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Mobile phone addiction levels and negative emotions among Chinese young adults: The mediating role of interpersonal problems

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ABSTRACT

This study evaluated the mediating role of interpersonal problems in the link between mobile phone addiction levels and negative emotions among mobile phone addicts and possible-mobile phone addicts respectively. The purpose of this study was to address two gaps in research. First, previous research has revealed that a positive association existed between mobile phone addiction levels and negative emotions, especially among those with interpersonal problems. The present study extended research by exploring the mechanisms underlying these associations. Second, Mobile phone addicts as a particular group has received much attention, however, research concerning the possible mobile phone addicts as another particular group is limited. A total of 1089 young adults in China were surveyed by using cluster sampling. Results showed that compared with nonaddicts, mobile phone addicts or possible mobile phone addicts spent more money and time on mobile phone use and were more vulnerable to have negative emotions. The effects of the possible mobile phone addiction on negative emotions were significant but weaker than those of the mobile phone addiction. Further, interpersonal problem was a significant mediator between mobile phone addiction levels and negative emotions. Findings and their implications are discussed.

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1. Introduction

Mobile phones are ubiquitous today and mobile phone use has increased dramatically in recent years, especially among youth in China. For example, the number of mobile phone users in China as the world's largest mobile phone market has reached 1.27 billion at the end of 2014 (Statista-China: [mobile users by month 2014, 2015](#)), and young adults (age 18–22) are the one of the largest and fastest-growing groups owning and using mobile phone in China (Statista-China: [smartphone users in 2012, 2015](#)).

Mobile phone is a double-edged sword for young adults. On the one hand, utilization of mobile phone facilitates young people to increase their social communication frequency (Park & Lee, 2012), improve their relationships and make new friends (Auter, 2007). On the other hand, improper using mobile phone influences young people negatively (Bianchi & Phillips, 2005). Specifically, improper mobile phone use can reduce individuals' concentration and the amount of information received during a typical

class (Campbell, 2006; Lepp, Barkley, & Karpinski, 2014), block the face-to-face communication (Pierce, 2009), and even lead to mental or physical problems (Beranuy, Oberst, Carbonell, & Chamarro, 2009; Jenaro, Flores, Gómez-Vela, González-Gil, & Caballo, 2007; Thomée, Härenstam, & Hagberg, 2011). Of all these negative outcomes, mobile phone addiction could be one of the most direct negative results of the mobile phone use (Choliz, 2010; Takao, Takahashi, & Kitamura, 2009).

Indeed, the number of studies investigating mobile phone addiction has increased in recent years, and previous studies mainly focused on the nature of mobile phone addiction (Billieux, 2012; Park & Park, 2014), antecedents of mobile phone addiction (Bianchi & Phillips, 2005; Hong, Chiu, & Huang, 2012; Toda et al., 2008; Walsh, White, Cox, & Young, 2011), as well as impacts of mobile phone addiction on individuals' psychological (Çağan, Ünsal, & Çelik, 2014), academic performance (Lepp et al., 2014), leisure (Lepp, Li, Barkley, & Salehi-Esfahani, 2015), behavioral (Kamibepu & Sugiura, 2005; Wang et al., 2014), and health issues (Lönn, Ahlbom, Hall, & Feychting, 2005; Thomée et al., 2011). These studies have concluded that mobile phone addiction proves to be an extremely important research topic and are associated with various factors.

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Among these associations, one phenomenon attracting researchers' attention is that mobile phone addiction level has been linked to interpersonal problems (Liu & Kuo, 2007; Park, Kim, & Lee, 2014; Przybylski & Weinstein, 2013) and negative emotions such as depression (Thomé et al., 2011; Wang et al., 2014; Yen et al., 2009) and anxiety (Beranuy et al., 2009; Hong et al., 2012; Yen et al., 2009). Specifically, mobile phone addicts are more sensitive to interpersonal relationships and experience more negative emotions than nonaddicts. Furthermore, previous studies also have found that people with high anxiety or depression are often uncomfortable with face-to-face communication and face much more interpersonal difficulties (Epkins & Heckler, 2011; Hames, Hagan, & Joiner, 2013; Nepon, Flett, Hewitt, & Molnar, 2011). By contrast, low depression and social anxiety are positively correlated to frequent peer contact (McCarroll, Lindsey, MacKinnon-Lewis, Chambers, & Frabutt, 2009). Consequently, it seems that there are certain underlying association among mobile phone addiction, negative emotions, and interpersonal problems. However, the mechanisms underlying associations are not clear. In other words, why do some mobile phone addicts are inclined to be with high level of depression or anxiety? Does interpersonal relationship play a part in the link between mobile phone addiction level and negative emotions? What are the mechanisms at work here?

Furthermore, besides mobile phone addicts, there are one potential but growing group, possible mobile phone addicts. While possible mobile phone addicts will become mobile phone addicts if their mobile phone uses are out of control, few studies have explored this potential but growing group. Is it possible for possible mobile phone addicts to be with high level of negative emotions and experience much more interpersonal problems? If this association exists, are the mechanisms similar to those of mobile phone addicts?

In order to answer the above questions and given the large population of young mobile phone users, the present research focused on undergraduate students, a typical group of young mobile users, and aimed to (1) estimate the prevalence of mobile phone addiction among young adults and explore the differences in mobile phones use among mobile phone addicts (MPAs), possible mobile phone addicts (possible-MPAs) and nonaddicts (non-MPAs); (2) compare the effects of mobile phone addiction levels on negative emotions between MPAs and possible-MPAs; and (3) evaluate the mediating role of interpersonal problems in the link between mobile phone addiction levels and negative emotions among MPAs and possible-MPAs respectively.

2. Literature review and hypotheses

2.1. Mobile phone addiction levels and mobile phone use

Addiction concerns recurring compulsions by an individual to engage in some specific activities and characterized by repetitive acts with a total negative sum of consequences (Waal & Mørland, 1999). There are basically two types of addiction: behavioral addiction and substance addiction (Alavi et al., 2012). Mobile phone addiction belongs to technology addiction, a typical behavioral addiction, and is characterized in the repetitive use of mobile phone to engage in behaviors that are counterproductive to health (Lopez-Fernandez, Honrubia-Serrano, Freixa-Blanxart, & Gibson, 2014). According to Billieux (2012), mobile phone addiction has been associated with behaviors that include an inability to regulate one's use of the mobile phone, resulting in various social, behavioral, and affective problems in daily life.

Besides mobile phone addiction, according to mobile phone addiction levels, there are two other kinds of mobile phone addictive states, possible mobile phone addiction and nonaddiction. Possible mobile phone addict means that an individual has a possible ten-

dency towards mobile phone addiction and experiences occasional or frequent problems due to mobile phone use. Nonaddict refers to an average mobile phone user who may use mobile phone a bit too long at times, but usage is in the control.

It is estimated that prevalence of mobile phone addicts ranges from 0% to 38% of mobile phone users across cultures and societies (Lopez-Fernandez et al., 2014), suggesting at least 62% of mobile phone users are with possible addiction or even without addiction. However, empirical studies on the possible mobile phone addiction are still limited.

Previous studies on internet addiction have demonstrated that there are significant differences in frequency (*i.e.*, how often people use internet) and amount (*i.e.*, how much time people spend on internet) of internet use among internet addicts, possible internet addicts, and nonaddicts (Aktepe, Olgaç-Dündar, Soyöz, & Sönmez, 2013; Bakken, Wenzel, GÖTESTAM, Johansson, & ØREN, 2009; Whang, Lee, & Chang, 2003; Yang & Tung, 2007). Similar to internet addiction, mobile phone addiction could have similar differences in mobile phone use. Therefore, this study proposed the first hypothesis:

H1. Significant differences exist in mobile phone use among MPAs, possible-MPAs and non-MPAs; and mobile phone use frequency increases with the increase of mobile phone addiction levels.

2.2. Mobile phone addiction levels and negative emotions

Negative emotion is usually an unpleasant or unhappy emotion that is evoked in individuals to express a negative affect towards an event or person, usually including depression, anxiety, loneliness, and anger (Lazarus, 1991). Empirical evidence of the link between mobile phone addiction levels and negative emotions has been rapidly accumulated in recent years. For example, in an early and influential study, Beranuy et al. (2009) surveyed 365 Spanish undergraduates and found that problematic users (including mobile phone addicts and internet addicts) showed more loneliness, anxiety and depression. In the same year, Yen et al. (2009) published another important study, surveying 10,191 adolescents to examine the association between mobile phone addiction levels and depression in adolescents. They found that adolescents who had significant depression were more likely to have four or more symptoms of mobile phone addiction. Similar patterns were also found in Korea (Ha, Chin, Park, Ryu, & Yu, 2008), USA (Chen, 2004), and Austria (Augner & Hacker, 2012).

These pioneering studies have revealed that negative emotions, such as social anxiety and depression, not only are significantly associated with higher levels of mobile phone addiction but also are key precedents of mobile phone addiction. These studies have inspired and motivated at least two new research questions.

The first question is whether mobile phone addiction levels have significant impacts on negative emotions. Based on Bandura's concept of reciprocal determinism in social cognitive theory (Bandura, 1986), individual' behaviors (*e.g.*, mobile phone use) not only react to their emotions (*e.g.*, depression affects mobile phone addiction) but their behaviors (*e.g.*, obsessive usage, a key manifestation of mobile phone addiction) can also affect their emotions. This interplay between a person's behaviors and emotions is reciprocal. However, most of existing studies into technology addiction and emotion have generally focused on negative emotions as the predictors of addiction behaviors (Bozoglan, Demirel, & Sahin, 2014; Hong et al., 2012; Odacı & Çelik, 2013; Yen et al., 2009). In the present study, we focused on the effect of mobile phone addiction levels on negative emotions.

The second question is whether the possible mobile phone addiction level has a significant effect on the negative emotions and whether this effect is weaker or stronger than that of the mobile

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