

# The impact of childhood traumas, depressive and anxiety symptoms on the relationship between borderline personality features and symptoms of adult attention deficit hyperactivity disorder in Turkish university students

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Dalbudak E, Evren C. The impact of childhood traumas, depressive and anxiety symptoms on the relationship between borderline personality features and symptoms of adult attention deficit hyperactivity disorder in Turkish university students. *Nord J Psychiatry* 2014;Early Online:1–6.

*Background:* Previous studies reported that there is a significant association between attention deficit hyperactivity disorder (ADHD) in childhood and borderline personality disorder (BPD) in adulthood. *Aim:* The aim of this study is to investigate the relationship of borderline personality features (BPF) and ADHD symptoms while controlling the effect of childhood traumas, symptoms of depression and anxiety in adulthood on this relationship in Turkish university students. *Methods:* A total of 271 Turkish university students participated in this study. The students were assessed through the Turkish version of the Borderline Personality Inventory (BPI), the Adult ADHD Self-Report Scale (ASRS), the Childhood Trauma Questionnaire (CTQ-28), the Beck Depression Inventory (BDI) and the Beck Anxiety Inventory (BAI). *Results:* Correlation analyses have revealed that severity of BPF is related with adult ADHD symptoms, emotional, physical abuse and depression scores. Hierarchical regression analysis has indicated that depressive symptoms, emotional and physical abuse and the severity of ADHD symptoms are the predictors for severity of BPF. *Conclusions:* Findings of the present study suggests that clinicians must carefully evaluate these variables and the relationship between them to understand BPF and ADHD symptoms in university students better. Together with depressive symptoms, emotional and physical abuse may play a mediator role on this relationship. Further studies are needed to evaluate causal relationship between these variables in both clinical and non-clinical populations.

• *Adult attention deficit hyperactivity disorder, Borderline personality features, Childhood traumas, University students.*

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## ***Borderline personality features***

Borderline personality disorder (BPD), which is characterized by a pervasive pattern of instability in affect regulation, impulse control, interpersonal relationships and self-image (1), is detected in 0.7% (2) to 1.4% of the general population (3). The disorder is strongly related with mood, anxiety disorders and substance use (4). Moreover, BPD may cause persistent dysregulation of emotion as well as behaviour, including suicidal behaviours, unsteadiness of relations and impulse control (5, 6). Nevertheless, as well as BPD, the severity of

borderline personality features (BPF) is also related with negative outcomes, social maladjustment and academic underachievement among young adults (7). Also, students with BPF may experience intense attacks of anger, depression or anxiety symptoms, and BPF is often associated with impulsive aggression, self-injury or substance abuse (6). BPD and BPF are associated with childhood traumas among Turkish university students (8). Although BPD is usually diagnosed in adults, BPF can often be traced back to childhood (9) like adult attention deficit hyperactivity disorder (ADHD) (10). There is no reason

to think that BPF magically or coincidentally first presents on a patient's 18th birthday or on a student's first day at university (6).

### ***Symptoms of adult attention deficit hyperactivity disorder and BPF***

Although ADHD is a childhood-onset psychiatric disorder, and the prevalence rate of ADHD in children ranges from 3% to 12% (11, 12), according to sample selection and diagnostic criteria, around two-thirds of these patients may have persisting ADHD symptoms during their adulthood (13–15). A recent study has suggested that the presentation of ADHD symptoms may change from adolescence to adulthood with less overt hyperactivity/impulsivity but ongoing attentional problems, disorganization and symptoms of emotional dysregulation, like mood swings, temper outbursts and irritability (10), which may all be mistaken with BPF. Consistent with this Fossati et al. (16) suggested that 60% of adults with BPD meet criteria for childhood ADHD. The reason for this may be that the two disorders share some similar clinical features, e.g. emotional dysregulation, impulsivity and irritability.

Although many previous studies reported that there is a significant association between ADHD and BPD, the nature of this relation has not yet been completely understood (17, 18). Nevertheless, among some possible psychopathological models to explain this association, there are two that become prominent among others (18). In their recent review, Storebø & Simonsen (18) suggested that many studies that evaluated associations between BPD and ADHD symptoms in childhood pointed at shared aetiology or the risk for development of one disorder, when the other disorder is present. Finally, Ferrer et al. (19) suggested that BPD patients could be separated into two clear subgroups associated to the adult ADHD comorbidity. BPD–ADHD patients showed a more homogeneous and impulsive profile while BPD without ADHD comorbidity had more anxiety and depressive disorders. Thus, these may suggest that association between BPF and ADHD symptoms is an important subject to study.

### ***Childhood traumas, symptoms of depression, anxiety, ADHD and BPF***

Previous studies suggested BPF to be associated with childhood traumas (20, 21), depression and anxiety symptoms (6). As BPF, symptoms of ADHD are also associated with childhood traumas (22), depression and anxiety symptoms (23). A recent study has suggested that childhood psychological trauma is a strong predictor of psychopathology in young adulthood (24), such as BPD (20, 21), including Turkish university students (8). In addition, childhood traumas may also have effect on other

psychopathologies such as ADHD, depression and anxiety symptoms in adulthood (22, 25). Although childhood abuse is correlated with depression and anxiety symptoms in adulthood, having BPF (6) or symptoms of ADHD (22) may better predict poor psychosocial functioning in adulthood.

### ***Aim***

As a result, previous studies reported associations between symptoms of ADHD in childhood and BPF in adulthood (18). As far as we know, there is no study that evaluates the relationship between the severity of BPF and the severity of symptoms of ADHD in adulthood, and since childhood traumatic experiences, depression and anxiety symptoms may have an important contribution on this relationship, we also wanted to control the effect of these variables. We have hypothesized that the severity of symptoms of ADHD in adulthood may still be a predictor of the severity of BPF even after controlling the other related variables.

### ***Methods***

The study was conducted with volunteers from Turgut Ozal University in Ankara between January 2013 and May 2013. Written informed consent was obtained from the students after the study protocol was thoroughly explained. The Ethical Committee of the University approved the study.

### ***Participants***

A total of 300 university students were randomly selected from the list of 930 students given by the Turgut Ozal University. Excluding criteria were refusing the participation, demanding any fee and incomplete participation to study. According to these criteria, 29 university students were excluded from the study. Thus, the study was conducted with a total of 271 university students (110 males and 161 females).

### ***Assessments***

All the students were assessed by using a semi-structured socio-demographic form and scales. The questionnaires were completed by students in a classroom setting via paper-and-pencil format.

#### **BORDERLINE PERSONALITY INVENTORY (BPI)**

BPI mostly focuses on borderline personality organization and is a 53-item self-rated scale (26) based on Kernberg's (27) structural borderline organization. In reliability analyses conducted among Turkish population, Cronbach's alpha of the whole group (40 patients with BPD, 35 patients with major depressive disorder, 30 patients with schizophrenia and 61 healthy subjects)

was 0.92, and for the BPD group it was 0.84. A cut-off point of 15/16 was reported. The Turkish version of BPI, which was found to be reliable and valid, was used in the present study (28). That is, Cronbach's alpha was 0.89 in the present study.

#### ADULT ADHD SELF-REPORT SCALES (ASRS-V1.1)

ADHD symptoms were measured with the ASRS (29), an 18-item scale based on *Diagnostic and Statistical Manual of Mental Disorders*, 4th edition (DSM-IV-TR) criteria (30). The Turkish version of ASRS demonstrated good reliability and validity in university students (31). Reliability analysis showed that the Turkish version of ASRS has a high level of internal consistency (Cronbach's alpha = 0.88). Cronbach's alpha coefficients for "inattention" and "hyperactivity/impulsivity" subscales were also high (0.82 and 0.78 respectively). Cronbach's  $\alpha$  was 0.85 in the present study.

#### CHILDHOOD TRAUMA QUESTIONNAIRE (CTQ-28)

The CTQ (32, 33) is a retrospective self-report instrument that inquires traumatic experiences during childhood and adolescence. It assesses five types of childhood trauma: emotional abuse, emotional neglect, physical abuse, physical neglect and sexual abuse. CTQ has an excellent test-retest reliability and convergent validity (32, 33). It comprises 28 items. Each item is rated from 1 (never) to 5 (very often). Scores range from 5 to 25 for each type of trauma and 25 to 125 for the total trauma score. The Turkish version of CTQ was used in clinical studies successfully (34) and Cronbach's  $\alpha$  was 0.81 in the present study.

#### BECK DEPRESSION INVENTORY-BECK ANXIETY INVENTORY

Depressive symptoms and the severity of depression were evaluated by using the Turkish version (35) of the Beck Depression Inventory (BDI; 36). Anxiety symptoms and the severity of anxiety were evaluated by the Turkish version (37) of the Beck Anxiety Inventory (BAI; 38). Both scales have been validated on Turkish populations. Cronbach's alphas were 0.97 for BDI and 0.90 for BAI in the present study.

#### Statistical analysis

We used Student's *t*-test for comparing mean of age between genders. To test the relationship of BPF with adult symptoms of ADHD, childhood trauma, depression and anxiety symptoms, Pearson's correlations were used. A hierarchical linear regression model was used to determine the predictors of BPF.

#### Results

In the present study, the number of the female participants was 161 (59.4%), whereas the number of the male

participants was 110 (40.6%). The mean age did not differ between males and females ( $21.95 \pm 1.73$ ,  $21.70 \pm 1.56$ , respectively,  $t = 1.24$ ,  $P = 0.22$ ). Among the participants, only 19.6% reported that they smoke cigarette and 2.2% reported that they use alcohol/substance (not shown).

Correlational analysis has revealed that BPF positively correlated with total and subscales scores of ASRS, total and subscales scores of CTQ-28 (particularly emotional and physical abuse). Although BPF positively correlated with sexual abuse, emotional and physical neglect scores, the powers of these relationships were relatively low (Table 1). In addition, the severity of emotional, sexual and physical abuse positively correlated with the severity of adult ADHD symptoms, respectively.

In the hierarchical linear regression model, BPI score was taken as a dependent variable, whereas depression and anxiety scores were entered as independent variables in step 1, subscales of CTQ-28 score in step 2, total score of ASRS in step 3a and subscale scores of ASRS in step 3b. The results have revealed that depression predicted the BPI score in the first step. In the second step, besides depression, emotional and physical abuse were found to be a predictor of BPI score among childhood trauma types, whereas in the step 3a, total score of ASRS was included in the model as a predictor of BPI score. Additionally, subscale scores of ASRS instead of total score of ASRS were the predictors of BPI score in step 3b (Table 2).

#### Discussion

Consistent with our hypothesis, one of the main findings of the present study is that the severity of adult ADHD symptoms predicted the severity of BPF among university students. In clinical populations ADHD symptoms in childhood was found to be a risk factor for the development of BPD in adulthood (16, 39). Thus, findings of the present study may suggest that not only childhood ADHD

Table 1. Correlations between the scales.

	ASRS Total	ASRS AD	ASRS HA	BPF
Emotional abuse	0.36*	0.38*	0.29*	0.43*
Physical abuse	0.21*	0.22*	0.17**	0.35*
Physical neglect	0.06	0.10	0.01	0.16**
Emotional neglect	0.01	0.07	-0.05	0.16**
Sexual abuse	0.25*	0.21*	0.24*	0.22*
CTQ-28	0.21*	0.11	0.18**	0.31*
BPF	0.44*	0.40*	0.46*	-
Beck Depression Inventory	0.10	0.07	0.11	0.24*
Beck Anxiety Inventory	0.22*	0.14***	0.26*	0.16**

ASRS, Adult Attention Deficit Hyperactivity Disorder Self-Report Scale; AD, attention deficit; HA, hyperactivity; BPF, borderline personality features; CTQ-28, Childhood Trauma Questionnaire.

\* $P < 0.001$ , \*\* $P < 0.01$ , \*\*\* $P < 0.05$ .

Table 2. Predictors of borderline personality features in hierarchical linear regression model.

Model		Unstandardized coefficients		Standardized coefficients Beta	<i>T</i>	<i>P</i>
		<i>B</i>	Std. Error			
1	Depression	0.147	0.036	0.241	4.068	< 0.001
2	Depression	0.105	0.033	0.173	3.151	0.002
	Emotional abuse	1.310	0.289	0.300	4.536	< 0.001
	Physical abuse	1.096	0.403	0.176	2.722	0.007
3a	Depression	0.099	0.031	0.163	3.174	0.002
	Emotional abuse	0.800	0.281	0.183	2.846	0.005
	Physical abuse	1.056	0.376	0.170	2.808	0.005
	ASRS	0.321	0.051	0.341	6.355	< 0.001
3b	Depression	0.100	0.031	0.164	3.194	0.002
	Emotional abuse	0.787	0.283	0.180	2.784	0.006
	Physical abuse	1.056	0.377	0.170	2.803	0.005
	ASRS-AD	0.374	0.118	0.217	3.159	0.002
	ASRS-HA	0.271	0.115	0.158	2.357	0.019

Variables entered in the first step: Depression and anxiety. Variables entered in the second step: Types of childhood trauma. Variable entered in the third step: <sup>a</sup>Adult Attention Deficit Hyperactivity Disorder Self-Report Scale (ASRS). <sup>b</sup>Attention deficit (AD) and hyperactivity (HA), respectively

1:  $F = 16.55$ ,  $df = 1, 269$ ,  $P < 0.001$ , adjusted  $R^2 = 0.054$ .

2:  $F = 27.07$ ,  $df = 3, 267$ ,  $P < 0.001$ , adjusted  $R^2 = 0.225$ ,  $R^2$  change for emotional abuse = 0.154,  $R^2$  change for physical abuse = 0.021.

3a:  $F = 33.39$ ,  $df = 4, 266$ ,  $P = 0.001$ , adjusted  $R^2 = 0.324$ ,  $R^2$  change = 0.101.

3b:  $F = 26.69$ ,  $df = 5, 265$ ,  $P < 0.001$ , adjusted  $R^2 = 0.322$ ,  $R^2$  change for ASRS-AD = 0.088,  $R^2$  change for ASRS-HA = 0.014.

symptoms (39) but also persisting ADHD symptoms during the young adulthood may still be associated with BPF even after controlling the effects of some variables, such as childhood traumas, anxiety and depression symptoms. Furthermore, both attention deficit and hyperactivity/impulsivity symptoms predicted BPF in the present study, although symptoms of attention deficit was a stronger predictor. This is consistent with the knowledge that the presentation of symptoms of ADHD may change from adolescence to adulthood with less overt hyperactivity/impulsivity but ongoing attentional problems (10). Nevertheless, this may suggest that not only main overlapping symptom of impulsivity but symptoms of ADHD as a whole are associated with BPF.

According to Sesar et al. (40), among types of trauma in childhood, particularly emotional and physical abuse were the most frequent types and mostly occurred together with other types of trauma among university students. They claimed that exposure to multi-type abuse in childhood is a traumatic experience with long-term negative effects. Moreover, traumatic experience during childhood is known to be significantly associated with psychopathology (24), i.e. depressive symptoms (25, 41), ADHD symptoms both in childhood (39) and in

adulthood (22), and last but not least BPF (20, 21, 41). Similarly, Sar et al. (8) suggested that childhood traumas, particularly childhood physical neglect, emotional and sexual abuse, had significant effects on BPF among Turkish university students. Although childhood traumas may have a high contribution on different psychopathologies in adulthood, this contribution may change according to population and types of traumas that are studied. Sesar et al. (40) suggested that emotional and physical abuse were more frequent among university population. Consistent with this, emotional and physical abuse predicted the severity of BPF in the present study. In addition, these trauma types were correlated with the severity of adult symptoms of ADHD. Consistent with these, Philipsen et al. (39) suggested childhood symptoms of ADHD to be related with emotional abuse in childhood and more severe BPF in adulthood among female sample. In addition, the severity of BPF in adulthood was associated with emotional abuse in childhood (39). When these findings are taken into consideration, we may speculate that because of ADHD symptoms in childhood, others may physically or emotionally abuse these children or adolescents, which in return may be the cause of depression and higher severity of BPF in adulthood. According to Igarashi et al. (41), childhood emotional and sexual abuse may influence depressive symptoms and BPF among Japanese university students. Nevertheless, according to the present study, childhood emotional and physical abuse types are correlated with both BPF and symptoms of adult ADHD among Turkish university students. Thus, the effect of ADHD symptoms on the severity of BPF may be both directly and indirectly, with latter being through emotional and physical abuse.

According to a recent review, association between ADHD symptoms and BPF is best explained by a partially shared aetiology and vulnerability model (18). In others words, symptoms of ADHD in childhood may be a risk factor for the later development of BPF or there is a common aetiology for both of these symptom clusters. Previous studies suggested that during childhood or adolescence, some BPF such as self-harm, impulsivity and emotional dysregulation were the predictive of BPD diagnoses in adulthood (42–44). Among these symptoms, impulsivity in particular is regarded as a core feature of BPD (1, 45) as it is in adult ADHD (10). Indeed the two disorders share some similar clinical features, e.g. emotional dysregulation and impulsivity, which may suggest a partially shared aetiology between these disorders (5). Since childhood traumas, particularly emotional and physical abuse, may cause neurobiological dysfunctions that may be related with some clinical features such as aggression, negative mood, emotional dysregulation and impulsivity (46), which both BPF and ADHD may share (5,18). Carlotta et al. (17) suggested that the combination of impulsivity, aggression, novelty seeking, and

juvenile conduct problems completely mediate the relationship between retrospectively assessed ADHD symptoms and current BPF. Thus, childhood traumas may also play a mediator role between the relationship of ADHD symptoms and the severity of BPF by being the cause of shared symptoms. Nevertheless, cross-sectional design of the study limits any argument about the causal relationship between the variables.

The results of this study are limited by several factors because participants do not represent the whole university students in Turkey and all the scales used in the present study were self-rated. Finally, since this study was cross-sectional, the findings cannot address the causal relationships among the primary constructs of interest.

## Conclusion

Despite these limitations, this is the first study directly to evaluate the relationship between BPF and adult symptoms of ADHD, while also considering other variables such as childhood traumas, depressive and anxiety symptoms. The results of the present study match up with our hypothesis that besides depressive symptoms, physical and emotional abuse, also the severity of symptoms of ADHD in adulthood predicted the severity of BPF. Therefore, at least, findings of the present study suggest that clinicians must carefully evaluate these variables in university students, since those with severe symptoms of ADHD in adulthood may also be candidates for severe BPF. Moreover, depressive symptoms, emotional and physical abuse all should be taken into consideration, since they have effect on this relationship. In clinical and non-clinical populations, further studies need to be done to evaluate the causal relationship between these variables.

**Disclosure of interest:** The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

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