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Fear of missing out (FoMO) and rumination mediate relations between social anxiety and problematic Facebook use

Abigail E. Dempsey[a], Kelsey D. O'Brien[a], Mojisola F. Tiamiyu[a], Jon D. Elhai[a,b,c,*]

[a] Department of Psychology, University of Toledo, 2801 W. Bancroft Street, Toledo, OH 43606, USA
[b] Department of Psychiatry, University of Toledo, 3000 Arlington Ave., Toledo, OH 43614, USA
[c] Academy of Psychology and Behavior, Tianjin Normal University, No. 57-1 Wujiayao Street, Hexi District, Tianjin 300074, China

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ABSTRACT

Introduction: Prior research has found that psychopathology constructs such as depression and anxiety are associated with problematic use of Facebook (PFU). In the present study, we examined a structural equation model whereby depression, social anxiety and lower life satisfaction predicted PFU severity, while analyzing mediating variables including rumination, fear of missing out (FoMO), and frequency of Facebook use, as well as age and gender as covariates.

Method: Participants were 296 college students administered a web survey of instruments measuring these constructs.

Results: Modeling results demonstrate that FoMO and rumination were significantly related to PFU severity. Facebook use frequency was related to PFU severity. FoMO and rumination each mediated relations between social anxiety and PFU severity.

Conclusions: Results are discussed in the context of prior work on FoMO and excessive technology use, as well as several relevant theoretical frameworks.

1. Introduction

Social networking site (SNS) use is very prevalent in industrialized nations. In the United States, Pew Research Poll data show that 68% of Americans currently use Facebook, with about three-quarters of users reporting daily Facebook use (Smith & Anderson, 2018, March 1). SNS use offers social capital advantages to its users (Baek, Bae, & Jang, 2013; Kim, Wang, & Oh, 2016; Pendry & Salvatore, 2015). However, problematic SNS use is an important concern (Andreassen & Pallesen, 2014), typically defined as symptoms that are observed in substance use disorders, such as tolerance, withdrawal and mood modification, with associated impairment in functional areas such as social or academic problems from SNS use (Marino, Gini, Vieno, & Spada, 2018). Problematic SNS use is related to such mental health problems as depression and anxiety severity symptoms (reviewed in Marino et al., 2018). However, less is known about relationships between problematic SNS use and many other psychopathology-related constructs.

An important contributing factor to problematic technology use is the increased frequency of use. Research demonstrates that frequent, habitual use of technology (even if initially healthy or productive) has the potential to grow into problematic use (Oulasvirta, Rattenbury, Ma, & Raita, 2012; van Deursen, Bolle, Hegner, & Kommers, 2015). In fact, frequent SNS use has been demonstrated as a predictor of problematic SNS use (Ryan, Chester, Reece, & Xenos, 2014; Salehan & Negahban, 2013). Frequent internet communication use has also mediated relations between psychopathology and problematic use (Elhai, Levine, Dvorak, & Hall, 2017; van Deursen et al., 2015).

Problematic SNS use is generally related to depression and anxiety severity (Blanchard, McGrath, Pogge, & Khadivi, 2003; Casale & Fioravanti, 2015; Giota & Kleftaras, 2013; Hong, Chiu, & Huang, 2012; Lee-Won, Herzog, & Park, 2015). In addition to problematic SNS use, some studies found that increased frequency of SNS use is associated with depression and anxiety severity (reviewed in Seabrook, Kern, & Rickard, 2016). Problematic SNS use is inversely correlated with life satisfaction and other measures of well-being (reviewed in Marino et al., 2018; Seabrook et al., 2016).

Newer studies have expanded the inquiry of problematic SNS use beyond depression and anxiety in order to explore transdiagnostic psychopathology-related constructs – that appear across numerous mental disorders. FoMO is a fairly new construct that involves a

* Corresponding author at: Department of Psychology, University of Toledo, 2801 W. Bancroft Street, Toledo, OH 43606, USA.
E-mail address: contact@jon-elhai.com (J.D. Elhai).
URL: http://www.jon-elhai.com (J.D. Elhai).

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person's reluctance to miss out on important information and social events from those in their social network (Przybylski, Murayama, DeHaan, & Gladwell, 2013). Such hesitancy results in a person's need to repeatedly check their SNS platforms (Billieux, Maurage, Lopez-Fernandez, Kuss, & Griffiths, 2015). FoMO is a construct involving unmet social needs, and is conceptualized to result from depression and social anxiety (Oberst, Wegmann, Stodt, Brand, & Chamarro, 2017; Wegmann, Oberst, Stodt, & Brand, 2017). Additionally, unmet social needs play an important role in problematic internet use (Wegmann & Brand, 2016). FoMO also involves negative expectancies and cognitions, which play a role in problematic internet use (Wegmann et al., 2017). In fact, mixed findings are sometimes apparent in the literature on relations between psychopathology and both frequency of and problematic SNS use (Seabrook et al., 2016). FoMO may be an important mechanism that explains these mixed findings. Recently, three studies found FoMO associated with problematic SNS use (Błachnio & Przepiórka, 2018; Blackwell, Leaman, Tramposch, Osborne, & Liss, 2017; Dhir, Yossatorn, Kaur, & Chen, 2018). Other recent studies found that FoMO mediated relations between psychopathology and problematic smartphone use (PSU, Elhai et al., 2018; Oberst et al., 2017). One study discovered that state-based FoMO, but not trait-based FoMO, mediated relations between psychopathology symptoms and problematic technology use (Wegmann et al., 2017). The negative cognitions involved with FoMO may represent a mechanism in how psychopathology may lead to problematic technology use, with FoMO accounting for this relationship (Wegmann et al., 2017).

Another important transdiagnostic psychopathology construct is rumination, which involves repetitive focusing on one's negative thoughts (Mennin & Fresco, 2013). In social relationships, those who ruminate tend to do so about aspects of the relationship (Kashdan & Roberts, 2007). While rumination can represent the *cognitive* aspect of anxiety in social relationships, habitually checking SNS for notifications can represent the *behavioral* aspect of the anxiety (Billieux et al., 2015). This habitual use leads to PSU (Oulasvirta et al., 2012; van Deursen et al., 2015), and problematic SNS use (Ryan et al., 2014; Salehan & Negahban, 2013). In fact, Feinstein et al. (2013) found that negative social comparison on Facebook predicts increased rumination, which in turn related to depressive symptoms. Rumination has also been linked with problematic use of other technology, including smartphones, with rumination serving as a mediator between depression and anxiety with PSU (Elhai, Tiamiyu, & Weeks, 2018). As with FoMO, because of rumination's relevance to social relationships, rumination could also be an important mechanism explaining associations between psychopathology and problematic SNS use.

While most research on problematic SNS use has focused primarily on relations with psychopathology variables, little research has explored possible inverse relationships with positive psychology constructs, such as life satisfaction. According to Yang and Srinivasan (2016), life satisfaction refers to a somewhat stable cognitive assessment of one's own life and is an important component of subjective well-being. Further, life satisfaction and other indicators of the quality of one's life reflect a general evaluation of one's environment, which may be positive or negative (Scheufele & Shah, 2000). A meta-analysis by Marino et al. (2018) found that life satisfaction is inversely related to PFU.

1.1. Theory

Relevant to this study is Kardefelt-Winther's (2014) Compensatory Internet Use Theory (CIUT). CIUT attempts to understand adverse stressors and life events that motivate people to use/overuse technology as a means to alleviate negative emotions. In CIUT, there is an emphasis on the cause being negative life events and the consequence being problematic internet use. Compensatory behavior is aimed at regulating stressor-related negative emotions such as depression and anxiety. Several studies have found evidence for CIUT in conceptualizing problematic technology use (Long et al., 2016; Wang, Wang, Gaskin, & Wang, 2015; Zhitomirsky-Geffet & Blau, 2016).

In addition to psychopathology, other factors influence problematic technology use. The Interaction of Person-Affect-Cognition-Execution (I-PACE) model of specific internet use disorders (Brand, Young, Laier, Wolfling, & Potenza, 2016) is a comprehensive model of factors influencing internet use and excessive use. Personal factors include genetic and biological influences, psychopathology, personality, cognitions, and use motives. Responses to such personal factors involve mechanisms that may be risk or resilience factors for internet use, including cognitive bias, coping style, inhibitory control, craving, and attention bias. Such responses may lead to the decision to use a particular type of internet use or application (e.g., Facebook), which may lead to healthy gratification or excessive use.

Finally, similar to the I-PACE model is the Differential Susceptibility to Media Effects Model (DSMM) (Valkenburg & Peter, 2013). DSMM conceptualizes three factors influencing media use, including dispositional personality, developmental, and social context. Subsequently, media use can influence resulting response states, including cognitive, emotional and excitative states. These response states serve as mechanisms between the use of media and consequential effects from media, such as harmful overuse. Finally, the effects from media can further influence the original three personality, development and social variables, resulting in a recursive framework.

1.2. Aims

Despite the literature on problematic SNS use in relation to depression and anxiety (Andreassen, 2015; Marino et al., 2018; Seabrook et al., 2016), less is known about relations with many other relevant psychopathology constructs. Other psychopathology constructs may mediate relations between both depression and anxiety with problematic SNS use. For example, using a large sample of adolescents, Oberst et al. (2017) recently discovered that FoMO mediated relations between PSU and both depression and anxiety severity. Furthermore, the intensity of SNS use also served as a mediator in these relationships (Oberst et al., 2017). However, their study involved SNS intensity rather than problematic SNS use, and sampled adolescents rather than adults; adults and adolescents may have different patterns of SNS use (Hayes, van Stolk-Cooke, & Muench, 2015).

Our aim was to explore relationships between depression, social anxiety, and life satisfaction with problematic Facebook use (PFU) severity, through FoMO and rumination as mediating variables. We tested a structural model, discussed below, in order to examine these relationships.

1.3. Hypotheses

Based on current theory and the literature presented, we posed the following hypotheses. Each of these hypotheses represents a portion of Fig. 1.

H1. FoMO will be positively related to PFU severity.

H2. Rumination will be positively related to PFU severity.

H3. FoMO will account for relationships between depression severity (3a), social anxiety severity (3b), and life satisfaction (3c) with PFU severity.

H4. Rumination will account for relationships between depression severity (4a), social anxiety severity (4b), and life satisfaction (4c) with PFU severity.

H5. The frequency of Facebook use will account for relationships between depression severity (5a), social anxiety severity (5b), and life satisfaction (5c) with PFU severity.

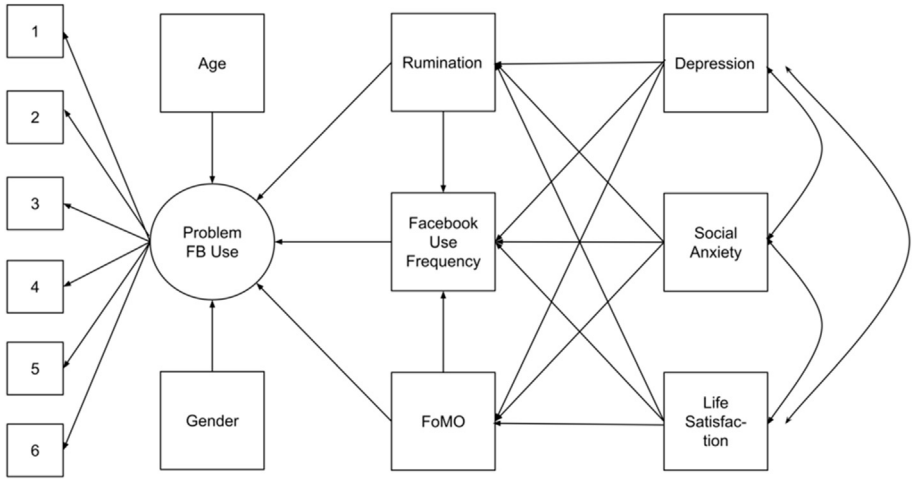

Fig. 1. Hypothesized model.
Notes: The circle represent a latent variable; squares represent observed variables.

1.4. Research model

We tested the model depicted in Fig. 1. All variables were estimated as observed variables (to preserve statistical power with such a complex structural model), with the exception of PFU severity, which was estimated as a latent variable using CFA as the end-point dependent variable in the model. We included depression and social anxiety as predictor variables, as they are psychopathology variables conceptualized to positively influence excessive internet use such as PFU, based on CIUT, I-PACE, and DSMM. We also included life satisfaction as a predictor variable, because life satisfaction is inversely related to psychopathology, is an important functional health/mental health outcome in daily life, and a complement to psychopathology assessment (reviewed in Pavot & Diener, 2008). Life satisfaction should be inversely related to PFU.

We included rumination as a mediating variable, which should be positively related to depression and social anxiety, and inversely related to life satisfaction (Kashdan & Roberts, 2007; Mennin & Fresco, 2013). We also included FoMO as a mediating variable, positively related to depression and social anxiety, and inversely related to life satisfaction (Oberst et al., 2017; Przybylski et al., 2013; Wolniewicz, Tiamiyu, Weeks, & Elhai, 2018). Rumination and FoMO would be considered transdiagnostic psychopathology variables that appear across mental disorders. In fact, transdiagnostic variables represent mechanisms explaining how mental disorders exacerbate problematic behaviors (Mansell, Harvey, Watkins, & Shafran, 2008), and thus they appear as mediators in Fig. 1. FoMO and rumination would be categorized as response styles in I-PACE and DSMM models, and involve negative affect that individuals attempt to regulate in CIUT.

Frequency of Facebook use was also included as a mediator, as frequency of technology use can grow into problematic use (Oulasvirta et al., 2012; van Deursen et al., 2015). Frequency of technology use also acts as an intermediary variable between psychopathology such as depression and anxiety and problematic technology use (Elhai & Contractor, 2018; van Deursen et al., 2015). Facebook use frequency was also specified as a dependent variable predicted by rumination (Elhai, Tiamiyu, & Weeks, 2018) and FoMO (Oberst et al., 2017; Przybylski et al., 2013). Facebook use frequency would also represent a choice of internet application use in I-PACE, a type of media use in DSMM, and a consequence of negative emotion in CIUT.

Finally, we also included age and gender as covariates of PFU severity; many studies include these variables as covariates of PFU, and some studies find younger age and female gender as significant predictors of PFU (reviewed in Andreassen, 2015).

2. Methods

2.1. Participants

Two hundred ninety-six undergraduate students from a Midwestern U.S. university were recruited from its pool of introductory psychology students. Five participants did not continue past the initial demographic items and were excluded, resulting in a sample of 291 subjects. The average age was 20.03 (SD = 3.06). The majority (n = 274, 95.8%) were between 18 and 25 years old, while a small minority were non-traditional college students: between age 26–30 (n = 13, 4.4%), and between age 35–44 (n = 3, 1.0%). The majority of participants were women (n = 167, 57.6%). Most participants were Caucasian (n = 215, 73.9%), with other racial group representations including African Americans (n = 36, 12.4%), Asian Americans (n = 18, 6.2%), and Hispanic/Latinos (n = 17, 5.9%). Participants were primarily first year (n = 141, 48.5%), second year (n = 86, 29.6%), third year (n = 30, 10.3%), or fourth year undergraduate students (n = 22, 7.6%); the remaining 12 (4.1%) participants who responded to this question indicated “other student” status. (Note that some percentages above do not add to 100%, as some missing data were present).

2.2. Procedure

We recruited participants using the department's Sona Systems website, which lists available departmental research studies throughout a particular semester. In exchange for participation, students were awarded course research points. Those who chose to participate were routed to an online consent statement. After consenting, participants were then directed to a web survey hosted on PsychData.com. The study was approved by the authors' university Institutional Review Board.

2.3. Measures

2.3.1. Demographics

Demographics that were inquired include age, gender, race, school, and employment.

2.3.2. FoMO scale

The FoMO scale, developed by Przybylski et al. (2013), is a 10-item rating scale with answer choices ranging from 1 = “Not at all true of me” to 5 = “Extremely true of me.” This scale measures anxiety that individuals experience when they miss out on rewarding experiences with others (e.g., going out with friends). Examples of items include “I

fear others have more rewarding experiences than me," and "When I miss out on a planned get-together, it bothers me." Przybylski et al. (2013) demonstrated adequate reliability, and validity through positive relations with social media engagement, and inverse correlations with need satisfaction, positive mood and life satisfaction. Coefficient alpha in our sample was 0.87.

2.3.3. PHQ-9 scale

The Patient Health Questionnaire-9 (PHQ-9) developed by Spitzer, Kroenke, Williams, and the Patient Health Questionnaire Primary Care Study Group (1999) is a 9-item self-administered scale for depression. PHQ-9 items map onto DSM-5 major depressive episode symptom criteria, with response options ranging from 0 = "Not at all" to 3 = "Nearly every day." Items include "Little interest or pleasure in doing things," and "Feeling tired or having little energy." Internal reliability is sound (Spitzer et al., 1999), with validity against depression diagnoses and measures (Manea, Gilbody, & McMillan, 2015). Coefficient alpha in the present sample was 0.86.

2.3.4. Rumination scale (RTSQ)

The Ruminative Thought Styles Questionnaire (RTSQ) (Brinker & Dozois, 2009) consists of 20 items that measure neutral, positive, and negative aspects of rumination (e.g., "I have never been able to distract myself from unwanted thoughts," or "I find myself reliving events again and again"). Response options range from 1 = "Not at all" to 7 = "Very well." Items include "I tend to replay past events as I would have liked them to happen," and "I find that my mind often goes over things again and again." Internal reliability is good, with convergent validity against similar scales (Brinker & Dozois, 2009). Coefficient alpha in the sample was 0.88.

2.3.5. Life-satisfaction scale

The Satisfaction with Life Scale (SWLS), developed by Diener, Emmons, Larsen, and Griffin (1985), is a 5-item scale measuring cognitive judgments of one's satisfaction with life. Response options range from 1 = "Strongly disagree" to 7 = "Strongly agree." Statements include "If I could live my life over, I would change almost nothing" and "In most ways my life is close to my ideal." Internal reliability of the SWLS is adequate, with validity against measures of well-being (Diener et al., 1985). Coefficient alpha in the sample was 0.88.

2.3.6. Facebook use frequency scale

To assess Facebook use frequency, participants answered five items regarding how often they engage in various Facebook features, using a scale ranging from 1 = "Several times a day" to 7 = "Never"; thus *lower* scores indicate more frequent use. Items queried the following activities: "Change or update your status on Facebook," "Click the 'like' button next to other people's status, photos, links, or other posts on Facebook," "Comment on other people's photos on Facebook," "Comment on other people's status, photos, links, or other posts on Facebook," and "Send private messages on Facebook." Coefficient alpha in this sample was 0.87.

2.3.7. Bergen Facebook addiction scale

To measure PFU severity, we used the 6-item Bergen Facebook Addiction Scale developed by Andreassen, Torsheim, Brunborg, and Pallesen (2012). Response options range from 1 = "Very rarely" to 5 = "Very often." Items include "Used Facebook in order to forget about personal problems?" and "Used Facebook so much that it has had a negative impact on your job/studies?" Reliability is adequate, with convergence against scales of increased Facebook use. Coefficient alpha in the sample was 0.87.

2.3.8. Social interaction anxiety scale

The Social Interaction Anxiety Scale (SIAS), developed by Mattick and Clarke (1998), is a 20-item self-report scale that measures social anxiety. Response options range from 0 = "Not at all characteristic or true of me" to 4 = "Extremely characteristic or true of me." Items include "I tense up if I meet an acquaintance in the street," and "I have difficulty talking with other people." In calculating a total scale score, we summed the 17 straightforwardly-worded items, excluding reverse-coded items, based on improved psychometrics from this method (Rodebaugh, Woods, & Heimberg, 2007). The SIAS has high internal consistency, and convergence with similar measures. Coefficient alpha in the sample was 0.93 (Rodebaugh et al., 2007).

2.4. Analyses

Missing item-level data for the psychological surveys were estimated using maximum likelihood procedures, with SPSS Missing Values Analysis V.22. Subsequently, we summed scale scores. Our scale scores were normally distributed, as the largest value in absolute size for skewness was 0.98 (for PFU), and for kurtosis was 0.79 (for Facebook use frequency), considered well below thresholds for non-normality (Curran, West, & Finch, 1996).

CFA and structural equation modeling (SEM) were conducted using Mplus 8 software. Two participants did not indicate their age and/or gender and were therefore excluded from these analyses, as SEM models included these variables as covariates (resulting sample size = 289). Bergen Facebook Addiction Scale items have five ordinal response options, so we treated items as ordinal in CFA, using a polychoric covariance matrix and probit factor loadings, and weighted least squares estimation with a mean and variance adjustment (WLSMV) (DiStefano & Morgan, 2014). We report standardized parameter estimates. The first factor loading was fixed to a value of "1", and no residual covariances were estimated. We used similar estimation procedures for the SEM. Goodness of fit was assessed using the root mean square error of approximation (RMSEA), Tucker-Lewis Index (TLI), and comparative fit index (CFI) (Hu & Bentler, 1999). Good fit is assessed against benchmarks including CFI $\geq$ 0.95, TLI $\geq$ 0.95, and RMSEA $<$ 0.06 (Hu & Bentler, 1999).

Using SEM, we controlled for age and gender as covariates of PFU severity. FoMO was specified to predict PFU (H1). Rumination was specified to predict PFU (H2). Further, FoMO was predicted to mediate the relationship between a) depression severity and PFU (H3a), b) social anxiety and PFU (H3b), and c) life satisfaction and PFU (H3c). Rumination was predicted to mediate the relationship between a) depression severity and PFU (H4a), b) social anxiety and PFU (H4b), and c) life satisfaction and PFU (H4c). Facebook use frequency was predicted to mediate relations between a) depression severity and PFU (H5a), b) social anxiety and PFU (H5b), and c) life satisfaction and PFU (H5c). Additionally, rumination and FoMO were modeled to predict Facebook use frequency.

In conducting mediation, we computed the cross product of two direct path coefficients to obtain an indirect path coefficient. The delta method was used to calculate the standard error of indirect effects. We used 1000 bootstrapped simulations of the standard errors, to obtain indirect path coefficients based on a normal sampling distribution (MacKinnon, 2008).

3. Results

Table 1 displays bivariate Pearson correlation coefficients for the study variables. PFU severity was found to be associated with both FoMO (H1) and rumination (H2). In fact, all scales were significantly associated with PFU severity, with the exception of life satisfaction.

The CFA model of PFU yielded some evidence for adequate fit (but not based on RMSEA), robust $\chi^2(9, N = 289) = 136.27$, $p < 0.001$, CFI = 0.96, TLI = 0.93, RMSEA = 0.22 (90% CI: 0.19 to 0.26). Additionally, all factor loadings were uniformly high, with no value lower than 0.75 (Fig. 2).

Fig. 2 displays standardized path coefficients for the SEM, which

Table 1
Correlation matrix of primary study variables.

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. PFU	11.33	5.06	–	−0.07	0.20**	0.30**	0.20**	0.32**	−0.37**
2. Life satisfaction	22.45	6.52		–	−0.35**	−0.16**	−0.22**	−0.11	0.02
3. Depression	6.71	5.41			–	0.43**	0.49**	0.26**	−0.11
4. Social anxiety	20.96	13.50				–	0.48**	0.42**	−0.20**
5. Rumination	85.01	24.12					–	0.43**	−0.14*
6. Fear of missing out	22.04	7.51						–	−0.19**
7. Facebook use frequency	22.66	7.36							–

Note: PFU = Problematic Facebook use. Lower scores for Facebook Use Frequency indicate greater frequency.
* Correlation is significant at $p < 0.05$ (2-tailed).
** Correlation is significant at $p < 0.01$ (2-tailed).

overall demonstrated some evidence for adequate fit, robust $\chi^2(61, N = 289) = 228.28$, $p < 0.001$, CFI = 0.95, TLI = 0.93, RMSEA = 0.09 (90% CI: 0.08 to 0.11). Adjusting for gender, age, rumination and Facebook use frequency, FoMO was related to PFU, $\beta = 0.26$, SE = 0.06, $p < 0.001$ (supporting H1). Furthermore, adjusting for covariates, rumination was associated with PFU severity, $\beta = 0.13$, SE = 0.06, $p = 0.04$ (supporting H2). Although not explicitly hypothesized, age was positively related to PFU severity, $\beta = 0.14$, SE = 0.07, $p = 0.04$. Adjusting for covariates, Facebook use frequency was associated with greater PFU severity, $\beta = -0.35$, SE = 0.05, $p < 0.001$. Psychopathology variables, however, were not related to Facebook use frequency. Additional direct effects were significant as well (Fig. 2).

Among the mediation hypotheses, FoMO mediated the relationship between social anxiety and PFU, $\beta = 0.12$, SE = 0.03, $p < 0.001$ (H3b). Rumination mediated relations between social anxiety and PFU, $\beta = 0.05$, SE = 0.03, $p = 0.05$ (H4b). Frequency of Facebook use did not mediate relationships between depression, social anxiety or life satisfaction with PFU (rejecting H5).

4. Discussion

In support of H1, we found that FoMO was positively related to levels of PFU. These findings are consistent with prior research on the FoMO-PFU relationship (Błachnio & Przepiórka, 2018; Blackwell et al., 2017; Dhir et al., 2018). These findings fit with CIUT, I-PACE and DSMM in conceptualizing predisposing negative emotion and thoughts, such as the negative social cognitions associated with FoMO, as driving excessive internet use, such as PFU (Przybylski et al., 2013).

We found that rumination was significantly associated with PFU severity when adjusting for covariates in SEM (supporting H2). Rumination has been theoretically proposed as a pathway to excessive technology use (Billieux, Maurage, et al., 2015), and supported for empirical relations with PSU (Elhai, Tiamiyu, & Weeks, 2018). Rumination about social/interpersonal relationships offline may drive excessive online SNS use in an attempt to satisfy or relieve such rumination and alleviate negative mood (Billieux, Maurage, et al., 2015). This finding also fits with CIUT's focus on negative emotion driving excessive technology use (Kardefelt-Winther, 2014), and I-PACE's proposition of cognitive bias and coping style (relevant to rumination) serving as risk factors for such excessive use (Brand et al., 2016).

Among the mediation hypotheses, Facebook use frequency did not account for relations between psychopathology variables and PFU severity, rejecting H5. Habitual Facebook use can grow into problematic use (Ryan et al., 2014; Salehan & Negahban, 2013), and psychopathology may fuel this process based on I-PACE and DSMM. Perhaps our measurement of Facebook use frequency was not sensitive enough or objectively measured to reveal such a finding.

H3b was supported, in that FoMO mediated relations between levels of social anxiety and PFU. Related work recently demonstrated that FoMO severity mediated relations between social anxiety and variables involving internet use: social smartphone use frequency, social networking use, and PSU (Oberst et al., 2017; Wolniewicz et al., 2018). Furthermore, H4b was supported in that rumination mediated relations between social anxiety and PFU severity. These findings also fit with CIUT in explaining PFU based on relieving negative emotion. Findings also fit with I-PACE's conceptualization of cognitive bias and coping style (related to rumination) as mechanisms in the relationship between predisposing factors and excessive internet use. Additionally, FoMO fits with DSMM's focus on social context as driving media use. That is,

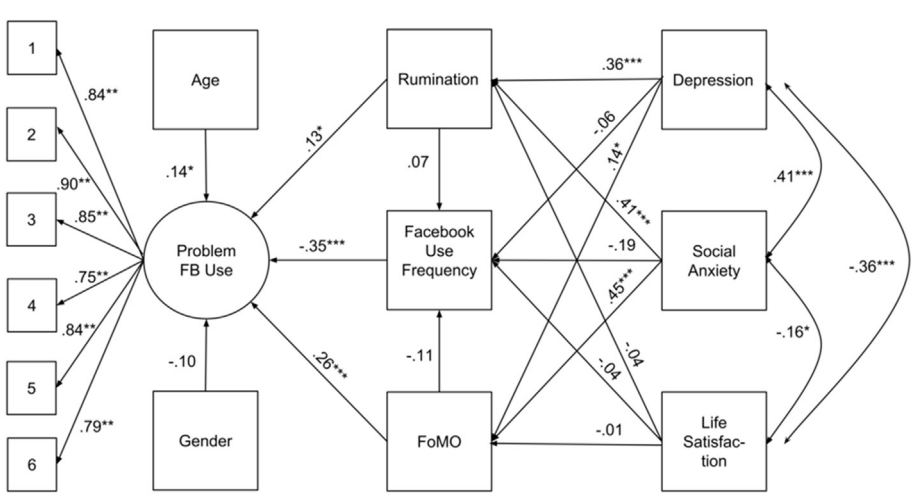

Fig. 2. Hypothesized model with standardized path coefficients.
Notes: The circle represents a latent variable; squares represent observed variables.
*$p < 0.05$, **$p < 0.01$ ***$p < 0.001$.

people with social anxiety may engage in PFU as a compensatory process for their anxiety, but this relationship is accounted for by increased FoMO and rumination, based on our findings.

There are several limitations to our study. Because our study sampled undergraduate students at one particular university, our results may not generalize to the wider population. Additionally, we measured PFU by self-report methodology, rather than using more objective methods for studying social media use. And self-reported technology usage has compromised validity against objective methods (Elhai et al., 2018; Lee, Ahn, Nguyen, Choi, & Kim, 2017). Also, despite adequate fit in our CFA and SEM models from TLI and CFI indices, RMSEA values evidenced poor fit; with a larger sample or more degrees of freedom, RMSEA may evidence adequate fit along the lines of the TLI and CFI values (Kenny, Kaniskan, & McCoach, 2014). Finally, our study was cross-sectional, and therefore our mediation results should be interpreted with caution; perhaps future studies should test moderation in this regard.

Nonetheless, this study adds to prior research on relations between PFU and mental health constructs. This study further adds the examination of transdiagnostic constructs such as rumination and FoMO that may account for PFU. Results suggest that the mental health constructs assessed were more related to PFU than to the frequency of Facebook use. Results also suggest that rumination and FoMO may account for the previously established relations between social anxiety and PFU severity. Future research should examine additional transdiagnostic psychopathology constructs for relations with PFU.

Conflict of interest

All authors declare that they have no conflicts of interest with this study.

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