Original Article

Borderline personality traits; Eigenvalue spectrum of correlation network

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Abstract

Introduction: Borderline personality influenced by numerous factors is considered as a complex network. Purpose of the study was to conduct a research on borderline personality traits (BPT) using network dynamics for research on factors influencing BPT.

Materials and Methods: The statistical population included monozygotic and dizygotic twins (N=500; Mean age=23.46 years; 74.40% female; Iranian). The research instruments were self-report for participants. We used a threshold for correlations to remove links which represented weak relations. After creating a sparse network, Inverse Participation Ratio (IPR) method was used to extract affective nodes.

Results: In total sample and monozygotic twins, nodes of secure attachment to mother and father had a profound effect on network stability (Prevention of sings) and node of secure attachment to father had the greatest impact on the given stability among dizygotic twins. Nodes of interpersonal problems, emotional neglect, and insecure attachment to father were among the most important ones affecting all groups in no stability of network (moving towards signs).

Conclusion: Given the dominance of environmental factors within threshold conditions, the influence of environment on heritability for BPT was confirmed.

Keywords: Borderline personality, Network, Threshold, Trait, Twins

Introduction

Whenever an individual is affected with problems in interpersonal relationships, disturbing identity, and ability of intimacy, empathy, and sympathy, he/she have a personality disorder or a pathological personality trait (1). Borderline Personality Disorder (BPD) is considered accompanied by instability in interpersonal relationships, emotional vulnerability, and suicidal tendencies. Dialectical Behavior Therapy (DBT) is an approach designed by Linehan (2) for BPD treatment, and it is based on an understanding and formulation of it.

DBT model for BPD. In the DBT model for BPD (3), presented in Figure. 1, secure and insecure attachment to mother and father, emotional

neglect, impulsivity, emotional dysregulation, and interpersonal problems have been raised. This research investigates relations between factors based on the correlation coefficient. Therefore, the model is considered undirected.
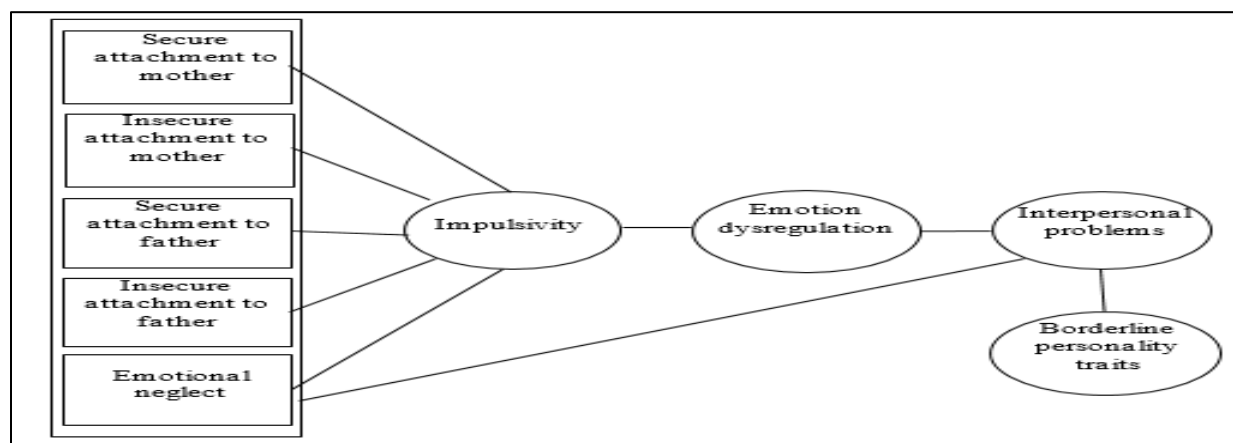

Figure 1. Proposed by Crowell et al., 2009

The attachment being placed under the subcategory of care section in Linehan's theory is an emotional bond established via relationships with valuable people in life, and it can lead to social, emotional, and cognitive growth. According to Ghaffari and Rezaee (4), insecure and avoidant attachment styles were the most potent variables for predicting BPD. On the other hand, Linehan has argued about childhood trauma as a potential causal factor in developing the BPD (5). According to Mikaeli and Zamanloo (6), child abuse in Iran consists of emotional abuse, emotional neglect, physical abuse, and physical neglect. Furthermore, there is a relationship between childhood abuse and BPD (7). Linehan has recently suggested that apart from emotion, impulsivity may influence performance. This concept is the basis of unplanned and immediate responses to internal or external stimuli, regardless of their negative consequences. Initial impulsivity provides readiness for vulnerability to the BPD (3). In externalizing disorders studies, impulsivity shows a high heritability (8). Another factor in the DBT model is called emotional dysregulation. Carpenter and Trull (9) have introduced this concept as the inability to respond to emotions and control them flexibly. In Linehan's view, emotional dysregulation is associated with impulsivity, and it has a mediating role between an invalid environment and the BPD (2). In addition, this factor acts based on high-risk gene-environment interactions (10). Moreover, Suveg, Morelen, Brewer, and Thomassin (11) noted that an emotional family environment could influence increased anxiety due to the intermediary effect of emotional dysregulation.

Interpersonal problems in Linehan's model are a specific factor of the BPD (12). Creating a problem in interpersonal relationships is one of the effects of high emotion (13). In addition, due to maladaptive behaviors, alertness to loneliness, exclusion, and intolerance may be observed in these patients (14). This way, they will experience avoidance of real or imaginary abandonment. Genetics is one of the factors involved in the transfer of borderline personality to later generations. Factor affecting the monozygotic twins more is affected by genetics. Therefore, in this study, monozygotic and dizygotic twin groups were used to identify factors that directly affect genetics or the environment.

Network science. The instability in BPD is not random; instead, one of the significant scientific challenges is the complexity of "nature vs. nurture" (15). Accordingly, it is required to use complexity science to investigate the structure and processes in these interactions. During the last two decades, numerous studies have been

conducted in the domain of complexity in various sciences (e. g., 16). Complex systems consist of many components associated with each other whose characteristics can be changed due to environmental interactions. The science of complexity utilizes various sciences to identify patterns (17). Compared with other sciences, this science uses more appropriate methods to describe a better understanding of dynamics and change processes (18).

A new domain of the science of complexity employed recently by psychopathology is network analysis (19,20), providing a powerful and comprehensible tool for this purpose in recent years. In network science, it is examined which variable has what kind of relationship with which variable or variables and the characteristics and nature of the network.

A network comprises nodes or vertices that contain its factors and links or edges that are the relationships between the factors. Each node is a fundamental variable and has different meanings in different situations (21,22). Going from node u to node v that is far away is the sequence of adjacent nodes starting from u to v (23), and how the factors interact with each other is determined (24). Many phenomena can be explained by network science. For example, the brain is a network of nerve cells connected to synapses. Mental disorders are a network of symptoms. Recently, networks of relationships between thoughts, emotions, and behaviors have been introduced in personality models. Personality traits are assumed as emergent phenomena arising from such networks (19).

In the usual method of statistics in psychology, the relations are considered statically and without paying attention to the nature of the relationships. On the other hand, network analysis can show the nature of relationships based on the dynamics and variables processes. In a dynamic state, the predicted path moves due to the fluctuations of the factors. So, the most significant uncertainty in the relationship occurs. In this method, the effect of arousal or deterrence of factors on each other is considered. For example, we realize that childhood problems are a source of emotion dysregulation and impulsivity in a static state. In a dynamic state, the emotion dysregulation may win some time and lead the relationships after fluctuations. However, in the future of this system, it is not confident that emotion dysregulation can be overcome. In fact, by network analysis, we look at the dynamics of the system at the moment in time.

Since the final competition between the factors is obtained, it is more accurate than the results of the static state, which is only based on what is observed. Therefore, such results can be more confidently considered in psychotherapy and drug therapy for borderline personality, and a particular factor is the focus of treatment.

No study investigated the DBT model for the BPT using the science of complexity and network analysis methods. This is the innovative aspect of this study. Here, the role of factors of secure and insecure attachment to mother and father, emotional neglect, impulsivity, emotional dysregulation, and interpersonal problems in interacting with genetics and environment impacts were investigated for stability or no stability in the BPT network.

Material and Methods

Here correlation design is used. The statistical population included all monozygotic and dizygotic twins enrolled as the Persian Twins and Multiples Association members. According to Cochran's formula, 520 participants were selected. A simple random sampling method considered one hundred thirty pairs of twins. In each group, five pairs were excluded due to lack of willingness to cooperate or incomplete completion of the questionnaire (exclusion criteria). Finally, 125 monozygotic twin pairs and 125 dizygotic twin pairs (n1=n2=250) remained.

The inclusion criteria were the similarity for monozygotic twins and the non-similarity for dizygotic ones, specified through the self-report Zygosity Questionnaire. In addition, participants must be aged at least 18 years and hold a high school diploma.

The mean and standard deviation of age and education were 23.46 years (4.27) and 15.05 (2.12), respectively. Moreover, 372 participants (74.40%) were females, and 128 (25.60%) were males. Within the groups of monozygotic twins, 190 participants (76%) were females, and 60 people (24%) were males. In addition, 182 participants among dizygotic twins (72.80%) were females, and 68 (27.20%) were males.

Since all the twins could not attend the Persian Twins and Multiples Association office simultaneously, the questionnaires were administered individually. This process lasted about nine months. Participants included as a part of the sample group received a phone call from the Central office and were asked to complete the questionnaires. Also, some questionnaires were sent via email or fax. There was no time limit. In order to avoid the effect of the order of implementation of questionnaires, the rotation was used, and the questionnaires were arranged in fifteen different modes. Consent was obtained from the participants and explained that their information would be confidential.

Research instruments

A) Zygosity Questionnaire (ZQ): This questionnaire includes two items based on twins' resemblance to each other, and zygosity estimates are fulfilled accurately by 95% (25). The researchers reported that individuals' answers compared with serum protein markers were 95% diagnostic accuracy (26). Compared to DNA markers in the Iranian sample, the accuracy of the questionnaire was reported to be 97.11% (27). In this study, the diagnostic accuracy calculated was 98.40% in monozygotic twins and 98% among dizygotic ones.

B) Borderline Personality Scale (Persian version): It is a subscale of the Schizotypal Trait Questionnaire, which measures borderline personality in a non-clinical sample, and Cronbach's alpha coefficient .88 has been reported (28). In the Iranian version, Adding six more items, ending 20 items after factor analysis reporting internal consistency was 0.77, and appropriate validity was reported (29). The ordinal theta coefficient was used to calculate the internal consistency taking the Payandeh Najafabadi and Omidi Najafabadi (30). In this study, the ordinal theta coefficient was equal to 0.82.

C) Parental Care-giving Style Questionnaire (PCSQ): Hazan and Shaver (31) developed this test comprised three paragraphs for each parent. Responses are based on a 9-point scale ranged from totally disagree to agree (32). The reliability for insecure attachment style to mother and father was .84 and .94. Also, 58% of the variance was extracted (33). In the study by Khorashadizadeh,

Shahabizadeh, and Dastjerdi (34), the reliability for secure and insecure attachment to mother (.70, .82) and father (.86, .85) was reported.

D) Emotional Neglect (EN): It is 15 items from the Childhood Trauma Questionnaire (CTQ) subscale on a 5-point scale (35). Grassi-Oliveira et al. (36) reported internal consistency of 0.91. In Shahani Yelagh, Mikaelie, Shokrkon, and Haghighi's (37) study, Cronbach's alpha was .67. In this research, the ordinal theta coefficient was 0.91.

E) Barratt Impulsiveness Scale-11 (BIS-11): This scale was the revised version of the original scale designed by Barratt, Stanford, Kent, and Felthous (38) to measure impulsivity. BIS-11 contains 30 items on a 4-point scale. Stanford et al. (39) reported the reliability was .83, and its validity was favorable. In a study (40), the validity of the test was appropriate, and Cronbach's alpha coefficient for the whole test was .83. In this study, the ordinal theta coefficient was .83.

F) Difficulty in Emotional Regulation Scale (DERS): This scale measures a person's difficulty regulating emotion and consists of 36 items and six subscales on a Likert-type range (41). Internal consistency and test-retest reliability were .93 and .85, respectively. In addition, the construct validity was reported favorable (41). In a study (42), high internal consistency for the whole scale was .86. In the present study, the ordinal theta coefficient was .91.

G) Inventory of Interpersonal Problems (IIP) (Persian version-29 items): Barkham, Hardy, and Startup (43) developed IIP with 32 items and eight subscales. A study reported Cronbach's alpha from .70 to .90 and found its validity at a reasonable level (44). Fath, Azadfallah, Rasool zadeh-Tabatabaee, and Rahimi (45) conducted factor analysis, and 29 items remained. Cronbach's alpha was .82. In this study, the ordinal theta coefficient was 0.8.

Results

Data analysis was performed using new network science methods, and a few steps were taken. At first, the normal data distribution and linearity were investigated, and outliers were eliminated. Then, a threshold was used to focus on data with a stronger correlation. After that, we used the IPR method to extract important and influential

nodes. Correlations between network nodes were investigated using the SPSS software version 23, and the symmetrical correlation matrices of N×N were obtained with the Pearson correlation coefficients. Results were presented in table 1. Considering the statistical method, the mean and standard deviation of each node were shown in the diameter of the matrix. Accordingly, each node within the matrix could play the role of a variable.

As shown in Table 1, the correlations between all pairs of nodes were significant for the whole sample (*P*< 0.01). The highest correlation was observed between nodes of insecure attachment to mother and father (r= 0.71). The lowest correlation belonged to the nodes for secure attachment to father and impulsivity (r= 0.14). The nodes of secure attachment to mother and father were similarly in an anti-correlation (negative correlation) with the nodes of insecure attachment to mother, insecure attachment to father, emotional neglect, impulsivity, emotional dysregulation, interpersonal problems, and BPT.

Table 1. Correlation matrix of BPT network for the whole sample

	SAM	IAM	SAF	IAF	EN	IM	ED	IP	BPT
SAM	M= 7.55 SD= 1.66	-0.44	0.56	-0.31	-0.35	-0.26	-0.29	-0.23	-0.31
IAM	-0.44**	5.19 3.76	-0.28	0.71	0.38	0.30	0.39	0.35	0.40
SAF	0.56	-0.28	6.95 2.04	-0.45	-0.30	-0.14	-0.15	-0.20	-0.24
IAF	-0.31	0.71	-0.45	5.94 4.01	0.38	0.22	0.32	0.30	0.35
EN	-0.35	0.38	-0.30	0.38**	20.59 5.05	0.24	0.33	0.33	0.46
IM	-0.26	0.30	-0.14	0.22	0.24	60.41 11.37	0.56	0.39	0.48
ED	-0.29	0.39	-0.15	0.32	0.33	0.56	78.05 19.24	0.52	0.63
IP	-0.23	0.35	-0.20	0.30	0.33	0.39	0.52	38.37 12.90	0.49
BPT	-0.31	0.40	-0.24	0.35	0.46	0.48	0.63	0.49**	4.62 3.47

Note. SAM: Secure attachment to mother; IAM: Insecure attachment to mother; SAF: Secure attachment to father; IAF: Insecure attachment to father; EN: Emotional neglect; IM: Impulsivity; ED: Emotional dysregulation; IP: Interpersonal problems; BPT: Borderline personality traits. M: Mean; SD: Standard deviation. All correlations were significant (*P*< 0.01).

To avoid prolongation of the article, only the result of the correlation coefficient test for the monozygotic and dizygotic twin groups is presented separately. For monozygotic twins, significant correlations were observed between all pairs of nodes (*P*< 0.01). The nodes of insecure attachment to mother and father had the maximum correlation (r= 0.71), and the nodes of insecure attachment to father and impulsivity (r= 0.12) had the minimum correlation.

The correlations for all pairs of nodes in the dizygotic twins' group were significant (*P*< 0.01), so that the maximum and minimum correlations were observed between emotional dysregulation nodes and BPT (r= 0.70) and the nodes of secure attachment to father and impulsivity (r= 0.13); respectively. In both groups, an anti-correlation was also dominant between the nodes of secure attachment to mother and secure attachment to father and the nodes of insecure attachment to

mother, insecure attachment to father, emotional neglect, impulsivity, emotional dysregulation, interpersonal problems, and BPT.

Using the correlation matrix and aspects in graph theory, important nodes were extracted. The diameter of the mentioned matrices for three groups which represented variance and mean of nodes, was considered zero in the following measurements. For analysis, MATLAB-R2015a software was used.

As all the correlations are nonzero, the correlation matrix created a fully connected network. A threshold was defined to remove weak correlations to focus on the most important relations. Correlation varied in the range (-1, +1). To implement the threshold only values greater than the variance of the data, whether positive or negative, were retained. This method was used as filtration for identifying nodes being highly correlated with each other. This process gave rise to a sparse matrix. Then, Eigenvalues and eigenvectors of the created correlation matrix were investigated to find important system trends and extract important nodes. Eigenvalues represent the strength of the system's trends. The larger the Eigenvalues are, the more influential they are.

Eigenvector of each of the Eigenvalues for each network node. In Figures 2(a) to 2(c), the eigenvector of each of the Eigenvalues is shown for each network node. Each column in these figures represents an eigenvector corresponding to a specific Eigenvalue (horizontal axis). Each eigenvector includes nine components indicating each node's impact on that eigenvector. Colors change from blue to red to show deviation from negative to positive impacts of nodes. The color of each part characterizes eigenvalue fluctuation. For example, the warm color spectrum means a positive fluctuation, and the cold color spectrum means an unfavorable fluctuation. Here, there is only a red and blue spectrum, indicating a boundary between the positive and negative states in the values. The higher the distance of the eigenvalue components from zero, whether positive or negative, the other the impact of that node in the behavior of the system. In other words, nodes with larger components can have the most significant impacts if a desired or damaging event occurs in the system. As shown in Figure 2(a), at the Eigenvalue of 2.05 and

eigenvector of 0.20, secure attachment to the mother and father nodes is in the positive range and has the highest impact on stability. With an Eigenvalue of -0.48 and an eigenvector above 0.60, interpersonal problems have the most significant impact on the network instability for the whole sample.

As shown in Figure 2(b), for monozygotic twins, the nodes of secure attachment to mother and father with an Eigenvalue of 1.65 and an eigenvector of about 0.30 have the most significant impact on network stability and order. In addition, the emotional neglect node with an Eigenvalue of 0.22 and an eigenvector higher than 0.60 is the most influential and increases instability and complexity in the network.

According to Figure 2(c) for dizygotic twins, there was a consistency between the eigenvector higher than 0.60 for secure attachment to father and the negative eigenvalue -0.18 and insecure attachment to father with the positive eigenvalue 0.06. Thus, the given nodes were considered the most influential ones within this network.

Nodes' participation in the overall network process. Subsequently, the IPR method was used to determine the nodes' participation in the overall network process. In the study of network dynamics, some physics studies are also used from the IPR (e. g., 46).

$$\frac{1}{\sum_{i=1}^{N} V_i^4}$$

Here, Vi refers to the *i*th component of the eigenvector, and N represents the number of nodes. The positive and negative effects of the eigenvector components are removed as the Vi is to the power of 4, and there is only a focus on their values. In other words, it is just important how much these components have deviated from zero. Value of components is in the range of [-1, 1], and the amount of the IPR also varies from 1 to N; so, the greater the distance of the components of an eigenvector from zero, the larger the IPR value. If only one independent node from other nodes plays a role in the network behavior, the IPR value can reach its minimum amount. The present study was essential to determine which Eigenvalue could increase IPR and how all network nodes contributed to network behavior. In Figure. 3, the horizontal axis represents different Eigenvalues for the three

groups, mostly varying between -1 and +3.50, and the vertical axis stands for the IPR for each Eigenvalue. Therefore, comparing the three groups in the Eigenvalue area of +3 as the highest Eigenvalue, with the highest IPR, is considered the most participatory research node in these three groups. In this area, the highest and the lowest effects of nodes were respectively seen in the group of dizygotic twins and monozygotic ones.
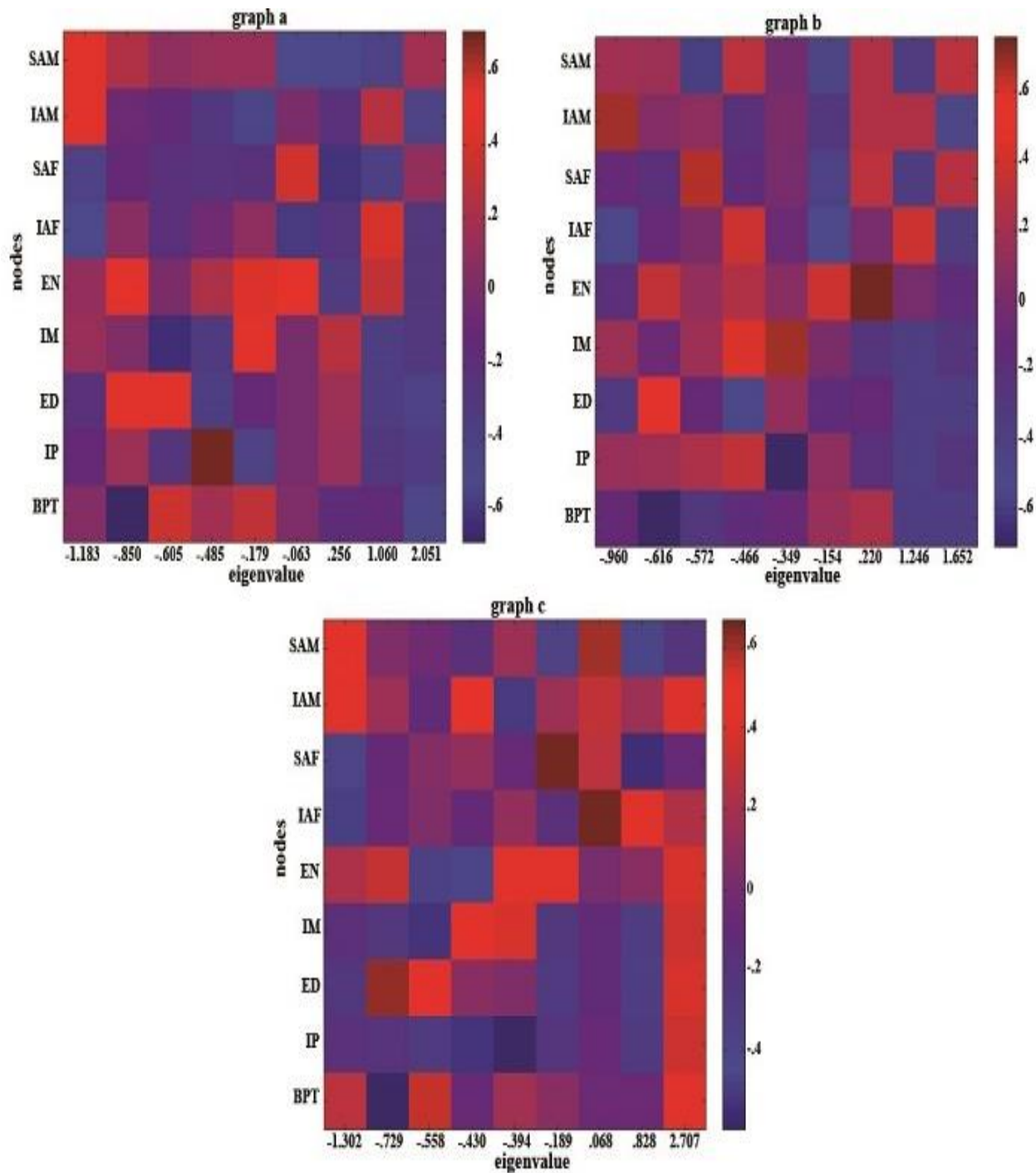
Figure 2. Impact of nodes on different Eigenvalues based on a threshold for the total sample (Graph a), group of monozygotic twins (Graph b), and a group of dizygotic twins (Graph c)
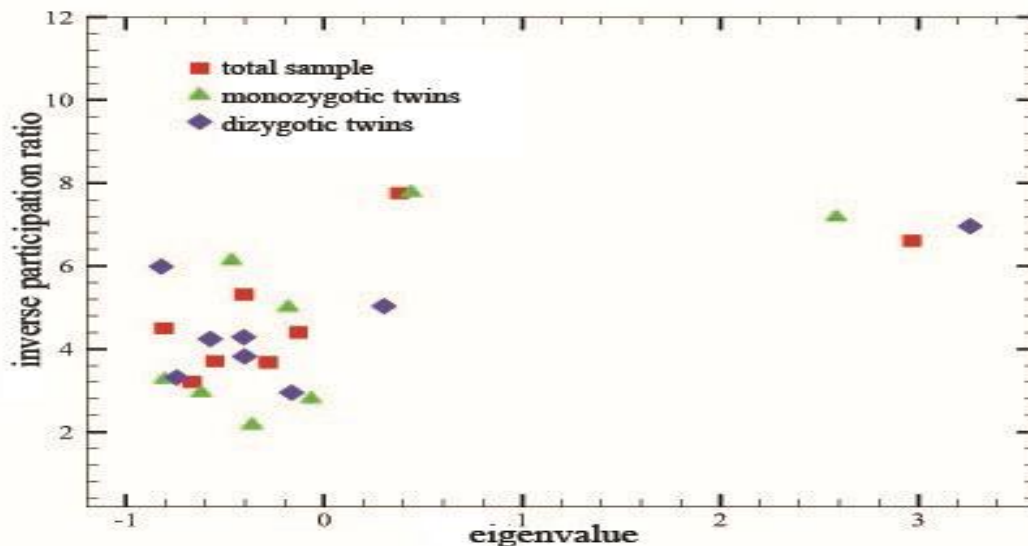
Figure 3. IPR based on Eigenvalues and threshold method for the groups

Discussion

The purpose was to conduct a study on the BPT using complex networks for research on factors influencing BPT. One of the findings for the whole sample and monozygotic twins was that the nodes of secure attachment to mother and father and the nodes of secure attachment to father in dizygotic twins had the most significant effect on the network stability. Also, in all groups, the nodes of interpersonal problems, emotional neglect, and insecure attachment to the father were the most affected in the network instability. Nevertheless, findings were similar to those done by Ghaffari and Rezaei (4), Mikaeli and Zamanloo (6), Haliczer, Woods, and Dixon-Gordon (48), Godbout, Daspe, Runtz, Cyr and Briere (49), Peng, Liu, Liu, Chu et al. (50) and Suveg et al. (11).

Treating people with BPD is essential and challenging. This importance is that their behavior is influential in their lives and others. The difficulty in treatment is because patients with BPD find it difficult to change their behaviors, thoughts, and feelings and have little motivation for treatment. Therefore, their high resistance and the probability of dropping out of treatment need attempts to collapse the strongest building stones making the BPD concrete. Emotional neglect is one of the building stones depending on the environment. Typically, most families provide food and clothing and meet physical needs for their children; but they ignore their children's emotional and psychological needs. Isolation can increase the possibility of child abuse. Limited communication with other people is a growing issue. On the other hand, if parents do not know how to behave with difficult-class children, the psychological and physical system will pass through no stability threshold, confusing. In the study of Mikaeli and Zamanloo (6), which was performed on 400 participants using questionnaires such as the Childhood Trauma Questionnaire using discriminant analysis method, as in the present study, emotional neglect was one of the most common types of child abuse.

In a BP network, an environmental factor creates a node such as emotional neglect resulting in the emergence of other nodes of interpersonal problems, and a self-reinforcement cycle might happen; i.e., interpersonal problems can activate other network nodes. The nodes may include biopsychological cases, but there is no independent nature against BP in part. Therefore, BP nodes are not passive psychometric indicators; instead are considered as active elements of this network. Therefore, there was no possibility of studying nonlinear dynamics for the BP network in the present study. However, based on the threshold results, it can be deduced that nodes at the crisis threshold are considered as the equivalent of accumulated energy of the BP

network, and they are assumed as an unstable and chaotic nonlinear dynamicity for the network. Since the accumulated energy in a system increases sensitivity to primary conditions, emotional neglect or interpersonal problems in adulthood can activate the negative attachment system. Also, a study by Haliczer et al. (48) of 173 participants reported that BPD characteristics are associated with interpersonal conflicts and problems in emotion regulation.

In Ghaffari and Rezaei's study (4), which was conducted on 200 people using the Borderline Personality Disorder Questionnaire, insecure and avoidant attachment styles were the strongest predictors and showed that they could bring the network closer to a crisis than stability. Also, Goodbot et al. (49) used structural equations in a study of 954 participants with paternal maltreatment during childhood and secure attachment and reported insecure attachment to the father related to borderline personality traits. These findings on network crisis are consistent with the findings of this study. Within the traditional Iranian context, secure attachment to the father symbolizes strength and reliance and can stabilize the BP network in crisis time more than maternal emotional attachment. This finding contrasts with the results of some theories stressing the importance of secure maternal attachment. One reason is the used statistical method. In this study, the data progressed to the stability or crisis threshold; therefore, an exact behavior associated with the nature of the attachment was obtained.

Severe sensitivity of individuals with BPD to isolation and interpersonal ups and downs can make their experiences with self-esteem dependent on how much important people are available (12). A history of a cold environment and avoidant and unavailable attachment faces can similarly lead to socio-psychological and physiological problems. So, cognitive distortions associated with the interpersonal domain are formed being a misunderstanding of others' intentions (47; 12), attribution of malignant intentions to them, classification of individuals into "good" and "bad", misunderstanding about the risk of abandonment, and failure to understand others' mental state (47). These processes make them less tolerant, and they may express their anger and show self-destructive

behaviors when everything is not as they wish. The collection of such events can increase the BP network entropy, and it is impossible to prevent it from going towards crisis. In a study by Peng et al. (50) on 637 participants with psychological disorders, they used the Borderline Symptom List, Childhood Trauma Questionnaire, and Attachment Style Questionnaire. They reported that childhood trauma in borderline personality played a mediating role in the relationship between insecure attachment style and emotion dysregulation. In the present study, it was observed that emotional neglect and attachment style have an important role in borderline personality.

Since the emotional neglect node has been observed in monozygotic twins, it shows that when the behavior of the network reaches the threshold, it dominates inheritance. Genes do not directly affect behavior. There are no genes for extroversion. The impact of genes on the development of personality traits can occur through the guidance of the biological performance of the body and the environment. Considering the study of monozygotic twins, factors such as using the word "twins" instead of their real names, tired parents and less care, similar classrooms, lower social bonds with others, tendency to make them similar, comparisons, as well as the same supports for their similarities can lead to ignoring their needs and feelings. Moreover, the same games, clothes, etc., can result in an obligation to go along with these same behaviors. Likewise, lack of understanding can lead to senses of frustration and anger. In a study of nodes' participation in the overall network process, the highest effects of nodes were seen in the group of dizygotic twins. Monozygotic twins siblings spend more time together during the development and growth process. This helps them to experience the common environment stronger than dizygotic twins. Therefore, changes made by the environment on these individuals' DNA are less than changes in the dizygotic twins' group. Even considering the effects of the environment on genes, monozygotic twins go through fewer differences, and thus genetic similarity can occur. So, when genetic diversity is high, the system passes faster through the threshold, and undesirable symptoms have the opportunity to

emerge. Since individuals suffering from BPD have biological vulnerability and have heritability with themselves, they affect the environment. This leads to high-risk interactions of the gene environment. Findings showed that the gene-environment interaction implies that the environment can strongly influence the expression of genetic factors associated with BPD. From the nonlinear perspective in complex systems, the environment is a more potent factor than genetics and is endowed with sensitivity to initial conditions by itself. Therefore, parents with BPD may be ready to transfer their behaviors to their children. Accordingly, the importance of preventive and psychotherapy interventions prior to having children is highlighted. If the symptoms can be adjusted based on the effects of epigenetics, the effects of transferring this disorder to the next generation are reduced. Therapists should accept and welcome the instability of this nonlinear BPD system. Therapists can trust the instability of this complex system and allow it to move towards development. For confirming zygosity, the genomic study was impossible. There was no possibility of controlling some variables like intelligence and fatigue. It is proposed to consider the nature of the BP network and the constant changes in the network in a fractal manner and

dynamically. By editing data to establish the assumption of normality and linearity, it may manipulate meanings. Namely, the opportunity to see the hidden aspects is lost by eliminating the outliers and frequent linear methods. It is suggested to set the research design and data analysis based on differential equations. It is desirable to integrate the transdiagnostic perspective as a new framework for the formulation of mental disorders with the network approach.

Conclusion

According to the results, in BPD, environmental factors dominated the genetic factor. Also, the secure attachment to mother and father was strongly emphasized to prevent sings. Interpersonal problems, emotional neglect, and insecure attachment to the father were factors that facilitate the development of this disorder.

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