ADHD Attention Deficit and Hyperactivity Disorders (2019) 11:271–278
https://doi.org/10.1007/s12402-019-00291-x

ORIGINAL ARTICLE

# The importance of avoidant personality in social anxiety disorder with and without attention-deficit/hyperactivity disorder

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Received: 19 November 2018 / Accepted: 6 February 2019 / Published online: 14 February 2019


## Abstract

In the present study, our primary aim was to compare the generalized social anxiety (GSAD) patients with and without attention-deficit/hyperactivity disorder (ADHD) in terms of avoidant personality disorder (AVPD), and some clinical variables. We also investigated the relationship of AVPD and depression with ADHD and GSAD. We hypothesized that ADHD may be associated with AVPD in patients with GSAD. Seventy-six patients with GSAD were evaluated for depression, AVPD, and childhood and adulthood diagnoses of ADHD. The GSAD patients with ($n=34$) and without adulthood ADHD ($n=30$) were compared with respect to some sociodemographic and clinical variables. GSAD patients with adulthood ADHD had significantly higher comorbid diagnosis of AVPD, more avoidant personality and depression symptoms than those without ADHD. Pearson's correlation coefficient in total sample ($n=76$) showed that the mean number of AVPD criteria was significantly associated with the severity of Beck Depression Inventory, Wender Utah Rating Scale (WURS), and inattention symptoms of ADHD. There were no correlations between the total and subscale scores of Liebowitz Social Anxiety Scale and the mean number of AVPD criteria. The scores of WURS significantly predicted the mean number of AVPD criteria ($\beta=0.305$, $p=0.007$). The severity of current depression ($\beta=0.143$, $p=0.30$) and inattention symptoms of adulthood ADHD ($\beta=0.112$, $p=0.46$) were not associated with the severity of AVPD symptoms. These results might demonstrate that comorbid AVPD in adult SAD patients was related to a childhood ADHD independent from depression, and inattention symptoms of ADHD in adulthood.

**Keywords** Social anxiety disorder · Avoidant personality disorder · Attention-deficit/hyperactivity disorder · Depression

Social anxiety disorder (SAD) is characterized by a persistent fear of at least one social or performance condition 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 be in conditions that will be humiliating or embarrassing, and being exposed to the feared situations almost invariably provokes anxiety (Stein and Stein 2008). Avoidant personality disorder (AVPD) is a pervasive pattern of social inhibition, feelings of inadequacy, and hypersensitivity to negative evaluation and criticism that begins in early adulthood (American Psychiatric Association 2013). Several studies found a significant association between AVPD and SAD with varying rates of comorbidity between 22 and 89% (Cox et al. 2009; Hummelen et al. 2007; Alden et al. 2002; Schneier et al. 1991; Reich 2000). SAD and AVPD comorbidity was considered as a continuum of social anxiety, ranging from normal social anxiety and shyness to AVPD (Isomura et al. 2015; Ralevski et al. 2005; Reich 2009). Previous studies reported that comorbid SAD and AVPD was associated with more severe anxiety symptoms (Cox et al. 2009; Chambless et al. 2008; van Velzen et al. 2000), increased psychiatric comorbidity (Cox et al. 2009; Reich 2000; Boone et al. 1999), and greater disability (Reich 2000) compared to those with SAD and no comorbid AVPD. Attention-deficit/hyperactivity disorder (ADHD) is a childhood-onset disorder that persists into adolescence and adulthood in more than half of the cases (Biederman et al. 2011a, b; Klein et al. 2012; Kessler et al. 2005; Lara et al. 2009). While hyperactivity and impulsivity decline with

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increasing age, inattention symptoms have a more stable course (Biederman et al. 2011b; Klein et al. 2012; Kessler et al. 2005). The close association between SAD and ADHD in adolescent and adult patients is well defined in many previous studies. The rate of comorbid childhood ADHD in SAD patients was reported to be between 3 and 72% (Mancini et al. 1999; Lara et al. 2009; Cumyn et al. 2009; Kessler et al. 2006; Mörtberg et al. 2012; Park et al. 2011; Safren et al. 2001). It was reported that comorbid ADHD was associated with higher generalized type and increased severity of SAD (Chavira et al. 2004), more severe symptoms of depression, and decreased functionality (Koyuncu et al. 2015a). The presence of comorbidity is more associated with predominantly inattentive type of ADHD (Schmitz et al. 2010; Yuce et al. 2013; Koyuncu et al. 2015a, b). Some studies suggested that ADHD and severity of ADHD symptoms are related to both fear and avoidance of SAD among young adults, while personality scores of introversion and high neuroticism may have an effect on this relationship (Evren et al. 2017). Koyuncu et al. (2016) reported higher rates of emotional traumatic experiences and impulsivity as well as more severe symptoms of depression, anxiety, and social anxiety in SAD patients with childhood ADHD than those without ADHD in childhood. Social problems and some adverse events caused by ADHD are suggested to lead to secondary SAD development in a subgroup of patients with SAD (Koyuncu et al. 2016). Some patients may develop maladaptive coping behaviors, social fears, and a cognitive inhibition in social environments due to some symptoms of ADHD (Koyuncu et al. 2016; Young 2005). In most of the previous studies of examining the relationship between SAD and ADHD, the diagnosis of AVPD was not examined. The effects of lifetime or current major depression, and the presence of AVPD on the development of SAD in ADHD patients have not been also well studied to date. A high comorbidity between ADHD and major depression (Cumyn et al. 2009; McGough et al. 2005; Sobanski et al. 2005), and strong relationship of SAD with depression (Hunt et al. 2002) and AVPD (Cox et al. 2009; Hummelen et al. 2007; Alden et al. 2002; Schneier et al. 1991; Reich 2000) led us to consider that the relationship between ADHD and SAD should be assessed taking into account the influences of depression and AVPD. Therefore, the current study aimed to examine the relationship between ADHD and generalized SAD considering the effects of AVPD and depression. We hypothesized that ADHD may also be associated with AVPD in patients with generalized SAD (GSAD).

## Methods

### Participants

We assessed 100 adult patients who met the criteria for SAD (aged 18 and 65 years) according to the Structured Clinical Interview for DSM-IV, Clinician Version (SCID-I/CV) First et al. 1997; Corapcigil et al. 1999). The patients were admitted to psychiatry outpatient service and anxiety division between August 2017 and June 2018. To evaluate the childhood and adulthood diagnoses of SAD, ADHD, and other comorbid Axis I disorders (major depression, obsessive–compulsive disorder, panic disorder, generalized anxiety disorder), each patient was administered the Schedule for Affective Disorders and Schizophrenia for School Age Children, Present and Lifetime Version (K-SADS-PL) (Kaufman et al. 1997; Gökler et al. 2004), and SCID-I/CV. Exclusion criteria were lifetime history of schizophrenia and other psychotic disorders, bipolar disorder, substance abuse or dependence within the past 12 months, mental retardation or pervasive developmental disability, and receiving any psychotropic drugs for at least 1 month before the interviews.

### Assessment

GSAD was determined using a criterion of fear in more than four social situations, including at least one performance situation and two social interaction situations. Eight subjects with performance type of SAD were excluded from the sample. The severity of SAD was assessed by the Turkish version (Soykan and Ozgüven 2003) of Liebowitz Social Anxiety Scale (LSAS) (Liebowitz 1987). This clinician-rated scale contains 24 items, 13 concerning performance anxiety and 11 related to social situations. Each item is rated separately for fear (0–3 = none, mild, moderate, severe) and avoidance behavior (0–3 = never, occasionally, often, usually). Soykan and Ozgüven (2003) suggested a cutoff score of 25 for subscales and 50 for the whole LSAS in Turkish samples. Accordingly, we did not include the subjects whose total and subscale scores were lower than these cutoff scores into study ($n = 16$). Therefore, total sample consisted of 76 participants with generalized SAD. The diagnosis of AVPD was assessed with the Structured Clinical Interview for DSM-IV Axis II Disorders—Personality Questionnaire (SCID-II-PQ) (First et al. 1997). SCID-II-PQ is a 120-item self-report inventory. For the present study, only seven items (1 = absent, 2 = possible/subthreshold, 3 = definite) screening for the diagnostic criteria for AVPD were administered. In order to meet the diagnostic criteria for AVPD, participants had

to receive a score of 3 on 4 or more items. In the current study, we examined AVPD as both a dichotomous variable and a continuous variable indicating the number of items. The patients who reported six symptoms of either inattention or hyperactivity–impulsivity during a 6-month period (DSM-IV criterion A); symptoms of either inattention or hyperactivity–impulsivity before age 7 (criterion B); some impairment in at least two or more settings (like at school or at home) (criterion C); and clinically significant impairment in social, academic, or occupational functioning (criterion D) were considered to have a diagnosis of ADHD. The patients who reported that their ADHD symptoms continued after 18 years old were diagnosed as adulthood ADHD ($n = 34$). Twelve patients who did not meet the criteria of ADHD after 18 years old were considered as having childhood ADHD.

To assess the severity of ADHD symptoms, we used the Turkish version (Gunay et al. 2005) of Turgay's Adult Attention-Deficit/Hyperactivity Disorder (ADD/ADHD) DSM-IV-Based Diagnostic Screening and Rating Scale (Turgay 1995). It is a five-point Likert scale consisting of three subscales. Inattention section includes nine questions of DSM-IV inattention symptoms. Hyperactivity–impulsivity section contains a total of nine items composed on the basis of DSM-IV hyperactivity symptoms. ADHD characteristics and problems section consisted of 30 items questioning ADHD associated with emotional and behavioral symptoms. In the present study, only inattention and hyperactivity–impulsivity sections were used. We retrospectively assessed the severity of childhood ADHD symptoms in total sample by using the Turkish version of (Oncu et al. 2005) Wender Utah Rating Scale (WURS) that is a 25-item self-report questionnaire with a 5-point Likert scale (Ward et al. 1993). The current severity of depression was determined through Beck Depression Inventory (BDI). The BDI is a 21-item self-report questionnaire for evaluating the severity of depression in normal and psychiatric populations (Beck et al. 1961). All patients gave informed consent to participate in the study after the study protocols had been fully explained. This study was approved by local ethics committee. All study interviews and ratings were carried out by an expert author (C.Y), under the supervision of a certified child and adolescent psychiatrist (D.S), and by senior psychiatrists (B.D., C.O.M., L.S.). The study procedures complied with the Declaration of Helsinki.

### Statistical analysis

Data were analyzed using the SPSS (Windows Release 21.0; SPSS Inc., Chicago, Illinois, USA). Comparisons between continuous variables were analyzed using Student's t test according to normal distribution of data. Differences in categorical variables were assessed by means of the Chi-square test, and Fisher's exact test, as appropriate. Pearson's correlation analyses were used for normally distributed variables to assess the relationship between the several clinical variables. Results were evaluated using a significance level of $p < 0.05$.

We performed multiple linear regression analysis using 'Enter' technique, to determine the association between the possible predictors and the dependent variable. Before conducting these analyses, we tested the possible multicollinearity between the variables that would be inserted in the adjustment of models. Multicollinearity was assessed by examining tolerance and the variance inflation factor (VIF). Factors were only entered in the regression models if they showed significant correlation in the univariate correlation analysis.

## Results

Table 1 indicates the differences between generalized SAD patients with ($n = 34$) and without adulthood ADHD ($n = 42$) with respect to several sociodemographic and clinical variables. There were no significant differences between the two groups in sociodemographic variables, family history, and the childhood diagnosis of SAD. The scores of total and subscale scores of LSAS, the lifetime diagnoses of generalized anxiety disorder, panic disorder, and obsessive–compulsive disorder did not differ between the groups. We have also found that lifetime and current diagnoses of major depression did not differ between the two groups. SAD patients with adulthood ADHD had significantly higher comorbid diagnosis of AVPD ($p = 0.003$) and more AVPD symptoms ($p = 0.01$) than those without ADHD. Current severity of depression ($p < 0.0001$), and the scores of WURS ($p < 0.0001$) and ADD/ADHD scale ($p < 0.0001$) were significantly higher in comorbid group compared to SAD group without ADHD. Pearson's correlation coefficient in total sample ($n = 76$) showed that total, and fear and avoidance subscale scores of LSAS had no significant correlations with the mean number of AVPD criteria, and with total or subscale scores of ADD/ADHD, WURS, and BDI. The mean number of AVPD criteria was significantly associated with the severity of BDI ($r = 0.27$, $p = 0.01$), WURS ($r = 0.30$, $p = 0.007$), and inattention symptoms of ADHD ($r = 0.28$, $p = 0.01$) (Table 2). We have found no correlations between the total and subscale scores of LSAS and the mean number of AVPD criteria (Table 3). To identify the variables which may predict the mean number of AVPD symptoms, we conducted a multiple linear regression analysis using 'stepwise' method, WURS, BDI, and inattention subscale scores of ADD/ADHD scale as independent variables (Table 4). A significant regression equation was found, $F = 7.591$, $p = 0.007$. The assumptions of error independence were met

**Table 1** General description of the sample ($n = 100$)

| | SAD + adulthood ADHD ($n = 34$) | | SAD ($n = 42$) | | Statistical analyses | | |
|---|---|---|---|---|---|---|---|
| | *n* | % | *n* | % | $\chi 2$ | *df* | *p* |
| *Gender* | | | | | 0.28 | 1 | 0.59 |
| Female | 17 | 50.0 | 17 | 56.7 | | | |
| Male | 17 | 50.0 | 13 | 43.3 | | | |
| *Marital status* | | | | | 1.32 | 2 | 0.51 |
| Single | 28 | 82.4 | 25 | 83.3 | | | |
| Married | 6 | 17.6 | 4 | 13.3 | | | |
| Separated/divorced | – | – | 1 | 3.3 | | | |
| Childhood diagnosis of SAD | 34 | 100.0 | 29 | 96.7 | 1.15 | 1 | 0.28 |
| Comorbid diagnosis of AVPD | 34 | 100.0 | 23 | 76.7 | 8.90 | 1 | 0.003[a] |
| Lifetime diagnosis of major depression | 22 | 64.7 | 19 | 45.2 | 2.86 | 1 | 0.28 |
| Current diagnosis of major depression | 16 | 47.1 | 10 | 23.8 | 4.51 | 1 | 0.05[a] |
| Lifetime diagnoses of | | | | | | | |
| Generalized anxiety disorder | 3 | 8.8 | 3 | 7.1 | 0.07 | 1 | 0.78 |
| Panic disorder | 3 | 8.8 | 2 | 4.8 | 0.50 | 1 | 0.47 |
| Obsessive–compulsive disorder | 6 | 17.6 | 2 | 4.8 | 3.31 | 1 | 0.06 |
| | *m* | SD | *m* | SD | *T* | *df* | *p* |
| Age | 25.3 | 8.1 | 25.5 | 8.1 | 0.07 | 74 | 0.94 |
| Educational level (years) | 13.6 | 3.3 | 13.6 | 4.0 | −0.01 | 74 | 0.99 |
| The mean number of AVPD criteria | 5.9 | 1.0 | 5.1 | 1.6 | −2.44 | 74 | 0.01 |
| BDI | 29.3 | 11.7 | 15.6 | 9.4 | −5.09 | 74 | < 0.0001 |
| LSAS total | 95.4 | 32.2 | 105.5 | 28.2 | 1.32 | 74 | 0.19 |
| Fear | 49.1 | 16.4 | 53.8 | 14.2 | 1.22 | 74 | 0.22 |
| Avoidance | 46.0 | 19.2 | 51.3 | 15.7 | 1.19 | 74 | 0.23 |
| WURS | 55.1 | 17.7 | 28.7 | 14.0 | −7.25 | 74 | < 0.0001 |
| *ADD/ADHD scale* | | | | | | | |
| Total | 30.1 | 8.0 | 14.5 | 7.2 | −8.82 | 74 | < 0.0001 |
| IA | 18.4 | 4.4 | 9.5 | 4.7 | −8.23 | 74 | < 0.0001 |
| HA/I | 11.7 | 5.7 | 4.9 | 4.7 | −5.62 | 74 | < 0.0001 |

[a]Fisher's exact test

*ADHD* attention-deficit/hyperactivity disorder, *AVPD* avoidant personality disorder, *LSAS* Liebowitz Social Anxiety Scale, *BDI* Beck Depression Inventory, *SAD* social anxiety disorder, *WURS* Wender Utah Rating Scale, *ADD/ADHD* adult attention-deficit/hyperactivity disorder, *IA* inattention, *HA* hyperactivity, *I* impulsivity

**Table 2** Correlation coefficients of BDI, WURS, and ADD/ADHD scale with the mean number of AVPD criteria and LSAS (n = 76)

| | BDI | WURS | ADD/ADHD scale total | ADD/ADHD scale IA | ADD/ADHD scale HA/I |
|---|---|---|---|---|---|
| *The mean number of* | | | | | |
| AVPD criteria | 0.27* | 0.30** | 0.20 | 0.28* | 0.07 |
| LSAS total | 0.03 | 0.12 | 0.10 | 0.06 | 0.11 |
| Fear | 0.01 | 0.11 | 0.09 | 0.04 | 0.12 |
| Avoidance | 0.06 | 0.11 | 0.09 | 0.08 | 0.08 |

*BDI* Beck Depression Inventory, *WURS* Wender Utah Rating Scale, *ADD/ADHD* adult attention-deficit/hyperactivity disorder, *IA* inattention, *HA* hyperactivity, *I* impulsivity, *LSAS* Liebowitz Social Anxiety Scale

$^{**}p < 0.01$; $^{*}p < 0.05$

**Table 3** Correlation coefficients of the mean number of AVPD criteria total and subscale scores of LSAS (n = 76)

| | LSAS total | LSAS fear | LSAS avoidance |
|---|---|---|---|
| The mean number of AVPD criteria Avoidance | 0.02 | 0.01 | 0.03 |

*LSAS* Liebowitz Social Anxiety Scale, *AVPD* avoidant personality disorder

for analysis (Durbin–Watson = 2.221; Adj $R^2 = 0.081$). The highest VIF values for the model were 1.737. Therefore, we determined that multicollinearity was not present. The scores of WURS significantly predicted the mean number of AVPD criteria ($\beta = 0.305$, $p = 0.007$). The severity of current depression ($\beta = 0.143$, $p = 0.30$), and inattention symptoms of adulthood ADHD ($\beta = 0.112$, $p = 0.46$) were not associated with the severity of AVPD symptoms.

## Discussion

In the present study, we primarily investigated the relations of ADHD with the development of adult GSAD considering the role of comorbid AVPD and depression. The heterogeneous and complex association of ADHD symptomatology with SAD needs to be investigated within the context of the comorbid diagnoses of AVPD and depression. Some research reported that although AVPD and SAD do not have significant differentiating features, AVPD appeared to be a severe form of SAD (van Velzen et al. 2000; Carter and Wu 2010; Eikenaes et al. 2013; Lampe and Sunderland 2013; Marques et al. 2012. However, some of the studies (Stein and Stein 2008; Reich 2000) found no significant differences between SAD and AVPD in social fears, anxiety, avoidance, and skills. Epidemiological and clinical studies suggest that both AVPD and SAD are associated with 'behavioral inhibition' which is characterized by avoidance of strangers, shyness, and increased anxiety (Hummelen et al. 2007; Herbert et al. 1992; Bohlin and Hagekull 2009; Cox et al. 2005; Meyer et al. 2005; Eggum et al. 2009; Goldin et al. 2009). Since the predominant view is that SAD and AVPD represent a continuum ranging from normal social anxiety at the milder end to AVPD as the most severe variant (Isomura et al. 2015; Ralevski et al. 2005; Huppert et al. 2008; Tillfors et al. 2004; Turner et al. 1991), and depression is considered as one of the most frequent disorders in both SAD (Hunt et al. 2002) and ADHD (Pliszka 1998; Turgay and Ansari 2006), we concentrated on the possible effects of AVPD and depression regarding comorbidity between ADHD and SAD. Our results demonstrated that total and subscale scores of LSAS had no significant correlations with the mean number of AVPD criteria and current depression scores. We have interpreted this finding as an overlap between SAD and AVPD, and AVPD may not be a more severe form of SAD. SAD and AVPD comorbidity may reflect a spectrum to support a severity continuum hypothesis. Moreover, the mean number of AVPD symptoms in our sample was associated with the severity of current depression. Similarly, some of the previous studies reported that the SAD patients with comorbid AVPD had higher rates of depression than those without AVPD (Herbert et al. 1992; Turner et al. 1992; Brown et al. 1995). AVPD may be either the cause or result of other mood and anxiety disorders. The insecurity and isolation symptoms of AVPD can trigger depression (Brown et al. 1995; Kose et al. 2009). In our sample, 58.2% and 43.0% of GSAD patients had a diagnosis of childhood and adulthood ADHD, respectively, in consistent with the rates of previous studies (Cumyn et al. 2009; Kessler et al. 2006; Koyuncu et al. 2015a, b; Mörtberg et al. 2012; Park et al. 2011; Safren et al. 2001; Karam et al. 2017). Unexpectedly, we have found that the severity of childhood and adulthood ADHD were not associated with the current scores of LSAS. We suggested that adulthood ADHD did not influence the development of SAD in adult patients. This finding contrasted with some of the previous studies which proposed a specific ADHD and SAD relationship (Kessler et al. 2006; Park et al. 2011; Koyuncu et al. 2016). One explanation for this finding might be that our sample included SAD patients with generalized subtype having subscale and total scores above cutoff points. Second, there was no association between SAD and AVPD, and the majority of the sample had an additional diagnosis of AVPD. Instead, our results pointed out a relationship between AVPD and childhood ADHD despite the associations of current depression and inattention symptoms of adulthood ADHD with

**Table 4** Multiple regression results for studying the effects of depression, inattention, and childhood ADHD in explaining the mean number of AVPD symptoms

| Dependent | Independent | *B* | SE | $\beta$ | *p* | $R^2$ | Adjusted $R^2$ | Durbin–Watson |
|---|---|---|---|---|---|---|---|---|
| The mean number of Wender Utah Rating Scale AVPD symptoms | WURS | 0.021 | 0.343 | 0.305 | 0.007 | 0.093 | 0.081 | 2.221 |
| | BDI | 0.017 | 0.016 | 0.143 | 0.304 | | | |
| | Inattention | 0.025 | 0.033 | 0.112 | 0.464 | | | |

*BDI* Beck Depression Inventory, *WURS* Wender Utah rating scale, *AVPD* avoidant personality disorder

these conditions. Multiple linear regression analysis indicated that the severity of childhood ADHD symptoms was the strongest predictor for the severity of AVPD after the effect of depression and inattention ADHD symptoms were controlled. Recently, individuals diagnosed with childhood ADHD were reported to be at increased risk of borderline, antisocial, avoidant, and narcissistic personality disorders in late adolescence (Korsgaard et al. 2016). The majority of patients with ADHD might encounter several difficulties due to their inappropriate behaviors and impulsivity in family and social environments. Lack of intimate relationships and feeling socially isolated may predispose to the development of AVPD in patients with ADHD (Weiss et al. 2011). Parenting styles and teasing in the early childhood environment are also considered a potential risk factor for AVPD (Storch et al. 2003). These experiences may contribute to later feelings of inadequacy and withdrawal from the social world (Storch et al. 2004). Some authors suggested an 'internal design' in childhood ADHD which begins with anxiety, avoidance, and isolation about how they are perceived by others as a result of experiences caused directly by the symptoms of ADHD (Rappe and Heimberg 1997). Avoidance may be a leading mechanism used to escape from a consequence that is perceived as intensely painful. Therefore, similar to previous suggestions for SAD (Koyuncu et al. 2015b), these unpleasant experiences may become chronic and progress into AVPD. Our findings also demonstrated that the mean number of AVPD criteria was related to inattention symptoms of ADHD in adulthood. Some recent studies found a relationship between inattention type of ADHD and SAD (Koyuncu et al. 2015b; Schmitz et al. 2010). Consistently, some of the previous studies reported that children with inattention ADHD symptoms have more difficulties in social interactions and have been more passive, shy, and neglected than controls and the ADHD children with a combined type (Hodgens et al. 2000; Cordier et al. 2010). A recent study indicated that cases with ADHD inattentive type had higher harm avoidance scores compared to the combined and hyperactive/impulsive types (Perroud et al. 2016). High frequency of depression comorbidity might be an underlying reason for the predominance of inattention and less frequency of hyperactive type or combined type in our sample as depression may also cause attention problems. As the age increases, cognitive and attentional problems may cause anxiety and depression in patients with ADHD (Weiss et al. 2011).

These results might demonstrate that comorbid AVPD in adult SAD patients was related to a childhood ADHD independent from depression, and inattention symptoms of ADHD in adulthood. We still need more knowledge to clarify the boundaries between SAD and AVPD, and the question of whether ADHD may play a role in the association of both disorders is of vital importance during the transition from childhood to adulthood. Future research should focus on the issue of how the symptoms of ADHD are related to SAD and AVPD. There are several limitations associated with this study. First, the sample was relatively small. Thus, further studies are required to confirm these results. Since data of this sectional study may limit the generalization of the findings, the lifetime influences of these comorbid conditions on the development of SAD should be assessed in longitudinal investigations. Childhood and adulthood ADHD symptoms were assessed by self-report scales to be affected by memory biases.

**Funding** The authors received no financial support for the research, authorship, and publication of this article.

## Compliance with ethical standards

**Conflict interest** The authors declared no potential conflicts of interest with respect to the research, authorship, and publication of this article.

**Ethical approval** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

## References

Alden LE, Laposa JM, Taylor CT, Ryder AG (2002) Avoidant personality disorder: current status and future directions. J Pers Disord 16:1–29

American Psychiatric Association (2013) Diagnostic and statistical manual of mental disorders, 5th edn. American Psychiatric Association, Arlington

Beck A, Ward C, Mendelson M (1961) Beck depression inventory. Arch Gen Psychiatry 4:561–571

Biederman J, Petty CR, Clarke A et al (2011a) Predictors of persistent ADHD: an 11-year follow-up study. J Psychiatr Res 45:150–155

Biederman J, Fried R, Petty CR et al (2011b) Cognitive development in adults with attention deficit/hyperactivity disorder: a controlled study in medication-naive adults across the adult life cycle. J Clin Psychiatry 72:11–16

Bohlin G, Hagekull B (2009) Socio-emotional development: from infancy to young adulthood. Scand J Psychol 50:592–601

Boone ML, McNeil DW, Masia CL et al (1999) Multimodal comparisons of social phobia subtypes and avoidant personality disorder. J Anxiety Disord 13:271–292

Brown EJ, Heimberg RG, Juster HR (1995) Social phobia subtype and avoidant personality disorder: Effect on severity of social phobia, impairment, and outcome of cognitive behavioral treatment. Behav Ther 26:467–486

Carter SA, Wu KD (2010) Relations among symptoms of social phobia subtypes, avoidant personality disorder, panic, and depression. Behav Ther 41:2–13. https://doi.org/10.1016/j.beth.2008.10.002

Chambless DL, Fydrich T, Rodebaugh TL (2008) Generalized social phobia and avoidant personality disorder: meaningful distinction or useless duplication? Depress Anxiety 25:8–19

Chavira DA, Stein MB, Bailey K, Stein MT (2004) Comorbidity of generalized social anxiety disorder and depression in a pediatric primary care sample. J Affect Disord 80:163–171
Corapcigil A, Aydemir O, Yildiz M et al (1999) Adaptation into Turkish and reliability of structured clinical interview for DSM-IV (SCID). J Drug Treat 12:233–236
Cordier R, Bundy A, Hocking C, Einfeld S (2010) Comparison of the play of children with attention deficit hyperactivity disorder by subtypes. Aust Occup Ther J 57:137–145
Cox BJ, MacPherson PS, Enns MW (2005) Psychiatric correlates of childhood shyness in a nationally representative sample. Behav Res Ther 43:1019–1027
Cox BJ, Pagura J, Stein MB, Sareen J (2009) The relationship between generalized social phobia and avoidant personality disorder in a national mental health survey. Depress Anxiety 26:354–362
Cumyn L, French L, Hechtman L (2009) Comorbidity in adults with attention-deficit hyperactivity disorder. Can J Psychiatry 54:673–683
Eggum ND, Eisenberg N, Spinrad TL et al (2009) Predictors of withdrawal: possible precursors of avoidant personality disorder. Dev Psychopathol 21:815–838
Eikenaes I, Hummelen B, Abrahamsen G et al (2013) Personality functioning in patients with avoidant personality disorder and social phobia. J Pers Disord 26:746–763
Evren C, Dalbudak E, Ozen S et al (2017) 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. Psychiatry Res 254:158–163
First M, Spitzer R, Gibbon M, Williams JB (1997) Structured clinical interview for DSM-IV clinical version (SCID-I/CV). American Psychiatric Press, Washington DC
Gökler B, Ünal F, Pehlivantürk B et al (2004) Reliability and validity of schedule for affective disorders and schizophrenia for school age children-present and lifetime version-Turkish version (K-SADS-PL T). Turk J Child Adolesc Ment Health 11:109–116
Goldin PR, Manber T, Hakimi S et al (2009) Neural bases of social anxiety disorder: emotional reactivity and cognitive regulation during social and physical threat. Arch Gen Psychiatry 66:170–180
Gunay S, Savran C, Aksoy UM (2005) The reliability and validity study of adult attention disorder hyperactivity scale (adult ADD/ADHD DSM IV-based diagnostic secreening and rating scale. The J Educ Sci Ataturk Educ Faculty 21:133–150
Herbert JD, Hope DA, Bellack AS (1992) Validity of the distinction between generalized social phobia and avoidant personality disorder. J Abnorm Psychol 101:332-9
Hodgens JB, Cole J, Boldizar J (2000) Peer-based differences among boys with ADHD. J Clin Child Psychol 29:443–452
Hummelen B, Wilberg T, Pedersen G, Karterud S (2007) The relationship between avoidant personality disorder and social phobia. Compr Psychiatry 48:348–356
Hunt C, Issakidis C, Andrews G (2002) DSM-IV generalized anxiety disorder in the Australian National Survey of Mental Health and well-being. Psychol Med 106:27–34
Huppert JD, Strunk DR, Ledley DR et al (2008) Generalized social anxiety disorder and avoidant personality disorder: structural analysis and treatment outcome. Depress Anxiety 25:441–448
Isomura K, Boman M, Rück C et al (2015) Population-based, multigenerational family clustering study of social anxiety disorder and avoidant personality disorder. Psychol Med 45:1581–1589
Karam RG, Rovaris DL, Breda V (2017) Trajectories of attention-deficit/hyperactivity disorder dimensions in adults. Acta Psychiatr Scand 136:210–219. https://doi.org/10.1111/acps.12757
Kaufman J, Birmaher B, Brent DA et al (1997) Schedule for affective disorders and schizophrenia for school age children-present and lifetime version (K-SADS-PL): initial reliability and validity data. J Am Acad Child Adolesc Psychiatry 36:980–988
Kessler RC, Adler LA, Barkley R et al (2005) Patterns and predictors of attention-deficit/hyperactivity disorder persistence into adulthood: results from the national comorbidity survey replication. Biol Psychiatry 57:1442–1451
Kessler RC, Adler L, Barkley R et al (2006) The prevalence and correlates of adult ADHD in the United States: results from the national comorbidity survey replication. Am J Psychiatry 163:716–723
Klein RG, Mannuzza S, Olazagasti MA et al (2012) Clinical and functional outcome of childhood attention deficit/hyperactivity disorder 33 years later. Arch Gen Psychiatry 69:1295–1303
Korsgaard HO, Torgersen S, Wentzel-Larsen T, Ulberg R (2016) Personality disorders and Axis I comorbidity in adolescent patients with ADHD. BMC Psychiatry 16:175. https://doi.org/10.1186/s12888-016-0871-0
Kose S, Solmaz M, Celikel FC et al (2009) Comorbidity of Avoidant personality disorder in generalized social phobia and its impact on psychopathology. Bull Clinical Psychopharmacol 19:1340–1346
Koyuncu A, Ertekin E, Yüksel Ç et al (2015a) Predominantly inattentive type of ADHD is associated with social anxiety disorder. J Atten Disord 19:856–864
Koyuncu A, Çelebi F, Ertekin E et al (2015b) Clinical effects of ADHD subtypes in patients with social anxiety disorder. J Atten Disord 2015:4
Koyuncu A, Çelebi F, Ertekin E et al (2016) Attention deficit and hyperactivity in social anxiety disorder: relationship with trauma history and impulsivity. Atten Defic Hyperact Disord 8:95–100
Lampe L, Sunderland M (2013) Social phobia and avoidant personality disorder: similar but different? J Pers Disord 27:1–16. https://doi.org/10.1521/pedi.2013.27.1.1
Lara C, Fayyad J, de Graaf R et al (2009) Childhood predictors of adult attention-deficit/hyperactivity disorder: results from the World Health Organization World Mental Health Survey initiative. Biol Psychiatry 65:46–54
Liebowitz MR (1987) Social phobia. Mod Probl Pharmacopsychiatry 22:141–173
Mancini C, Van Ameringen M, Oakman JM et al (1999) Childhood attention deficit/hyperactivity disorder in adults with anxiety disorders. Psychol Med 29:515–525
Marques L, Porter E, Keshaviah A et al (2012) Avoidant personality disorder in individuals with generalized social anxiety disorder: what does it add? J Anxiety Disord 26:665–672. https://doi.org/10.1016/j.janxdis.2012.05.004
McGough JJ, Smalley SL, McKracken JT et al (2005) Psychiatric comorbidity in adult attention deficit hyperactivity disorder: findings from multiplex families. Am J Psychiatry 162:1621–1627
Meyer B, Ajchenbrenner M, Bowles DP (2005) Sensory sensitivity, attachment experiences, and rejection responses among adults with borderline and avoidant features. J Pers Disord 19:641–658
Mörtberg E, Tilfors K, Bejerot S (2012) Screening for ADHD in an adult social phobia sample. J Atten Disord 16:645–659
Oncu B, Olmez S, Sentürk V (2005) Validity and reliability of the Turkish version of the Wender Utah rating scale for attention-deficit/hyperactivity disorder in adults. Turk Psikiyatri Derg 16:252–259
Park S, Cho MJ, Chang SM et al (2011) Prevalence, correlates, and comorbidities of adult ADHD symptoms in Korea: results of the Korean epidemiologic catchment area study. Psychiatry Res 186:378–383. https://doi.org/10.1016/j.psychres.2010.07.047
Perroud N, Hasler R, Golay N et al (2016) Personality profiles in adults with attention deficit hyperactivity disorder (ADHD). BMC Psychiatry 16:199. https://doi.org/10.1186/s12888-016-0906-6
Pliszka SR (1998) Comorbidity of attention-deficit/hyperactivity disorder with psychiatric disorders: an overview. J Clin Psychiatry 59(suppl 7):50–58

Ralevski E, Sanislow CA, Grilo CM et al (2005) Avoidant personality disorder and social phobia: distinct enough to be separate disorders? Acta Psychiatr Scand 112:208–214

Rappe RM, Heimberg R (1997) A cognitive-behavioral model of anxiety in social phobia. Behav Res Therapy 35:72–75

Reich J (2000) The relationship of social phobia to avoidant personality disorder: a proposal to reclassify avoidant personality disorder based on clinical empirical findings. Eur Psychiatry 15:151–159

Reich J (2009) Avoidant personality disorder and its relationship to social phobia. Curr Psychiatry Rep 11:89–93

Safren SA, Lanka GD, Otto MW, Pollack MH (2001) Prevalence of childhood ADHD among patients with generalized anxiety disorder and a comparison condition, social phobia. Depress Anxiety 13:190–191

Schmitz M, Ludwig H, Rohde LA (2010) Do hyperactive symptoms matter in ADHD-I restricted phenotype? J Clin Child Adolesc Psychol 39:741–748

Schneier FR, Spitzer RL, Gibbon M et al (1991) The relationship of social phobia subtypes and avoidant personality disorder. Compr Psychiatry 32:496–502

Sobanski E, Bruggemann D, Alm B et al (2005) Subtype differences in adults with attention deficit hyperactivity disorder (ADHD) with regard to ADHD-symptoms, psychiatric comorbidity and psychosocial adjustment. Eur Psychiatry 23:142–149

Soykan C, Ozgüven HD (2003) Liebowitz social anxiety scale: the Turkish version. Psychol Rep 93:1059–1069

Stein MB, Stein DJ (2008) Social anxiety disorder. Lancet 371:1115–1125

Storch EA, Masia-Warner C, Brassard MR (2003) The relationship of peer victimization to social anxiety and loneliness in adolescence. Child Study J 33:1–18

Storch EA, Roth DA, Coles ME et al (2004) The measurement and impact of childhood teasing in a sample of young adults. J Anxiety Disord 18:681–694

Tillfors M, Furmark T, Ekselius L, Fredrikson M (2004) Social phobia and avoidant personality disorder: one spectrum disorder? Nord J Psychiatry 58:147–152

Turgay A (1995) Adult hyperactivity assessment scale based on DSM IV (unpublished scale). Integrative Therapy Institute Toronto, Canada

Turgay A, Ansari R (2006) Major depression with ADHD in children adolescents. Psychiatry (Edgmont) 3:20–32

Turner SM, Beidel DC, Borden JW et al (1991) Social phobia: axis I and II correlates. J Abnorm Psychol 100:102–106

Turner SM, Beidel DC, Townsley RM (1992) Social phobia: a comparison of specific and generalized subtypes and avoidant personality disorder. J Abnorm Psychol 101:326–331

van Velzen CJM, Emmelkamp PMG, Scholing A (2000) Generalized social phobia versus avoidant personality disorder: differences in psychopathology, personality traits, and social and occupational functioning. J Anxiety Disord 14:395–411

Ward MF, Wender PH, Reimherr FW (1993) The Wender Utah rating scale: an aid in the retrospective diagnosis of childhood Attention Deficit Hyperactivity Disorder. Am J Psychiatry 150:885–890

Weiss M, Gibbins C, Hunter JD (2011) Attention- deficit hyperactivity disorder and anxiety disorder in adults. In: Buitelaar JK, Kan CC, Asherson P (eds) ADHD in adults, chapter 11. Cambridge University Press, Cambridge, UK, pp 130–137

Young SJ (2005) Coping strategies used by ADHD adults. Pers Individ Dif 38:809–816

Yuce M, Zoroglu SS, Ceylan MF et al (2013) Psychiatric comorbidity distribution and diversities in children and adolescents with attention deficit/hyperactivity disorder: a study from Turkey. J Neuropsychiat Dis Treat 9:1791–1799