Research Article

Structural Model of Ego Strength and its Relationship with Borderline Personality Traits in Adolescents

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Abstract

This study aimed to evaluate the structural model of ego strength and its relationship with borderline personality Traits in adolescents, focusing on the mediating roles of defense mechanisms and sensation-seeking. The research used a descriptive-correlational design with structural equation modeling (SEM). The population included adoles- cents aged 15 to 19 studying in Khorramabad, Iran, during the 2022–2023 academic year. A convenience sampling method was applied, and the sample size was set at 200 participants based on Müller's formula. The study uti- lized the Borderline Personality Features Scale for Children (BPFS-C), the Psychosocial Inventory of Ego Strength (PIES), Andrews et al.'s Defense Mechanism Questionnaire, and Arnett's Sensation-Seeking Scale to measure the variables. Data were analyzed using SPSS-26 and PLS software through structural equation modeling. The findings revealed that the proposed structural model achieved an acceptable fit. Ego strength had a significant direct effect on borderline personality traits (P 0.001). Moreover, sensation-seeking and defense mechanisms mediated the rela- tionship between ego strength and borderline personality traits (P 0.001). These results indicate that ego strength, sensation seeking, and defense mechanisms play crucial roles in borderline personality traits. Understanding these factors can help design effective adolescent prevention programs and therapeutic interventions.

Keywords: Ego strength; Borderline Personality Disorder; Defense Mechanisms; Sensation Seeking; Adolescents

Abbreviations

BPD: Borderline Personality Disorder; BPFS-C: Borderline Personality Features Scale for Children; PIES: Psychosocial Inventory of Ego-Strengths; DMQ: Defense Mechanisms Questionnaire; AISS: Arnett Inventory of Sensation-Seeking; SPSS: Statistical Package for the Social Sciences; PLS: Partial Least Squares; DSM-IV: Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition.

Introduction

Adolescence is a structural change in cognitive, social, and brain [1]. This is a vital stage in assembling knowledge, learning to manage emotions, and developing skills for adulthood [2]. Thus, forming a structure of identity could be a basis for social interactions for adolescents and might affect an individual's life [3]. Sometimes, adolescents suffer from mental disorders and show the first symptoms [4]. According to research, 20% to 25% of adolescents deal with mental disorders [5]. Therefore, the mental health of adolescents and young people is a significant public health issue, having both social and economic impacts globally [6].

One of the mental disorders of this era is Borderline Personality Disorder (BPD) [7]. Nowadays, the focus on adolescence and early adulthood has increased because it is considered the beginning of BPD [8]. BPD is associated with social instability and behavioral and emotional distress and affects 1% to 3% of adolescents [9]. Genetic factors or unpleasant childhood experiences might disturb emotion regulation and impulsivity, causing inefficient behaviors and psychosocial challenges. This may strengthen the dysfunction of emotional regulation and impulsivity [10]. The family and friends of people with BPD report distress, unpleasant caring, an environment filled with negative emotions, criticism, and being overly emotional [11]. According to the cumulative prevalence rate, 1.4% of adolescents show criteria for this disorder till age 16, and this increases at age 22 to 3.2% [12]. BPD affects 11%-22% of adolescent outpatients [13]. According to the analytic approach, the functional weakness of the Ego may cause mental disorders [14]. BPD has a negative and significant relation with ego strength [15]. In the psychoanalytic approach and Freud's structural model, the Ego is a part of the mind that manages perception, thinking, decision-making, managing emotional issues, satisfying conflicting drives, and stabilizing identity coherence despite constant internal conflicts.

Ego strength refers to the individual's ability to manage between id drives, the superego, and external reality. If the Ego loses balance, personality disturbances can result. In other words, the weaker the Ego is, the more unbalanced the personality becomes, resulting in mental disorder. On the other hand, when the Ego is strengthened, a person can overcome and solve problems and tolerate stress without mental breakdown [16]. Ego strength shows successful performance [17], described as Adaptive Capacity and Situational Control [18]. Ego strength is the active quality that creates energy for people throughout

life. It reflects a strong inner core, leading to commitments to ideals, beliefs, essential others, and the wider community. The epigenetic principle states that all sorts of ego strengths exist in life, but each acts positively toward resolving the psychosocial crisis associated with itself [19].

The defense mechanism is another variable associated with BPD [20]. The defense mechanism is defined as a reaction to emotional conflicts or external challenges, working to justify the desires, motivations, and inner needs with the reality and decreasing negative emotions (distress, anxiety, insecurity, fear, etc.) related to perilous, emotional, or threatening events [20]. The empirical view considers mental defense as a characteristic of the disorder or a result of treatment and to adapt the person to the environment. Also, from a psychodynamic point of view, it is considered a fundamental mechanism of change [21]. Thirty defense mechanisms with specific definitions and functions help determine individual defensive styles. Defense mechanisms are structured hierarchically in seven adaptive levels ranging from the least mature to the most mature [22]. At the more immature levels, defenses cause distortions and emotion suppressions, while at more adaptive levels, defenses are associated with awareness of feelings and ideas, resulting in satisfaction and flexibility [23]. Immature defense mechanisms are related to various levels of severe psychological functions and psychological pathology, especially Personality Disorders. Contrarily, mature defense mechanisms are linked to physical and mental health and enhanced adaptability [20]. These mechanisms can be categorized as conscious or unconscious, intentional or unintentional, situational or hierarchical. Besides, they have mental and physical health implications or pathology [24]. Defense mechanisms are also classified by maturity levels and adaptive values, which can lead to physical and psychological outcomes [25].

Research has proved that BPD is also related to sensation-seeking [26]. Sensation-seeking includes extensive concepts and was introduced by Hans Eysenck. Zuckerman defined sensation-seeking as the need for different, new, complex, difficult emotions and experiences and risk-taking willingness in physical, social, and financial subjects. Four factors are identified for determining sensation-seeking: danger-seeking or adventure, which is a willingness to engage in dangerous physical activities like speed. Second, experience-seeking: seeking new experiences like travel, music, art, and personal lifestyles. Third, disinhibition: the need to explore and release in social activities, lack of inhibitions in alcohol consumption, sensitivity to monotony, boredom, repetitive experience, and daily tasks, or engaging in repetitive interactions with predictable individuals, and they get dissatisfied when facing these situations [27].

Previous research studied the treatment and causes of BPD. Iranian and international studies also pointed to physical, cultural, psychological, and environmental factors as profound and practical causes of BPD. However, fewer studies focused on the structural effect of ego strength. For example, Roshan et al. [28] worked on predicting cluster B personality disorders based on the Zuckerman-Kohlman alternative five-factor model and ego strength. Yet, psychological factors in this field should be studied. This research aims to study research gaps in this field. Exploring these variables in this form: determining the goodness of fit of the Ego Strength structure model

in Borderline Personality Traits of adolescents with the mediating role of Defense Mechanisms and Sensation-Seeking has not been done before; this research is a novel work that collects variables together as a model for borderline personality disorder.

Methodology

This study aimed to determine the goodness of fit of the Ego Strength structure model in Borderline Personality Traits of adolescents with the mediating role of Defense Mechanisms and Sensation-Seeking.

Statistical Population, Sampling Method and Sample Size

The statistical population includes adolescents aged 15 to 19 studying in Khorramabad city of IRAN in 2022-2023. Initially, the necessary permits were obtained from the education department of Khorramabad city. Schools were chosen through a random sampling, and questionnaires were given to volunteer participants. Determining an appropriate minimum sample size is crucial for effective data collection in structural equation modeling; because of that, the Müller method (1996) was used in this research. The sample size ratio to the parameter was used to determine the sample size in structural equations. The minimum ratio is 5 to 1, the average is 10 to 1, and the maximum is 20 to 1 [29].

We examined 15 parameters with 200 participants selected via a non-random convenience sampling method. Also, Kline (2010) believes the minimum sample size of 200 people is defendable. The inclusion criteria for the research are: first, aging between 15 and 19 years old; Second, willingness and consent for entering the project. Exclusion criteria for this research were: first, being addicted to any drugs; Second, the presence of other psychological disorders; Third, distorted or incomplete information. Samples were assured that information would remain confidential, and we used a code instead of a name so that people could get the results with the code if they wished.

Materials

Crick's Borderline Personality Features Scale for Children (BPFS-C)

Psychosocial Inventory of Ego-Strengths (PIES), Defense Mechanisms Questionnaire (DMQ), and Arnett Inventory of Sensation-Seeking (AISS) were used in this research.

Crick's Borderline Personality Scale (BPFS-C)

The borderline personality questionnaire was designed by Crick in 2005. This scale is a validated and reliable 24-item self-report scale that measures borderline personality traits according to DSM-IV. The questionnaire has four subscales, and the scoring system is based on a 5-point Likert scale of one to five. The internal consistency validity of this scale was 76% [30]. Also, Sharp et al. reported a reliability with Cronbach's alpha of 90% [31]. The questionnaire was standardized among Iranian adolescents, and Cronbach's alpha in Iranian research was 0.84 on the whole scale. The subscales of emotional instability, identity problems, negative relationships, and self-injury are 0.78, 0.77, 0.77, and 0.76, respectively. The confirmatory factor analysis results indicate an accepted goodness of fit of the four-factor structure of the scale [32].

Psychosocial Inventory of Ego-Strengths (PIES)

Markstrom et al. (1997) created this questionnaire with 64 questions that measure eight features such as hope, will, purpose, competence, fidelity, love, care, and wisdom with a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). They checked validity and reliability and confirmed the face, content, and construct validity, and using Cronbach's Coefficient Alpha, they reported its reliability as 0.68 [33]. According to Altafi, Cronbach's alpha on an Iranian sample was 0.91, and its split-half reliability was 0.77 [34]. In the study of Parviz et al., the face and content validity of this questionnaire was confirmed [35].

Defense Mechanisms Questionnaire (DMQ)

Andrews, Singh, and Bond designed this questionnaire in 1993. It measures 20 defense mechanisms based on three defensive styles: mature, neurotic, and immature, with 40 questions. It is based on a 9-point Likert scale from (strongly agree) to (strongly disagree). Ranjbari et al. reported Cronbach's alpha of mature, neurotic, and immature defense styles as 0.75, 0.73, and 0.74, respectively, and the test-retest reliability coefficient with a 4-week interval was 0.82 [36].

Arnett Inventory of Sensation-Seeking (AISS)

Arnett developed this scale in 1993 to avoid the limitations of Zuckerman's fifth form. And to discover the relationship between sensation seeking and the need for novelty and intensity as two sub-axis. This scale has 20 items and two subscales: desire for novelty and intensity of the sensory experience. It is based on a 4-point Likert scale from 1 (does not describe me) to 4 (describes me very well). In Iran, psychometric characteristics were reported by Pourvafaee, cited by Abolghasemi and Narimani. Cronbach's alpha coefficient was 0.65, and the correlation coefficient of Arnett's scale with Zuckerman's sensation-seeking scale was R=0.41 [37].

Mean, standard deviation, and frequency percentages were used to analyze the data at the descriptive statistics level. At the level of inferential statistics, the formulation of the borderline personality disorder model is assigned. After establishing the modeling hypotheses, structural equation modeling was used to examine direct and indirect causal relations. In this step, SPSS26 and PLS were used.

The Protocol

The collection method was voluntary, non-random, and convenience sampling. After obtaining the necessary permits from Lorestan University and the Education Organization, male and female school adolescents were given questionnaires. Ethical considerations, including informed consent and maintaining data and information confidentiality, were also explained to the students.

Findings

The descriptive results are related to 200 adolescents aged 15 to 19 studying in Khorramabad, Iran, in 2022-2023.

According to Table 1, as can be seen in BPD Traits, the highest mean is in self-harm (17/29), and the lowest mean is in identity issues (13/89). In Ego Strength, the highest mean is in caring (29/01), and the lowest is in wisdom (20/73). In the Defense Mechanisms, the highest mean is in undeveloped (128/32), and the lowest is in developed

Table 1: Descriptive characteristics of research variables.

Variable	Mean	Standard Deviation	Minimum	Maximum	Skewness	Kurtosis
Love	22.36	3.7	13	34	0.543	0.689
Desire	24.89	4.5	13	40	0.535	0.892
Competence	25.01	3.96	16	38	0.743	1.203
Wisdom	20.73	4.05	11	34	0.551	0.928
Loyalty	25.21	4.55	14	38	0.809	0.671
Caring	29.05	4.6	18	41	0.402	0.062
Hope	25.10	4.23	13	38	0.091	0.322
Goal	24.64	4.96	9	40	0.614	1.136
Ego Strength	197.03	24.02	145	278	1.391	1.86
Emotional Deprivation	14.98	2.98	8	23	0.068	-0.379
Loneliness	15.88	3.6	6	27	-0.069	-0.257
Self-Harm	17.29	2.97	9	25	-0.259	-0.106
Identity Issues	13.89	3.41	6	23	0.233	-0.015
Borderline Personality	42.39	9.32	34	86	-0.225	0.164
Neuroticism	62.05	10.10	16	69	0.13	-0.364
Developed	43.66	9.32	20	69	0.085	-0.177
Undeveloped	128.32	27.03	74	214	0.466	0.251
Defense Mechanisms	214.38	41.77	133	348	0.506	0.387
Need for Novelty	25.81	4.15	16	36	0.17	-0.305
Need for Intensity	26.4	3.6	18	36	0.098	-0.294
Sensation Seeking	52.21	5.76	37	67	0.192	-0.172

(43/66). In Sensation-Seeking, the highest mean needs for intensity (26/4) and the weakest needs for novelty (25/81).

The results of Pearsonian correlation coefficients have shown a significant association between subscales of Ego Strength and BPD Traits (P<0.001). Also, there is a substantial association between Ego Strength, Sensation-Seeking, and Defense Mechanisms subscales. There is a moderate correlation between variables. Skewness and kurtosis tests were used to examine the normality of the statistics. The normality assumption was confirmed as all variables' skewness and kurtosis statistics were between (+2 & -2). The overall goodness of fit indices between the variables for evaluating the model adequately is presented in Table 2. The anticipated model for developing a structural model of Borderline Personality Traits among 15 to 19-year-old adolescents in Khorramabad based on the effect of Ego Strength with the mediating role of Defense Mechanism and Sensation-Seeking is presented in Table 1.

Diagram 1: shows all the measures are acceptable, and the obtained values are satisfactory, as presented in Tables 3 and 4.

Discussion and Conclusion

The study aimed to determine the goodness of fit of the Ego Strength structure model in Borderline Personality Traits of adolescents with the mediating role of Defense Mechanisms and Sensation-Seeking.

The results suggested that Ego Strength has an indirect and significant causal effect on Borderline Personality Traits with the mediating role of Defense Mechanism. The results were consistent with previous studies [38–41].
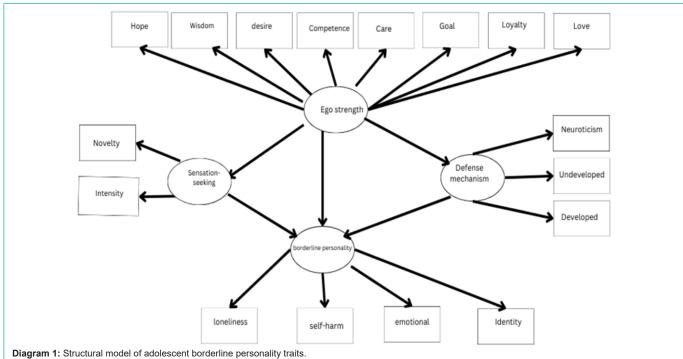
Table 2: The goodness of fit indices.

Test Name	Description	Acceptable Value	Obtained Value
Chi-Square Test	Chi-Square Value	<3	2.71
Chi-Square Normalization Test	Chi-Square Normalization Test	-	369.173
Degrees of Freedom (DF)	Degrees of Freedom	-	136
RMSEA	Root Mean Square Error of Approximation	<0.1	0.074
GFI	Goodness of Fit Index	>0.9	0.902
GFI	Normed Fit Index	>0.9	0.93
CFI	Comparative Fit Index	>0.9	0.96

Table 3: Model estimation using Maximum Likelihood Method (ML).

Variable	b	β	R²	t	significance
Ego Strength on BPD	0.247	0.25	0.112	2.6	0.009
Defense Mechanisms on BPD	0.210	0.27	0.116	1.253	0.006
Sensation Seeking on BPD	0.638	0.268	0.159	0.471	0.001

Table 4: Indirect model estimation using Bootstrap method.

Variable	B	Lower limit	Upper limit	Significance
Ego strength over borderline personality with the mediation of defense mechanism and sensation seeking	0.56	0.42	0.66	0.000

According to psychoanalysis, personality consists of Id, Ego, and Super Ego. When the Ego cannot react appropriately, all the psychological problems are apparent because the Ego has to manage the psychological system. Ego Strength stabilizes identity and psychological health in distressful situations without considering conflicts between internal needs and external wishes [42]. Considering the results of this study, in threatening and distressful situations, Ego stabilizes the identity using Defense Mechanisms. Prior research concluded that the Ego creates flexibility in using defense mechanisms [40].

On the other hand, the inflexible use of defense mechanisms causes borderline personality disorder. Therefore, defense mechanisms considerably affect psychological distress [43]. Defense Mechanisms are known as an individual's reactions to emotional conflicts or external challenges, and they are used to match internal needs, intentions, and thoughts to the real world. Defense Mechanisms also help control negative emotions related to threatening or dangerous events, such as anxiety, distress, and fear [44]. If inconsistent emotions and difficulty in emotion regulation cause the inability to manage emotions and impulses, it may lead to unpredictable behavior patterns and can cause borderline personality disorder [45]. Additionally, previous studies found that defense mechanisms predict the most variance in BPD [46].

Another purpose was to determine the indirect effect of Ego Strength on Borderline Personality Traits with the mediating role of Sensation-Seeking among adolescents aged 15 to 19 years old. Findings show that Ego Strength has an indirect and significant causal effect on Borderline Personality Traits with the mediating role of Sensation-Seeking. No research was found in this field. According to the findings, Ego Strength has a direct and indirect relationship with borderline personality disorder in adolescents. Also, the mediating role of Defense Mechanisms in the relationship between Ego Strength and borderline personality disorder was evaluated favorably. Ego Strength refers to a person's ability to adapt to challenges without experiencing stress, which leads to realistic understanding and efficient responses. This issue helps to provide effective responses to emotional challenges. Also, the Ego manages the pressure of instinctual desires [42]. In opposition, Sensation-Seeking causes an

Diagram 1: Structural model of adolescent borderline personality traits.

intense desire to experience risky and impulsive activities without considering the consequences [47]. Sensation-Seeking is essential to health issues because it relates to behavioral disorders [48]. Moreover, BPD is a severe disorder that is associated with social instability and emotional or behavioral difficulties [49]. Lack of emotional regulation and impulsivity in individuals with BPD can lead to dysfunctional behaviors and psychosocial challenges, which may strengthen emotional regulation deficits and impulsivity [50].

According to the findings, identifying the predictor variable of borderline personality disorder and the mediating role of Defense Mechanisms and Sensation-Seeking is possible. However, limitations that affect the generalization of results should be considered. In this study, the questionnaires were given to male and female adolescents aged 15 to 19. The structural equation modeling method does not prove causality. Furthermore, a non-random sampling method was used in this study. On the other hand, it was impossible to control some intervening variables completely. So, caution should be considered. In this study, a self-report form was used. Because of the limitations of this method, participants may not have answered the questions completely honestly. It is suggested that future studies focus on other age groups. Also, researchers can use experimental studies to determine causality in the relationships between variables. Examining the effectiveness of psychological interventions, increasing Ego Strength, and decreasing Borderline Personality Traits may result in developing more successful treatments. Also, interviewing participants may help control honesty in self-report questionnaires. Based on the results, educational programs can be designed to increase Ego Strength in patients with BPD. Programs include self-awareness exercises, emotion management, and strengthening defensive skills. It is suggested that psychologists and mental health professionals use the results to hold educational courses and therapy sessions to regulate Sensation-Seeking and Defense Mechanisms or study more on the role of Ego Strength in adolescents with borderline personality disorder.

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Author's Contributions

Conceptualization and writing—introduction and problem statement: Baba Ahmadi Milani F,

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Supervision and guidance: Payvastegar MAll authors have read and approved the final version of the manuscript.

Data Availability

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

Ethics Approval and Consent to Participate

This study was reviewed and approved by the Alzahra University Ethics Committee under the ethical code IR.AL.ZAHRA.REC.1402.038. It was conducted in accordance with the principles of the Declaration of Helsinki. Participants were provided with a Participant Information Sheet, which explained the purpose of the study and the intent to publish the findings. All participants gave informed consent, confirming their understanding that their responses would remain anonymous and confidential.

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