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PTSD's relation with problematic smartphone use: Mediating role of impulsivity

Ateka A. Contractor ^{a,*}, Nicole H. Weiss ^b, Matthew T. Tull ^c, Jon D. Elhai ^{c,d,e}^a Department of Psychology, University of North Texas, Denton, TX, USA^b Department of Psychiatry, Yale University School of Medicine, New Haven, CT, USA^c Department of Psychology, University of Toledo, Toledo, OH, USA^d Department of Psychiatry, University of Toledo, Toledo, OH, USA^e Laboratory for Traumatic Stress Studies, CAS Key Laboratory of Mental Health, Institute of Psychology, Chinese Academy of Sciences, Beijing, China

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ABSTRACT

Posttraumatic stress disorder (PTSD) frequently co-occurs with addictive behaviors. Recently, the addictive behavior of excessive smartphone use is being widely researched. Impulsivity commonly relates to PTSD severity and problematic smartphone use. However, unexamined is the mediating role of impulsivity facets (lack of premeditation, negative urgency, sensation seeking, and lack of perseverance) in the PTSD-problematic smartphone use relationship; this was the purpose of the current study. We used data collected from 346 participants recruited through Amazon's Mechanical Turk (MTurk) platform. PTSD severity, impulsivity facets, and problematic smartphone use were assessed using the PTSD Checklist for DSM-5 (PCL-5), the UPPS Impulsive Behavior Scale, and the Smartphone Addiction Scale-Short Version (SAS-SV), respectively. Negative urgency and lack of perseverance had significant positive correlations with both PTSD severity and problematic smartphone use. Results of mediation analyses indicated that negative urgency significantly mediated the relationship between PTSD severity and problematic smartphone use. Findings support the underlying role of negative urgency in the relation between PTSD severity and problematic smartphone use. Thus, treatments targeting negative urgency may potentially serve to reduce problematic smartphone use among individuals experiencing PTSD symptoms.

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1. Introduction

Posttraumatic stress disorder (PTSD) frequently co-occurs with addictive behaviors (Breslau, 2009). Problematic smartphone use as an addictive behavior is increasingly being researched in relation to psychopathology (Elhai, Dvorak, Levine, & Hall, 2017), including PTSD severity (Contractor, Frankfurt, Weiss, & Elhai, 2017). Research has linked impulsivity to both PTSD severity (Contractor, Armour, Forbes, & Elhai, 2016; Weiss, Connolly, Gratz, & Tull, 2017) and problematic smartphone use (reviewed in Billieux, 2012). No study has examined the potential mediating role of impulsivity facets in the PTSD-problematic smartphone use relation; this was the focus of the current study.

Smartphone addiction (termed as problematic smartphone use

for this paper) has been characterized as a type of non-chemical behavioral addiction (reviewed in Billieux, 2012; van Deursen, Bolle, Hegner, & Kommers, 2015). It involves excessive and problematic use of a smartphone despite functional impairment (Demirci, Akgönül, & Akpınar, 2015). Problematic smartphone use shares characteristics similar to other non-behavioral addictive behaviors including habitual overuse, functional impairment, and withdrawal following cessation of use (e.g., Ezoë et al., 2009). Research has indicated that excessive phone use relates to impaired driving (Violanti, 1998); difficulties in real-life social engagement (Kuss & Griffiths, 2011); sleep difficulties (Demirci et al., 2015); and psychopathology constructs of depression, anxiety, and stress (Demirci et al., 2015; Elhai et al., 2017). The concept of “iDisorder” highlights the detrimental influence of problematic technology use on mental health (Rosen, Cheever, & Carrier, 2012).

Given these aforementioned findings, research on problematic smartphone use in relation to psychopathology is gaining attention. However, only one study to our knowledge has examined the relation between PTSD severity and problematic smartphone use,

* Corresponding author. University of North Texas, Department of Psychology, 369 Terrill Hall, Denton, TX, 76203, USA. Tel.: +940 369 8228.

E-mail address: ateka.c@gmail.com (A.A. Contractor).

and found a positive significant relation between the two constructs (Contractor et al., 2017). From a negative reinforcement perspective, excessive smartphone use could function to escape or avoid emotional distress stemming from external and internal stimuli perceived as threatening among people experiencing PTSD symptoms (reviewed in Billieux, 2012). This framework is consistent with the *impulsive pathway perspective* (reviewed in Billieux, 2012) in technology addiction research; and the *affective processing model of negative reinforcement* in substance addiction research (Baker, Piper, McCarthy, Majeskie, & Fiore, 2004). Thus, similar to other addictive behaviors, excessive smartphone use may serve an avoidant function among individuals who experience PTSD symptoms, which may prevent the habituation to fear cues and the processing of traumatic memories, exacerbating PTSD severity in the long-term.

As such, it is essential to identify factors that elucidate the mechanism linking PTSD severity to problematic smartphone use. Impulsivity may be an important factor to consider in this regard. The UPPS Impulsivity Scale is one of the most widely researched instruments assessing impulsivity as a multidimensional construct (Whiteside & Lynam, 2001). It identifies four facets of impulsivity: lack of premeditation (tendency to act without careful thought), negative urgency (tendency to engage in rash behaviors in the context of intense negative affect), sensation seeking (tendency to seek excitement), and lack of perseverance (difficulty completing tasks and tendency to become easily bored). Several of these impulsivity facets have been shown to be positively associated with PTSD severity (Contractor et al., 2016; Jakšić, Brajković, Ivezić, Topić, & Jakovljević, 2012) and problematic smartphone use (reviewed in Billieux, 2012; Kim et al., 2016), and may thus serve a mediational role in this relationship.

According to the *disinhibition* viewpoint of impulsivity, individuals with PTSD symptoms may struggle to inhibit risky behaviors (e.g., reading a received text in anticipation of good news when driving) when perceiving rewarding situations (Casada & Roache, 2005). This conceptualization of impulsivity references the lack of premeditation facet which is shown to significantly relate to PTSD severity (Roley, Contractor, Weiss, Armour, & Elhai, 2017) as well as prohibited use of mobile phones (Billieux, Van Der Linden, & Rochat, 2008). Thus, people who experience PTSD symptoms may use smartphones without considering potential adverse consequences.

Alternatively, the impulsivity facet of negative urgency, which relates to *emotion regulation*, could play a role in the relation between PTSD severity and problematic smartphone use. Following the experience of a potentially traumatic event (PTE), one may engage in impulsive behaviors to reduce the consequent negative affect related to PTSD (Marshall-Berenz, Vujanovic, & MacPherson, 2011; Weiss, Tull, Sullivan, Dixon-Gordon, & Gratz, 2015; Weiss, Tull, Viana, Anestis, & Gratz, 2012). Such impulsive behaviors could take the form of illegal/dangerous uses of smartphones (Billieux, Van Der Linden, D'Acremont, Ceschi, & Zermatten, 2007). Thus, the functional role of smartphones could be that of mood repair and emotion regulation (Billieux, 2012; Billieux et al., 2007; Roberts, Pullig, & Manolis, 2015). As expected, negative urgency strongly relates to PTSD severity (Contractor et al., 2016; Roley et al., 2017) and to problematic mobile phone use (Billieux et al., 2007; Billieux et al., 2008).

Further, the impulsivity facet of sensation seeking may mediate the relation between PTSD symptoms and problematic smartphone use. The *compulsive re-exposure* hypothesis states that people with PTSD symptoms may engage in sensation-seeking activities (which may even result in additional PTEs) to mimic the biological arousal experienced during the PTE(s) (Joseph, Dalglish, Thrasher, & Yule, 1997; Van der Kolk, Greenberg, Boyd, & Krystal, 1985).

Alternatively, people with greater sensation-seeking tendencies may be more likely to engage in impulsive, risky behaviors (e.g., substance use; Horvath & Zuckerman, 1993); which in turn may increase the chances of experiencing PTEs (e.g., accidents while intoxicated; Davis, Combs-Lane, & Jackson, 2002), and possibly developing significant post-trauma symptoms. Irrespective of the directionality between sensation-seeking and PTEs, it is possible that high sensation seeking among people with PTSD symptoms in turn may predict problematic use of smartphones (e.g., use while driving) to re-create a hedonic and physically arousing stimulation (Billieux, 2012; Billieux et al., 2008). Research validates that sensation seeking is predictive of PTSD severity (Contractor et al., 2016; Roley et al., 2017).

Lastly, a cognitive explanation underscores the potential role of attentional difficulties and restriction in information processing capacity (lack of perseverance facet) in risky behaviors following the experience of a PTE(s) (Ben-Zur & Zeidner, 2009). Specifically, following the experience of a PTE(s), people may experience intrusive thoughts related to the traumatic events, which may subsequently result in attentional difficulties. Consequently, one may use smartphones to redirect their attention or to distract themselves from intrusive thoughts (Billieux, 2012; Roberts et al., 2015; Wu, Cheung, Ku, & Hung, 2013). Unsurprisingly, results have indicated that lack of perseverance is predictive of PTSD severity (Roley et al., 2017) and relates to problematic mobile use (Billieux et al., 2007).

Extant literature highlights the potential mediating role of impulsivity in the PTSD-problematic smartphone use relation; however, no study to our knowledge has examined this model empirically using impulsivity facets. Further, several models could explain the mediating role of impulsivity facets in the PTSD-problematic smartphone use relation. Hence, we have no *a priori* hypotheses for the mediation models. Results could highlight the functional role of specific impulsivity facets; and targets of clinical interventions for clients with comorbid PTSD-problematic smartphone use.

2. Method

2.1. Procedure and participants

The Institutional Review Board of University of North Texas approved the study. We recruited participants through Amazon's Mechanical Turk (MTurk) platform, a growing platform used by social science researchers to gather reliable data from diverse samples (Buhrmester, Kwang, & Gosling, 2011; Mischna & Carleton, 2017). The MTurk platform is a useful resource for studying mental health problems and clinical populations (Shapiro, Chandler, & Mueller, 2013). We described the study as a 30-min survey of the nature and extent of smartphone use among people with stressful life experiences. Participants 18 years and older were screened for four inclusionary criteria: (1) living in North America; (2) knowledge of the English language; (3) using a smartphone; and (4) experiencing a PTE. After obtaining informed consent, participants completed the survey hosted on Psychdata.com (data collection platform) and were compensated 75 cents.

2.2. Exclusions, missing data, and sample characteristics

Among the 499 respondents who completed the survey, 19 participants attempted the questionnaire twice/thrice and were excluded ($n = 480$). We further excluded participants (1) not meeting one or more of the inclusionary criteria ($n = 120$); (2) missing data on all measures ($n = 11$); and (3) missing more than 70% item-level data on the PTSD Checklist for DSM-5 (≥ 6 items;

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