



ADHD and autistic traits, family function, parenting style, and social adjustment for Internet addiction among children and adolescents in Taiwan: A longitudinal study



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ABSTRACT

This longitudinal study investigated the prevalence, predictors, and related factors for Internet addiction among elementary and junior high school students in Taiwan. A convenient sample of grades 3, 5, and 8 students ($n = 1153$) was recruited from six elementary and one junior high schools. They were assessed during the beginning and the end of the spring semester of 2013. Internet addiction was examined by the Chen Internet Addiction Scale (CIAS). Other factors were screened using the Chinese version of the Autism Spectrum Quotient (AQ) for autistic trait, the Parental Bonding Instrument (PBI) for parenting, the Family APGAR for family support, the Social Adjustment Inventory for Children and Adolescents for social function, and the Swanson, Nolan, and Pelham, version IV scale (SNAP-IV) for ADHD symptoms. The prevalence of Internet addiction decreased from 11.4% to 10.6%. Male, low family support, poor social adjustment, and high ADHD-related symptoms were related to Internet addiction. However, there was an inverse relationship between autistic traits and Internet addiction. Further, its predictivity could be accounted by poor academic performance, male, and protective parenting style. Internet addiction is not uncommon among youths in Taiwan. The predictors identified in this study could be the specific measures for the development of a prevention program for Internet addiction in the youth population.

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1. Introduction

Internet addiction disorder (IAD) was first reported by Young (1996). She described people who were addicted to the Internet in a same way that others became addicted to drugs or alcohol, impairing their academic, social, and occupational performances (Young, 1996). Four components have been proposed to be associated with Internet addiction. The first is excessive use, which is often associated with a loss of the sense of time or a neglect of basic drives. The second is the withdrawal behaviors, including feelings of anger, tension, or depression due to the lack of computer usage. The third is tolerant behavior, including the need for better computer equipment, more software, or more hours of use. Finally, the fourth

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is negative repercussions, including arguments, lying, poor achievement, social isolation, and fatigue (Block, 2008). However, it should be noted that the *Diagnostic and Statistical Manual of Mental Disorders*, the fifth edition (APA, 2013) still does not include the Internet addiction as a formal and unique disorder, but as a specifier. Debates continue on the standardized definitions for Internet addiction.

Internet usage in the child and adolescent population has increased dramatically in recent years (Kandell, 1998). High prevalence rates for Internet addiction among adolescents in Asia were found to be 19.8% for adolescents in Taiwan (Ko et al., 2005), 13.8% and 20.3% for children and adolescents, respectively, in South Korea (Ha et al., 2006) and 13.7% for adolescents in China (Tao et al., 2010). However, they are reported to be relatively lower in other western countries (e.g., 2.0% for adolescents in Norway; Johansson & Göttestam, 2004). This may be explained by mythological and cultural differences.

Lack of family and social support or loneliness are important factors to predict Internet addiction (Ko, Yen, Liu, Huang, & Yen, 2009; Whang, Lee, & Chang, 2003). Functional families could provide sufficient support and validation to their children (Markman & Notarius, 1987). Nevertheless, some scholars have reported that after Internet use, people increased their perceived social support significantly (Shaw & Gant, 2002). Some children who have not received enough family or social support may tend to use the Internet to fill their solitude. Therefore, an investigation considering family factors, including parenting style and family function, in the context of Internet use in youths, to clarify their impact on Internet use is warranted.

Attention-deficit/hyperactivity disorder (ADHD) and autism spectrum disorder (ASD) have both been reported in people whose characteristics resulted in a higher possibility to develop Internet addiction or compulsive Internet use (Finkenaue, Pollmann, Begeer, & Kerkhof, 2012; Yoo et al., 2004). This is not limited to a certain kind of ADHD subtypes. For instance, Yoo and colleagues (2004) reported that both inattention and hyperactivity–impulsivity subtypes are at risk for Internet addiction. Finkenaue and colleagues (2012) also reported the first empirical study for examining autistic traits in adults and claimed that strong autistic traits could predict compulsive Internet use, but not frequent Internet use. Their findings were further supported by a recent study demonstrating a positive relationship between Internet addiction and the autistic trait (Romano, Osborne, Truzoli, & Reed, 2013). Those findings indicated that possessing certain kinds of traits may result in increasing the vulnerability for Internet addiction.

However, research regarding the relationships between Internet addiction and childhood disorders, family function, and social adjustment is relatively rare, unclear, or not examined conjointly. The aforementioned studies were primarily conducted in a cross-sectional design. The longitudinal effects among these factors have not been examined.

The two objectives of this study are to trace and clarify the relationships between Internet addiction, frequency of Internet use, and family function, parenting style, social adjustment, ADHD-related symptoms, and autistic traits in Taiwanese elementary and junior high school students. The study was conducted in two waves at a four-month interval to prospectively identify the independent predictors for Internet addiction and Internet usage over time. Second, we explored whether certain patterns for Internet and computer usage exist for children and adolescents with potential cases of Internet addiction, ADHD, and ASD.

2. Methods

2.1. Participants

This study is a questionnaire-based survey with repeated measures at a 4-month interval (early March 2013 and late June 2013). Grade 3 and 5 students were recruited from six elementary schools and grade 8 students were from one junior high school in Northern Taiwan. These schools were selected based on the cooperation of principals who accepted invitations from the Ministry of Education, Taiwan.

The study sample consisted of 1253 eligible students and parents of 1113 students, and data were collected in early March 2013 and late June 2013. The follow-up rates were 93.1% ($N = 1166$) and 89.2% ($N = 1013$) for participating students and their parents, respectively. Data from the participants whose identification could not be confirmed or who did not complete both examinations were excluded. Thus, only the data from 1153 participating students and 997 parents were utilized in analyses. Fig. 1 depicts the detailed information for the number of participants and their parents for grades 3, 5, and 8 and the two waves. No significant differences among participating students were found between the respondents and the non-respondents in gender, but in grades ($\chi^2 = 1.31, p = .253$ and $\chi^2 = 34.11, p < .001$, respectively). The dropouts were comparatively fewer in grade 5 than grades 3 and 8.

2.2. Measure

2.2.1. The Chen Internet Addiction Scale (CIAS)

The Chen Internet Addiction Scale (CIAS) is a 26-item self-reported measure using a 4-point Likert scale from 1 to 4 to assess five dimensions of Internet-related symptoms and problems, including symptoms of compulsive use (five items), withdrawal (five items), tolerance (four items), and problems in interpersonal/health relationships (seven items) and time management (five items). Using a sample of college students, the psychometric study of the CIAS demonstrated high internal consistency for each of the subscales (Cronbach's alpha, .79–.93; Chen, Weng, Su, Wu, & Yang, 2003). The CIAS scores range from 26 to 96, in which a higher score indicates the more severe and problematic Internet usage. The cut-off point of 63/64

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