

# Designing and Testing a Model of Some Precedents and Outcomes of Borderline Personality Disorder in High School Students of Shiraz

Seyede Fateme Sajadi <sup>1,\*</sup>; Yadolla Zargar <sup>1</sup>; Mahnaz Mehrabizade Honarmand <sup>1</sup>; Nasrin Arshadi <sup>1</sup>

<sup>1</sup>Department of Psychology, Shahid Chamran University of Ahvaz, Ahvaz, IR Iran

\*Corresponding author: Seyede Fateme Sajadi, Department of Psychology, Shahid Chamran University of Ahvaz, Ahvaz, IR Iran. Tel: +98-9173046244, Fax: +98-7132306089, E-mail: f-sajadi@mscstu.scu.ac.ir

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**Background:** Borderline Personality Disorder (BPD) characterized by emotion dysregulation, disturbed interpersonal relationship, unstable sense of self, affect and behavior, is a severe disorder with a reported suicide rate 50 times the general population.

**Objectives:** The aim of this study was designing and testing a model for some antecedents and outcomes of borderline personality disorder.

**Patients and Methods:** In this research child's attitude toward father and mother, early trauma, alexithymia, schema, dissociation experiences, and emotional regulation were considered as precedents of borderline personality disorder, along with associated outcomes including active addiction potential, passive addiction potential, suicide ideation and educational performance. The sample consisted of 300 high school students of Shiraz that selected via multistage random sampling. Data were collected by Borderline Personality Features Scale for Children, Early Trauma Inventory, Young's schema questionnaire-short form, Dissociative Experience Scale, Child's Attitude toward Father (CAF) and Mother (CAM) Scales, Toronto Alexithymia Scale, Difficulties in Emotion Regulation Scale (DERS), Iranian Addiction Potential Scale (IAPS), and Beck Suicide ideation Scale. Structural Equation Modeling (SEM) through AMOS 18 and SPSS 18 were used for data analysis.

**Results:** Results suggested that model with some modification had good fit with the data. Also 2 out of 15 direct paths (the child's attitude toward father and child's attitude toward mother to emotional regulation) were not significant and thus omitted from the model. All the indirect hypotheses of model were confirmed.

**Conclusions:** Alexithymia is correlated with all aspects of emotion dysregulation including impulsivity, negative affect, and difficulty in engaging goal-oriented behaviors and lack of skills for managing strong emotions. BPD or alexithymia patients have difficulties also in engaging cognitive reappraisal.

**Keywords:** Borderline Personality Disorder; Child's Attitude Toward Father and Mother; Early Trauma; Suicide Ideation; Addiction Potential; Affective Symptoms; Self-Evaluation Programs

## 1. Background

Borderline Personality Disorder (BPD) characterized by emotion dysregulation, disturbed interpersonal relationship (1), unstable sense of self, affect and behavior (2), is a severe disorder with a reported suicide rate 50 times the general population (3). The etiology of this disorder, involves genetic factors, early trauma, dysfunctional parent-child interactions (4), early maladaptive schema, dissociation (5) as well as emotion dysregulation (6).

The family environment is among the pernicious factors that can cause Borderline Personality Disorder (BPD), which may emanate from the parental relationship situated between the two attachments and detachment extremes (7), or from unstable and dysregulated relations with the caregivers (4). Obstruction of normal child development, particularly during the crucial rapprochement age (16 to 25 months) may hinder the formation

of constant and independent identity, which is considered as the prominent symptom of BPD (7). A mismatch between parental rearing behavior and child intrinsic temperament may also lead to the early development of maladaptive schemas. Trait-like maladaptive schema are a set of internal working models and coping responses that preserve itself through cognitive deficiency, self-defeating life patterns and poor coping strategies that result in psychological and personality disorders (8). These maladaptive schemas root from early trauma or toxic experiences (5), and studies show that 87% of BPD patients have experienced various trauma including neglect and sexual (26%), physical (46%), emotional and verbal (72%) abuses particularly between ages of 6 and 12 years (9, 10).

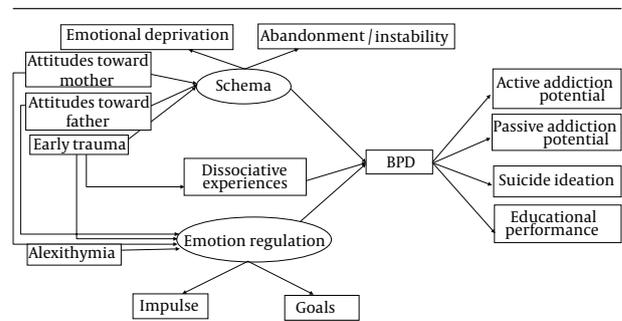
Traumatic experiences and intensive psychological tensions lead to activation of dissociative patterns (11). In

other words, dissociation is emotional adaptation following traumatic events (12) owing to dissociative experiences that involve detachment from the irritating emotional content of the trauma. Since trauma-related dissociation is a conditioned way for emotion regulation and adaptations to severe early traumatic events, it becomes automatized and pervasive in response even to minor stressors interfering with the emotional information processing (13-15). Like dissociation, alexithymia is another coping strategy which is used to ameliorate painful emotions. Alexithymia is multi-faceted personality construct namely difficulties in identifying and expressing feelings and externally oriented thinking. The link between alexithymia and BPD suggests that patients involved have difficulty in identifying, differentiating and understanding emotions that impairs the ability for emotion regulation (16). A common impairment in BPD and individuals with alexithymia is emotion dysregulation which is known by impulsiveness, experiencing intense negative emotion managed by limited skills (17). Most of the dysfunctional impulsive behavior which is prevalent in BPD, including self-harm, substance abuse, and aggressive behaviors toward others, are deemed as maladaptive attempts to decrease or avoid intense negative emotions. Individuals with BPD habitually attend to negative stimuli, have inappropriate access to negative memories, endorse a wide range of negative beliefs about themselves, the world and the others, and holding negatively biased interpretations and evaluations about neutral or ambiguous stimuli (18).

Poor educational performance (19), high risk behaviors such as substance abuse (20); and suicide (21) can be the consequences of BPD. Despite the fact that many BPD patients are intelligent and creative, they seldom succeed in developing their talents and often their education is incomplete and remain unemployed (19). The association between BPD and substance abuse is not very surprising as both have emotional instability, negative emotion oriented, impulsiveness (22) as well as interpersonal problems (23). Emotional instability, fear of abandonment (24), impulsivity and aggressive behavior in combination with oversensitivity toward trivial life events (21) are underlying causes of suicidal tendencies and self-harm behaviors in BPD patients.

## 2. Objectives

The primary purpose of this study was to examine a model of precedents and outcomes of borderline personality disorders in adolescents, as a hypothesized model illustrated in Figure 1. In this model circles represent latent variables and rectangles indicate measured variables. It was hypothesized that attitudes toward father and mother and early trauma indirectly predict BPD via schema that include latent variable with two indicators of "emotional deprivation" and "abandonment/instability"; early trauma indirectly predicting BPD via dissociative experiences; attitudes toward father and mother, early



**Figure 1.** Proposed Structural Equation Modeling (SEM) of Precedents and Outcomes of BPD

trauma and alexithymia indirectly predicting BPD via emotion regulation (latent variable with two indicators including "impulse control difficulties" and "difficulties engaging in goal-directed behavior"); and BPD directly predicting active and passive addiction potential, suicide ideation and educational performance.

## 3. Patients and Methods

This is a correlational study via Structural Equation Modeling (SEM), which is a general linear model testing a collection of regression equations. Structural equation modeling through AMOS 18 and SPSS 18 were used for data analysis.

### 3.1. Participants

This study was a questionnaire-based survey conducted on the first, second and third grade high school students from four regions in Shiraz, in academic year 2013 - 2014 which is comparable to the Iranian year 1392 - 1393. The sample included 300 students including 150 males and 150 females chosen by multistage sampling. First, two girl's schools and two boy's schools were chosen, followed by selecting two classes from each school. Finally half of the students of each class were then chosen to answer the questionnaire. All foregoing selections were carried out in random fashion. The participants aged between 14 to 18 years, with Mean  $15.72 \pm 0.99$  SD. Of participants, 45%, 41%, and 14% were in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> grades of high school, respectively. The average CGPA (Cumulative Grade Point Average) of sample was  $17.14 \pm 1.92$  SD.

### 3.2. Instruments

In this research all the variables were assessed by self-reporting questionnaire, but educational performance was evaluated by student's educational average score. Each participant filled out the following 9 questionnaires:

#### 3.2.1. Borderline Personality Features Scale for Children (BPFS-C: Crick, Murray-Close, and Woods, 2005)

This is a 24-item self-report questionnaire that assesses borderline personality features among children

and adolescents aged from 9 to 17 (25). This measure was adopted from the BPD scale of the Personality Assessments Inventory (PAI; Morey, 1991), modified for use with youth. BPFs-C is scored on 5-point Likert scale with responses ranging from 1 “not at all true” to 5 “always true” to evaluate affective instability, identity problems, and negative relationships and self-harm (26). After reverse-scoring of four responses, individual item scores for each of the 22-items are summed to yield a total score. Higher scores indicate greater levels of borderline personality features. The optimal cut-off score was 66 for the BPFs-C ( $Se = 0.856$ ;  $Sp = 0.840$ ) (27). The BPFs-C has shown good internal consistency across 12 months study by Crick et al. (25), done on a sample of 400 students aged from 10 to 12, ( $\alpha > 0.76$ ) as well as criterion validity (27) and construct validity (25). Prior research in Iran examining the 22-item instruments with a large community sample ( $n = 400$ ) of boys and girls in high school showed high consistency ( $\alpha > 0.84$ ) (28). In the current study, Cronbach's  $\alpha$  was 0.83.

### 3.2.2. Child's Attitude toward Parents (CAP: Hudson, 1992)

This is a 50-items self-report scale (25-items for assessing the severity of a child's problem with mother and 25-items for assessing child's problem with the father) that measures the severity of problems in the child-parents relationship from the child's point of view. The items are scored on a 7-point Likert scale ranging from 1 (rarely or none of them) to 7 (most or all the time). Items are both positively and negatively worded to reduce response bias, where the positive items are reverse scored. High score is the indicator of severe problem in the child-parent relationship (29). Cronbach's  $\alpha$  of the scale range between 0.93 and 0.97 (30). Cronbach's  $\alpha$  in the Iranian sample was 0.85 (31) and in the current study was 0.75.

### 3.2.3. Toronto Alexithymia Scale (TAS-20)

This is a self-descriptive scale including 20-item statements. Each participant was rated using a five-point Likert scale including 5-point (strongly disagree to strongly agree) Likert Scale. The TAS-20 comprises three dimensions so called Difficulty Identifying Feelings (DIF), Difficulty Describing Feeling (DDF), and External Oriented Thinking style (EOT) (16), that has been shown to have good psychometric properties. The internal consistency ( $\alpha$ ) of DIF, DDF, and EOT subscales were 0.83, 0.77, and 0.73, respectively, with the TAS-20 total score being  $\alpha = 0.82$  (32). Cronbach's  $\alpha$  in Iranian sample was 0.85 for total scale and 0.82, 0.75 and 0.72 for DIF, DEF and EOT, respectively (33). In current study Cronbach's  $\alpha$  was 0.95 for total scale and 0.75, 0.54 and 0.40 for DDF, DIF and EOT, respectively.

### 3.2.4. Early Trauma Inventory (ETI; Mehrabizade et al. 2011)

ETI has 23-items, investigating traumas before age of 18. Participants are asked to answer Yes/No to each item, scoring 1 for Yes and 0 for No. Total score varies from 0 to 23. Adequate psychometric properties have been demonstrated for the scale in large samples; Mehrabizade et al. (34) reported Cronbach's  $\alpha < 0.89$  ( $n = 120$ ) and Cronbach's  $\alpha > 0.91$  to 0.93 ( $n = 180$ ). In current study, reliability using Cronbach's  $\alpha$  was 0.71 and half-split was 0.64. The validity was correlated with a 10-score question, 0 (never) to 10 (always). Correlation coefficient was 0.50 ( $P < 0.001$ ).

### 3.2.5. The Young Schema Questionnaire, Short-Form (YSQ-SF)

This is referred to by Young and Brown in 1990, and includes 75-item self-report questionnaire that evaluates 15 early maladaptive schemas belonging to five schema domains as postulated by Young et al. (35). Each item is formulated as a negative belief about self and rated on 6-point Likert scale (1 = completely untrue of me, 6 = completely describes me). An individual schema score is obtained by averaging scores on the five items in each schema. The Iranian translation of the YSQ-short form (36) demonstrates good psychometric properties. In the current study abandonment/instability and emotional deprivation were the 2 sub-scales, related to borderline personality features that were studied and Cronbach's  $\alpha$  for each was 0.72 and 0.75, respectively.

### 3.2.6. Dissociative Experience Scale (DES: Bernstein and Putnam, 1986)

This is a 28-item self-report measure with a 10-point scale ranging from “never” (0%), to “always” (100%). Each item describes a kind of experience that the subjects may have had. Studies showed that grades higher than 15 need more investigation to diagnose dissociation, a score higher than 30 indicates high probability of dissociative disorders and Post traumatic stress disorder, and scores over 40 express high probability of dissociative identity disorder (37). Factor analysis has revealed three factor structures and these subscales can be scored separately (38), including amnesic dissociation (e.g. finding new objects in your stuff that you don't remember buying), depersonalization and derealization (e.g. feeling that your body does not belong to you) and imaginative involvement (e.g. being in a familiar place but assigning as strange) (39). Construct validity studies have been reported by Frischholz et al. (40), that indicate good concurrent and criterion related validity. Olsen and Beck (12) reported high internal consistency of DES with a Cronbach's  $\alpha$  of 0.7. Cronbach's  $\alpha$  in Iranian sample was 0.96 (37). In current study Cronbach's  $\alpha$  was 0.92.

### 3.2.7. Difficulties in Emotion Regulation Strategies Scale (DERS: Gratz and Roemer, 2004)

The DERS consists of 36 items that are rated on a 5-Likert scale, ranging from 1 indicating almost never, (0 - 10%), 2 sometimes (11 - 35%), 3 about half the time (36 - 65%), 4 most of the time (66 - 90%) and 5 almost always (91 - 100%). A higher score indicates higher difficulties in emotion regulation. DERS provides a comprehensive assessment of difficulties in emotion regulation, including non-acceptance, difficulty in engaging Goal-oriented behaviors (Goals), impulse controlling difficulties (Impulse), lack of emotional awareness (Aware), limited access to emotion-regulation strategies (Strategies) and lack of emotional clarity (clarity). Prior research examining this instrument with a clinical community sample ( $n = 111$ ) of boys and girls demonstrated high internal consistency ( $\alpha > 0.86$ ), (41). In Iranian sample, this scale has shown good internal consistency ( $\alpha > 0.86$ ), (37). In the current study, 2 sub-scales used were difficulties engaging in goal-directed behavior (goals) and impulse control difficulties (impulse), assumed to be indicating borderline personality feature. Cronbach's  $\alpha$  for each was 0.76 and 0.67 respectively.

### 3.2.8. Iranian Addiction Potential Scale (IAPS: Zargar, 2006)

IAPS is a self-report measure, evaluating susceptibility or vulnerability toward substance abuse in individuals abusing or not currently abusing. The measure contains 36 items, each scored on a four-point scale (0 = completely disagree to 3 = completely agree) plus 5 lie detector statement reversely scored. IAPS assesses 2 factors, active potential (28-items) and passive potential (9-items). The scale showed high internal consistency in prior research (Cronbach's  $\alpha > 0.90$ ; Cronbach's  $\alpha$  for active potential  $> 0.91$ ; Cronbach's  $\alpha$  for passive potential  $> 0.75$ ) (42). Zargar and Ghaffari (43) also reported good psychometric properties for total scale (Cronbach's  $\alpha > 0.90$ ; 0.91 and 0.75 for active and passive potential, respectively). In current study Cronbach's  $\alpha$  for total scale, active and passive potential were 0.87, 0.85 and 0.70, respectively.

### 3.2.9. Scale for Suicide Ideation (SSI; Beck et al. 1979)

SSI is a 19-item self-report questionnaire designed to measure severity of attitude, behaviors and plans to complete suicide. It assesses death wish, active/inactive tendency to suicide, length and plentitude of suicidal thoughts, self-control, inhibitors and readiness to commit suicide (44). The items are scored on a 3-point scale from 0 to 2. The total score may vary from 0 to 38, with higher scores indicating more intense levels of suicidal ideation (45). The SSI has demonstrated good psychometric properties for psychiatric outpatients (46). Another study (47) reported high internal consistency of SSI with Cronbach's  $\alpha = 0.89$ . In the current sample Cronbach's  $\alpha$  was 0.9.

## 4. Results

Descriptive statistics and correlation matrix for the variables are shown in Table 1.

According to the data presented in Table 1, the Mean  $\pm$  (SD) scores of the sample ( $n = 300$ ) on variables of borderline personality features was 58.983  $\pm$  1.244, early trauma 5.54  $\pm$  3.40, schema 33.023  $\pm$  9.861, alexithymia 59.153  $\pm$  9.959, child's attitude toward mother 84.290  $\pm$  11.916, child's attitude toward father 84.233  $\pm$  12.425, emotion regulation 23.833  $\pm$  8.910, dissociative experiences 30.233  $\pm$  1.649, addiction potential 36.48  $\pm$  12.54, suicidal ideation 5.296  $\pm$  6.412 and educational performance 17.139  $\pm$  1.932. As expected, borderline personality features were positively associated with trauma experience, maladaptive schema, alexithymia, child's attitude toward parents, emotion dysregulation, dissociative experience, addiction potential and suicidal ideation, but there was no significant relationship between borderline personality features and educational performance.

Model fit was evaluated based on six indicators including the Root Mean Square of Approximation (RMSEA), Normed Fit Index (NFI), Comparative Fit Index (CFI), Goodness of Fit Index (GFI), Adjusted Goodness of Fit Index (AGFI), Incremental Fit index (IFI), (Table 2). RMSEA fit indices of zero are considered a perfect fit and values less than 0.05 are considered a close fit. CFI and NFI values range from zero to one, with one representing a perfect fit. Values above 0.90 are considered to be excellent (48).

As seen in Table 2, the results based on the hypothesized model ( $\chi^2 = 349.14$ ,  $P < 0.001$ ; RMSEA = 0.1, CFI = 0.76, NFI = 0.73, AGFI = 0.74) are indicative of adequate initial model fit. Despite this proper fit, post-hoc model modifications were performed to develop a better fitting model by excluding two insignificant paths (attitudes toward father to emotion regulation, attitudes toward mother to emotion regulation), characterized by  $\chi^2 = 353.48$ ,  $P < 0.001$ ; RMSEA = 0.1, CFI = 0.76, NFI = 0.73, and AGFI = 0.75. The best fit to the data was obtained in the final model that two paths errors (suicide ideation to active addiction potential and dissociative experiences emotion regulation) was correlated,  $\chi^2 = 229.61$ ,  $P < 0.001$ ; RMSEA = 0.07, CFI = 0.90, NFI = 0.85, AGFI = 0.84. The final model represents a direct effect of maladaptive schemas, dissociative experiences and emotion dysregulation on borderline personality features, the direct effect of borderline personality features on active and passive addiction potential, suicide ideation and educational performances and indirect effect of early trauma, attitudes toward parents and alexithymia on borderline personality features (Figure 2).

Indirect effects were tested by bias-corrected bootstrapped confidence intervals (49). These indicated significant indirect effects of attitudes toward father on BPF via schema (boot = 0.11), significant indirect effects of attitudes toward mother on BPF via schema (boot = 0.12), significant indirect effects of early trauma on BPF via schema (boot = 0.41), dissociative experiences (boot = 0.21), and emotional regulation (boot = 0.34). Alexithymia also had the significant indirect effect on BPF via emotion regulation (boot = 0.18).

**Table 1.** Correlation Matrix and Descriptive Statistics for Research Variables<sup>a</sup>

Variables	1	2	3	4	5	6	7	8	9	10	11	12
<b>Borderline personality features</b>	-											
<b>Early trauma</b>	0.40	-										
<b>Schema</b>	0.57	0.31	-									
<b>Alexithymia</b>	0.46	0.16	0.42	-								
<b>Childs attitude toward mother</b>	0.34	0.35	0.30	0.17	-							
<b>Childs attitude toward father</b>	0.36	0.42	0.28	0.27	0.45	-						
<b>Emotion regulation</b>	0.53	0.34	0.36	0.34	0.20	0.28	-					
<b>Dissociative experiences</b>	0.46	0.32	0.34	0.31	0.20	0.23	0.42	-				
<b>Active addiction potential</b>	0.58	0.50	0.42	0.28	0.35	0.35	0.47	0.35	-			
<b>Passive addiction potential</b>	0.60	0.35	0.52	0.42	0.31	0.31	0.42	0.42	0.55	-		
<b>Suicidal ideation</b>	0.45	0.39	0.37	0.23	0.27	0.26	0.30	0.27	0.51	0.40	-	
<b>Educational performance</b>	0.10	0.12	0.12	-0.01	0.11	0.05	0.03	-0.08	-0.05	-0.08	-0.15	-
<b>Mean</b>	58.98	5.55	33.02	59.15	84.29	84.23	23.83	30.23	18.07	14.21	5.29	17.13
<b>SD</b>	1.244	3.42	9.86	9.95	11.91	12.42	8.91	1.649	11.53	4.92	6.41	1.93
<b>Range</b>	31-98	0-17	10-58	31-88	51-122	57-137	4-44	36-77	0-59	1-27	0-34	10-20

<sup>a</sup> N = 300, P = 0.004 = 0.05 (Because of the large number of comparisons the bonferroni correction was used to adjust the significance level).

**Table 2.** Hypothesized, Modified and Final SEM Model Fit Based on Fit Indicators

Fit Indicators	$\chi^2$	df	$\chi^2/df$	GFI	AGFI	IFI	CFI	NFI	RMSEA
<b>Hypothesized model</b>	349.14	66	5.290	0.84	0.74	0.77	0.76	0.73	0.1
<b>Modified model</b>	353.48	68	5.198	0.83	0.75	0.77	0.76	0.73	0.1
<b>Final model</b>	229.61	66	3.479	0.90	0.84	0.90	0.90	0.85	0.07

## 5. Discussion

The purpose of this study was to clarify the roles of remembered precedents (child's attitude toward father and mother, early trauma, alexithymia with a mediating role of schema, dissociation and emotion regulation) and outcomes (active/passive addiction potential, suicide ideation and educational performance) of BPD in adolescents. Structural Equation Modeling (SEM) revealed significant adequate fit for the theoretical model and all the paths in modified model. All of relations found in the present study were consistent with those of previous studies but, to our knowledge this study was the first to investigate operational and comprehensive model investigating all these relations simultaneously.

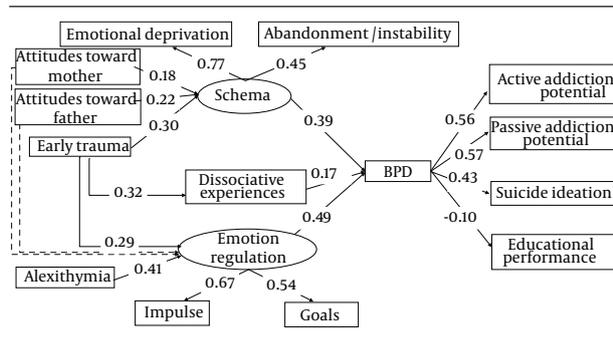
The results point to the indirect roles of attitudes toward father and mother on BPD through developing maladaptive schemas (consistent with Thimm (8); Lobbestael et al. (50)); indirect roles of early trauma on BPD via developing maladaptive schema (consistent with Cecero et al. (51); Sempertegui (52)), dissociation (consistent with Stiglmayr et al., (11); Gunderson et al. (53) and emotional dysregulation (consistent with Gaher et al. (49); Gratz et al. (54)); and indirect role of alexithymia on BPD through emotional dysregulation (consistent with Ridings (55);

Webb and McMurran (17)). Support was also obtained for the hypothesis that BPD has a direct relation with addiction potential (consistent with Evren et al. (16); Trull et al. (23)), suicide ideation (Consistent with LeGris et al., (56); Ruth et al. (57)) and low educational performance (consistent with Proche et al (58); Trull et al. (59)).

Young assert that four schema modes are central to BPD. These include the Detached Protector, the Angry and Impulsive Child, the Abandoned Child and the Punitive Parent (Lobbestael et al. 2005), but according to another study (2000) introduced only Punitive Parents to highlight the parental role on developing maladaptive schemas in BPD patients. When individuals with BPD find themselves in the Punitive Parent mode, they become afraid if he/she did something wrong, see him/herself worthless because of activated feelings (50). More specifically, rejection from both parents and less emotional warmth from mother were significantly related to cluster B personality pathology such as BPD. The Disconnection/Rejection, Other direct Directedness, and Vigilance and Over-Inhibition schema domains were associated with less maternal emotional warmth (8). When BPD patients find themselves in the abandoned and abused

child mode, they feel

**Figure 2.** Final SEM Model



(N = 300). All values are standardized coefficients. The dotted lines represent the two excluded paths ( $P < 0.001$ ).

enormous pain and fear of abandonment evoked by their traumatic history expressed in depressive, desperate, fearful, inferiority emotions (50), and suicide. While the important others is needed for self-coherence, abandonment means the reinternalization of the unbearable strange self-image, and consequent self-destruction. Suicide deputize the fantasized destruction of this strange others within the self. Suicide attempts are often aimed at obviating the possibility of abandonment or a last attempt at re-establishing a relationship. The child's experience may have been that only something extreme would causes changes in the adult's behavior, and that their parents used similarly compulsive methods to influence them (60).

The effect of early trauma on BPD reflect in the form of emotion dysregulation, physiological arousal, lack of reflective capacity and dissociation that leads to impulsivity, self-harm, disturbed interpersonal relationship, conductive problems and substance abuse (61, 62). Trauma, in the form of sexual abuse, is also strongly associated with self-harm in BPD patients (63). Self-destructive behaviors such as cutting are often experienced as painless at the time, suggesting that it takes place in a dissociated state. In this case, dissociation used as a coping strategy in the childhood assault stress (64). Traumatic stress may also disturb information processing which leads to unpleasant psychiatric and behavioral outcomes that create obstacles to successful educational performance. Low educational performance due to poor concentration is one of the BPD features, reflecting information processing disturbance that originate from traumatic events (58).

In line with previous studies BPD may be associated with alexithymia since emotional dysregulation is a core feature of BPD. This inability to identify emotions contributes to the incapability to regulate affect. Alexithymia is correlated with all aspects of emotion dysregulation including impulsivity, negative affect, and difficulty in engaging goal-oriented behaviors and lack of skills for managing strong emotions. BPD or alexithymia patients have difficulties also in engaging cognitive reappraisal.

In other words, it is likely that these individuals are incapable of mentally reframing negative situations to positive outcome. Therefore, these patients tend to experience a wide range of negative emotions due to their limited capacity to turn a negative situation into a more positive event, and it may be very difficult for them to control their emotions (55).

BPD can also cause or lead to substance abuse or vice versa, because substance abuse is associated with the affective instability, impulsivity and interpersonal problems. So that one condition may be the consequence of the others, For example, excessive alcohol consumption may result in serotonin reduction that, in turn, can lead to impulsive and self-destructive behaviors. It is assumed that individuals with a neurobiological vulnerability to BPD might be disposed to the neuropharmacological sequelae of substance abuse. On the other hand, BPD patients might turn to psychoactive substance users in order to self-medicate, overcome affective disturbance or to cope with feelings of emptiness or abandonment; in this case, BPD might influence the development of substance abuse (23).

Several limitations of our study should be acknowledged. Firstly, our sample was restricted to high school students (nonclinical sample). The results of this study need to be confirmed using larger groups and clinical samples and extrapolated to other age groups. Secondly, the study involved solely self-report data to assess the model, where the nature of our assessments introduces the possibility of self-report bias. Future research would benefit from a more expanded use of behavioral, biological, and/or psychophysiological measures of the key constructs of our investigation. More studies are warranted to address these limitations and more fully examine the foregoing relationships. Also more attention should be paid to the demographical variables such as sex, social and economic class that may help extend generalizability of findings.

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## Authors' Contributions

Seyede Fateme Sajadi "Acquisition of data, administrative, technical, material support and drafting of the manuscript". Yadolla Zargar "study supervision, concept and design". Mahnaz Mehrabizade Honarmand "Critical revision of the manuscript for important intellectual content". Nasrin Arshadi "Statistical analysis and interpretation of data".

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