



The Relationship between brain-behavioral systems and cluster B personality disorders by mediating dark traits of personality

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ABSTRACT

Background and Aim: It seems that one of the important influencing factors in cluster B personality disorders is brain-behavioral systems and dark personality traits, so the purpose of the present study is the relationship between brain-behavioral systems and cluster B personality disorders with the mediation of dark personality traits. **Methods:** The design of this research was a correlation method in terms of applied purpose and in terms of controlling variables. The statistical population of the study was all students of Tabriz universities in the academic year 2021-22, of which 450 people were selected by cluster random sampling and studied. For data collection, the Dark Dimensions of Personality Questionnaire, the revised Jackson Strengthening Sensitivity Scale, and the Millon Multi-Axis Clinical Test were used. Data were analyzed using Pearson correlation coefficient and path analysis. **Results:** The results showed that there is a positive relationship between behavioral activation system and cluster B of personality disorders. There is also a negative relationship between behavioral inhibition system and cluster B personality disorders. There is a positive relationship between dark personality traits and dramatic personality disorder. There is a negative relationship between behavioral inhibition system and war and escape with the dark trait of Machiavellianism. **Conclusion:** The results of this research show that paying attention to the variables of behavioral brain systems and dark personality traits play an important role in personality disorders.



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Introduction

Personality disorders are one of the most important social and medical problems, and psychiatrists and mental health specialists pay a lot of attention to these disorders. The prevalence of these disorders in the general population is reported to be between 11 and 23%, which is an alarming figure; That is, one out of every 4 to 10 people, regardless of economic and social status, has a personality disorder (Kaplan & Sadock, 2015). About half of psychiatric patients suffer from personality disorder, which can predispose a person to other psychiatric disorders and interfere with their treatment results (Abolghasmi et al., 2018). According to the definition of DSM-5, personality disorder is an enduring pattern of inner experience and behavior that significantly deviates from the expectations of the individual's culture, is pervasive and inflexible. It begins in adolescence or early adulthood. It does not change over time and causes a person's unhappiness and impaired functioning (American Psychiatric Association, 2013). In DSM-5, personality disorders are divided into three clusters: the first cluster includes paranoid, schizoid, and schizotypal personality disorders, the second cluster includes antisocial, borderline, dramatic, and narcissistic personality disorders. In the third cluster, there are avoidant, dependent and obsessive-compulsive disorders (Kaplan & Sadock, 2015).

According to DSM-5, antisocial personality disorder is a disorder that is a pervasive pattern of disregard and violation of the rights of others that started from adolescence and continues until adulthood. Antisocial people are often irritable and aggressive. They are very deceitful and are very skilled in achieving personal benefits through manipulation, deceit, and putting others to work. Nothingness and loss, pain and loss to others rarely cause them discomfort and helplessness, for this reason others usually consider them to lack moral conscience (American Psychiatric Association, 2013). According to DSM-5, borderline personality disorder is a disorder that is defined as a pervasive pattern of instability in interpersonal relationships, self-concept, emotions, and impulsivity. This disorder is known as the most common personality disorder among inpatients and outpatients (Ganji, 2017). Dramatic personality disorder according to DSM-5 is a disorder that is a pervasive pattern

of excessive excitability and attention seeking. People with this disorder need to be constantly in the center of everyone's attention, and if they are not, they feel extremely uncomfortable and angry. In addition, narcissistic personality disorder based on DSM-5 is a disorder that begins in early adulthood in the form of a pervasive pattern of obsessive behavior (in imagination and behavior). These people do not tolerate criticism in any way, and if they are criticized, they are generally indifferent to criticism or get angry and simply accept their opinion (American Psychiatric Association, 2013).

Also, people with personality disorders have specific malfunctions in interpersonal relationships, although the type of malfunctioning of social relationships is different and sometimes contradictory in different types of personality disorders (Ganji, 2017). In fact, personality traits and dimensions are one of the most important intervening factors in psychological disorders, in order to explain the relationship between personality traits and people's bodies prone to psychological disorders, various theoretical models such as Eysenck and Gray's theory have been used (Matthews & Gilliland, 1999).

Some psychologists believe that personality is based on the functioning of the nervous system. In this regard, Eysenck (1990) has paid special attention to the brain with his perspective on personality. Eysenck mentions the dimension of introversion-extroversion and the dimension of neuroticism in his biological theory (Alebooyeh & Jafari, 2021). According to Eysenck, the nervous system of introverts is inherently prone to stimulation and the nervous system of extroverts is prone to inhibition. In Eysenck's theory, the network activation system (ARAS), which is a structure in the brain, works differently in each person. Later, Geoffrey Gray (1987) continued Eysenck's work and proposed his own neuropsychological theory of personality known as "reinforcement sensitivity" theory (Gray & McNaughton, 2000). The theory of personality emphasizes the separate evolution of reward and punishment mechanisms in the brain of vertebrates. By reviewing the literature of his studies in the theory of sensitivity to reinforcement (RST), Gary presented a biological model of personality that includes three brain-behavioral systems. The three brain/behavioral systems that

are believed to underlie personality differences are: (1) behavioral activation system (BAS), (2) behavioral inhibition system (BIS), (3) fight-flight system (FFS). (Matthews & Gilliland, 1999; Corr, 2004; Garcia et al., 2013). The behavioral activation system underlies reward sensitivity and is activated by conditioned pleasant stimuli (Gray & McNaughton, 2000). The behavioral inhibition system is a nervous system that processes threat-related information and triggers anxiety (Matthews and Gillind, 1999; Kerr, 2004; Sigara et al., 2014). In response to conditioned and unconditioned unpleasant stimuli, the fight-flight system activates escape and avoidance behavior and attributes the emotion of fear to it (Gray & McNaughton, 2000). The theory of personality is based on the principle that individual differences in personality are a reflection of the difference in the sensitivity of people in inhibition systems (BIS) and behavioral activation (BAS) (Franken et al., 2006).

Based on the theory of brain-behavioral systems, Gray (1982) put forward the hypothesis that psychiatric disorders caused by dysfunction (hyperactivity or hypoactivity) are one of the systems or their interactions. Since the presentation of Gary's model, researchers have hypothesized that the abnormal sensitivity of these systems indicates the readiness and aptitude for many forms of psychopathology (Meyer et al., 1999). According to Gray (1987), excessive inhibition, the central core of anxiety disorders and high impulsivity along with low anxiety, is the basis of antisocial personality disorders. In addition, from this point of view, emotional stability stems from low anxiety along with low impulsivity (Lara et al., 2012). The activity of the behavioral activation system (BAS) is related to the development of positive mood effects and impulsivity personality dimensions, while the activity of the behavioral inhibition system (BIS) is related to the development of negative mood effects and personality dimensions of anxiety (Gray, 1987; Corr, 2004). The differences in people's behavior and mood are derived from the difference in the response of these systems. BIS overreactivity is associated with reward focus and impulsivity. Individuals with an overreaction to the FFS show higher levels of fear and avoidance behavior, and overactivity of

the BAS is associated with a tendency to worry and anxious thoughts (Corr, 2008).

Application of the neurobehavioral model, BIS, and BAS, which has been proposed for a wide range of disorders, generally confirms the relationship between BAS-BIS and specific pathology, with high levels of BIS being associated with anxiety (Gray, 1982). while its low levels are believed to be used for primary pathology (Rauthmann, 2012). It has been suggested that BAS shows differences in mood disorders, for example mania may reflect increased BAS (Meyer et al., 1999). while depression reflects low BAS (Cash et al., 2002). In recent years, personality psychologists in research have focused their attention on dark personality traits, and an umbrella of research is on the term dark traits. Dark personality traits are considered as destructive and negative aspects of human personality. This model includes a group of personality traits that are not as severe as clinical disorders and in fact are a milder state and more precisely "subclinical threshold" of the disorder. The essential characteristic of dark personality traits is that they are socially and interpersonally annoying and unpleasant (Bertel et al., 2017).

The dark triad of personality or the dark triangle, which was proposed for the first time in 2002 by Paulhouse and Williams (2002). They stated that it seems that in a normal statistical society and in a situation where unusual behavioral signs have not appeared, the three traits of narcissism, antisocialism and Machiavellianism can be considered as a single trait. These traits have a high internal correlation with each other; However, they are not equivalent. In other words, they have a lot of overlap, but they are separate constructs (Pallhaus and Williams, 2002).

The first component of the dark trinity of personality traits is narcissism. Narcissism refers to exaggerated feelings of self-centeredness, pride, self-absorption, and entitlement (Ziegler & Markus, 2016). Antisociality is the most pessimistic trait in the set of dark triad traits (Paulhaus and Williams, 2002). These people are characterized by traits such as impulsivity, sensation seeking, callousness, arrogance, and interpersonal aggression (Patrick et al., 2009). The third component of the dark triad of personality traits is the term Machiavellianism, which reflects a

highly selfish orientation in which a person tends to achieve their goals by any means such as deception, fraud, and exploitation (Ziegler & Markus, 2016). In recent decades, this set of traits has been considered as the core of emotional coldness, self-presentation and social deviance (Palhaus and Williams, 2002). The result of Miri and Egan's research (2017) showed that among the dimensions of dark personality traits, psychopathy was a strong predictor of psychological and physical/sexual abuse. The result of Flexon et al.'s research (2016) showed that low self-control and dark personality traits independently predict committing a crime. Research findings have also reported the relationship between the dark triads of personality with impulsivity, behavioral risk-taking, and lack of self-control. Risk-taking refers to behaviors that increase the probability of negative, unpleasant, and destructive physical, psychological, and social outcomes. There are several reasons why people behave in a risk-taking style. One possibility is that people have an innate tendency to perform risky behaviors due to traits related to the dark triads of personality (Rasaei Kashuk & Mansouri, 2020).

The results of Knight's study (2016) showed that all the dark triad traits (narcissism, psychopathy, and Machiavellianism) are related to aggression; It is therefore not surprising that these three traits are frequently considered to be part of the dark side of human nature (Knight, 2016). Three dark personality traits are related to some negative traits, including dishonesty (Lee & Ashton, 2005), aggressiveness (Jonason & Webster, 2010). Some researchers have proposed that the triple dark traits of personality should be developed into a new formulation called dark quadruple traits of personality, in which the component of bullying is added to this set (Ziegler-Hill & Marcus, 2016; Meyer & Egan, 2017). Torture is enjoying the suffering of others. This phenomenon has often been discussed in its extreme form in criminal and sexual contexts. Recently, Pinker proposed a milder form of this phenomenon called "soft harassment" or "everyday harassment", which often occurs as non-sexual harassment, is common in people of different societies, and seems to be statistically distributed naturally. (Pinker, 2011). Bullies look for opportunities to engage in cruel or abusive everyday activities. Compared to antisocial individuals who do not

care about others in their own interpersonal relationships, abusive individuals may also harm others in pursuit of their own selfish goals (Ziegler-Hill & Markus, 2016). The result of Jackson's research (2002) showed that people who have a high level of Machiavellianism, psychopathy, and sadism get lower scores in the empathy subscales, and people who have a higher level of happiness get higher scores in the impulsivity subscales. Also, the results of this research showed that psychopathy and sadism predict a lack of empathy, while only sadism predicts poor impulse control. In general, brain-behavioral systems provide a blueprint for personality disorders as well as differences and different personality traits. According to the researches mentioned above, what deserves more discussion and study is how these variables are placed in an organized model framework to be able to explain the relationships between these variables well. Therefore, in this regard, the current research has investigated the relationship between brain-behavioral systems and cluster B of personality disorders with the mediation of dark personality traits.

Method

In terms of the purpose, the current research was one of the basic researches, and in terms of the method of data collection, it was a descriptive-correlational type of research. The statistical population of this research includes all male and female students of universities (general, free and non-profit) in Tabriz city who were studying in the academic year 2021-22. The sample of this research includes 450 students who were selected as a statistical sample by random cluster sampling from among the universities of Tabriz city. Ethical considerations included informed consent to participate in the research, emphasizing the confidentiality of information and avoiding any harm to them.

Materials

1. Revised Jackson Reinforcement Sensitivity Scale (r-RST). The Revised Jackson Reinforcement Sensitivity Scale (r-RST) has 30 items designed by Jackson in 2009. This questionnaire includes 3 brain behavior systems, which are the subscales of behavioral activation system (BAS), inhibition system (BIS), and fight, flight, and freeze system (r-FFF). The third system includes the three components of war, escape and trust, which, together with the

activation system and the inhibition system, form Jackson's 5 factors. In this questionnaire, the questions of 5 subscales are as follows: behavioral activation system (questions 1 to 6); behavioral inhibition system (questions 7 to 12); The three components of the war, escape, freeze system include: the fight component (questions 13 to 18); Elusive component (questions 19 to 24); Freezing component (questions 25 to 30). Jackson (2009) examined the psychometric properties of the Revised Jackson Reinforcement Sensitivity Scale (r-RST). The construct validity of the five factors Behavioral Activation System (BAS), Behavioral Inhibition System (BIS), Fight, Escape, and Freezing was confirmed. He used the Cronbach's alpha method to measure the reliability of this test and reported its overall Cronbach's alpha coefficient of 0.70. The reliability of its subscales was reported as 0.83 for the behavioral activation system, 0.76 for the behavioral inhibition system, 0.74 for the fight-avoidance and freezing system (war component 0.78, avoidance component 0.74, and freezing component 0.70). In Iran, Hosni et al. (2011) standardized this questionnaire. In this research, the validity of the questionnaire was investigated based on the methods of internal consistency, item set correlations, and retesting. Also, scale validity was checked through factor analysis method, correlation between subscales and criterion validity. Cronbach's alpha range (0.72 to 0.88), test-retest coefficients (0.64 to 0.78) and item set correlations (0.28 to 0.68) indicated the favorable validity of the Persian version of Jackson's five-factor questionnaire. Exploratory and confirmatory analysis supported the main five-factor model of the questionnaire.

2. Questionnaire of dark personality traits.

This questionnaire was created and standardized in Iran by Yousefi and Imanzad (2017) based on the combination of O'meara et al. Is.: Narcissism scale (questions 9, 10, 11, 12); Machiavellianism (questions 1, 2, 3, 4); Anti-social behavior (questions 5, 6, 7, 8); Sadism (questions 13, 14, 15, 16, 17, 18, 19, 20, 21). The mentioned questionnaire has 21 items and the subjects indicate the degree of suitability of the items with their situation with a 7-point Likert scale (completely disagree = 1, to completely agree = 7). The construct validity of the four-factor structure has shown its good fit

through confirmatory factor analysis. Reliability coefficients are reported in the range of 0.76 to 0.84 and through the internal consistency coefficient (alpha coefficient), in the range of 0.68 to 0.88.

3. Milon's multi-axial clinical test. The Milon Multi-axial Clinical Questionnaire was developed in the 1970s by personality theorist Theodore Milon and his colleagues. Milon is a self-report scale and is intended for clinical decision making. This test has 175 yes/no items. This questionnaire has 28 scales. Of these 28 scales, 4 scales are dedicated to its validity and reliability, 11 measure clinical personality patterns and clinical symptoms and are used for adults 18 years and older. This scale measures clinical patterns of personality including: Schizoid, avoidant, depressed, dependent, dramatic, narcissistic, antisocial, sadism-masochism, negativity and abusive-self-abusive personality and 3 other scales of serious clinical symptoms (thought disorder, major depression and delusional disorder). This test has been standardized twice in Iran. The second version of this test was translated once in Tehran by Khajeh Moghi and standardized in 1993, and the third version was standardized in Isfahan by Sharifi in 2002. The reliability coefficient of MCMI scales for subscales of clinical syndromes and clinical patterns of personality and the whole questionnaire were obtained as 0.87, 0.83 and 0.92, respectively. Cronbach's alpha coefficient in this test in this research is 0.85.

Implementation

First, a number of faculties were randomly selected from among the universities (general, free, non-profit), then a number of classes were randomly selected from each faculty, and finally 450 students of these classes were selected as a statistical sample. After coordinating and explaining the purpose of the research and getting their satisfaction and ensuring the confidentiality of the information, the questionnaires were provided to them at the same time. In order to analyze the data, structural equations were used using LISREL 8.8.

Results

In terms of demographic characteristics, the statistical sample of this research was homogeneous. The findings of the descriptive

statistics of the current research are reported below.

Table 1. Descriptive statistics of dark personality dimensions variables

Variable		Mean	SD	SE
Dark personality traits	Machiavellianism	08/13	48/8	40/0
	Narcissism	96/12	47/8	39/0
	Psychopathy	08/12	12/7	33/0
	Sadism	20/13	10/8	38/0
Brain-behavioral systems	BIS	35/35	95/14	70/0
	BAS	27/33	56/12	59/0
	FFS	17/34	29/15	72/0
Cluster B	NPD	11/29	23/11	52/0
	DPD	58/31	43/15	72/0
	APD	87/26	01/9	42/0
	BPD	17/28	56/9	45/0

Table 1 shows the mean, standard deviation, and standard error of the mean for the studied variables. As can be seen, the highest average (standard deviation) in the dark dimensions of the personality belongs to sadism with a value

of 13.20 (8.10); in the brain-behavioral systems belonging to the behavioral inhibition system with a value of 35/35 (14/95); In personality disorders, cluster B belongs to narcissistic personality with a value of 29/11 (11/23).

Table 2. Correlation test between behavioral activation system with cluster B personality disorders and dark personality traits

Variable	Personality disorders				Dark personality traits			
	NPD	DPD	BPD	APD	Narcissism	Psychopathy	Machiavellianism	Sadism
BIS	0/02	0/15**	0/14**	0/06	0/14**	0/10*	0/13*	0/02
BAS	-0/16**	-0/13**	-0/15**	-0/13**	-0/14**	-0/19**	-0/12*	-0/02
FFS	0/07	-0/14**	-0/14**	-0/06	-0/10**	-0/11**	-0/09*	0/004

**P < 0.01

*P < 0.05

In Table 2, the results of the correlation test between the behavioral activating system with cluster B personality disorders and dark personality traits are presented. As can be seen, there is a significant relationship between behavioral activation and cluster B personality disorders and dark personality traits (P < 0.05).

Also, there is a significant relationship between behavioral inhibition and cluster B personality disorders and dark personality traits (P < 0.05). Finally, there is a significant relationship between fight and flight and cluster B personality disorders and dark personality traits (P < 0.05).

Table 3. Correlation test between dark personality traits and antisocial personality disorder

Variable	Machiavellianism	Narcissism	Psychopathy	Sadism
Antisocial personality disorder	0/18**	0/16**	0/11*	0/12*
Borderline personality disorder	0/09*	0/11*	0/19**	0/12*
Dramatic personality disorder	0/13**	0/16**	0/10*	-0/006
Narcissistic personality disorder	0/15**	0/12**	0/15**	0/16**

**P < 0.01

*P < 0.05

Table 3 shows the results of the correlation test between cluster B personality disorders and dark personality traits. Further, the VIF index (more than 10) and the tolerance index (less than 0.1) showed that the VIF and tolerance indices in each of the predictor variables are at the optimal level and there are no large correlations between the predictor variables and serious collinearity is evident. is not. Also, the two presuppositions of linearity of relationships and the same distribution of residuals were

checked with the distribution chart of predicted scores and residual scores. The absence of a clear trend in the distribution of points on the page indicates compliance with this assumption. After making sure that the assumptions of structural equation analysis are met, the results of this test are given in the following tables (Figure 1).

In measurement models, the strength of the relationship between the factor and the observable variable is shown by factor loading.

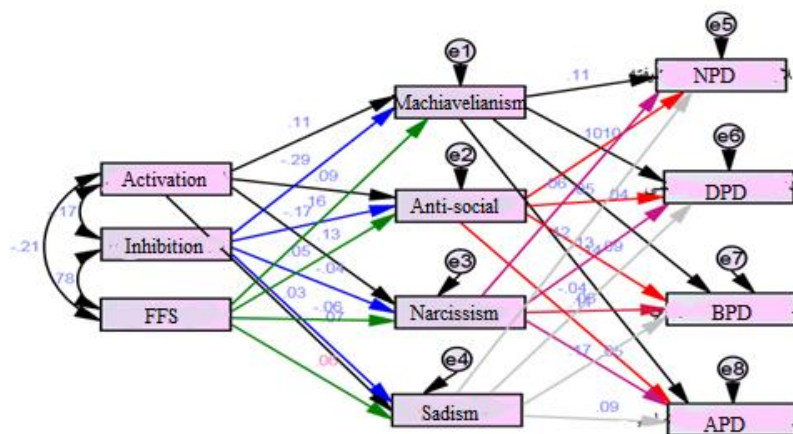


Figure 1. Effect coefficients of behavioral brain systems on personality disorder through dark personality traits

Table 4. Fit indices of the output model							
Index	X ²	X ² /df	GFI	AGFI	CFI	RMSEA	p
Model	30/41	2/53	0/93	0/95	0/97	0/06	0/001

Table 4 shows the fit indices of the proposed model, as it can be seen that the values of the fit index or GFI, the adjusted fit index or AGFI, the incremental fit index or IFI and the comparative fit index or CFI in the model are more than 0.9. Also, in appropriate models, the index of the ratio of chi square to the degree of freedom X²/df should be in the range of 1 to 3, and in this model, the index of the ratio of chi square to the degree of freedom X²/df is in the range of 1 to 3. Also, RMSEA should be less than 0.09, which was obtained in this model as 0.06, which shows that the validity of this model is favorable.

Conclusion

The aim of the present study was to investigate the relationship between brain-behavioral systems and cluster B personality disorders with the mediation of dark personality traits. The results showed that there is a positive relationship between the behavioral activation

system and cluster B personality disorders. This finding is in line with the research results of Azami and Kakabraei (2016) and Corr (2016). In another study, Corr (2016) showed that people who have a more sensitive behavioral activation system experience positive emotions such as hope and happiness and on the other hand report more emotional arousal such as aggressive tendencies. Azami and Kakabraei (2016) in another study reached the conclusion that the dark dimensions of the personality can be predicted by the variables of the behavioral activation system, behavioral inhibition system and emotional dysregulation. Therefore, the variables of behavioral inhibition system, behavioral activating system and emotional dysregulation are very important in predicting students' confusion and dark personality. Abnormal sensitivity of brain-behavioral systems indicates readiness and aptitude for many forms of mental disorders. As a result, it

is assumed that the behavioral activation system and the behavioral inhibition system can explain a wide range of disorders. In people whose inhibitory system works poorly, attention control, planning, action planning and control of inappropriate behavior and emotional regulation are weak in them, this increases their readiness for emotional dysregulation in patients. In fact, a person who has the ability to regulate his emotions, free from any internal or external coercion, can experience emotions or prevent them from occurring. On the other hand, a person who does not have the ability to manage his emotions and regulate his emotions, cannot experience emotions well or prevent them from occurring, and personality disorders increase.

The other part of the results showed that there is a negative relationship between the behavioral inhibition system and cluster B personality disorders. Cluster B personality disorder sufferers are born with a biological tendency to stress and have an innate defect in emotion regulation. Wrong learning, lack of learning or insufficient learning caused by environmental factors during childhood leads to weak emotional responses. This inability is in areas such as avoidance and escape behaviors, failure to acquire the necessary skills to regulate emotions, and wrong learning in interpersonal relationships and are related to the behavioral brain system (Kohi & Karami, 2014).

Also, based on the results, there is a positive and significant relationship between dark personality traits and personality disorder. Regarding the explanation of the results of these findings, it can be stated that: dark personality traits are in the form of a tendency to experience negative emotions such as anxiety and depression. These negative emotions can disrupt cognition in the form of insecurity, treatment and interference with interpersonal behavior in the form of anger and submission. According to the self-concept of vulnerability in students with this dimension, they may show the need to stay away from some people and situations. They may suppress negative emotions through attention-seeking behavior or through coercive actions on their environment. Therefore, these people have a personality disorder.

Another finding showed that there is a positive and significant relationship between the behavioral activation system and Machiavellianism, anti-socialism and Machiavellianism. Behavioral activation system

has a significant negative relationship with emotional problems. On the other hand, one of the symptoms of students with dark personality traits, emotional problems and experiencing negative emotions, such as fear, depression and anger, and emotional dysregulation. These results show that people who have more problems are less in search of rewards and have less tendency towards pleasurable behaviors and as a result experience less pleasant emotions than normal people. Also, students with more dark personality components probably have a limited ability to choose an adaptive emotional regulation strategy. It is possible that they misinterpret the physiological feelings associated with emotional arousal and their perception of these feelings is associated with behavioral inhibition, and in fact, the behavioral activation system increases the behaviors of dark personality traits in students (Corr, 2016). Another finding of the research showed that there is a negative and significant relationship between the behavioral inhibition system and narcissism, antisociality and Machiavellianism. Dark personality traits include the tendency to ignore the needs of others and to be on the sidelines, deceptive and controlling behaviors, being callous, grandiose and attention-seeking. Dissatisfied people try to get a high opinion of themselves as a special and superior person, an attitude that facilitates oppositional behavior in front of others and attention-seeking behavior and causes depression. Also, people with this pattern do not pay attention to the feelings and problems of others; lack guilt and remorse about the negative and harmful effects of their actions on others; Fear of being alone due to rejection or separation from important people in life, which is caused by uncertainty about their ability to take care of themselves physically and emotionally. The fact that they don't have the strength to tolerate monotony makes them ready to try anything, this diversity is related to their general impulsivity and the defect in the inhibition and emotional control system. (Yousefi et al., 2019).

Another finding of the research showed that there is a negative and significant relationship between the fight-flight system and narcissism, anti-socialism, and Machiavellianism. Gray (1987) considers heart disease as a reflection of over- or under-reactivity in one of the systems, dysfunction in one system, combination of over- or under-reactivity or dysfunction in more than

one system or dysfunction in the interaction between systems. Individual differences in anxiety and irritability represent a different pattern of reaction or sensitivity of two basic brain systems to internal stimuli. So that people with marital dissatisfaction are more sensitive to threatening situations that may result in punishment or stop a reward; In other words, these people are more sensitive to the signs of reward and punishment. In fact, these people are less inclined towards rewarding situations due to their fight-and-flight personality, and because of psychological and social issues that often manifest as depression and anxiety, they have less hope in life. They do not have proper emotional regulation and the amount of dark personality traits is higher in them (Azmi & Kakabraei, 2016).

Also, based on the findings, the dark traits of borderline personality have a significant mediating role in the relationship between behavioral brain systems and borderline personality disorder. In explaining this finding, it can be said that the high activity levels of both brain-behavioral systems in the borderline personality model are expected in borderline students due to the characteristics of anxiety, high level of dark personality traits, tendency to externalize and self-blame. Therefore, negative emotions and having dark personality traits and extreme guilt are the result of excessive activity of the behavioral inhibition system and reduced activity of the behavioral activation system that exists in people with borderline personality disorder (Kohi & Karami, 2014).

Also, people with dramatic personality disorder have difficulty in establishing intimate relationships and are unable to express their inner feelings. These people are afraid of being criticized in social interactions. They consider themselves as incompetent and unlovable and are unable to manage and resolve their communication conflicts, and in the face of such helpless and unpredictable conditions, they feel incompetent, ashamed and guilty. They decide to punish the person who made them feel inferior, frustrated and angry. Therefore, they plan to take revenge on the person who created these unpleasant feelings in them, and they get a sense of satisfaction when they have punished the other party. Sometimes people who fall into this category of personality disorders have dark personality traits in order to indirectly reduce

their feelings of tension, worry, failure and inadequacy (Kruger & Markon, 2014).

Also, the other part of the results showed that dark personality traits have a significant mediating role in the relationship between behavioral brain systems and narcissistic personality disorder. Narcissistic people are more aware of their emotions than borderline people, and this ability helps them to control and master their emotions. Narcissistic personality has a positive relationship with anxiety, hostility, depression, impulsivity and vulnerability and a negative relationship with positive emotions, trust, openness and acceptance and self-control. Therefore, it is more possible to experience dark personality traits and behavioral brain systems have a moderating role in this context (Kruger & Markon, 2014).

In general, the study of the role of biological personality traits in students will help researchers and specialists in the clinical field to achieve community-oriented protective and preventive factors in order to prevent the occurrence of psychological problems in students. This research was accompanied by limitations, including the fact that the data collection tool was self-reported and this study was conducted among the students of East Azerbaijan universities, so the generalization of the findings for other universities should be done cautiously. It is also suggested that these limitations be taken into consideration by future researchers.

Conflict of Interest

According to the authors, this article has no financial sponsor or conflict of interest.

References

- Abolghasemi, A., Taherifard, M., & Kiamarsi, A. (2020). The Role of Self-Regulation Behaviors in Prediction of Perception of Interpersonal Reactive in the Prisoners with Antisocial Personality Disorder. *Clinical Psychology and Personality*, 17(1), 33-43. (In Persian).
- Alebooyeh S, Jafari A. (2021). The Prediction of Positive and Negative Affect based on Self-Compassion with the mediating role of Personality Types A and B in Alzheimer's Caregivers. *Journal of Assessment and Research in Applied Counseling*. 3(4), 1-8. doi:[10.52547/jarcp.3.4.1](https://doi.org/10.52547/jarcp.3.4.1)
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental*

- disorders. Translated by Yahya Seyed Mohammadi. Tehran: Ravan publication. (In Persian).
- Azami, E., & Kakaberari, K. (2016). Distress tolerance. *Quarterly Journal of Health Breeze*, 5(1), 26-36. (In Persian)
- Bertl, B., Pietschnig, J., Tran, U.S., Stieger, S., Voracek, M. (2017). More or less than the sum of its parts? Mapping the Dark Triad of personality onto a single Dark Core. *Personality and Individual Differences*, 114, 140-144.
- Corr, P. J. (2008). *The reinforcement sensitivity theory of personality*. Cambridge University Press.
- Corr, P. J. (2016). Reinforcement sensitivity theory of personality questionnaires: Structural survey with recommendations. *Personality and Individual Differences*, 89, 60-64.
- Corr, P. J. (2004). Reinforcement sensitivity theory and personality. *Journal of Neuroscience and Biobehavioral Reviews*, 28, 317-332.
- Eysenck, M.W., (1990). *Happiness: Facts and Myths*, East Sussex, England: Erlbaum.
- Flexon, J.L., Meldrum, R.C., Young, J.T.N., & Lehmann, P.S. (2016). Low self-control and the Dark Triad: Disentangling the predictive power of personality traits on young adult substance use, offending and victimization. *Journal of Criminal Justice*, 46, 159-169.
- Franken, I.H., Muris, P., Georgieva, I. (2006). Gray's model of personality and addiction. *Addictive behaviors*, 31(3), 399-403.
- Ganji, H. (2017). *Mental health book*. Publications: Arsbaran. Print: 15.
- Garcia, D., Nima, A.A. & Archer, T. (2013). International note: Temperament and character's relationship to subjective well-being in Salvadorian adolescents and young adults. *Journal of Adolescence*, 36, 1115-1119.
- Gray, J. A. McNaughton, N. (2000). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. New York: Oxford University; 53-98.
- Gray, J. A. (1982). *The neuropsychology of anxiety: An enquiry into the functions of the septo-hippocampal system*. Oxford: Oxford University Press.
- Gray, J. A. (1987). Perspectives on anxiety and impulsivity: A commentary. *Journal of Research in Personality*, 21, 493-509.
- Gray, J. A. (1990). Brain systems that mediate both emotion and cognition. Special issue: Development of relationships between emotion and cognition. *Cognition and Emotion*, 4, 269-288.
- Gray, J. A. (1991). Neural systems, emotion and personality. In J. Madden, IV (Ed.), *Neurobiology of learning, emotion, and affect*. New York: Raven Press.
- Gray, J. A. (1994). Framework for a taxonomy of psychiatric disorders. In S. H. M. V. Goozen, N. E. V. Poll & J. Sergeant (Eds.), *Emotions: Essays on emotion theory*. New Jersey: Erlbaum.
- Hasani, J., & Rasoli Azad, M. (2012). Psychometric properties of Jackson's five factor questionnaire: Scales of revised reinforcement sensitivity theory (r-RST). *Journal of Research in Psychological Health*, 6(3), 60-73.
- Jackson, C. J. (2002). Mapping Gray's model of personality on to the Eysenck personality profiler (EPP). *Personality and Individual Differences*, 32(5-6), 795-802.
- Jonason, P.K., Webster, G.D. (2010). The dirty dozen: A concise measure of the dark triad. *Psychological Assessment*, 22(2), 420-432.
- Kaplan, H. I., & Sadock, B. J. (2015). *Synopsis of psychiatry: Behavioral sciences clinical psychiatry*. Williams & Wilkins Co.
- Kasch, K. L., Rottenberg, J., Arnow, B. A., & Gotlib, I. H. (2002). "Behavioral activation and inhibition systems and the severity and course of depression": *Journal of Abnormal Psychology*, 111, 589-597.
- Knight, Niki M. (2016). *The Dark Triad and HEXACO model of personality in relational aggression*. Master's theses. The University of Southern Mississippi.
- Kouhi, F., & Karami, J. (2015). The relationship between brain-behavioral systems, alexithymia and somatoform disorder symptoms in female students. *Journal of Research in Psychological Health*, 9(3), 13-21. (In Persian)
- Krueger, R.F., Markon, K.E. (2014). The Role of the DSM-5 Personality Trait Model in Moving Toward a Quantitative and Empirically Based Approach to Classifying Personality and Psychopathology. *Annual Review of Clinical Psychology*, 10:7.1-7.25.
- Lara, D. R., Bisol, L. W., Brunstein, M. G., Reppold, C. T., de Carvalho, H. W., & Ottoni,

- G. L. (2012). The Affective and Emotional Composite Temperament (AFECT) model and scale: a system-based integrative approach. *Journal of Affective Disorders*, 140(1), 14-37.
- Lee, K., & Ashton, M. C. (2005). Psychopathy, machiavellianism, and narcissism in the Five-Factor model and the HEXACO model of personality structure. *Personality and Individual Differences*, 38, 1571–1582.
- Matthews, G., & Gilliland, K. (1999). “The personality theories of H. J. Eysenck and J. A. Gray: A comparative review”: *Personality and Individual Differences*, 26, 583–626.
- Matthews, G., & Gilliland, K. (1999). “The personality theories of H. J. Eysenck and J. A. Gray: A comparative review”: *Personality and Individual Differences*, 26, 583–626.
- Meere, M; Egan, V. (2017). Everyday sadism, the Dark Triad, personality, and disgust sensitivity. *Personality and Individual Differences*, 112, 157–161.
- Meyer, B., Johnson, S. L., & Carver, C. S. (1999). “Exploring behavioral activation and inhibition sensitivities among college students at risk for mood disorders”: *Journal of Psychopathology and Behavioral Assessment*, 21, 275–292 .
- Meyer, B., Johnson, S. L., & Carver, C. S. (1999). “Exploring behavioral activation and inhibition sensitivities among college students at risk for mood disorders”: *Journal of Psychopathology and Behavioral Assessment*, 21, 275–292 .
- Miller, J. D., Gentile, B., Wilson, L., & Campbell, W. K. (2013). Grandiose and vulnerable narcissism and the DSM-5 pathological personality trait model. *Journal of Personality Assessment*, 95, 284–290.
- O’Meara, A., Davies, J., Hammond, S(2011). The psychometric properties and utility of the Short Sadistic Impulse Scale (SSIS). *Psychological Assessment*, 23(2), 523–531.
- Patrick, CJ., Fowles, DC., Krueger, RF(2009). Triarchic conceptualization of psychopathy: Developmental origins of disinhibition, boldness, and meanness. *Development and Psychopathology*, 21(3), 913–938.
- Paulhus, DL., Williams, KM(2002). The dark triad of personality: Narcissism, Machiavellianism, and psychopathy. *Journal of Research in Personality*, 36(6), 556-563.
- Pinker, S. (2011). *The better angels of our nature: Why violence has declined*. New York, Viking.
- Rasaei, Z., & Mansouri, A. (2020). The role of dark triad of personality in the prediction behavioral risk-taking and moral disengagement. *Clinical Psychology and Personality*, 16(1), 83-91.
- Rauthmann, JF(2012). The Dark triad and interpersonal perception: Similarities and differences in the social consequences of narcissism, Machiavellianism, and psychopathy. *Social Psychological and Personality Science*, 3(4), 487–496.
- Segarra, P., Poy, R., López, R., Moltó, J(2014). Characterizing Carver and White’s BIS/BAS subscales using the Five Factor Model of personality. *Personality and Individual Differences*, 61, 18-23.
- Twenge, J.M., & Campbell, W.K. (2009). *Living in the age of entitlement: The narcissism epidemic*. New York, NY: Free Press.
- Vervoort, L., Wolters, LH., Hogendoorn, SM., De Haan, E., Boer, F., Prins, PJ(2010). Sensitivity of Gray’s behavioral inhibition system in clinically anxious and non-anxious children and adolescents. *Personality and Individual Differences*, 48(5), 629-633.
- Yousefi, R., & Imanzad, A. (2018). Validating the Dark Tetrad personality model. *Iranian journal of psychiatry and clinical psychology*, 24(2), 190-201. (In Persian)
- Yousefi, R., Ahmadi, E., & Mirzazadeh, A. (2021). Cross-Validation of the Dark Pentad Personality Traits Model. *Journal of Modern Psychological Researches*, 16(61), 95-110. (In Persian)
- Zeigler-Hill, V., Marcus, D.K. (2016). *The dark side of personality: Science and practice in social, personality, and clinical psychology*. Washington D.C: American Psychological Association.