

Personality Characteristics as Predictive Factors for the Occurrence of Depressive Disorder

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Abstract

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BACKGROUND: The depressive disorder is one of the most frequent mental disorders, which is often associated with severe dysfunctionality. Personality traits are considered as important factors for the occurrence of depressive disorder.

AIM: To determine the specificity of personality dimensions as predictive factors of depressive disorder.

METHODS: This research was conducted at the University Psychiatric Clinic Skopje as a "case-control" study. TCI-R (temperament and character inventory – revised) was used as the main research instrument.

RESULTS: There are specific personality traits expressed through high scores of Harm Avoidance and low scores of Self –Directedness traits as predictive factors related to an incidence of the depressive disorder.

CONCLUSION: The results of this study show that certain personal traits, and more specific HA and SD, are with a specific predictability of the depressive disorder.

Introduction

Cloninger has developed personality theory as the biopsychosocial model of temperament and character, which is based on biological, neurophysiological, psychological and genetic studies [1-3]. It describes the relationship between personality biogenetic structure and mental disorders. Cloninger proposed that person can be considered as a multidimensional construct that includes lower and higher levels of personal functioning through the features of temperament and character. Cloninger conceptualises personality as the combination of two interrelated domains: temperament and character traits.

Temperament is reflecting heritable and neurobiologically based differences in behavioural

conditioning, and character traits reflecting both neurobiological and sociocultural mechanisms of semantic and self-aware learning. Those domains are hypothesised to interact as a nonlinear dynamic system regulating the development of human psychological functions [4, 5].

Personality system was proposed as the seven-factor model of temperament and character. Cloninger et al. proposed that temperament consists of four heritable dimensions: Novelty-Seeking (NS); Harm-Avoidance (HA); and Reward Dependence (RD), from which the fourth dimension Persistence (P) emerged.

Cloninger hypothesised that temperament traits are determined genetically and correlated with dopaminergic, serotonergic and noradrenergic activities, with early life manifestation. It is discussed that they have strong relations with the older cortico-

striatal and limbic systems that regulate habits and skills.

Temperament is largely genetically determined and configures automatic behavioural responses, which are related to vulnerability to a wide range of mental disorders. Cloninger et al., proposed three dimensions of character which mature in adulthood, using them to measure a person's humanistic and transpersonal style: Self-Directedness (SD), Cooperativeness (C), and Self-Transcendence (ST).

These character dimensions present persons mental self-government and can measure the presence of personality disorder. Cloninger et al. have hypothesised that character dimensions are influenced environmentally. However, some authors have suggested that they are related with recently evolved regions of the brain - such as the frontal, temporal, and parietal neocortex - that regulate learning of facts and propositions. However, Cloninger has later acknowledged that the relationship between neurotransmitters and temperament is more complex than the originally postulated [4].

Temperament traits

Novelty was seeking: Novelty seeking (NS) is explained as the tendency toward exploratory activity and intense excitement in response to novel stimuli, linked with low basal dopaminergic activity.

Harm avoidance: Harm avoidance (HA) is explained as a tendency to respond intensely to aversive stimuli and to avoid punishment, linked with high serotonergic activity.

Reward dependence: Reward dependence (RD), is explained as the tendency to respond intensely to that was originally hypothesised to be linked with low basal noradrenergic activity.

Persistence: Persistence (P) is the dimension of personality temperament, which indicates person's perseverance in their intentions and actions, despite relative chances of success.

Character traits

Self –Directedness: Self –Directedness (SD) refers to the person the ability to adjust behaviour according to the selected goals and values. It is the source of a sense of personal integrity and self-esteem.

Cooperatives: Cooperativeness (C) is defined as the ability of the person to accept and identify with other people.

Self – Transcendence: Self-Transcendence refers to the interest people have in searching for something elevated, something beyond their individual

existence [23]. According to Cloninger's model, self-transcendence can manifest as an intuitive understanding of elevated aspects of humanity, like compassion, ethics, art, and culture.

Relation of temperament and character traits with the emergence of depressive disorder

The relationship between affective disorders and personality is complex. Personality features may predispose an individual to, result from, or modify clinical symptoms of a depressive illness, or be an attenuated expression of a Self –Directedness n affective disorder [6]. Several clinical studies indicate that personality traits can be used to predict further vulnerability to mood disorders [7-10].

Cloninger's Personality model is quite adequate for clinical use as in the process of assessing the risk of a depressive disorder and in the planning of appropriate antidepressant treatment. Cloninger suggests that the interaction of all dimensions of personality may influence vulnerability to depression [11]. Relevant scientific studies prove the clinical use of Cloninger's theory, especially in patients with the unipolar depressive disorder. These studies demonstrate that high-HA in relation with other personal characteristics, among other is associated with the onset of a depressive disorder, and familial vulnerability to unipolar depression is associated mostly with high HA and low SD [12-15].

In recent years TCI is widely used for determination of the personal characteristic of people with depression. Result in many studies show higher levels of HA and ST and a lower level of SD and C, in comparison with the control groups [11, 17-20]. Studies indicate that several clinical features specific to hit the highway connect such as recurrence of mood changes, and comorbidity with other psychiatric conditions associated with personality characteristics. The presence of comorbid anxiety disorders is most frequent, compared to control groups [13].

In line with the most research in this field, the results show that as the most effective dimensions of personality with the distinctive predictability of occurrence of depressive disorder can serve HA and SD dimensions of personality. Depressed patients exhibit higher harm avoidance scores as well as lower self-directedness scores as compared to healthy controls in most of the studies, as well as in this study. Regarding other traits, results differ, and there are different types of analysis. Some authors are finding lower C and higher ST and RD, but with conclusions that these scores are likely to state dependent. Svrakic has concluded that high scores of SD and C are more common in people with mood disorders [21]. Rosenström et al has reported that characteristic of people with major depressive disorder (MDD) are

dependable of mood state [22]. Hi LU has concluded that trait depression and anxiety were linked to high harm avoidance and low self-directedness, and trait depression was linked to high self-transcendence [23]. Other studies have shown that antidepressants are changing personality characteristics after successful therapy outcome, and some studies even showed that temperament might influence response rate to antidepressant treatments in patients with major depression [24].

The main purpose of this study is to determine the role of specific personality traits as predictors of depressive disorder.

Methods

Research tools

Two questionnaires were used as research tools.

For depression measurement: The Beck Depression Inventory is a 21-question multiple-choice self-report inventory. It is widely used the questionnaire to assess the presence and severity of depressive symptoms. They assessed four points scale of 0 to 3, based on the weight of each question. Beck (1996) classifies the total score as follows: 0 -9 normal range; 10-18 minimal depressive symptoms; 19-28 moderate symptoms and severe symptoms 29-63 [25, 26].

For personality measurement: Cloninger's Temperament and Character Inventory-Revised (TCI-R) is 240 items self-report questionnaire with 5-grade Likert scale responses ranging from definitely false to true. It is intended to assess the individual differences of the four temperaments (Harm Avoidance, Novelty Seeking, Reward Dependence and Persistence) and three character higher-order dimensions (Self-Directedness, Cooperativeness and Self-Transcendence). Each higher order dimension if further divided into sub-scales. TCI has been proven internally consistent and factor-analytically valid tool for clinical and legal samples [27-31].

Data was analysed using SPSS version 17. One way ANOVA was used to compare the mean score results between the groups, with the level of significance set at 5%.

Subject and procedures

Examined group (EG): A set of questionnaires was twice applied to the participants of the examined group – inpatients in the University Clinic of Psychiatry Skopje, diagnosed with the recurrent depressive disorder (F33.x). A total of 20 subjects were included

in this study, ten males (50%), and ten women (50%).

Their mean age was 35.9 years, SD \pm 6.8 years. First time (T1), questionnaires were applied during the depressive episode, and a second time (T2) after three months anti-depressive treatment (89 days \pm 13.5 days).

Control Group (CG): 20 individuals – volunteers, without the history of mental illnesses or relatives with mental illnesses. The research tools were applied once (T1 time), ten males (50%), and ten women (50%). Their mean age was 32.7 years, SD \pm 4.9 years.

Informed consent was signed by all participants from both groups. This research was conducted at the University Psychiatric Clinic - Skopje.

Results

The obtained results show that there are significantly relevant differences of certain personality traits between the both groups of respondents, indicating that HA high scores and SD low scores are characteristic of people with a depressive disorder, and therefore predictors for its occurrence (Table 1).

Table 1: Comparison of personality traits between depress patients and controls

		Mean	Std. Deviation	95% Confidence Interval for Mean		Minimum	Maximum	p
				Lower Bound	Upper Bound			
NS_TOTAL	EG before treatment	94.40	5.67	91.22	96.77	79	104	.004
	EG after treatment	102.33	6.33	96.79	107.77	83	114	
	CG	104.70	6.95	93.82	109.88	83	113	
HA_TOTAL	EG before treatment	113.44	9.98	106.75	119.04	95	159	<0.01
	EG after treatment	107.30	8.47	104.52	108.08	84	130	
	CG	94.49	8.99	90.01	100.01	88	120	
RD_TOTAL	EG before treatment	99.14	6.10	96.17	102.44	88	120	.048
	EG after treatment	103.97	6.52	100.42	105.53	93	120	
	CG	105.97	6.06	104.35	107.51	93	120	
P_TOTAL	EG before treatment	114.99	10.46	112.31	117.76	88	150	.026
	EG after treatment	116.83	10.64	114.29	119.37	93	162	
	CG	117.18	10.15	115.50	120.93	94	155	
SD_TOTAL	EG before treatment	122.34	5.44	118.93	125.72	106	139	<0.01
	EG after treatment	127.67	6.56	121.96	133.13	110	137	
	CG	142.43	7.60	133.07	155.14	124	159	
C_TOTAL	EG before treatment	115.80	5.35	110.93	118.72	102	129	0.045.
	EG after treatment	118.55	6.56	113.96	123.13	104	141	
	CG	125.88	7.60	119.07	128.14	109	148	
ST_TOTAL	EG before treatment	72.84	5.35	70.93	73.72	59	86	0.23
	EG after treatment	71.89	6.56	69.96	73.13	48	85	
	CG	71.32	7.60	71.07	75.14	49	87	

Discussion

Our findings show that the human personality consists of multiple dimensions that interact as a complex adaptive system, not as a set of individual components. The results, which are in line with most studies in this field, are conclusive that certain personality characteristics could be assessed as predictors of depressive disorder. Scores of dimensions Harm Avoidance (HA) and Self – Directedness (SD) presented significant differences in scores between EG and CG, which do not change significantly even after treatment, suggesting that these characteristic values for people with depression.

This study has defined high scores of HA and low scores of SD as predictors of the occurrence of depressive disorder. Namely, after antidepressant treatment, scores of HA and SD remain close to values before treatment, which means that high HA and low SD are typical for people who suffer from a depressive disorder. The results of TCI inventory indicated that HA is an emotional marker for vulnerability to depressive disorder and SD represents the marker for executive functions for protection. These conclusions are in line with findings of many scientific types of research; confirming that high scores of HA and low scores of SD are significant predictors of vulnerability to depressive disorder [15].

Harm Avoidance (HA) is a characteristic of a person who is associated with inhibition or interruption of a certain kind of behaviour in any frustrated situation. Persons who have high scores of HA are characterised by uncertainty, light tiredness, seclusion, pessimism, and is described as fearful, inhibited, with the constant anticipation of damage, while a person with low scores is described as calm, uninhibited, carefree, energetic, and optimist [2].

Taking into account the total values of HA for all groups, it can be concluded that people with high levels of HA are at increased risk of depressive disorder, or are characteristic of a population that already had depressive episodes. With high levels of the personality, characteristic HA can be described tendency toward negative emotions such as fear, shyness and constant concern. These personality traits are characteristic of a person with a higher risk of the depressive disorder. These values are accepted as a general characteristic of people with the depressive disorder. However, the mood state of the depressive patient should be taken into consideration because of possible bias. The results of relevant studies suggest that elevated HA are due to personality characteristics, and are characteristic of people prone to depression.

The obtained results are also leading to conclusions that low levels of SD can be a risk factor for depression; however is not clear how low SD can cause depression. SD as a feature of personality involves the ability of individuals to control their

behaviour, with the high capacity for adaptability to new requirements or conditions, reinforcing behavioural patterns aimed at satisfying individual targets and selected values [2-3].

Persons who have high scores for SD are characterised by responsibility, maturity, self-respect, initiative, determination for achievement, with a high degree of insight. On the other hand, people who have low scores for SD are characterised by a sense of inferiority, lack of initiative, proneness to wishful thinking, blaming others for their mistakes. These characteristics are very similar to the description of the depressive person, so it is presumable that low SD scores are linked occurrence of depression. Such findings are stressing conclusions that those subjects with high SD are more able to cope effectively and successfully with difficult life situations or to adapt accordingly and to use their defence mechanisms to deal with the stressor situation [18, 32-34].

Some of the others dimensions are also influenced by depressive episode, but the conclusion is that they are variably influenced by mood state and that they don't have characteristics of prediction.

Novelty seeking (NS) is associated with the initiation of interest for new events or things, and of the appropriate action. NS median values after treatment of the depressive patients are closer to the values of the control group [35]. This indicates that this personality characteristic is probably changeable as a result of a depressive disorder and that due to the process of recovery values are closer to those of the control group. This aspect, along with the results of the correlation of the total value of NA (negative correlation with Beck scale) indicates that this personality characteristic can be an indicator of the success of antidepressant treatment rather than a predictor of depression.

Reward dependence (RD) is characterised by a tendency toward dependence on signals of reward, especially verbal signals of social approval, social support and present mood state. As the results of other relevant research, results of our study show that the values of RD are correlated with depressive mood [36]. A change in scores of RD reflects the present mood state, and it can be assumed that the various expressions of depressive symptoms showed different influence on personality characteristics. RD is negatively correlated with Beck scale, which shows that reducing the Beck scale scores is correlated with an increase of RD scores.

Cooperation (C) is the dimension of the character which is defined as the ability of a person identification and acceptance by others [11]. The results obtained from personality dimension C, during can be concluded that its score is dependable of mood state, and average values after antidepressant treatment are closed to control group. This result is leading to the conclusion that C is not having the predictability of occurrence of depression.

Results obtained have shown that some of the personality characteristics are not influenced by mood state: Persistence (P) is the personality temperament dimension, which indicates whether person's perseverance is in their intentions and actions and despite the relative chances of success [38]. The results obtained in this study show that P does not qualify as any of predictability of occurrence of depressive disorder nor the success of antidepressant therapy. Certain changes are interpreted as variables dependent on the current affective state, i.e. changes in scores with a certain value in a depressed state and after the treatment.

Self-transcendence (ST) is the dimension of the character that relates to the spiritual aspects of the person. The differences in the values of self-overcoming feature did not show statistically significant difference [11]. Obtained results are not leading to the conclusion that this personality characteristic lacks specificity for any predictability of occurrence, nor are dependable of the mood state, i.e. the antidepressant treatment is without influence on this particular personality characteristic.

However, beside general conclusions which indicate that HA and SD may be a relevant predictors of the occurrence of depressive disorder, this kind of interpretation or conclusion can not be generalised. Namely, a very important circumstance is referred to the relationship with other personal dimensions. Many authors suggest interplay with other features of personality such as NS, RD or ST, can be of more important influence than singular dimension itself.

In conclusion, the results of this study show that certain personal traits, and more specific HA and SD, are with a specific predictability of the depressive disorder. Personality dimensions HA and SD differ significantly among the individuals from the examined and control group, which gives it a feature of risk factors for the emergence of the depressive disorder. Although these results are correlated with other scientific researches, it is important to mention that there is a discussion whether they are the result of the primary personal characteristics, or are the result of a personality change due to recurrent depressive disorder. These features should be considered independently, but should always acknowledge the interaction and mutual influence with other personality characteristics. So far in psychiatric science reliable indicators are not established, that would indicate the possibility to predict relapse of depressive episodes. However, these findings could lead to a development of an individual approach in the treatment of the depressive disorder [11, 38, 39].

References

1. Cloninger CR, Svrakic DM, Przybeck TR. A psychobiological model of temperament and character. *Archives of General Psychiatry*. 1993;50(12):975–990. <https://doi.org/10.1001/archpsyc.1993.01820240059008> PMID:8250684
2. Cloninger CR, Svrakic NM, Svrakic DM. The Role of personality self-organization in development of mental order and disorder. *Development and Psychopathology*. 1997;9(4):881–906. <https://doi.org/10.1017/S095457949700148X>
3. Cloninger CR (ed). *Personality and psychopathology*. Washington, D.C.: American Psychiatric Press, 1999.
4. Cloninger CR. The psychobiological theory of temperament and character: comment on Farmer and Goldberg. *Psychological Assessment*. 2008;20(3):292–299. <https://doi.org/10.1037/a0012933> PMID:18778165
5. Turner RM, Hudson IL, Butler PH, Joyce PR. Brain function and personality in normal males. *Neuroimage*. 2003; 19:1145–1163. [https://doi.org/10.1016/S1053-8119\(03\)00171-X](https://doi.org/10.1016/S1053-8119(03)00171-X)
6. Duggan C, Milton J, Egan V, McCarthy L, Palmer B, Lee A. Theories of general personality and mental disorder. *Br J Psychiatry* 2003; 182(Suppl 44):19–23. <https://doi.org/10.1192/bjp.182.44.s19>
7. Josefsson K, Merjonen P, Jokela M, Pulkki-Råback L, Keltikangas-Järvinen L. Personality profiles identify depressive symptoms over ten years? A population-based study. *Depress Res Treat*. 2011;2011:431314. <https://doi.org/10.1155/2011/431314>
8. Black DW, Shaw M, McCormick B, Bayless JD, Allen J. Neuropsychological performance, impulsivity, ADHD symptoms, and novelty seeking in compulsive buying disorder. *Psychiatry Res*. 2012;200:581–587. <https://doi.org/10.1016/j.psychres.2012.06.003> PMID:22766012 PMCID:PMC3665329
9. Wu PJ, Chang SM, Lu MK, Chen WJ, Yang YK, Yeh TL, Liao SC, Lu RB, Kuo PH. The profile and familiarity of personality traits in mood disorder families. *J Affect Disord*. 2012;138:367–374. <https://doi.org/10.1016/j.jad.2012.01.015> PMID:22331025
10. Farmer A, Mahmood A, Redman K, Harris T, Sadler S, McGuffin P. A sib-pair study of the Temperament and Character Inventory scales in major depression. *Arch Gen Psychiatry*. 2003; 60:490–496. <https://doi.org/10.1001/archpsyc.60.5.490> PMID:12742870
11. Cloninger CR, Švrakić DM, Przybeck TR. Can personality assessment predict future depression? At twelve-month follow-up of 631 subjects. *J Affect Disord*. 2006;92:35–44. <https://doi.org/10.1016/j.jad.2005.12.034> PMID:16442638
12. Abrams KY, Yune SK, Kim SJ, Jeon HJ, Han SO, Hwang J, et al. Trait and state aspects of harm avoidance and its implication for treatment in major depressive disorder, dysthymic disorder, and depressive personality disorder. *Psychiatry Clin Neurosci*. 2004;58(3): 240–248. <https://doi.org/10.1111/j.1440-1819.2004.01226.x> PMID:15149288
13. Jylhä P, Isometsä E. The relationship of neuroticism and extraversion to symptoms of anxiety and depression in the general population. *Depress Anxiety*. 2006;23(5):281–9. <https://doi.org/10.1002/da.20167> PMID:16688731
14. Hruby R, Nosalova G, Ondrejka I, Preiss M. Personality changes during antidepressant treatment. *Psychiatr Danub*. 2009;21(1): 25–32. PMID:19270618
15. Farmer A, Mahmood A, Redman K, Harris T, Sadler S, McGuffin P. A sib-pair study of the Temperament and Character Inventory scales in major depression. *Arch Gen Psychiatry*. 2003; 60:490–496. <https://doi.org/10.1001/archpsyc.60.5.490> PMID:12742870
16. Svrakic DM, Przybeck TR, Cloninger CR. Mood states and personality traits. *Journal of Affective Disorders*. 1992; 24:217–26. [https://doi.org/10.1016/0165-0327\(92\)90106-G](https://doi.org/10.1016/0165-0327(92)90106-G)
17. Nery FG, Hatch JP, Nicoletti MA, Monkul ES, Najt P, Matsuo K, Cloninger CR, Soares JC. Temperament and character traits in major depressive disorder: influence of mood state and recurrence of episodes. *Depress Anxiety*. 2009;26(4):382–8. <https://doi.org/10.1002/da.20478> PMID:19195006
18. Sat o T, Narita T, Hirano S, Kusunoki K, Goto M, Sakado K, et al. Factor validity of the Temperament and Character Inventory in patients with major depression. *Compr Psychiatry*. 2001;42:337–41. <https://doi.org/10.1053/comp.2001.24587> PMID:11458309
19. Matsudaira T, Kitamura T. Personality traits as risk factors of

- depression and anxiety among Japanese students. *J Clin Psychol*. 2006;62:97–109. <https://doi.org/10.1002/jclp.20215> PMID:16287151
20. Hansenne M, Reggers J, Pinto E, Kjiri K, Ajamier A, Ansseau MA. Temperament and character inventory (TCI) and depression. *J Psychiatr Res*. 1999;33:31. [https://doi.org/10.1016/S0022-3956\(98\)00036-3](https://doi.org/10.1016/S0022-3956(98)00036-3)
21. Svrakic DM, Whitehead C, Przybeck TR, Cloninger CR. Differential diagnosis of personality disorders by the seven-factor model of temperament and character. *Arch Gen Psychiatry*. 1993;50:991–999. <https://doi.org/10.1001/archpsyc.1993.01820240075009> PMID:8250685
22. Rosenström T, Jylhä P, Robert Cloninger C, Hintsanen M, Elovainio M, Mantere O, Pulkki-Råback L, Riihimäki K, Vuorilehto M, Keltikangas-Järvinen L, Isometsä E. Temperament and character traits predict future burden of depression. *J Affect Disord*. 2014;158:139–47. <https://doi.org/10.1016/j.jad.2014.01.017> PMID:24655778
23. Lu X, Chen Z, Cui X, Uji M, Miyazaki W, Oda M, Nagata T, Kitamura T, Katoh T. Effects of temperament and character profiles on state and trait depression and anxiety: a prospective study of a Japanese youth population. *Depression research and treatment*. 2012;2012.
24. Sato T, Hirano S, Narita T, Kusunoki K, Kato J, Goto M, Sakado K, Uehara T. Temperament and character inventory dimensions as a predictor of response to antidepressant treatment in major depression. *J Affect Disord*. 1999;56(2-3):153–61. [https://doi.org/10.1016/S0165-0327\(99\)00047-6](https://doi.org/10.1016/S0165-0327(99)00047-6)
25. Beck AT. *Depression: Causes and Treatment*. Philadelphia: University of Pennsylvania Press, 1972.
26. Beck AT, Steer RA, Garbin MG. Psychometric properties of the Beck Depression Inventory: twenty-five years later. *Clinical Psychology Review*. 1988; 8:77–100. [https://doi.org/10.1016/0272-7358\(88\)90050-5](https://doi.org/10.1016/0272-7358(88)90050-5)
27. Cloninger CR. (1994). *The temperament and character inventory (TCI): A guide to its development and use*. St. Louis, MO: Center for Psychobiology of Personality, Washington University, 1994.
28. Brandstrom S, Schlette P, Przybeck TR, Lundberg M, Forsgren T, Sigvardsson S, Nylander PO, Nilsson LG, Cloninger RC, Adolfsson R. Swedish normative data on personality using the Temperament and Character Inventory. *Comprehensive Psychiatry*. 1998;39:122–128. [https://doi.org/10.1016/S0010-440X\(98\)90070-0](https://doi.org/10.1016/S0010-440X(98)90070-0)
29. Gutiérrez-Zotes JA, Bayón C, Montserrat C, Valero J, Labad A, Cloninger CR, Fernández-Aranda F. "[Temperament and Character Inventory Revised (TCI-R). Standardization and normative data in a general population sample]". *Actas españolas de psiquiatria*. 2004;32(1): 8–5. PMID:14963776
30. Pelissolo A, Mallet L, Baleyte JM, Michel G, Cloninger CR, Allilaire JF, Jouvent R. The Temperament and Character Inventory-Revised (TCI-R): psychometric characteristics of the French version. *Acta Psychiatrica Scandinavica*. 2005;112(2):126–33. <https://doi.org/10.1111/j.1600-0447.2005.00551.x> PMID:15992394
31. Preiss M, Kucharová J, Novák T, Stepánková H. The temperament and character inventory-revised (TCI-R): a psychometric characteristics of the Czech version". *Psychiatria Danubina*. 2007;19 (1–2): 27–24. PMID:17603413
32. Hansenne M, Reggers J, Pinto E, Kjiri K, Ajamier A, Ansseau MA. Temperament and character inventory (TCI) and depression. *J Psychiatr Res*. 1999;33:31–36. [https://doi.org/10.1016/S0022-3956\(98\)00036-3](https://doi.org/10.1016/S0022-3956(98)00036-3)
33. Matsudaira T, Kitamura T. Personality traits as risk factors of depression and anxiety among Japanese students. *J Clin Psychol*. 2006;62:97–109. <https://doi.org/10.1002/jclp.20215> PMID:16287151
34. Smit h DJ, Duffy L, Stewart ME, Muir WJ, Blackwood DH. High harm avoidance and low self-directedness in euthymic young adult with recurrent, early-onset depression. *J Affect Disord*. 2005;87:83–89. <https://doi.org/10.1016/j.jad.2005.03.014> PMID:15967233
35. Stedenfeld KA, Clinton SM, Kerman IA, Akil H, Watson SJ, Sved AF. Novelty-Seeking Behavior Predicts Vulnerability in a Rodent Model of Depression. *Physiology & behavior*. 2011;103(2):210–216. <https://doi.org/10.1016/j.physbeh.2011.02.001> PMID:21303678
36. Millon T, Lerner MJ, Weiner IB. (January 3, 2003). *Handbook of psychology: Personality and social psychology*. Wiley, 2003: 688.
37. Siddiqi SH, Chockalingam R, Cloninger CR, Lenze EJ, Cristancho P. Use of the Temperament and Character Inventory to Predict Response to Repetitive Transcranial Magnetic Stimulation for Major Depression. *J Psychiatr Pract*. 2016;22(3):193–202. <https://doi.org/10.1097/PRA.0000000000000150> PMID:27123799
38. Aukst Margetić B, Jakovljević M. Psychobiological model of personality and psychopharmacotherapy outcomes in treatment of depression and schizophrenia. *Psychiatria Danubina*. 2013;25(3):0–328.
39. Corruble E, Duret C, Pelissolo A, Falissard B, Guelfi JD. Early and delayed personality changes associated with depression recovery? A one-year follow-up study. *Psychiatry Res*. 2002; 109:17–25. [https://doi.org/10.1016/S0165-1781\(01\)00366-3](https://doi.org/10.1016/S0165-1781(01)00366-3)