was built using SurveyMonkey, and it was filled out anonymously. No IP addresses were collected. The data collected used opportunistic sampling and took place from May–August of 2013.

### Measures

The survey consisted of several broad domains, which included specific questions about demographics, self-reported

Facebook usage, trouble controlling use, and inter- and intrapersonal distress and well-being. Specific variables of interest were: time on Facebook per day, times accessed Facebook per day, fear of negative social evaluation, self esteem, social comparison, positive social relationships, and symptoms of Facebook addiction. Each variable is described in detail below.

*Facebook usage. Time on Facebook per day.* The amount of time on Facebook per day was assessed using a face-valid, self-report item specific to the past 30 days. Item responses were categorical and ranged from "0–15 minutes" to "4 hours or more". *Times accessed Facebook per day.* Checking behavior was assessed using another face-valid, self-report item containing options ranging from 1 through 14 times per day, with an additional option of "15 times or more".

*Fear of negative social evaluation. Brief Fear of Negative Evaluation Subscale (BFNES).* Three items were selected from the Brief Fear of Negative Evaluation Scale to form a subscale to measure fear of negative social evaluation. All items were answered on a five-point Likert scale of Never (1) to Always (5). The Cronbach's alpha for the three items is .89, which is in line with the original scale's reliability ( $\alpha = .90$ ) (Leary, 1983).

*Self-esteem. Rosenberg Self-Esteem Subscale (RSE).* To measure self-esteem, four items were selected from the Rosenberg Self Esteem Scale (Rosenberg, 1965). Two of these items were reverse coded, but all questions utilized a Likert scale ranging from (1) Strongly Agree to (4) Strongly Disagree. The Chronbach's alpha of the current subscale is .88, which is equivalent to the alpha presented in previous findings using a large sample of United States citizens (Schmitt & Allik, 2005).

*Social variables. Positive social relationships.* Positive social relationships were measured via items that included "I feel my friends love me" and "I feel a deep connection to people in my life" on a similar Likert scale as the RSE. Social comparison and fear of missing out on social activities were measured via two items that included "Facebook makes me feel that other people have better lives than I do" and "I feel that I am missing out on enjoyable social interactions more than others." *Social desirability.* Due to the nature of the SNS being explored, social desirability is an important confound for which to control. To account for respondents that were answering in a socially desirable way, one dichotomous question was included: "I have never been jealous of the good fortune of others" vs. "Sometimes I am jealous of the good fortune of others". Those responding "never" were deemed to be answering the survey in a socially desirable way, either knowingly or unknowingly.

*Facebook Addiction Scale (FAS).* Due to assessment length limitations we developed a brief scale measuring loss of control of Facebook use based on Charlton and Danforth's addiction scale (Charlton & Danforth, 2007). We included three additional items to Charlton and Danforth's scale to assess salience and overall satisfaction with the Facebook site. The items were answered on a four-point Likert scale and are: "I sometimes neglect important things because of Facebook", "My in-person social life has sometimes suffered because of me interacting with Facebook", "Using Facebook sometimes interferes with other activities" and "I have made unsuccessful attempts to reduce the time I interact with Facebook". The measure originally contained five

items. After completing a principle components analysis and looking at the internal consistency of the 5 items, we removed the item, “When I am not using Facebook, I can feel agitated”. We did so because the component extracted only explained 49.92% of the total variance and the communality for that item was 0.431, the smallest among the three variables that had communalities less than 0.50. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.752, and the Bartlett’s sphericity test was significant ( $\chi^2(10) = 526.254, p < 0.001$ ).

The diagonals of the anti-image correlation matrix were also all over 0.70. There was one component extracted for the 4 remaining variables. The reliability of the scale was .71. The component explained 54.70% of the total variance in the variables, which were included on the component. All items had primary loading over 0.60. Even though the item “I have made unsuccessful attempts to reduce the time I interact with Facebook” had communality less than 0.50, it was not removed because there was only one component in the solution, indicating a simple structure in the variables. The scale was significantly related to single-item questions not within the scale that also measure difficulty controlling use including “I use Facebook more than I intend.”,  $r(147) = .596, p < .001$ , “How much effort does it take not to look at your Facebook account when you have the urge but should be doing something else?”,  $r(147) = .596, p < .001$ , and both time on Facebook,  $r(481) = .278, p < .001$ , and Facebook checking,  $r(459) = .200, p < .001$ . A complete description of the Facebook addiction responses to individual items can be seen in Table 3.

#### Data analysis

We ran several multiple linear regressions on the multiple item scales, and performed path analyses when coupling single items of a construct not derived from a larger scale (e.g. positive social relationships). We did this to understand the unique relationship of time on Facebook, checking one’s account, trouble controlling Facebook use and self-esteem on social insecurity, social comparison and quality of friendships. We included the social desirability question in the analyses to control for participants who may skew outcomes because of answering the questions in a socially desirable way.

Because we used an ordinal scale for time on Facebook, we tested assumptions including ordinal variables in our path analysis. First, we need to test the assumption to see if it has a linear impact across its increments. In order to see if it is a significant predictor in the multiple linear regression model, we dummy coded each of the responses. Because the regression model with Facebook use as dummy variable ( $F = 14.475, p < 0.01$ ) does not report a better fit than the model with Facebook use as one predictor variable ( $F = 29.355, p < 0.01$ ), we can use the ordinal variable in the path analysis. Further, we recoded the frequencies into approximate quartiles to create four groups with similar sample sizes and tested the fit compared to the ordinal variable. Similarly, the fit was no better than the ordinal variable.

#### Ethics

All study procedures were carried out in accordance with the Declaration of Helsinki. The New York State Psychi-

atric Institute’s Institutional Review Board reviewed and approved all procedures of the study. All participants were informed about the study, and provided consent before completing any study-related measures.

## RESULTS

### Demographics

Demographics are presented in Table 1. Overall, the sample was predominantly white and female, with 86.3% having at least some college education. The modal age group of this sample is mid-to-late 20s (23–29), while the age range of respondents is 18–70+ years. These analyses include individuals older than 40 (37%), whereas almost all other data presented regarding Facebook use has used exclusively a

Table 1. Demographic information

	N	Percent
Gender		
Male	157	34.4
Female	300	65.6
Age		
18–22	77	15.7
23–29	139	28.4
30–39	92	18.8
40–49	88	18
50–69	86	17.6
70+	7	1.4
Education		
Less than high school	5	1.1
GED/high school	35	7.6
Some college/		
Bachelors Degree	312	67.6
Masters Degree	81	17.5
PhD or equivalent	29	6.3
Marital status		
Single	247	53.5
Married	175	37.9
Divorced/Separated/Widowed	38	8.7
Race/Ethnicity		
White	385	84.1
Hispanic or Latino	24	5.2
Asian	24	5.2
Black or African American	21	4.6
Other	4	0.9
Lifetime mental health Tx		
Yes	193	41.8
Prefer not to answer	6	1.3
Drank 4 or more drinks in 1 sitting		
Less than 1x per month	318	66.7
1–2x per month	75	15.7
1x per week	46	9.6
2–6x per week	30	6.3
1x per day, or more	8	1.6
How did you hear about survey?		
Facebook	277	56.6
Other	189	38.6
E-mail	21	4.3

Table 2. Facebook demographic information

	N	Percent
Number of Facebook friends		
0–150	158	32.5
151–400	154	31.6
401–800	95	19.4
801–1,400	67	13.8
1,400+	13	2.6
Percentage of Facebook friends close friends		
0% (None)	24	4.9
10%	236	48.5
20%	88	18.1
30–50%	104	21.3
60% or greater	35	7.1
Deactivate Facebook account ever		
No	385	79.1
Yes, for personal reasons	91	18.7
Yes, for professional reasons	11	2.3
Times accessed Facebook per day		
1–2 times	122	26.5
3–5 times	150	32.7
6–9 times	51	11.0
10–14 times	56	12.0
15 times or more	81	17.6
Time spent on Facebook per day		
0–15 minutes	87	18.0
16–45 minutes	140	29.1
46 minutes–2 hours	157	32.6
2–4 hours	66	13.7
4 hours or more	32	6.6
Number of people “unfriended”		
0 (none)	85	17.9
1–5	200	42.1
6–10	70	14.7
11–50	85	17.9
More than 50	35	7.4
Rejected friend requests		
0 (none)	105	22.6
1–5	166	35.7
6–10	71	15.3
11–50	109	23.4
More than 50	14	3.0

college undergraduate sample or younger. Almost twenty-seven percent (26.8%) of the sample responded in a socially desirable way saying “I have never been jealous of the good fortune of others”. The MTurk sample was significantly younger than the convenience sample,  $F = 10.23, p < .001$ , but did not spend significantly more time on Facebook,  $F = 2.86, p > .05$ . To ensure differences were due to age and not compensation, we created an age matched group from the convenience sample, which revealed no trending or significant differences between groups.

*Facebook use*

Of the current sample, 94% reported being on Facebook at least once per day. The majority of respondents reported being on Facebook for more than 15 minutes per day (80.8%), and a fifth spend more than 2 hours of their day on the social

Table 3. Addiction scale – individual item responses

	N	Percent
Neglect important things because of Facebook		
Not at all	316	64.9
Somewhat	149	30.6
Very much	19	3.9
Extremely	3	0.6
My in person social life has suffered because of Facebook		
Not at all	421	86.3
Somewhat	58	11.9
Very much	8	1.6
Extremely	1	0.2
Using Facebook has interfered with other activities		
Not at all	315	64.8
Somewhat	152	31.1
Very much	17	3.5
Extremely	2	0.4
Unsuccessful attempts to reduce Facebook use		
Not at all	376	77.5
Somewhat	89	18.4
Very much	14	2.9
Extremely	6	1.2

networking site (20%). The mean time spent on Facebook per day was 31–45 minutes, and mode was 46–60 minutes. The mean range of Facebook friends that the respondents in this study report having is 201–300, and mean percentage of Facebook friends being described as “close friends” (interaction outside of Facebook at least once every 2 weeks) is about 20%. Full descriptive data on Facebook usage can be seen in Table 2.

*Self-esteem:* Because we were using self-esteem as a predictor not associated with Facebook behavior, which could have significant overlap with most variables, we examined the relationship between Facebook use, Facebook addiction scores, and social desirability on self-esteem using multiple linear regression. Results indicate that none of the variables were significantly associated with self-esteem when controlling for the others.

*Social comparison:* To understand the relationship between comparative social insecurity we conducted a path analysis on the variables “I feel like I am missing out on enjoyable social interactions more than others” and “Feeling other people have better lives than me” using time on Facebook, checking Facebook, self-esteem, and Facebook addiction as predictors. The path diagram generated from the output with only significant direct path coefficients is shown in Figure 1. The path coefficients showed the absolute magnitude of a correlation. For example, for one standard deviation increment on Facebook addiction, there was 0.21 standard deviation increment on “missing out on enjoyable social interactions” (missing out) and vice versa. Social desirability had the most significant direct effect on both variables. As the model indicates, Time on Facebook is highly associated with Facebook addiction, but not social comparison.



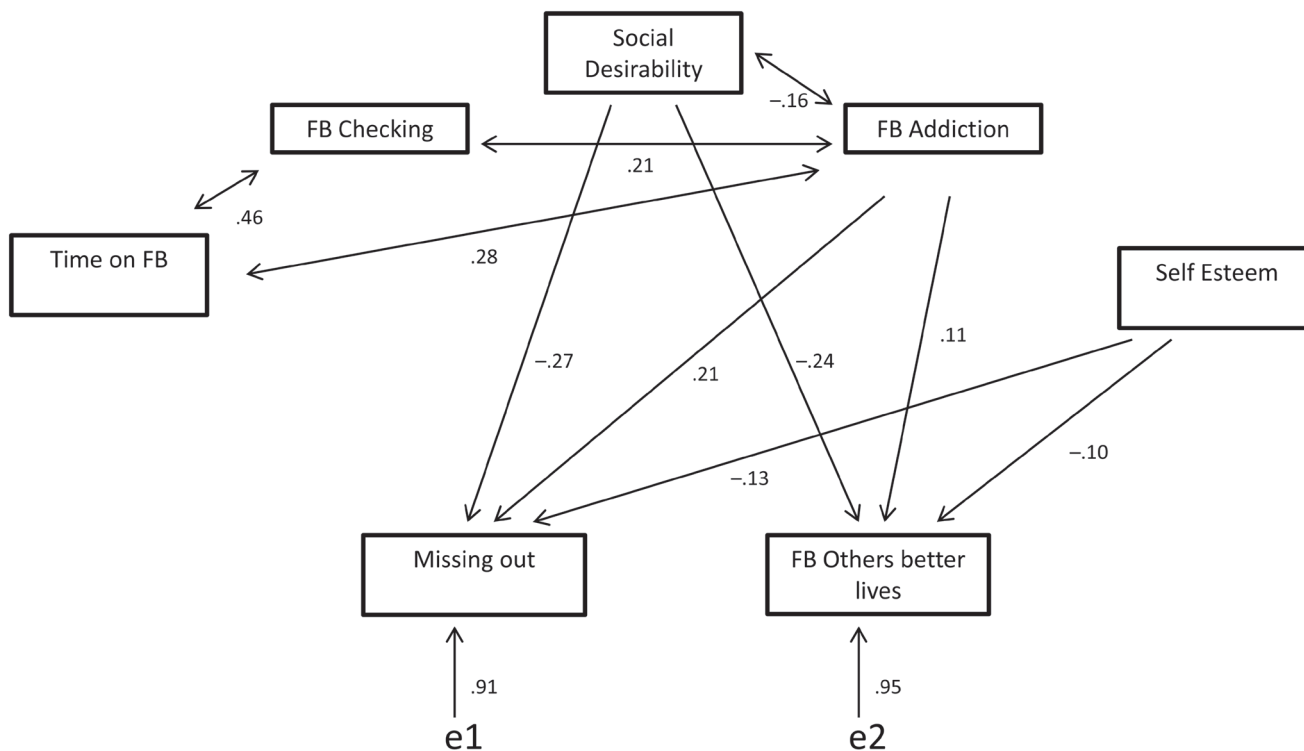


Figure 1. Models of mediated effects. Only significant relationships are shown

*Fear of Negative Social Evaluation (FNSE):* To understand the relationship between FNSE and Facebook use variables and self-esteem we regressed the Facebook use variables on the FNSE score. Results indicate that while neither time on Facebook nor Facebook checking was associated with fear of negative social evaluation, Facebook addiction scores, self-esteem, and social desirability all independently predicted fear of negative social evaluation; full model,  $F(5, 421) = 16.40, p < .0001$ , Facebook addiction,  $b = .21, t(421) = 4.41, p < .0001$ ; social desirability,  $b = -.27, t(421) = -5.93, p < .0001$ ; self-esteem,  $b = .13, t(421) = -2.91, p < .01$ .

*Positive social relationships:* We conducted another path analysis to understand the relationship between positive social relationships and our dependent variables. Results indicate significant relationships between positive social relationships and self-esteem and social desirability. There were no significant relationships between time on Facebook, Facebook checking and Facebook addiction.

## DISCUSSION

To our knowledge, this is the first study to examine the independent contribution of difficulty controlling Facebook use, time on the site, and checking while controlling for self-esteem and socially desirable responding. While there is a significant relationship between Facebook addiction items, time on the site, and Facebook checking, there was no relationship between time on Facebook, Facebook checking, fear of negative evaluation. Rather, trouble controlling Facebook use was independently associated with each. Because time was not associated with any other variables while con-

trolling for Facebook addiction, previous research that has used time on Facebook as the predictor of pathology may have missed the important distinction between ego-syntonic and -dystonic Facebook use.

Alternatively, individuals who are more socially insecure or experience fear of negative social evaluation may be more predisposed to problematic Facebook use because of the promise of some social reinforcement when using the site. However, because Facebook has not been shown to increase the depth and quality of connections, but rather the breadth of connections, this pursuit may result in a negative feedback loop where social insecurity drives use but is not satiated upon use for these individuals. While those who have difficulty controlling their use may be more likely to spend more time on the site and access the site more often than those with less control, it appears that it may not be a result of time on the site alone but rather a predisposition to these negative social feelings which then can become exacerbated by interaction with the site.

Interestingly, there was no relationship between trouble controlling Facebook use and positive social relationships and self-esteem. The lack of association between positive social relationships and self-esteem and Facebook addiction items suggests that the drive to use Facebook more than intended may be caused by social insecurity and comparison rather than a lack of positive social relationships. It is possible that one can have positive social relationships and feel close to others but still have underlying social insecurity which is exacerbated by Facebook use. When taken together, our results suggest that Facebook addiction may be driven primarily by social insecurity rather than either a lack of positive social relationships or the actual amount of time on the site.

These conclusions have important implications for understanding who is at risk of developing problematic use of SNS and how it differs from other behavioral addictions. For example, whereas pathological gambling may be driven by reward and deficits in monetary loss sensitivity, trouble controlling SNS use may be driven in part from the desire to gratify social insecurity and comparison among other factors even when positive relationships already exist. As these sites become a staple in everyday life, and the demographics of users becomes more diverse, society will likely begin to see more individuals who are predisposed to experiencing negative consequences from SNS. This phenomenon is similar to studies that have examined increases in pathological gambling after Casino's are built or increases in online gambling problems in individuals who are predisposed to the reinforcer, which is triggered by availability. Similar to other addictive behaviors, most people can use SNS without significant harm while a subgroup has difficulty controlling use. Therefore, it is important to explore the reinforcers for problematic use rather than just focusing on the amount of time spent on SNS to effectively develop interventions and treatments for individuals suffering from loss of control over SNS use.

This study had several limitations including a convenience sample of self-referred individuals as well as individuals who are seeking compensation for completing surveys through MTurk. Consequently, our sample was overwhelmingly white and highly educated. The MTurk sample was also younger and trended towards more Facebook use. However, an age-matched sample revealed no differences between groups. This helped make our sample more diverse with regard to age compared to nearly every other study conducted on SNS user characteristics. While we used self-report, we included several control items and methods to exclude individuals (similar but reverse coded questions, time to complete survey exclusions) and controlled for social desirability. Perhaps the most interesting finding was that the social desirability item had the most robust relationships with all variables of interest. Just under twenty-seven (26.8) percent of individuals answered in a socially desirable way (I am never jealous of the good fortune of others), suggesting a lack of insight into their behavior. This was associated with psychological health in all domains. Controlling for social desirability offers greater confidence in our findings.

Although the purpose of the study was not to develop a Facebook addiction scale, we did use an invalidated measure with only fair internal consistency. However, it was highly correlated with many face-valid measures of addiction constructs and correlates loss of control over Facebook use, such as using the site more than intended. Similarly, while some of our measures were shortened versions of validated scales, our measure of social insecurity and positive social relationships were single-item face-valid measures. Path analyses revealed each of the two items in both the positive and negative social analyses were highly correlated, but future research should examine these constructs using a variety of validated measures. Overall, despite some limitations, the present study is an important contribution to understanding individuals who may be having difficulty controlling SNS use and methods to best intervene with the substantial subgroup of individuals.

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