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## Associations between compulsive internet use and the autism spectrum



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### ABSTRACT

The increasingly complex relationship between individuals and online environments has prompted research exploring the potential for compulsive Internet use (CIU) in varying populations. Identification of the determinants of CIU, such as offline social difficulties associated with autism spectrum disorder (ASD), could clarify whether individuals compensate for offline difficulties through online interactions. In Study 1, 597 undergraduates took an online survey measuring CIU, social symptoms of ASD, restricted interests and repetitive behaviors (RIRB), self-esteem, and Facebook behaviors. A relationship between CIU and autistic traits was attributable to non-social characteristics (RIRB) and a relationship was identified between RIRB and information-seeking behaviors. These results complicate the social compensation hypothesis by suggesting that non-social personality characteristics contribute more strongly to CIU than individuals' attempts to compensate for offline social challenges. Study 2 matched a sample of students with ASD ( $n=33$ ) to neurotypical students ( $n=33$ ) and uncovered no significant differences in CIU scores between the matched samples. These results suggest that findings observed by measuring autistic traits in neurotypical samples may not replicate with autistic samples.

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### 1. Introduction

People with autism spectrum disorder (ASD) may experience unique communicative benefits from the Internet (Gillespie-Lynch, Kapp, Shane-Simpson, Smith, & Hutman, 2014). At the same time, people with ASD (MacMullin, Lunskey, & Weiss, 2015) as well as people in the general population with heightened autistic traits (Finkenaue, Pollmann, Begeer, & Kerkhof, 2012; Romano, Osborne, Truzoli, & Reed, 2013; Romano, Truzoli, Osborne, & Reed, 2014) may be at heightened risk for compulsive Internet use (over-attachment to the Internet or to specific functions of the Internet). While the Internet affords people who face offline social challenges, such as ASD, shyness, and social anxiety, with opportunities to compensate for these challenges (Benford, 2008; McKenna and Bargh, 2000; Sheeks & Birchmeier, 2007), using the Internet to compensate for social challenges may contribute to compulsive Internet use (Caplan, 2005; Davis, 2001; Kim & Haridakis, 2009).

Associations between autistic traits and compulsive Internet use have been interpreted as evidence that people with heightened autistic-like social symptoms become exceptionally attached to the Internet because it provides opportunities

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for them to compensate for their offline social challenges (Finkenaue et al., 2012; Romano et al., 2013, 2014). However, ASD is defined not only by social difficulties, but also by restricted interests and repetitive behaviors (RIRB; American Psychiatric Association, 2013). In addition to using the Internet for social endeavors, people with highly focused interests, a common characteristic of ASD, may use the Internet to engage in their interests (Jordan & Caldwell-Harris, 2012). Both primarily social activities (e.g., social network site use) and primarily non-social activities (e.g., shopping, Internet surfing) have been associated with psychological dependence on the Internet (Kim & Haridakis, 2009; Kim, La Rose, & Peng, 2009; Kuss, Griffiths, & Binder, 2013; Li & Chung, 2006; Mazer & Ledbetter, 2012; van den Eijnden, Meerkerk, Vermulst, Spijkerman, & Engel, 2008). Therefore, observed associations between heightened autistic traits (more generally) and compulsive Internet use may be attributed to social challenges (e.g., difficulty with social interactions), as well as non-social challenges (e.g., restricted interests), or both. Autistic traits may predispose people toward using the Internet to investigate their (often non-social) focused interests. Indeed, parental reports suggest that individuals with ASD may be drawn to non-social uses of the Internet (MacMullin et al., 2015; Mazurek, Shattuck, Wagner, & Cooper, 2012; Mazurek & Wenstrup, 2013).

### 1.1. Compulsive Internet use and autistic traits

Compulsive Internet use is defined by a preoccupation with online activities, difficulty reducing the amount of time spent online, and symptoms of withdrawal when separated from the Internet or specific sites on the Internet (Meerkerk, van den Eijnden, Vermulst, & Garretsen, 2009). It is associated with heightened depression, lower self-esteem, and lower levels of perceived social support (e.g., Armstrong, Phillips, & Saling, 2000; Davis, 2001; Meerkerk et al., 2009; Thorsteinsson & Davey, 2014). Researchers use a variety of terms to refer to characteristics of compulsive Internet use including Internet addiction, Internet dependence, pathological Internet use, and problematic Internet use (Meerkerk et al., 2009). These terms reflect differences in theoretical orientations rather than clear behavioral differences (Kim & Haridakis, 2009). For coherency, we describe all terms for this construct as compulsive Internet use in this report.

Despite emerging evidence that autistic traits (more generally) are associated with compulsive Internet use in the general population (Finkenaue et al., 2012; Romano et al., 2013, 2014), prior research has not examined whether social symptoms and/or non-social symptoms (RIRB) drive the association. Prior studies that demonstrated associations between autistic traits and compulsive Internet use measured autistic traits in the general population with a standardized measure (autism quotient; Hoekstra et al., 2011) and reported that the severity of autistic traits correlated positively with compulsive Internet use (Finkenaue et al., 2012; Romano et al., 2013, 2014), but did not relate to the frequency of Internet use (Finkenaue et al., 2012).

Finkenaue et al. (2012) sampled married couples ( $n=390$ ) in the Netherlands. Participants completed the Autism Quotient, items assessing their frequency of Internet use, and the Compulsive Internet Use Scale (Meerkerk et al., 2009). Although the frequency of Internet use was unrelated to autistic traits, compulsive Internet use was positively associated with heightened autistic traits. In a subsequent study, researchers documented a positive relationship between autistic traits and compulsive Internet use in a non-clinical sample of 60 undergraduates (Romano et al., 2013).

Replicating this link, Romano et al. (2014) sampled 90 university students, divided into groups with *high vs. low* autistic traits, and found higher levels of compulsive Internet use in the *high autistic trait* group. While both autistic traits and anxiety were positively associated with compulsive Internet use, compulsive Internet use was *less* common among people with heightened autistic traits who also reported heightened anxiety. The authors interpreted this finding as evidence that anxiety alters the functions that the Internet serves for individuals with heightened autistic traits. This finding also suggests that anxiety and autistic traits may contribute to compulsive Internet use in unique ways. For example, generalized anxiety may mirror social anxiety, shyness, and loneliness (e.g., Caplan, 2002, 2005; Davis, 2001; Engelberg & Sjöberg, 2004; Kim & Haridakis, 2009) in predisposing people toward using the Internet for social compensation, whereas autistic traits may predispose people toward using the Internet to investigate their focused interests. However, due to inherent limitations of the Autism Quotient, researchers in the three aforementioned studies were unable to determine the type of autistic traits (social or non-social) that were associated with compulsive Internet use.

Consequently, a primary aim of the studies in this report was to examine whether autistic-like social symptoms and/or RIRB were associated with compulsive Internet use in a general population sample of college students without ASD (Study 1) and in a sample of college students with ASD (Study 2) by using the Social Responsiveness Scale (Constantino & Gruber, 2012), which is a well-validated measure of autistic traits that distinguishes between social symptoms and RIRB. Given that associations between autistic traits and compulsive Internet use in the general population have led to concerns that compulsive Internet use may be elevated among individuals with ASD. The primary aim of Study 2 was to examine if college students with ASD report heightened levels of compulsive Internet use relative to their non-ASD peers.

### 1.2. Compulsive Internet use among people with ASD

A recent study suggests that compulsive Internet use may indeed be elevated among youth and young adults with ASD. MacMullin et al. (2015) recruited an online sample of parents of individuals with and without ASD (age range 6–21 years;  $M=12$ ). Parents of individuals with ASD reported that their child spent more time online and showed higher levels of compulsive Internet use relative to parents of individuals without ASD. Parents of individuals with ASD were more likely to report that they felt their child's use of electronics was negatively impacting their child's life and that their child learned

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