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The relationship of social anxiety disorder symptoms with probable attention deficit hyperactivity disorder in Turkish university students; impact of negative affect and personality traits of neuroticism and extraversion

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ABSTRACT

The aim of the present study was to evaluate relationship of social anxiety disorder symptoms with probable attention deficit hyperactivity disorder (ADHD) while controlling the personality traits of neuroticism and extraversion, anxiety and depression symptoms in a sample of Turkish university students (n = 455). Participants were evaluated with the Beck Depression Inventory (BDI), the Beck Anxiety Inventory (BAI), the Eysenck Personality Questionnaire Revised-Abbreviated Form (EPQR-A), *the* Adult *ADHD* Self-Report Scale (*ASRS*-v1.1) and the *Liebowitz Social Anxiety Scale (LSAS)*. Severity of social anxiety, depression, anxiety and neuroticism were higher among those with probable ADHD, whereas extraversion score did not differ between the groups. The severity of ADHD score, particularly hyperactivity/impulsivity score, was related with the "fear or anxiety" together with low extraversion (introversion) and high neuroticism dimensions of personality, whereas the severity of ADHD score, both inatentiveness and hyperactivity/impulsivity scores, was related with "avoidence" together with low extraversion (introversion) dimension of personality. These findings suggest that probable ADHD and severity of ADHD symptoms are related with both "fear or anxiety" and "avoidance" of social anxiety, while personality dimensions of low extraversion (introversion) and high neuroticism may have an effect on this relationships among young adults.

1. Introduction

Social anxiety disorder (SAD) is characterized by a persistent fear of one or more social or performance situations with exposure to unfamiliar people or to possible scrutiny by others (American Psychiatric Association, 2013). A person with SAD fears that he or she will act in a way that will be humiliating or embarrassing, and exposure to the feared situations almost invariably provokes anxiety (Stein and Stein, 2008). SAD is a common condition among university students and is associated with functional impairment in educational career (Dell'Osso et al., 2014).

Research on personality traits and the development of social anxiety stresses the dimensional nature of social anxiety. Traits related to emotional processing, such as neuroticism (a temperamental sensitivity to painful or negative stimuli, and experiencing negative affect more frequently and/or intensely) and extraversion (a temperamental sensitivity to pleasurable stimuli [rewards] and experiencing positive effect, pride, and self-confidence more frequently and/or intensely) (Winter and Kuiper, 1997) are critical. Neuroticism is regarded as a 'vulnerability' marker, and extraversion a 'protective' factor in the development of SAD (Bienvenu et al., 2007; Naragon-Gainey and Watson, 2011). Moreover, it has been found that the heritability of social anxiety can, to a large extend, be explained by the heritability of these personality traits (Bienvenu et al., 2007). Thus, someone who scores low on extraversion and high on neuroticism is more likely to develop social anxiety later in life.

Attention-deficit/hyperactivity disorder (ADHD) is a childhood-onset disorder that persist into adolescence and adulthood in more than half of the cases (Klein et al., 2012) and characterized by hyperactivity/impulsivity and inattention that negatively impacts one's

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ability to function and fulfill social and personal obligations (Ivanov and Yehuda, 2014). Several studies provided evidence that adults diagnosed with ADHD tend to demonstrate increased levels of neuroticism compared with nonclinical controls (Nigg et al., 2002; Parker et al., 2004; Jacob et al., 2007; Koerting et al., 2016), whereas measures of extraversion have reported mixed results (Nigg et al., 2002; Parker et al., 2004; Jacob et al., 2007; Koerting et al., 2016). The latest study on this subject found that adult ADHD patients scored comparable with nonclinical individuals on extraversion (Koerting et al., 2016).

There are a few studies that investigated the relationship between ADHD and SAD. Among patients with anxiety disorder, rate of childhood ADHD risk was 24.0% (n = 36) (Mancini et al., 1999), whereas adult ADHD was 27.9% (n = 36) (Van Ameringen et al., 2011). Mancini et al. (1999) was the first group to evaluate this relationship, whom reported that 12 of 34 patients with SAD (35.2%) were found to have childhood ADHD. Also, childhood ADHD was associated with earlier onset of anxiety disorder, higher number of comorbidity (anxiety, mood, or substance use disorders), and more severe anxiety and depression symptoms. Van Ameringen et al. (2011) reported a 38.5% SAD comorbidity in adult patients with ADHD. In other two studies conducted with smaller sample of patients with SAD, Safren et al. (2001) found the rate of childhood ADHD as 3% in 33 SAD patients, whereas Mörtberg et al. (2012) found the childhood symptoms of ADHD as 7.8% in 39 SAD patients and 5.1% scored within the range of adult ADHD. In addition, a childhood study found that the generalized type of SAD had higher ADHD comorbidity rates than nongeneralized subtype of SAD (Chavira et al., 2004). Finally, adult ADHD epidemiological studies conducted in USA (Kessler et al., 2006) and Korea (Park et al., 2011) also revealed an association between these two disorders.

Rest of the studies that evaluated the relationship between ADHD and SAD comes from Turkish literature almost all conducted by the same group of researchers. A childhood study has found higher SAD comorbidity rates in inattention type (60%) of ADHD than in combined type (11.8%) (Yuce et al., 2013). Similarly, a previous study has found a rate of approximately 72% comorbid childhood ADHD in 130 adult outpatients with SAD (Koyuncu et al., 2015a). Fear/anxiety, avoidance, and total scores of Liebowitz Social Anxiety Scale (LSAS) and lifetime major depressive disorder were found to be higher and functionality was found to be lower in the group of patients with comorbid ADHD, when compared with those without ADHD. In their second study, Koyuncu et al. (2015b) found the rate of childhood ADHD comorbidity as 62% (n = 88) in patients with SAD (n = 142), and 63 of these patients had the diagnosis of inattentive type. This group had higher scores of social anxiety and avoidance and had earlier onset of SAD than the combined type of childhood ADHD. In their third study, Koyuncu et al. (2016a) found higher rates of emotional traumatic experiences and impulsivity along with more severe symptoms of depression, anxiety and social anxiety in the group of SAD patients (n = 123) with childhood ADHD than in SAD patients without ADHD in childhood. In their latest study, Koyuncu et al. (2016b) suggested that SAD may develop secondary to childhood ADHD in a subgroup of the patients with SAD.

These previous studies conducted among patients with SAD demonstrated that ADHD symptoms in childhood is related with SAD in adulthood. We, believe that it is important to evaluate the relationship of probable ADHD and symptoms of SAD in population based studies, such as university students, and to control the effects of personality traits of neuroticism and extraversion, anxiety and depressive symptoms.

2. Methods

2.1. Participants and procedure

Cross-sectional online self-report survey was conducted in a university located in Ankara. A website was prepared for online participation. Approval from the Ethical Committee of the university was taken. The study was carried out between November 2015 and January 2016. The students were asked to fill out the form on the website anonymously. Informed consent was approved by students online before continuing with further questions. A total of 520 university students were randomly selected from the list of 3120 students from the whole 5 different faculties of the university. Excluding criteria were rejection to participation (n = 27), demanding any fee (n = 11), mother language being other than Turkish (n = 4) and incomplete participation to study (n = 23). According to these criteria 65 university students were excluded from the study. Thus, the study was conducted with a total of 455 university students (184 males and 271 females).

2.2. Measures

2.2.1. Liebowitz Social Anxiety Scale (LSAS)

The LSAS contains 24 situations, selected on the basis of clinical experience, which are rated by the assessor on separate 4-point scales for fear/anxiety and avoidance (Liebowitz, 1987). The scales range from no fear/anxiety (0) to severe fear/anxiety (3) and never avoids (0) to usually avoids (3). Patients are asked to provide ratings based on Turkish version of this scale (Soykan et al., 2003). Although the LSAS has also self-rated version, which has reported strong psychometric properties with an internal consistency of *alpha* = 0.95 and a 12-week test-retest reliability of $r = 0.83$ (Baker et al., 2002), the reliability and validity study for the Turkish version of the LSAS was carried out only for the "clinician-administered" form (Soykan et al., 2003). Nevertheless, Soykan et al. (2003) noted that individuals with social anxiety suffer from difficulties in social interactions and especially face-to-face contact which can effect their answers in clinician-administered scales and suggested further studies to obtain information about using the Turkish version of the scale in self-report assessment. The self-rated version of LSAS has also been evaluated for internet administration with a reported internal consistency of *alpha* = 0.94 (Hedman et al., 2010) and has recently been used in university students for similar purpose as the present study (Lemos et al., 2016). Finally, Cronbach's alpha coefficients were found to be 0.91 for fear/anxiety, 0.92 for avoidance and 0.95 for LSAS in the present study.

2.2.2. Adult ADHD self-report scales (ASRS-v1.1)

ADHD symptoms were measured with the ASRS (Kessler et al., 2005a, 2005b), an 18-item scale based on Diagnostic and Statistical Manual of Mental Disorders: Fourth Edition (DSM-IV-TR) criteria (American Psychiatric Association, 2000). As a self-report scale ASRS was found to be reliable and valid scale for evaluating ADHD for adults and shows a high internal consistency and high concurrent validity with the rater-administered measure (Adler et al., 2006). It should be noted that for the purposes of their study, Kessler et al. (2005a) administered the measure to a general population and not specifically to individuals who reported having symptoms of ADHD.

Developed under the auspices of the World Health Organization, ASRS is also a short six-item screening instrument, the questions in which were extracted, using stepwise logistic regression, from a larger survey of 18 questions comprising the Adult Self-Report Survey that taps the 18 specific "Criterion A" symptoms defining the disorder in DSM-IV. The ASRS 6-item screen was developed for community based studies and exhibits strong concordance with clinician diagnoses as well as sound psychometric properties (Chamberlain et al., 2016).

The 5-point Likert-type scale ranges from "0" (never) to "4" (very often). Thus, the possible range of scores on the ASRS screening version is 0–24, with higher scores indicating more ADHD symptomology. Each response of sometimes or greater (2 or more) on screening items 1–3 equated to 1 point; each response of ten or greater (3 or more) on screening items 4–6 resulted in a point. A total score of 4 or more indicated probable ADHD. We therefore used this recommended definition to identify highly likely ADHD cases in our sample and named as "probable ADHD". Previous data suggest that this approach is