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## The exacerbating role of perceived social support and the "buffering" role of depression in the relation between sensation seeking and adolescent smartphone addiction



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#### ABSTRACT

The present study examined the relation between sensation seeking and adolescent smartphone addiction, and tested both the moderating roles of perceived social support and depression on the relation between sensation seeking and smartphone addiction among Chinese adolescents. Six hundred and fifty-five adolescents completed measures regarding sensation seeking, smartphone addiction, perceived social support, and depression. The findings indicated that sensation seeking was positively significant associated with adolescent smartphone addiction. Contrary to the social support buffering hypothesis, the results indicated that perceived social support exacerbated the relation between sensation seeking and adolescent smartphone addiction. To be specific, for adolescents with a low level of perceived social support, the relation between sensation seeking and smartphone was positively significant, and for adolescents with a high level of perceived social support, the relation between sensation seeking and smartphone addiction. Specifically, for adolescents with a low level of depression, the relation between sensation seeking and smartphone addiction was positively significant, while for adolescents with a high level of depression, the relation between sensation seeking and smartphone addiction was not significant.

#### 1. Introduction

Smartphones have become an important part of many adolescents' daily lives in recent years. Smartphone addiction, as a relatively new form of behavioral addiction, is emerging as a big concern in the last decade (Bian & Leung, 2015; Lee & Lee, 2017). Smartphone addiction is a phenomenon characterized by withdrawal symptoms, tolerance, dependence, and social problems (Choi et al., 2015), it has received increasing academic attention because of its negative impacts on adolescent development. For example, previous studies indicate that smartphone addiction can negatively affect adolescents' sleep quality, emotional status, academic performance, peer relationship, and physical health (Kim, Kim, & Jee, 2015; Lemola, Perkinson-Gloor, Brand, Dewald-Kaufmann, & Grob, 2015; Lepp, Barkley, & Karpinski, 2014; Samaha & Hawi, 2016; Seo, Park, Kim, & Park, 2016; Thomee, Harenstam, & Hagberg, 2011; Wang et al., 2017). Given the adverse influences of smartphone addiction on adolescents, it is of both

theoretical and empirical importance to uncover the potential factors that can lead to adolescent smartphone addiction.

Although some risk factors for adolescent smartphone addiction have been recognized (Bae, 2015; Bian & Leung, 2015; Gökçearslan, Mumcu, Haşlaman, & Çevik, 2016; Hong, Chiu, & Huang, 2012; Lee, Chang, Lin, & Cheng, 2014; Lee & Lee, 2017; Roberts, Pullig, & Manolis, 2015), however, little research has explored the relation between sensation seeking and smartphone addiction. Sensation seeking has long been documented as one of the most confirmed predictive personal traits of problem and addictive behaviors (Jonah, 1997; Zuckerman & Kuhlman, 2000). For example, previous research demonstrates that sensation seeking is positively related to alcohol abuse, smoking, casual sexual behaviors, and dangerous driving (Jonah, 1997; Zuckerman & Kuhlman, 2000). While some studies find that sensation seeking is positively related to Internet addiction, however, the relation between sensation seeking and Internet addiction has been less consistent (Lavin, Marvin, McLarney, Nola, & Scott, 1998; Lin & Tsai, 2001). One

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possible reason is that there are certain key moderators causing the variation in the relation between sensation seeking and Internet addiction. Given that smartphones are based on the Internet, it is possible that the relation between sensation seeking and smartphone addiction would vary as a function of certain moderators.

Confirming the relation between sensation seeking and smartphone addiction, and the moderators of this relation would be critical to advance our understanding of adolescent smartphone addiction and to enlighten effective prevention and intervention as well. In addition, adolescents have poorer impulsive control compared with adults and they use smartphones to manage their emotions and social status (Lopez-Fernandez, Honrubia-Serrano, Freixa-Blanxart, & Gibson, 2014), which makes them at the most risk of getting addicted to smartphones. However, the majority of the studies regarding smartphone addiction are focused on young adults such as college students, it is necessary and important to focus more on adolescent smartphone addiction (Lopez-Fernandez et al., 2014). To fill these gaps, the present study utilized a sample of Chinese adolescents to examine the effect of sensation seeking on adolescent smartphone addiction, and explored whether perceived social support and depression would moderate the relation between sensation seeking and adolescent smartphone addiction.

#### 1.1. Sensation seeking and adolescent smartphone addiction

Sensation seeking is a common characteristic among adolescents (Cauffman et al., 2010; Steinberg et al., 2008; Zuckerman, 1994). According to the sensation seeking theory, sensation seeking is "a trait by the seeking of varied, novel, complex, and intense sensations and experiences, and the willingness to take physical, social, legal, and financial risks for the sake of such experience" (Zuckerman, 1994). Sensation seeking is a biological trait, which is an important predictor of human behavior (Zuckerman, 1996; Zuckerman & Kuhlman, 2000). For individuals with a high level of sensation seeking, they have lower baseline arousal, which may drive them to participate in highly arousing experiences. Therefore, it is possible that sensation seeking can be related to smartphone addiction. Empirical research is in support of this notion. For example, some cross-sectional studies found that adolescents with a high level of sensation seeking are at more risk of getting addicted to the Internet (Li, Newman, Li, & Zhang, 2016; Lin & Tsai, 2001; Velezmoro, Lacefield, & Roberti, 2010), even after controlling for other predictive factors such as anxiety, depressive symptoms, and lack of assertiveness (Dalbudak et al., 2015). Besides, a longitudinal study found that sensation seeking was a powerful predictor of Internet addiction (Ko, Yen, Yen, Lin, & Yang, 2007). Moreover, a meta-analysis indicated that there was a moderate and positive relation between sensation seeking and Internet addiction (Wang, Chen, Yang, & Gao, 2013). To our knowledge, little research has directly explored the relation between sensation seeking and adolescent smartphone addiction before. Based on the literature reviewed above, we put up the first hypothesis in the present study:

**Hypothesis 1.** Sensation seeking will predict adolescent smartphone addiction in general. To be specific, a high level of sensation seeking will predict a high level of adolescent smartphone addiction.

#### 1.2. The moderating role of perceived social support

While these studies mentioned above are in support of the notion that sensation seeking could predict smartphone addiction, a few studies indicate that sensation seeking as an explanation for Internet addiction are inconsistent (Ko et al., 2007; Lavin et al., 1998; Li et al., 2016; Lin & Tsai, 2001; Velezmoro et al., 2010; Wan & Chiou, 2006; Wang et al., 2013). Therefore, it is possible that sensation seeking could predict smartphone addiction in general, but the effect would vary as a function of certain variables (e.g., perceived social support, depression).

As the social support buffering hypothesis suggests (Cohen & Wills, 1985), perceived social support can buffer people from the impacts of some risk factors. Given that individuals with a high level of sensation seeking are more likely to seek varied, novel, complex, and intense sensations or experiences, even if they need to take physical, social, legal, and financial risks for the sake of such experience (Zuckerman, 1994). It is reasonable to regard sensation seeking as a risk factor in some cases. Therefore, it is theoretically possible that perceived social support could be a buffer in the relation between sensation seeking and adolescent smartphone addiction. Empirical research supports this notion. For example, a recent study found that family support moderated the relation between depression and Internet addiction (Wu. Li. Lau. Mo. & Lau. 2016). To our knowledge, no prior has examined the moderating effect of perceived social support in the relation between sensation seeking and adolescent smartphone addiction. Based on the social support buffering hypothesis and the empirical grounds reviewed above, we put forward the second hypothesis in the present study:

**Hypothesis 2.** Perceived social support will moderate the relation sensation seeking and adolescent smartphone addiction. To be specific, the relation between sensation seeking and smartphone addiction will be stronger for adolescents with a low level of perceived social support.

#### 1.3. The moderating role of depression

The inconsistency of outcomes may also come from individual traits that moderate (i.e., exacerbate or buffer) the influence of sensation seeking on adolescent smartphone addiction, for instance, depression. Depression is regarded as a constellation of negative emotions and behaviors, including feelings of worthlessness and loneliness, worrying about doing bad things, crying, and feeling the need to be perfect (Petersen et al., 1993). According to the cognitive-behavioral model of pathological Internet use (Davis, 2001), people with negative mental status are more likely to get addicted to the Internet, given that smartphone is based on the Internet, it is theoretically possible that depression could predict smartphone addiction. Empirical research is in line with this notion. For example, a study found that depression was positively related to smartphone addiction among college students, even after controlling for some confounders such as demographics, personality traits, and academic variables (Boumosleh & Jaalouk,

Moreover, depression may exacerbate the relation sensation seeking and adolescent smartphone addiction. According to the diathesis-stress framework, some personal traits such as depression can exacerbate the relation between some negative factors and their influences on people. Empirical research has supported this notion. For example, it is found that depression can moderate the relation between denial (a type of coping strategy) and Internet addiction (Chou et al., 2015). To our knowledge, no prior research has explored the direct relationship between sensation seeking and adolescent smartphone addiction, nor the moderating effect of depression on the relation between sensation seeking and adolescent smartphone addiction. Based on the literature reviewed above, we put up the third hypothesis in the present study:

**Hypothesis 3.** Depression would positively predict adolescent smartphone addiction. Moreover, depression would moderate the relation between sensation seeking and adolescent smartphone addiction. To be specific, the relation between sensation seeking and smartphone addiction would be stronger for adolescents with a high level of depression.

#### 1.4. The present study

Taken together, the main purposes of the present study were as follows. First, this study explored whether sensation seeking would be positively associated with adolescent smartphone addiction. Second,

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