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Gender differences in the relationship between internet addiction and depression: A cross-lagged study in Chinese adolescents

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ABSTRACT

The present study explored the role of gender in the association between Internet addiction and depression. Three-wave longitudinal panel data were collected from self-reported questionnaires that were completed by 1715 adolescents in grades 6–8 in China. Cross-lagged structural equation modeling was used to examine the relationship between Internet addiction and depression. In male adolescents, depression was found to significantly predict subsequent Internet addiction, suggesting that depression was the cause of Internet addiction and supporting the mood enhancement hypothesis. In female adolescents, Internet addiction was found to significantly predict subsequent depression, indicating that Internet addiction leads to depression and supporting the social displacement hypothesis. These results indicate that the relationship between Internet addiction and depression depended on gender. In addition, it was found that males and females exhibit different behavioral patterns and motivations of Internet usage. Males were more likely to use the Internet for pleasure and less likely to surf the Internet to search for information, compared with females. Although both males and females were prone to surfing the Internet alone, males were more likely to go online with friends compared with females. These findings suggest that gender-specific preventative and interventional strategies should be developed to reduce Internet addiction.

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1. Introduction

In the 21st century, the Internet has become a very important part of daily life. With the rapid rise of Internet use, the number of Internet users has dramatically increased over the past few years, especially in China. According to reports from the China Internet Network Information Center, there were 649 million netizens in China as of December 2014, and the Internet penetration rate increased by 13.6% from 2012 to 2014 (CNNIC, 2015). As the number of Internet users has increased, studying both the positive

contributions of the Internet and its negative influences is important. Limited and appropriate Internet use is beneficial, but excessive and uncontrolled Internet use has frequently been linked to many maladaptive problems. Those problems that are associated with Internet use have attracted much research and public attention.

The misuse and abuse of the Internet can lead to Internet addiction. Internet addiction is defined as the loss of control over Internet use and is considered an impulse control disorder (Young, 1999). The major symptoms of Internet addiction include uncontrolled impulsive use, usage more than intended, intolerance of withdrawal, and impairment in decision-making ability (Ko, Yen, Yen, Chen, & Wang, 2008). According to previous studies, Internet addiction is associated with physical and psychological problems, such as sleeplessness (Cao & Su, 2007), destructive lifestyles (Zamani, Chashmi, & Hedayati, 2010), academic failure (Whang, Lee, & Chang, 2003), depression (Dalbudak et al., 2013; Morrison

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& Gore, 2010; Tsai & Lin, 2003), loneliness (Casale & Fioravanti, 2011; Hardie & Tee, 2007), aggressive behavior (Ko, Yen, Liu, Huang, & Yen, 2009), social isolation (Valkenburg, Peter, & Schouten, 2006), and even psychiatric disorders (Ko, Yen, Yen, Chen, & Chen, 2012).

Relative to other maladjustment problems, Internet addiction and depression have the strongest correlation (Carli et al., 2013). Depression is viewed as a constellation of negative emotions and behaviors, including feelings of worthlessness and loneliness, crying, worrying about doing bad things, and feeling the need to be perfect (Achenbach, 1991; Petersen et al., 1993). Some evidence indicates that depression is strongly related to other psychological and behavioral problems, including social problems, attention problems, delinquent behavior, self-destructive behavior, and somatic complaints (e.g., Petersen et al., 1993). Based on the above, having a clear understanding of the relationship between Internet addiction and depression is very informative for effective prevention and intervention strategies for Internet addiction.

1.1. Relationship between internet addiction and depression

Reports have frequently linked depression with Internet addiction among adolescents (Yen, Ko, Yen, Wu, & Yang, 2007, 2008). However, remaining unclear is whether Internet addiction is the cause of depression or whether depression precedes the development of Internet addiction. Two models may help explain the relationship between Internet addiction and depression.

Kraut et al. (1998) proposed the social displacement hypothesis, claiming that indulgence in social communication through the Internet reduces the time spent in social interactions with friends and family, and which may result in maladjustment problems. Displacement implies that individuals' use of the Internet may usurp face-to-face communication (Caplan, Williams, & Yee, 2009; Kraut et al., 1998; Morahan-Martin & Schumacher, 2003; Nie & Erbring, 2002; Williams, Ducheneaut, Xiong, Yee, & Nickell, 2006). Smyth (2007) reported that online game players exhibited a greater decrease in the time spent socializing with offline friends after 1 month of play compared with players of arcade or offline video games. Over time, this displacement may have potential deleterious effects on adolescents' ability to maintain social relationships in the real world and subsequently lead to a decrease in the size and quality of individuals' offline social circles (Cole & Griffiths, 2007; Hussain & Griffiths, 2009; Lo, Wang, & Fang, 2005; Morahan-Martin & Schumacher, 2003; Shen & Williams, 2010). Adolescents who spend excessive time on the Internet spend less time maintaining social resources (Nie & Hillygus, 2001; Williams, 2007) and have poorer relationships with their friends and family (Sanders, Field, Diego, & Kaplan, 2000). Because more online social activities or more communication with anonymous individuals (such as visiting chat rooms) leads to an increase in alienation and conflict and a decrease in intimacy in relationships with parents, peers, and romantic partners (Blais, Craig, Pepler, & Connolly, 2008; Borca, Bina, Keller, Gilbert, & Begotti, 2015). Social relationships that are established through interactions are a major source of feelings of security and belonging (Chen, 2012). A lack of offline social interaction may lead to the emergence of negative emotions, especially among adolescents. According to the social displacement hypothesis, the displacement of offline social interaction by online social communication may lead to depression. Some studies have found that Internet addiction can predict the occurrence of later depression (Amorosi, Ruggieri, Franchi, & Masci, 2012; Dalbudak et al., 2013; Park, Hong, Park, Ha, & Yoo, 2013). Therefore, Internet addiction may result in depression.

Bryant and Zillmann put forward the mood enhancement hypothesis, which posits that individuals use the media based on their

moods (Bryant & Zillmann, 1984; Zillmann, 1991). To relieve stress, individuals with negative emotion are more likely to take part in leisure activities than others, including watching TV, surfing the Internet, and playing online games. Some studies have shown that levels of stress and depression can significantly decrease after entertainment (Bessière, Kiesler, Kraut, & Boneva, 2004). However, other studies have shown that activities that are aimed at "killing time" increase rather than decrease negative emotion (Weiser, 2001). Individuals with negative emotion might partake in recreation through media. According to the mood enhancement hypothesis, Internet users will selectively expose themselves to Internet content depending on their mood. To eliminate a negative mood, individuals with depression tend to seek entertainment and leisure activities, such as games and music on the Internet. Whang et al. (2003) found that serious Internet users access the Internet when they are depressed or stressed by work. Based on meta-analyses, the results implied that time spent online was not an adequate indicator of outcomes, and the links between online time and negative outcomes were weak (Ferguson, Coulson, & Barnett, 2011). The motivation for using the Internet and behavioral patterns have a greater effect on the consequences of Internet usage, compared with the actual time spent online. Przybylski and colleagues found that the level of basic psychological need satisfaction could moderate links between playing video games and positive emotion (Przybylski, Weinstein, Ryan, & Rigby, 2009). Some studies also indicated that depression increases the risk of Internet addiction (Park et al., 2013). Thus, depression may lead to overindulgence in the Internet.

The existing studies are inconsistent regarding the relationship between Internet addiction and depression. Different models point to different interpretations of this relationship. Most previous studies have used cross-sectional designs and thus are unable to reveal causal relationships between them. To gain more insights into this issue, longitudinal studies are more desirable.

1.2. Gender differences in internet addiction and depression

Gender differences have been frequently reported in the patterns of addictive behaviors and its motivations, including Internet addiction. According to previous studies, males are more likely to overindulge in the Internet than females (e.g., Li, Zhang, Lu, Zhang, & Wang, 2014; Scherer, 1997). Based on the results of a nationally representative sample study in China, the percentage of males with Internet addiction was significantly higher than females: 14.8% among males and 7.0% among females (Li et al., 2014). Many reports cite gender differences in the motivations for using the Internet. Males tend to experience more addictive behaviors when playing games related to power and controlling or exploring sexual fantasies online, whereas females are more likely to communicate with both closed and anonymous friends online with the aim of sharing their feelings and emotions (Young, 1998a).

Additionally, associations between Internet addiction and related factors have been found to vary by gender. Some studies reported that the negative effects of Internet addiction are more severe in females than in males (Ko et al., 2014). Yen, Yen, Chen, Tang, and Ko (2009) reported that the association between Internet addiction and attention deficit was more significant in females than in males. Ko, Yen, Chen, Chen, and Yen (2005) found that Internet addiction was associated with lower self-esteem in males but not in females. Li, Zhang, Li, Zhen, and Wang (2010) reported that males scored lower in protective factors of problematic Internet use but higher in risk factors compared with females. These results indicate that the association between Internet addiction and related factors might be different between males and females.

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