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The reciprocal longitudinal relationships between mobile phone addiction and depressive symptoms among Korean adolescents

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ABSTRACT

This study aimed to (a) explore the stability of changes in mobile phone addiction and depressive symptoms across time and (b) clarify the direction of reciprocal longitudinal relationships between mobile phone addiction and depressive symptoms among Korean adolescents. We analyzed three-year longitudinal data from the Korean Children and Youth Panel Survey conducted by the National Youth Policy Institute in Korea. A total of 1877 valid responses from 2011 to 2013 were analyzed using autoregressive cross-lagged modeling. We found that each mobile phone addiction and depressive symptom in earlier years was associated with increasing severity in these conditions consistently over the three years. In addition, we found that the relationships between mobile phone addiction and depressive symptoms were bidirectional over the three years. The significant implications for these findings in the context of adolescent behavior are also discussed.

1. Introduction

Mobile phone addiction has increased among Korean adolescents. According to national surveys, 29.2% of teenagers were potential addictive users of mobile phones compared to that of individuals in their twenties (19.6%) and thirties (11.3%) (Ministry of Science, ICT and Future Planning of Korea, 2015). Mobile phone addiction, a behavioral addiction analogous to gambling and Internet addiction, can be defined as the excessive and uncontrolled use of mobile phones (Billieux, 2012; Choliz, 2010; Jun & Choi., 2015). Kim, Seo, and David (2015) suggested the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV) from the American Psychiatric Association list the following as cognitive symptoms of mobile phone addiction: obsessive thoughts about mobile phones (craving), overuse of mobile phones (tolerance), anxiety when not using mobile phones (withdrawal), unsuccessful efforts to cease excessive mobile phone use, and feeling other activities that used to be fun are no longer enjoyable. The Ministry of Science, ICT and Future Planning of Korea (2015) described the main factors in adolescent mobile phone addiction as tolerance, cognitive or behavioral disorders that interrupt daily lives, and withdrawal. Further, mobile phone addiction leads to serious health problems such as stress, sleep disturbances, headache, and brain tumor (Hardell & Carlberg, 2009; Zhao, Zou, & Knapp, 2007). Adolescents are especially vulnerable to mobile phone addiction because of their level of cortical development (Gogtay et al., 2004), their greater interest in mobile technology, and their superior skills in using mobile phones compared to adults (Chóliz, 2010; 2012). The mobile phone addiction problem is by no means confined to Korean adolescents. The prevalence of mobile phone addicted teenagers in European countries—such as Switzerland, Spain, and the UK—has been estimated at 10–30% (Billieux, Van der Linden, d'Acremont, Ceschi, & Zermatten, 2007; Lopez-Fernandez & Freixa-Blanxart, 2014; Sánchez-Martínez & Otero, 2009). Chen (2004) indicated that 25% of American college students recognized they were addicted to mobile phones. In addition, 21.4% of Iranian youth and 27.4% of adolescents in Hong Kong have been classified as mobile phone addicts (Babadi-Akashe, EshratZamani, Abedini, Akbari, & Hedayati, 2014; Leung, 2008).

Mobile phone addiction is common among adolescents in industrialized countries, and it creates serious problems in their daily lives. Mobile phone addiction has been related to financial problems (Billieux, Van der Linden, & Rochat, 2008; James & Drennan, 2005), health problems (Kundi, 2010; Thomée, Harenstam, & Hagberg, 2011; Toda & Ezoe, 2013), and psychological problems (Augner & Hacker, 2012; Beranuy, Oberst, Carbonell, & Chamarro, 2009; Bianchi & Phillips, 2005; Bickhan, Hswen, & Rich, 2015; Park, Kim, & Hong, 2012). Depressive symptoms in particular are some of the most serious psychological problems in

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adolescents; the relationship between depressive symptoms and mobile phone addiction is a critical issue because such symptoms may lead to substance abuse (Goodman & Huang, 2002), school failure (Chilse, Miller, & Cow, 1980; Egger, Costello, & Angold, 2003; Hollis, 1996; Jun, 2015; Sánchez-Martínez & Otero, 2009), and even suicide (Klerman, 1987; Lewinsohn, Rohde, Kelein, & Seely, 1999).

Although depressive symptoms can be fatal in adolescents with mobile phone addiction, there have been few studies exploring the association between mobile phone addiction and depressive symptoms using standard instruments to measure the severity of depressive symptoms (Yen et al., 2009). Many studies have focused on some limited psychological variables—such as self-esteem, extraversion, and impulsivity—but not depressive symptoms (Bianchi & Phillips, 2005; Billieux et al., 2007; Butt & Phillips, 2008; Park et al., 2012; Walsh, White, Cox, & Young, 2011). Billieux (2012) reviewed existing articles and found that due to the lack of a theoretical framework, the etiology of mobile phone addiction is not obvious, and various psychological variables are included in research models in the previous studies. Based on a synthesis of previous empirical studies, Billieux (2012) proposed an integrative model to depict the pathways to problematic mobile phone use (e.g., addiction symptoms), that is, a pathway model (PM). The PM has four pathways: (1) the impulsive pathway, (2) the relationship maintenance pathway, (3) the extraversion pathway, and (4) the cyber addiction pathway; the final outcome variable is negative affect (e.g., depressive symptoms, anxiety). Billieux (2012) showed that mobile phone addiction was ultimately associated with depressive symptoms. In addition, a few pioneer studies have explored the co-relationship between mobile phone addiction and depressive symptoms with other psychological factors such as chronic stress among adolescents (Augner & Hacker, 2012; Chen, 2004; Sanchez-Martinez & Otero, 2009; Thomée et al., 2011).

However, it is interesting that the direction of relationship between mobile phone addiction and depressive symptoms is mixed. Some studies have found that mobile phone addiction affects depressive symptoms, whereas other studies have found that depressive symptoms influence mobile phone addiction. Some studies targeting Korean adolescents have illustrated that depressive symptoms are the crucial predictor of mobile phone addiction (Koo, 2012; Lee, 2009; Yang & Park, 2005). It has been shown that severe depressive symptoms can be caused by academic stress and peer relationship difficulties among Korean adolescents, resulting in mobile phone addiction (Lee, 2009; Park & Baik, 2004). Yen et al. (2009) discovered that adolescents in Southern Taiwan who have significant depressive symptoms are more likely to suffer from serious mobile phone addiction. Using univariate and multivariate logistic regression analyses, Toda and Ezoe (2013) revealed that depressive symptoms independently influence the degree of mobile phone dependency among Japanese youth. A few previous studies have focused on examining depressive symptoms as a predictor of mobile phone addiction (Babadi-Akashe et al., 2014; Kim, Bae, & Hyun, 2007; Kim et al., 2015).

In contrast, some researchers have shown that mobile phone addiction affects depressive symptoms (Bickhan et al., 2015; Han & Lee, 2010; Ko, 2012; Kumar, 2014). Bickhan et al. (2015) found that excessive mobile phone use might lead to the development of depressive symptoms among young adolescents in the northeastern USA. According to a review paper by Kumar (2014), the excessive use of mobile phones might decrease personal contact in real life and thus increase social isolation, which can lead to depressive symptoms. Ko (2012) found that tolerance, dependency, and obsession in mobile phone use increases the severity of depressive symptoms.

These results indicate that the association between mobile phone addiction and depressive symptoms has not been fully explained. Actually, a pioneer study on Internet addiction has shown through longitudinal analysis that there may be a bidirectional relationship between compulsive Internet use and psychological problems in adolescents (Van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engels, 2008). Therefore, the direction of the relationship between mobile phone addiction and depressive symptoms should be clarified. In order to examine the reciprocal effects in this relationship, it is necessary to analyze the longitudinal data on mobile phone addiction and depressive symptoms measured at multiple time points. However, longitudinal analyses have rarely been performed to investigate how these effects change across time. Previous studies on cross-sectional data have limitations in terms of isolating the direction of the relationship between mobile phone addiction and depressive symptoms. A pioneer study attempted to identify the longitudinal relationships between mobile phone addiction and depressive symptoms and showed that mobile phone addiction among Korean adolescents affected subsequent depressive symptoms (Jun, 2014). However, the researchers failed to identify additional consecutive relationships because they used only two-year longitudinal data, and they did not use the standard measures of depressive symptoms (Jun, 2014). Thus, more longitudinal studies are needed to examine the reciprocal relationship between mobile phone addiction and depressive symptoms in adolescents.

Based on the results of longitudinal studies on mobile phone addiction (Jun, 2014) and depressive symptoms (Bae, 2000; Rushton, Forcier, & Schectman, 2002), we proposed a causal relationship between past mobile phone addiction/depressive symptoms and future mobile phone addiction/depressive symptoms. The following hypotheses were developed:

H1. Mobile phone addiction at an earlier age positively affects mobile phone addiction at a later age.

H2. Depressive symptoms at an earlier age positively affect depressive symptoms at a later age.

Although the direction of the relationship between mobile phone addiction and depressive symptoms is uncertain, most studies agree these two constructs affect each other positively (Bickhan et al., 2015; Ko, 2012; Kumar, 2014; Lee, 2009; Toda & Ezoe, 2013; Yang & Park, 2005; Yen et al., 2009). We thus proposed a causal directional association between mobile phone addiction and depressive symptoms over time. The following hypotheses were developed:

H3. Mobile phone addiction at an earlier age positively affects depressive symptoms at a later age.

H4. Depressive symptoms at an earlier age positively affect mobile phone addiction at a later age.

In order to test our hypotheses, we used an autoregressive cross-lagged modeling and three-year longitudinal data on Korean adolescents. The purpose of the current study was to examine the longitudinal reciprocal effects of mobile phone addiction and depressive symptoms among Korean adolescents.

2. Methods

2.1. Participants

This study analyzed three-year longitudinal data from the Korean Children and Youth Panel Survey (KCYPS) conducted by the National Youth Policy Institute in Korea. The KCYPS is a national and longitudinal panel study that collects data on school and family lives, cultural activities, the use of mass media, and problematic