



## RESEARCH ARTICLE

# The relationship between perceived stress, dissociative experiences, depressive symptoms, and anxiety sensitivity in borderline personality disorder

Mehmet Emin Demirkol<sup>1</sup>, Lut Tamam<sup>1</sup>, Soner Cakmak<sup>1</sup>, Kerim Ugur<sup>2</sup>, Caner Yesiloglu<sup>1</sup>

<sup>1</sup>Cukurova University School of Medicine, Department of Psychiatry, Adana - Turkey

<sup>2</sup>Malatya Training and Research Hospital, Department of Psychiatry, Malatya - Turkey

### ABSTRACT

**Objective:** Borderline personality disorder is characterized by impulsive behaviors, inconsistency in interpersonal relationships, and difficulty in regulating feelings and thoughts. In these patients, dissociative symptoms, defined as impaired consciousness, memory, and integrity of perception, are often observed and negatively affect the prognosis. This study aims to demonstrate the mediating effects of depressive symptoms and anxiety sensitivity between perceived stress and dissociative experiences in patients with borderline personality disorder.

**Method:** Seventy-four patients with borderline personality disorder according to the DSM-5 criteria and 70 healthy controls with no psychiatric disorders were included in the study. A sociodemographic data form, the Beck Depression Inventory, Dissociative Experiences Scale, Perceived Stress Scale, and Anxiety Sensitivity Index were used for data collection.

**Results:** The total score and physical, cognitive, and social subscores of the Anxiety Sensitivity Index and the total scores of Dissociative Experiences Scale, Beck Depression Inventory, and Perceived Stress Scale were higher in the patient group than the control group. There was a positive and statistically significant correlation between anxiety sensitivity, dissociative experiences, depressive symptoms, and perceived stress scores in the patient group. Depressive symptoms and anxiety sensitivity had partial mediating effects in the relationship between perceived stress and dissociative experiences.

**Conclusion:** Dissociative symptoms lead to worsening of the course of borderline personality disorder. Our study revealed a significant relationship of perceived stress, depressive symptoms, and anxiety sensitivity with dissociative experiences. Therapeutic interventions for anxiety sensitivity and depressive symptoms would be beneficial regarding the prognosis of borderline personality disorder by preventing or reducing the severity of dissociative experiences.

**Keywords:** Anxiety sensitivity, borderline personality disorder, depressive symptoms, dissociative experiences, perceived stress

## INTRODUCTION

Borderline personality disorder (BPD) is a personality disorder characterized by difficulties regulating

emotions and thoughts, impulsive behavior, and instability of interpersonal relations (1). In the normal population in the USA, a prevalence of 2.7% has been found, while the figure was 12% among patients seeking

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**Correspondence:** Lut Tamam, Cukurova University School of Medicine, Balcali Hospital, 01130, Saricam, Adana - Turkey

**E-mail:** ltamam@gmail.com

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psychiatric assistance (2). A study among university students in Turkey found a rate of 8.5% (3). Compared to the healthy population, individuals diagnosed with BPD display more commonly psychiatric comorbidities, suicide, and self-harm (4). In the etiology of BPD, the diathesis-stress model is commonly accepted, which consists of a combination of disposition, lack of confidence, and childhood trauma (5). According to Zanarini (6), 25-73% of individuals diagnosed with BPD had experienced physical abuse and 40-76% sexual abuse. Later studies have shown that emotional neglect may also lead to BPD (7).

Among the clinical findings of BPD, impulsivity, aggression, and affective lability are of particular importance (8). Apart from these findings, increased anxiety or stress level after assessing emotional sensitivity and emotions at a cognitive level are worth noting. Anxiety sensitivity is one of the cognitive characteristics increasing the symptom severity in BPD. It is a permanent personal characteristic giving rise to the belief that symptoms related to anxiety may cause negative somatic, cognitive, or social effects. While it has been stated that anxiety sensitivity may be acquired, the possibility of genetic transmission has also been demonstrated. In BPD patients, anxiety sensitivity is higher than in the normal population, and dimensional assessment of personality pathology regarding anxiety and anxiety sensitivity has shown these to be among the etiological factors affecting emotional dysregulation, one of the core symptoms of BPD (5). BPD is often accompanied by depressive symptoms (9) and causes a high degree of functionality loss (10).

Dissociation is a defense reaction used to adjust and cope after a traumatic experience. The dissociative process is defined as an impairment of the integrity of cognitive functions such as intelligence, identity, memory, perception, emotion, thought content, structure of thought, and behavior, generally seen as sudden and transient responses under stress (11). Dissociative symptoms occurring after stress are among the diagnostic criteria for BPD (1). Stiglmayr et al. (12) compared BPD, panic disorder, and major depressive disorder cases regarding dissociative experiences over a period of 48 hours after stress and found a greater intensity of dissociative experiences in BPD cases.

Dissociative experiences are observed in around two thirds of BPD patients. They can contribute to a more severe course of clinical presentation, impair social and professional functionality, and reduce self-respect. Despite their clinical relevance, it has not yet been

possible to elucidate the genesis of dissociative findings clearly (13). Our study assumes that dissociative symptoms can occur in individuals with BPD after stress; our aim was to demonstrate the mediating role of depressive symptoms and anxiety sensitivity in this relation. We suggest that demonstrating this relation may help prevent the occurrence and exacerbation of dissociative symptoms through treatment of anxiety sensitivity, stress load, and depressive symptoms, thus improving the patients' level of functionality and achieving a better course of disease.

## METHOD

Ethics committee approval for this study was granted by the Non-Interventional Clinical Research Ethics Committee of Cukurova University Medical Faculty, decision no. 32 dated Sept. 4, 2019. Before interview, written consent was received from all participants. The study was carried out in conformity with the Declaration of Helsinki. Psychiatric interviews were performed by the first author on the basis of DSM-5 diagnostic criteria. Enrolled in the study were 86 literate patients aged 18 and above being treated at the outpatient clinic of Cukurova University Medical Faculty Department for Mental Health and Diseases between September 15 and December 15, 2019 with a diagnosis of BPD and 75 volunteers who did not exhibit any signs of mental illness. In the DSM-5, anxiety disorders and mental diseases on the obsessive-compulsive spectrum have been specified as exclusion criteria because of their confounding effects on anxiety sensitivity, as have diseases of the psychotic disorder group, given that dissociative experiences may be confused with hallucinations. During first assessment, 4 members of the patient group were diagnosed with generalized anxiety disorder, 5 patients with panic disorder, and 3 patients with obsessive-compulsive disorder, while in the control group, 2 members were diagnosed with generalized anxiety disorder, 1 with panic disorder, and 2 with obsessive-compulsive disorder; all of these individuals were excluded from the study, which was therefore carried out with 74 patients and 70 healthy controls.

## Procedure

Each participant was given 60-90 minutes for psychiatric interview and completing sociodemographic data form and the measurement instruments. Elements not understood by the participants were explained by the interviewer.

## Measures

**Beck Depression Inventory (BDI):** This self-report instrument consisting of 21 items assessed on a 4-point Likert-type scale measures the severity of depressive symptoms. The total score ranges from 0 to 63. High scores indicate the intensity of the symptoms (14). Cronbach's alpha had a value of 0.80 in a Turkish validity and reliability study (15).

**Anxiety Sensitivity Index (ASI):** This self-report instrument consisting of 18 items assessed on a 5-point Likert-type scale measures anxiety sensitivity with its physical, cognitive, and social subdimensions. Anxiety symptoms due to somatic complaints are evaluated in the dimension of physical symptoms, anxiety regarding attention, thought content, and thought structure in the cognitive subdimension, and anxiety experienced in social environments in the social subdimension. Each item is scored according to the participant's previous experience with the relevant situation or in view of possible future experience (16). A higher total score indicates greater anxiety sensitivity (17). A Turkish validation study found Cronbach's alpha values of 0.88 for cognitive symptoms, 0.82 for social symptoms, 0.89 for physical symptoms, and 0.93 for the total scale (18).

**Perceived Stress Scale (PSS):** This self-report instrument consisting of 14 items assessed on a 5-point Likert-type scale (from 0: "not at all" to 4: "very often") measures the degree to which the person perceived his or her experiences during the past month as uncontrollable or unpredictable. Seven items containing negative expressions are reverse-scored. The score ranges between 0 and 56, with higher values indicating greater perceived stress (19). A Turkish adaptation study found a value of 0.84 for Cronbach's alpha (20).

**Dissociative Experience Scale (DES):** This self-report instrument consisting of 28 items has been developed to screen for dissociative experiences and measure their severity. Items are scored between 0 and 100, and the total score is calculated as the arithmetic mean. A high score indicates an increased severity of dissociative symptoms (21). In a Turkish reliability and validity study, Cronbach's alpha was found to be 0.91 (22).

## Statistical Analysis

Data were analyzed using the packages MPLUS 7.4, Jamovi project, and JASP Team. For the path coefficients of all models and in the evaluation of significance for comparisons,  $p=0.05$  was used as the critical value. Descriptive statistics are given as mean, standard deviation or median-interquartile range for

numerical variables and number and percentage for categorical variables. Before analysis, data were assessed for univariate normality and multicollinearity. As the sample size was above 50, it was assessed with Kolmogorov-Smirnov statistic for each variable. For multicollinearity, intervariable correlation coefficients and variance inflation factors (VIF) were assessed. Correlations between categorical variables were assessed by Pearson's chi-square test or Fisher's exact test. When comparing numerical variables between control group and BPD cases, independent samples t-test was used for normally distributed values and Mann-Whitney U test for not normally distributed values.

Correlations between scores from different instruments were examined using Spearman's rho correlation coefficient. Factors affecting dissociative experiences were examined with univariate and multiple regression models. When studying factors affecting dissociative experiences in the multiple regression model, the ASI total score created a multicollinearity problem ( $VIF>10$ ) and was removed from the model. A VIF value under 10 demonstrates the absence of multicollinearity issues (23). Mediation analysis was carried out using a bootstrap method (bootstrap 5000). In the mediation models, a maximum likelihood estimation method was used. In the first step, the basic model (not including mediating variable analysis) was tested to establish if the exogenous variable significantly predicted the endogenous variable. In the next step, the mediating variable was added to the model and its direct and indirect effects examined. Endogenous variable (DES), exogenous variable (perceived stress), and mediating variables (depressive symptoms and anxiety sensitivity) were continuous variables.

## RESULTS

Table 1 compares demographic and clinical characteristics of patient and control groups. Mean age was  $26.8\pm 7.9$  years in the BPD group and  $26.5\pm 4.1$  in the control group. There were no significant differences between groups regarding age, sex, duration of education, marital status, employment status, dwelling place, or alcohol and substance use status ( $p>0.05$  each). Smoking and attempted suicide rates were significantly higher in BPD patients than in the control group ( $p<0.001$  each).

Table 2 compares the ASI total score and subdomains, DES, BDI, and PSS scores between groups.

**Table 1: Comparison of some demographic and clinical characteristics**

	Group		df	p
	Control	BPD		
<b>Age</b>	26.5±4.1	26.8±7.9	142	0.245**
<b>Sex</b>				
Female	47 (67.1)	50 (67.6)	1	0.999*
Male	23 (32.9)	24 (32.4)		
<b>Duration of education (years)</b>	12 [9-15]	12 [9-14]	-	0.442**
<b>Marital status</b>				
Single	50 (71.4)	54 (73)	1	0.984*
Married	20 (28.6)	20 (27)		
<b>Employment status</b>				
Not working	33 (47.1)	41 (55.4)	1	0.410*
Working	37 (52.9)	33 (44.6)		
<b>Dwelling place</b>				
Center of province	51 (72.9)	58 (78.4)	1	0.563**
Smaller than center of province	19 (27.1)	16 (21.6)		
<b>Smoking</b>	6 (8.6)	52 (70.3)	1	<0.001*
<b>Alcohol use</b>	5 (7.1)	12 (16.2)	1	0.153*
<b>Substance use</b>	0 (0)	2 (2.7)	1	0.497***
<b>Suicide attempt</b>	0 (0)	48 (64.9)	1	<0.001*

Descriptive statistics are presented as number (%) for numerical variables and, depending on distribution, as mean, standard deviation and median [interquartile range] for categorical variables. BPD: Borderline personality disorder, df: Degrees of freedom, \*Pearson's chi-square test, \*\*Mann-Whitney U test, \*\*\*Fisher's exact test

**Table 2: Comparison of scale scores between groups**

	Group		p*
	Control	BPD	
<b>Anxiety Sensitivity Index</b>	4 [2-9]	35 [24-44]	<0.001
<b>Physical</b>	1 [0-4]	10.5 [6-18]	<0.001
<b>Cognitive</b>	2 [1-4]	14 [7-21]	<0.001
<b>Social</b>	2 [1-5]	13 [6-16]	<0.001
<b>Dissociative Experience Scale</b>	5 [3-9]	39 [27-52]	<0.001
<b>Beck Depression Inventory</b>	2 [1-4]	35.5 [20-43]	<0.001
<b>Perceived Stress Scale</b>	20.5 [16-23]	38 [34-44]	<0.001

Descriptive statistics are presented as median [interquartile range]. \*Mann-Whitney U test, BPD: Borderline personality disorder

In BPD cases, median ASI total score and physical, cognitive, and social subdomain scores were significantly higher than in the control group ( $p < 0.05$  each). Equally, DES, BDI, and PSS medians in the BPD group were significantly higher than in the controls ( $p < 0.05$  each).

Table 3 examines the correlation between status of education and ASI, DES, PSS, and BDI scores in the BPD cases. With increasing duration of education, DES scores in the cases decreased ( $p = 0.022$ ). A significant positive correlation was observed between ASI total score and DES, BDI, and PSS ( $p < 0.05$  each). On the

other hand, with increasing DES scores, the physical, cognitive, and social subdimensions of ASI as well as BDI and PSS scores also increased ( $p < 0.05$  each). Finally, a statistically significant positive correlation was seen between the PSS and BDI scores in the patient group ( $p < 0.001$ ).

Table 4 studies the factors affecting dissociative experiences in BPD cases. Examination of univariate results shows that duration of education, the physical, cognitive, and social subdimensions of ASI, and the BDI and PSS scores affect dissociative experiences ( $p < 0.05$  each). The multiple linear regression model

**Table 3: Correlation between duration of education and scale scores for BPD cases**

			<b>r</b>	<b>p</b>
<b>Duration of education</b>	-	Dissociative Experience Scale	-0.266	0.022
<b>Anxiety Sensitivity Index</b>	-	Dissociative Experience Scale	0.652	<0.001
<b>Anxiety Sensitivity Index</b>	-	Beck Depression Inventory	0.586	<0.001
<b>Anxiety Sensitivity Index</b>	-	Perceived Stress Scale	0.244	0.036
<b>Physical subdimension</b>	-	Dissociative Experience Scale	0.586	<0.001
<b>Cognitive subdimension</b>	-	Dissociative Experience Scale	0.562	<0.001
<b>Social subdimension</b>	-	Dissociative Experience Scale	0.407	<0.001
<b>Dissociative Experience Scale</b>	-	Beck Depression Inventory	0.749	<0.001
<b>Dissociative Experience Scale</b>	-	Perceived Stress Scale	0.433	<0.001
<b>Beck Depression Inventory</b>	-	Perceived Stress Scale	0.381	<0.001

Spearman's rho correlation coefficient was used. BPD: Borderline personality disorder

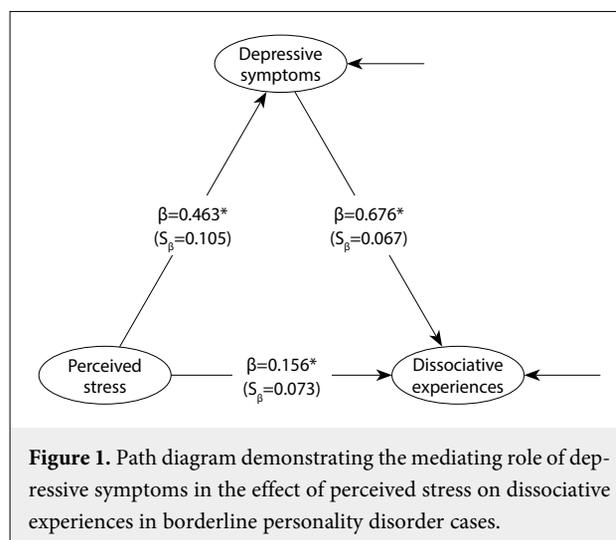
**Table 4: Factors affecting dissociative experiences in BPD cases**

	<b>Univariate linear regression</b>		<b>Multiple linear regression</b>	
	<b>Beta (95% CI)</b>	<b>p</b>	<b>Beta (95% CI)</b>	<b>p</b>
<b>Duration of education</b>	-1.63 [-3.1-0.16]	0.033	-1.52 [-2.44-0.61]	0.002
<b>ASI physical</b>	1.70 [1.09-2.30]	<0.001	-0.17 [-0.74-0.40]	0.560
<b>ASI cognitive</b>	1.72 [1.21-2.24]	<0.001	1.00 [0.53-1.47]	<0.001
<b>ASI social</b>	1.48 [0.82-2.14]	<0.001	0.19 [-0.3-0.69]	0.442
<b>Beck Depression Inventory</b>	1.17 [0.93-1.42]	<0.001	0.78 [0.52-1.05]	<0.001
<b>Perceived Stress Scale</b>	1.09 [0.62-1.57]	<0.001	0.37 [0.02-0.71]	0.041

Dependent variable: Dissociative Experience Scale. R<sup>2</sup>: 0.722. CI: Confidence interval, ASI: Anxiety Sensitivity Index, BPD: Borderline personality disorder

demonstrates that duration of education, the cognitive subdimension of ASI, and the BDI and PSS scores affect dissociative experiences ( $p < 0.05$  each). The variance explained in the multiple regression model was 72.2%.

Results of the mediation analysis examining the mediating role of depressive symptoms in the correlation between perceived stress level and dissociative experiences in BPD cases are shown in Table 5. A path diagram containing the standardized path coefficients and standard errors of the mediation analysis are presented in Figure 1. Following Table 5, the basic model (Model I), where depressive symptoms were not added, found a significant positive effect of perceived stress on dissociative experiences ( $\beta = 0.469$ ,  $p < 0.001$ ,  $R^2 = 0.22$ ). After adding depressive symptoms, mediation analysis (Model II) showed perceived stress predicting depressive symptoms ( $\beta = 0.463$ ,  $p < 0.001$ ) and depressive symptoms predicting dissociative experiences ( $\beta = 0.676$ ,  $p < 0.001$ ) at a significant level in a positive direction. In addition, a direct effect between perceived stress and dissociative experiences ( $\beta = 0.156$ ,  $p = 0.033$ ) and an indirect effect of perceived stress via depressive symptoms and dissociative experiences



( $\beta = 0.313$ ,  $p < 0.001$ ) were found to be significant in a positive direction. The model explains 58% of variance in dissociative experiences and 21% of variance in depressive symptoms.

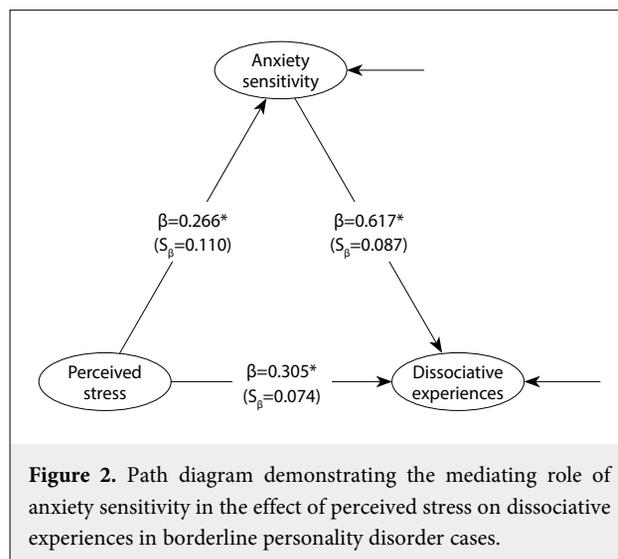
In summary, according to Table 5, after adding depressive symptoms (mediating variable), mediation analysis shows that the direct effect ( $p = 0.033$ ) as well as

the indirect effect ( $p < 0.001$ ) is significant. Therefore, it has been demonstrated that depressive symptoms play a partly mediating role in the effect of perceived stress on dissociative experience.

Results of the mediation analysis examining the mediating role of anxiety sensitivity in the correlation between perceived stress level and dissociative experiences in BPD cases are shown in Table 6. A path diagram containing the standardized path coefficients and standard errors of the mediation analysis are presented in Figure 2. Following Table 6, the basic model (Model I), where anxiety sensitivity was not added, found a significant positive effect of perceived stress on dissociative experiences ( $\beta = 0.469$ ,  $p < 0.001$ ,  $R^2 = 0.22$ ). After adding anxiety sensitivity, mediation analysis (Model II) showed perceived stress predicting anxiety sensitivity ( $\beta = 0.266$ ,  $p = 0.016$ ) and anxiety sensitivity predicting dissociative experiences ( $\beta = 0.617$ ,  $p < 0.001$ ) at a significant level in a positive direction. In addition, a direct effect between perceived stress and dissociative experiences ( $\beta = 0.305$ ,  $p < 0.001$ ) and an indirect effect of perceived stress via depressive symptoms and dissociative experiences ( $\beta = 0.164$ ,  $p = 0.018$ ) were found to be significant in a positive

direction. The model explains 57% of variance in dissociative experiences and 7% of variance in anxiety sensitivity.

In summary, according to Table 5, after adding anxiety sensitivity (mediating variable), mediation analysis shows that the direct effect ( $p < 0.001$ ) as well as the indirect effect ( $p = 0.0181$ ) is significant. Therefore,



**Figure 2.** Path diagram demonstrating the mediating role of anxiety sensitivity in the effect of perceived stress on dissociative experiences in borderline personality disorder cases.

**Table 5: Mediating role of depressive symptoms in the effect of perceived stress on dissociative experiences in BPD cases**

Model	Path	Standard path coefficient ( $\beta$ ) (95% CI)	Standard error ( $S_\beta$ )	p
<b>Model I. Basic model</b>	Stress → Dissociative experiences	0.469 (0.288-0.649)	0.092	<0.001
<b>Model II. Mediation analysis</b>	Stress → Depressive symptoms	0.463 (0.257-0.669)	0.105	<0.001
<b>Model II. Mediation analysis</b>	Depressive symptoms → Dissociative experiences	0.676 (0.544-0.808)	0.067	<0.001
<b>Model II. Mediation analysis (direct effect)</b>	Stress → Dissociative experiences	0.156 (0.012-0.299)	0.073	0.033
<b>Model II. Mediation analysis (indirect effect)</b>	Stress → Depressive symptoms → Dissociative experiences	0.313 (0.177-0.448)	0.069	<0.001

CI: Confidence interval

**Table 6: Mediating role of anxiety sensitivity in the effect of perceived stress on dissociative experiences in BPD cases**

Model	Path	Standard path coefficient ( $\beta$ ) (95% CI)	Standard error ( $S_\beta$ )	p
<b>Model I. Basic model</b>	Stress → Dissociative experiences	0.469 (0.288-0.649)	0.092	<0.001
<b>Model II. Mediation analysis</b>	Stress → Anxiety sensitivity	0.266 (0.050-0.482)	0.110	0.016
<b>Model II. Mediation analysis</b>	Anxiety sensitivity → Dissociative experiences	0.617 (0.447-0.787)	0.087	<0.001
<b>Model II. Mediation analysis (direct effect)</b>	Stress → Dissociative experiences	0.305 (0.161-0.449)	0.074	<0.001
<b>Model II. Mediation analysis (indirect effect)</b>	Stress → Anxiety sensitivity → Dissociative experiences	0.164 (0.028-0.300)	0.069	0.018

CI: Confidence interval

anxiety sensitivity has been demonstrated to play a partly mediating role in the effect of perceived stress on dissociative experience.

## DISCUSSION

Dissociative symptoms are seen in a number of psychiatric conditions such as BPD, anxiety disorder, obsessive-compulsive disorder, post-traumatic stress disorder, panic disorder, and social phobia, affecting the clinical presentation negatively (24). In BPD, identifying and correcting the reason for dissociative experiences often seen after stress can be the first step of treatment. The most important result of our study is to show that depressive symptoms and anxiety sensitivity have a mediating effect in the correlation between perceived stress level and dissociative experiences in individuals diagnosed with BPD.

It has been shown that traumatic early-life events may affect the development of BPD, while stressful life events and interpersonal conflicts can affect the etiology of major depression and other mental disorders (25). Therefore, perceived stress could be considered a transdiagnostic factor between BPD and depression. Depressive disorder, which severely affects quality of life and functionality, is the most commonly seen psychiatric comorbidity in BPD cases. An increase in illness severity, anger, hostility, and self-harm behavior has also been established in cases with comorbid depression and BPD compared to those where only one of the conditions was present (26). Previous studies have shown a mediating role for depressive symptoms in other mental conditions (27). Our first model designed on the basis of these data (Figure 1) showed a partial mediating role of depressive symptoms for dissociative experiences felt by BPD cases after stress. Our results demonstrate that treatment of depressive symptoms may control dissociative experiences in BPD cases even if the perceived stress level does not change.

Lilienfeld and Penna (28) point out that anxiety sensitivity may create a disposition towards negative clinical characteristics such as BPD-related interpersonal inconsistency, feeling of abandonment, or identity confusion. Bounoua et al. (29) showed that anxiety sensitivity played a mediating role between traits of borderline personality and emotional abuse during childhood. Anxiety sensitivity has also been shown to have a mediating effect between psychological concepts such as persistent pain and emotional eating behavior (30). Our model (Figure 2) demonstrated a partly mediating role of anxiety sensitivity for

dissociative experiences felt by BPD cases after stress. These data show that anxiety sensitivity intensifies dissociative experiences in situations involving an increased perceived stress level.

Dissociation is generally accepted to be a form of cognitive avoidance. Disposition for pseudo-memories and fantasies, attention deficit, cognitive failures, and sleep-related disorders have been associated with dissociation (31). In the light of this data, our findings indicating that the cognitive subdimension of anxiety sensitivity and low education level have a greater impact on dissociation than the social and physical subdimensions of anxiety sensitivity appear consistent. The importance of psychotherapy in addition to or instead of pharmacotherapy in BPD cases has been emphasized (32). Dissociative symptoms negatively affect the psychotherapeutic process by distancing the patient from his or her emotions, thoughts, and memories (33). Our study identified the relation of dissociative experiences with anxiety sensitivity and depressive symptoms in BPD patients. Our results will help increase the effectiveness of psychotherapeutic methods in persons with BPD by treating depressive symptoms and anxiety sensitivity.

Perceived stress is generally defined as the emotional pressure felt towards a negative life event. In BPD patients, reduced distress tolerance has been found to be effective in the observed dissociative symptoms, and individuals with a low tolerance for stress perceive these symptoms as overwhelming and unendurable, thus being more sensitive to anxiety (34). Higher anxiety sensitivity has also been found to increase impulsivity, emotional sensitivity, and inconsistency in interpersonal relations (29). In our study, we demonstrated higher perceived stress level and anxiety sensitivity in BPD cases compared to healthy controls. In conformity with the existing literature, we established a significant positive correlation between perceived stress level, depressive symptoms, dissociative experiences, and anxiety sensitivity. These data show that in BPD cases, dissociative and depressive symptoms and anxiety sensitivity increase with rising perceived stress level.

Depressive and anxious symptoms as well as alcohol and substance use are often observed in BPD cases. In our study, we found the BDI scores in BPD patients to be significantly higher than in the control group. Previous studies showed an increase in self-harm behavior, alcohol or substance use, and feeling of abandonment with decreasing distress tolerance (34). Individuals with BPD may use alcohol and other substances to treat themselves

in order to calm the anger they feel; hence the use of alcohol and substances being higher than in the normal population (35). Our study found higher perceived stress scores and more common suicide attempts in the BPD group compared to the control group. The similar rates of alcohol and substance use between patient group and control group may have been due to the participants' sociocultural characteristics and a tendency to hide alcohol consumption. A study in Turkey examining the sociodemographic characteristics of BPD cases found that 77% of the patients were unmarried, one-third lived on their own, 46% did not work, and 85% had undertaken a suicide attempt (36). Similar to the literature, in our study 73% of the patients were single, 55.4% did not work, and 64.8% had attempted suicide at least once. These data show that BPD, like numerous other mental disorders, negatively affects the patient's social and professional functionality.

Among the limitations of our study, no structured or semi-structured interviews were made in the patient and healthy groups, impulsivity and non-suicidal self-harm attempts were not assessed, the majority of the study population was female and of young age, and sociodemographic variables were not included as covariance variables in the mediation analysis. Another limitation is the use of mediation analysis in a cross-sectional design, while this method is generally used in a longitudinal process to assess cause-effect relations. In order to overcome this limitation, Maxwell and Cole (37) recommended testing different models. Accordingly, in our study we examined models both with depressive symptoms as well as with anxiety sensitivity as mediating factors. Dissociative experiences correspond with hypoactivation in brain regions such as hippocampus, amygdala, insula, and anterior cingulate cortex as well as with increased activity in the prefrontal cortex (31). In order to illuminate this issue, it will be useful to investigate the intensity of dissociative symptoms in future long-term follow-up studies with BPD cases not only with subjective measurement instruments but also with functional imaging methods.

To conclude, dissociative experiences in BPD patients negatively affect clinical presentation and functionality, and in many cases can become chronic (38). Our study has demonstrated a mediating role for depressive symptoms and anxiety sensitivity in the relation between perceived stress level and dissociative experiences. Showing this mediating role may help prevent the occurrence of dissociative experiences by treating anxiety sensitivity and depressive symptoms.

In the light of these findings, it can be presumed that depressive symptoms and anxiety sensitivity will be guides in the clinical follow-up of patients with BPD.

Contribution Categories		Author Initials
Category 1	Concept/Design	M.E.D., L.T., S.C., K.U., C.Y.
	Data acquisition	M.E.D.
	Data analysis/Interpretation	L.T., M.E.D.
Category 2	Drafting manuscript	M.E.D., L.T., S.C., K.U., C.Y.
	Critical revision of manuscript	L.T., M.E.D.
Category 3	Final approval and accountability	M.E.D., L.T., S.C., K.U., C.Y.
Other	Technical or material support	L.T., M.E.D., C.Y.
	Supervision	L.T., M.E.D.

**Ethics Committee Approval:** Ethics committee approval for this study was granted by the Non-Interventional Clinical Research Ethics Committee of Cukurova University Medical Faculty (CUMF), decision no. 32 dated Sept. 4, 2019.

**Informed Consent:** Written informed consent was obtained from the patient.

**Peer-review:** Externally peer-reviewed.

**Conflict of Interest:** None declared.

**Financial Disclosure:** None declared.

## REFERENCES

1. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. Fifth ed., Washington, DC: American Psychiatric Association, 2013.
2. Ellison WD, Rosenstein LK, Morgan TA, Zimmerman M. Community and Clinical Epidemiology of Borderline Personality Disorder. *Psychiatr Clin North Am* 2018; 41:561-573.
3. Sar V, Akyuz G, Kugu N, Ozturk E, Ertem-Vehid H. Axis I dissociative disorder comorbidity in borderline personality disorder and reports of childhood trauma. *J Clin Psychiatry* 2006; 67:1583-1590.
4. Crowell SE, Beauchaine TP, Linehan MM. A biosocial developmental model of borderline personality: Elaborating and extending Linehan's theory. *Psychol Bull* 2009; 135:495-510.
5. Gratz KL, Tull MT, Gunderson JG. Preliminary data on the relationship between anxiety sensitivity and borderline personality disorder: the role of experiential avoidance. *J Psychiatr Res* 2008; 42:550-559.
6. Zanarini MC. Childhood experiences associated with the development of borderline personality disorder. *Psychiatr Clin North Am* 2000; 23:89-101.
7. Sturrock, BA, Francis A, Carr S. Avoidance of affect mediates the effect of invalidating childhood environments on borderline personality symptomatology in a non-clinical sample. *Clinical Psychologist* 2009; 13:41-51.
8. Skodol AE, Gunderson JG, Pfohl B, Widiger TA, Livesley WJ, Siever LJ. The borderline diagnosis I: psychopathology,

- comorbidity, and personality structure. *Biol Psychiatry* 2002; 51:936-950.
9. Atesci FC, Kuloglu M, Tezcan E, Yildiz M. Axis I and Axis II diagnoses in suicide attempters. *Klinik Psikiyatri* 2002; 5:22-27. (Turkish)
  10. Tas HI, Altinbas K. Comparison of the Emotion Regulation and Temperament Characteristics Between Depressive Patients With and Without Mixed Features. *Noro Psikiyatr Ars* 2019; 57:27-32.
  11. Sadock BJ, Sadock VA. *Clinical Psychiatry*. Aydin H, Bozkurt A (Translation Editor) Eleventh ed., Ankara: Gunes Kitabevi Ltd. Sti., 2005, 451-465. (Turkish)
  12. Stiglmayr CE, Ebner-Priemer UW, Bretz J, Behm R, Mohse M, Lammers CH, et al. Dissociative symptoms are positively related to stress in borderline personality disorder. *Acta Psychiatr Scand* 2008; 117:139-147.
  13. Korzekwa MI, Dell PF, Pain C. Dissociation and borderline personality disorder: an update for clinicians. *Curr Psychiatry Rep* 2009; 11:82-88.
  14. Beck AT, Steer RA. Internal consistencies of the original and revised Beck Depression Inventory. *J Clin Psychol* 1984; 40:1365-1367.
  15. Hisli N. A study on the validity of Beck Depression Inventory. *Turkish Journal of Psychology* 1988; 6:118-122.
  16. Reiss S, Peterson RA, Gursky DM, McNally RJ. Anxiety sensitivity, anxiety frequency and the prediction of fearfulness. *Behav Res Ther* 1986; 24:1-8.
  17. Taylor S, Zvolensky MJ, Cox BJ, Deacon B, Heimberg RG, Ledley DR, et al. Robust dimensions of anxiety sensitivity: development and initial validation of the Anxiety Sensitivity Index-3. *Psychol Assess* 2007; 19:176-188.
  18. Mantar A, Yemez B, Alkın T. The validity and reliability of the Turkish version of the anxiety sensitivity index-3. *Turk Psikiyatri Derg* 2010;21:225-234. (Turkish)
  19. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983; 24:385-396.
  20. Eskin M, Harlak H, Demirkiran F, Dereboy C. The adaptation of the Perceived Stress Scale into Turkish: a reliability and validity analysis. *New Symposium* 2013; 51:132-140. (Turkish)
  21. Bernstein EM, Putnam FW. Development, reliability, and validity of a dissociation scale. *J Nerv Ment Dis* 1986; 174:727-735.
  22. Sar V, Kundakci T, Kiziltan E. Validity and reliability of the Dissociative Experiences Scale (DES-II). 33<sup>rd</sup> National Psychiatry Congress, Presentation Book, 1997, 55-64. (Turkish)
  23. Thompson CG, Kim RS, Aloe AM, Becker BJ. Extracting the variance inflation factor and other multicollinearity diagnostics from typical regression results. *Basic Appl Soc Psych* 2017; 39:81-90.
  24. Tekin M, Tekin A. Dissociative Symptoms in Anxiety Disorders. *Current Approaches in Psychiatry* 2014; 6:330-339. (Turkish)
  25. Moritz S, Schilling L, Wingenfeld K, Köther U, Wittekind C, Terfehr K, et al. Psychotic-like cognitive biases in borderline personality disorder. *J Behav Ther Exp Psychiat* 2011; 42:349-354.
  26. Köhling J, Ehrental JC, Levy KN, Schauenburg H, Dinger U. Quality and severity of depression in borderline personality disorder: A systematic review and meta-analysis. *Clin Psychol Rev* 2015; 37:13-25.
  27. Demirkol ME, Tamam L, Namli Z, Karaytuğ MO, Uğur K. Association of Psychache and Alexithymia With Suicide in Patients With Schizophrenia. *J Nerv Ment Dis* 2019; 207:668-674.
  28. Lilienfeld SO, Penna S. Anxiety sensitivity: relations to psychopathy, DSM-IV personality disorder features, and personality traits. *J Anxiety Disord* 2001; 15:367-393.
  29. Bounoua N, Felton JF, Long K, Stadnik RD, Loya JM, MacPherson L, et al. Childhood emotional abuse and borderline personality features: The role of anxiety sensitivity among adolescents. *Personal Ment Health* 2015; 9:87-95.
  30. Janke EA, Jones E, Hopkins CM, Ruggieri M, Hruska A. Catastrophizing and anxiety sensitivity mediate the relationship between persistent pain and emotional eating. *Appetite* 2016; 103:64-71.
  31. Kleindienst N, Priebe K, Görg N, Dyer A, Steil R, Lyssenko L, et al. State dissociation moderates response to dialectical behavior therapy for posttraumatic stress disorder in women with and without borderline personality disorder. *Eur J Psychotraumatol* 2016; 7:30375.
  32. Cristea IA, Gentili C, Cotet CD, Palomba D, Barbui C, Cuijpers P. Efficacy of psychotherapies for borderline personality disorder: a systematic review and meta-analysis. *JAMA Psychiatry* 2017; 74:319-328.
  33. Sahin M. The concept of integrative psychotherapy. *Avrasya Sosyal ve Ekonomi Arastirmalari Dergisi* 2019; 6:147-165. (Turkish)
  34. Keough ME, Riccardi CJ, Timpano KR, Mitchell MA, Schmidt NB. Anxiety symptomatology: the association with distress tolerance and anxiety sensitivity. *Behav Ther* 2010; 41:567-574.
  35. Evren C, Cinar O, Evren B, Celik S. History of suicide attempt in male substance-dependent inpatients and relationship to borderline personality features, anger, hostility and aggression. *Psychiatry Res* 2011; 190:126-131.
  36. Semiz UB, Basoglu C, Ebrinc S, Ergun BM, Noyan CO, Cetin M. Body dysmorphic disorder, trauma, and dissociation in patients with borderline personality disorder: a preliminary study. *Bulletin of Clinical Psychopharmacology* 2005; 15:65-70.
  37. Maxwell SE, Cole DA. Bias in cross-sectional analyses of longitudinal mediation. *Psychol Methods* 2007; 12:23-44.
  38. Ross CA. Borderline personality disorder and dissociation. *J Trauma Dissociation* 2007; 8:71-80.