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Fear of missing out, need for touch, anxiety and depression are related to problematic smartphone use

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ABSTRACT

Problematic smartphone use is an important public health challenge and is linked with poor mental health outcomes. However, little is known about the mechanisms that maintain this behavior. We recruited a sample of 308 participants from Amazon's Mechanical Turk labor market. Participants responded to standardized measures of problematic smartphone use, and frequency of smartphone use, depression and anxiety and possible mechanisms including behavioral activation, need for touch, fear of missing out (FoMO), and emotion regulation. Problematic smartphone use was most correlated with anxiety, need for touch and FoMO. The frequency of use was most correlated (inversely) with depression. In regression models, problematic smartphone use was associated with FoMO, depression (inversely), anxiety, and need for touch. Frequency of use was associated with need for touch, and (inversely) with depressive symptoms. Behavioral activation mediated associations between smartphone use (both problematic and usage frequency) and depression and anxiety symptoms. Emotional suppression also mediated the association between problematic smartphone use and anxiety. Results demonstrate the importance of social and tactile need fulfillment variables such as FoMO and need for touch as critical mechanisms that can explain problematic smartphone use and its association with depression and anxiety.

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1. Introduction

Smartphones are ubiquitous in modern day society globally. Pew Research polling indicates that 72% of Americans own a smartphone, with a global average ownership of 43% (Poushter, 2016, February 22). However, for many people, problematic smartphone use has harmful effects. For example, research indicates hazardous outcomes for problematic smartphone use, including distracting drivers and pedestrians (reviewed in Cazzulino, Burke, Muller, Arbogast, & Upperman, 2014; Thompson, Rivara, Ayyagari, & Ebel, 2013). Additionally effects include musculoskeletal health effects (Xie, Szeto, Dai, & Madeleine, 2016; İnal, Demirci, Çetintürk, Akgönül, & Savaş, 2015), poor physical

fitness (Lepp, Barkley, Sanders, Rebold, & Gates, 2013; Rebold, Sheehan, Dirlam, Maldonado, & O'Donnell, 2016) and academic deficits (Lepp, Barkley, & Karpinski, 2014; Prabu, Kim, Brickman, Ran, & Curtis, 2015). Studying problematic smartphone use is therefore of significant public health significance. Our focus in the present paper is on correlates and mechanisms of problematic smartphone use involving psychopathology, dysfunctional self- and emotional control, and social and tactile need fulfillment.

Evidence for the construct of problematic smartphone use, or smartphone addiction, comes from a growing literature base. In Pew Research polling, nearly half of Americans reported that they "couldn't live without" their smartphones (Smith & Page, 2015, April 1). When separated from one's smartphone in experimental studies, many participants evidence mounting anxiety (Cheever, Rosen, Carrier, & Chavez, 2014) and physiological increases in heart rate and blood pressure (Clayton, Leshner, & Almond, 2015). Furthermore, phantom cell phone vibrations are commonly reported, despite an absence of incoming phone notifications (Kruger

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& Djerf, 2016). These dependency-like behaviors and withdrawal-like symptoms are not surprising given how much people rely on their phones in daily life for productivity, information seeking, and social interaction, among other things (van Deursen, Bolle, Hegner, & Kommers, 2015).

Recent studies identified the psychopathological correlates of problematic smartphone use. Methodologically, this literature base has generous sample sizes ($n > 200$), primarily using student participants collected in the U.S., China and Korea, with standardized measures of problematic mobile phone use. The majority of these studies are cross-sectional, using regression or structural equation modeling analyses. Most widely reported are relationships between problematic smartphone use and severity of depression and anxiety symptoms. Other research has shown associations between problematic smartphone use and more general stress and self-esteem, but with less consistent findings (e.g., Smetaniuk, 2014; van Deursen et al., 2015). The association between smartphone use and depression typically ranges from 0.3 to 0.5 for bivariate correlations and standardized regression coefficients when adjusting for other relevant variables such as age and gender (most recently in Demirci, Akgonul, & Akpinar, 2015; Harwood, Dooley, Scott, & Joiner, 2014; J. Kim, Seo, & David, 2015; Smetaniuk, 2014). Anxiety symptoms are associated with problematic smartphone use on a bivariate and multivariate basis with coefficients averaging 0.2 (recently in Demirci et al., 2015; Harwood et al., 2014; R. Kim, Lee, & Choi, 2015; Lee, Chang, Lin, & Cheng, 2014).

Thus the literature demonstrates solid evidence for small to medium effect size associations between problematic smartphone use and depression and anxiety. There is evidence from prospective studies for bidirectional relations, whereby excessive smartphone use can result in psychopathology, which in turn drives smartphone use (van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008; Thomee, Härenstam, & Hagberg, 2011; Yen et al., 2012).

Theoretical explanations specific to problematic smartphone use are limited. Very recently, Billieux and colleagues developed a theoretical model to explain problematic mobile phone use (Billieux, Maurage, Lopez-Fernandez, Kuss, & Griffiths, 2015). Their model is based on primary pathways to problematic use including excessive reassurance seeking, impulsivity, and extraversion. We examine variables falling within this model in the prediction of problematic smartphone use, but we also extend this model by focusing on additional, newer variables with theoretical support that have only recently been tested empirically.

First, within Billieux et al.'s (2015) extraversion pathway, fear of missing out (FoMO) is a newer personality construct involving reluctance to miss important information, including social information. FoMO results in the need to frequently stay connected to social networks. FoMO was first discussed in the news media (Fake, 2011, March 15; Morford, 2010, August 4). People high in FoMO likely overuse their smartphones to satisfy the need to stay connected. FoMO appears to drive overuse of social media based on web surveys with college students and community participants (Alt, 2015; Przybylski, Murayama, DeHaan, & Gladwell, 2013). Among college students, FoMO was associated with increases in problematic smartphone use in a laboratory study (Clayton et al., 2015).

Another relevant construct, within the impulsive pathway to problematic smartphone use, is decreased emotional self-control, or emotional dysregulation. Dysregulated emotion is often defined by two processes – decreased cognitive reappraisal, and increased emotional suppression (Gross & John, 2003; Gross, 1998). Problematic smartphone users likely overuse their phones in part because of an inability to regulate their emotions. Additionally,

problematic smartphone use may be a technique (albeit ineffective) to deal with or regulate negative emotion. In fact, Hoffner and Lee (2015) found in a survey study with undergraduates that habitual use of emotional suppression was associated with more intense missing of particular aspects of smartphone use, including entertainment and information content. A host of research has shown that the relationship between problematic behaviors and associated mental disorders is mediated by emotional dysregulation (reviewed in Weiss, Sullivan, & Tull, 2015). We were particularly interested in whether emotional dysregulation mediates relations between problematic smartphone use in accounting for depression and anxiety.

We propose an additional variable to Billieux et al.'s (2015) model. One addictive aspect of smartphone use is the pleasure derived from tactile sensations in holding the phone, and the autotelic touch (Peck & Childers, 2003a) required in completing tasks with one's fingers (Lee et al., 2014). "Need for touch" (Peck & Childers, 2003b) is a construct from the marketing field describing a personality variable of desiring haptic information through the hands. People high in this trait are more likely to analytically and experientially sample a product's features (Yazdanparast & Spears, 2012). Research demonstrates that if experiential product sampling is satisfying and fun, people high in the need for touch are likely to engage in impulse purchasing (Peck & Childers, 2006; Viera, 2012). People high in the need for touch may demonstrate an overuse of a smartphone's touch screen to satisfy this need. Lee et al. (2014) found in a Taiwanese community survey that problematic smartphone use was significantly related to need for touch.

We also assess potential mechanisms that can account for relations between problem smartphone use and both depression and anxiety. One candidate mechanism is behavioral activation. According to the Behavioral Model of Depression, low levels of positive reinforcement are responsible for depressive symptoms, and increasing positive reinforcement can be obtained by increasing the number and types of gratifying/pleasurable events in one's environment (Lewinsohn, 1974). An elaboration of this model, the Integrated Model of Depression, adds a more comprehensive interplay of environmental and dispositional factors to developing depression, such as environmental stressors and maladaptive cognitions (Lewinsohn, Hoberman, Teri, & Hautzinger, 1985). Behavioral activation involves engagement in adaptive gratifying/pleasurable activities as a functional response alternative to avoidance. Behavioral activation has shown great promise as a target for alleviation of clinical depression (reviewed in Dimidjian, Barrera, Martell, Munoz, & Lewinsohn, 2011). It has also been found effective for other disorders with depression content, such as posttraumatic stress disorder (Acierno et al., 2016), as well as using different delivery formats, such as via the internet (Carlbring et al., 2013). Yet unexplored is whether increased behavioral activation offsets the impact of problematic smartphone use on depression and anxiety outcomes.

1.1. Hypotheses

In the present study, we had several hypotheses about variables predicting problematic smartphone use and usage frequency outcomes:

Hypothesis 1) We hypothesized that depression severity would be significantly, positively related to the smartphone use outcome variables, with moderate effect sizes. This hypothesis is based on prior research finding such effects for depression severity in relation these smartphone use variables (Demirci et al., 2015; Harwood et al., 2014; J. Kim, Seo et al., 2015; Smetaniuk, 2014).

Hypothesis 2) We expected that anxiety severity would be

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