

The relationship between five-factor model and diagnostic and statistical manual of mental disorder-fifth edition personality traits on patients with antisocial personality disorder

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Background: Despite the fact that new criteria of antisocial personality disorder (ASPD) in diagnostic and statistical manual of mental disorders-fifth edition (DSM-5) were resulted from five-factor model (FFM), there is a small amount of studies that investigate the relations between proposed personality traits and FFM. Also, cross-cultural study in this field continuously would be needed. The aim of the present study was to evaluate the relation between the FFM and DSM-5 ASPD pathological traits. **Materials and Methods:** This study was a cross-sectional study design. The participants consisted of 122 individuals with ASPD that selected from prisoners (73.0%), outpatients (18.0%), and inpatients (9.0%). They were recruited from Tehran Prisoners, and Clinical Psychology and Psychiatry Clinics of Razi and Taleghani Hospitals, Tehran, Iran, since 2013-2014. The Sample was selected based on judgmental sampling. The structured clinical interview for DSM-IV axis II disorders-Personality Questionnaire, NEO-Personality Inventory-Revised, and DSM-5 personality trait rating form were used to diagnosis and assessment of personality disorder. Pearson correlation has been used for data analysis. All statistical analyses were performed using the SPSS 16 software. **Results:** The results indicate that neuroticism (N) has positive significant relationship with hostility ($r = 0.33, P < 0.01$), manipulativeness ($r = 0.25, P < 0.01$), deceitfulness ($r = .23, P < 0.01$), impulsivity ($r = 0.20, P < 0.05$), and negative relation with risk taking ($r = -0.23, P < 0.01$). Also, there was significant relationship between extraversion (E) with manipulativeness ($r = 0.28, P < 0.01$) and deceitfulness ($r = 0.32, P < 0.01$). Agreeableness and conscientiousness have negative significant relation with DSM-5 traits. In addition, results showed that there is positive significant relationship between FFM and DSM-5 personality traits with DSM-fourth edition-text revision (DSM-IV-TR) ASPD symptoms ($P < 0.01$). **Conclusion:** Except manipulativeness, deceitfulness, and callousness, there is positively significant relationship between DSM-5 ASPD traits and DSM-IV-TR ASPD symptoms. The present study helps to understand the adequacy of dimensional approach to evaluation of ASPD pathology, specifically on Iranian sample.

Key words: Antisocial personality disorder, diagnostic and statistical manual of mental disorders-fifth division, five-factor model, personality traits

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INTRODUCTION

Personality disorders (PDs) are currently diagnosed using the American Psychiatric Association's diagnostic and statistical manual of mental disorders-fourth edition-text revision (DSM-IV-TR).^[1] The essential problems, with the PD diagnostic system in DSM-IV-TR, led to DSM approach revision to be considered.^[2,3] Since 2000, after the latest revision of DSM, PD researchers largely agree that personality pathology should be represented dimensionally rather than categorically.^[4] So, many alternative dimensional models of personality have been considered,^[5-8] and ongoing research was used

to delineate the conceptual and empirical structure of personality traits in the pathological range.^[7,9] One of the major catalysts for the advancement of research on personality in recent years has been the growing consensus for a personality model encompassing five broad dimensions, namely neuroticism (N), extraversion (E), openness to experience (O), agreeableness (A), and conscientiousness (C).^[10] Finally, dimensional model for PDs, based on five-factor model (FFM), has been represented. In this model, 25 primary traits are organized by five higher order dimensions (negative affect, detachment, antagonism, disinhibition (DS), and psychoticism).^[11] Dimensional models view personality

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traits as continuously distributed in populations and personality psychopathology as extreme variants of these personality traits and domains.^[12-14]

Antisocial personality disorder (ASPD) is one of the six PDs that have proposed for DSM-5. The essential features of ASPD in dimensional model are antagonism (characterized by manipulativeness, deceitfulness, callousness, and hostility) and DS (characterized by irresponsibility, impulsivity, and risk taking).^[15] As mentioned, Widiger^[16] have demonstrated that many of the central elements of PDs can be explained in terms of big-five or FFM traits. Trull and Widiger^[17] illustrated high and low relations of FFM factors with DSM-5 personality traits. One concern that has been raised with respect to the FFM of PD is its potential complexity.^[18] To the extent that the model is comprehensive in its coverage of maladaptive personality functioning, there is indeed to the potential for any particular individual's FFM profile to be exceedingly complex.^[17] So, the FFM profile of PDs especially ASPD has investigated in many studies. Previous studies showed that profile of individuals with ASPD composed of very low agreeableness and conscientiousness and high extraversion, along with high levels of facets of neuroticism (high impulsiveness and angry hostility, low anxiety, depression, self-consciousness, and vulnerability).^[19-27] Despite the good dimensional construction of ASPD that resulted from FFM, there is a small amount of literature investigating relations between proposed personality traits and FFM. Such relationships have however not been demonstrated across ASPD patients. Also, cross-cultural study in this field continuously would be needed. Though the purpose of the current study was two-fold, first, to examine the correlation between FFM and DSM-5 antisocial personality traits, and second, to explore that how well FFM and DSM-5 personality traits are related with DSM-IV-TR ASPD symptoms on Iranian patients.

MATERIALS AND METHODS

Design

This study was a cross-sectional study design.

Participant

The sample in this study consisted of 122 individuals with antisocial personality. Participants selected from prisoners (73.0%), outpatients (18.0%), and inpatients (9.0%). They were recruited from Tehran Prisoners, and Clinical Psychology and Psychiatry Clinics of Razi and Taleghani Hospitals, Tehran, Iran. Because of accessibility limitations, the sample was selected based on judgmental sampling. Inclusion criteria were diagnosis of ASPD, at least 18 years of age, and had at least secondary education; exclusion criteria were presence of a psychotic disorder, presence of severe mood disorder, presence of mental retardation,

and presence of physical condition that impairs person's mental state. All participants were male. Subjects aged 18-40, with guidance school degree of study and higher. History of axis I disorders, 55 patients (45.1%) without disorder, 49 patients (40.2%) with a history of substance-related disorders, 10 patients (8.2%) with history of mood disorder, and 8 patients (6.5%) with other disorders.

Materials

Patients in this study were enrolled based on the structured clinical interview for DSM-IV axis II disorders (SCID-II). The dimensional signs and symptoms of ASPD were evaluated by DSM-5 personality trait rating.

Structured clinical interview for diagnostic and statistical manual of mental disorders fourth edition disorders

SCID and its versions are considered as the most comprehensive of the structured diagnostic interviews that are available. In fact, they are new and wide range utility instruments in 1987 by Spitzer, Gibbon, Williams and built in compliance with the criteria of the DSM-IV.^[27] The instrument is established as the gold standard for the reliable assessment of psychiatric disorders. Interrater reliability for SCID-I was above 0.70 for mood, anxiety, schizophrenic disorders, and alcohol abuse; it was somewhat lower for a few other disorders,^[28] for SCID-II, it was reported between 0.48 and 0.98 for the categorical diagnoses (Cohen's κ) and 0.90-0.98 for the dimensional judgments (intra-class correlation coefficient).^[29] Cronbach's α was found between 0.71 and 0.94 for the SCID-II PD scales.^[29] Due to high accuracy of the diagnostic criteria and extraordinary compliance with DSM-IV criteria, the codification translated and adapted to different languages. In Iran, SCID-II and SCID-II-Personality Questionnaire (SCID-II-PQ) have been translated and adapted by Mohammadkhani *et al.*^[30] The duration of the SCID-I is 30-90 min and the duration of the SCID-II is 30-60 min.

NEO-Personality Inventory-Revised

The NEO-Personality Inventory-Revised (NEO-PI-R) was designed to measure the FFM of personality and yields scores for neuroticism, extraversion, openness to experience, agreeableness and conscientiousness. Coefficient alpha for these domains reported 0.92, 0.89, 0.87, 0.86, and 0.90, respectively.^[7] The NEO-PI-R consists of 240 self-reported items, rated on a 0-4 point scale (strongly disagree, disagree, neutral, agree, and strongly agree). In Iran, NEO-PI-R has been translated and adapted by Haghshenas. On the Iranian sample, the Cronbach's α was found between 0.86 and 0.92.^[31]

Diagnostic and statistical manual of mental disorders-fifth edition Clinicians Personality Trait Rating Form

DSM-5 PD traits are combined of 5 pathological trait domains and 25 pathological traits facets. PD traits are

evaluated in two ways: Domain assessment and facets assessment. Assessment is performed on a 4-point scale (0-3). 0 indicates very little or not at all descriptive the pathological trait domain and facet, and 3 indicated extremely descriptive. The personality trait assessment can be conducted both generally and in detail by specified facets.^[32] These dimensions originally present general picture of patient's personality pathology. The five broad trait domains proposed for DSM-5 — negative emotionality, detachment, antagonism, DS, and psychoticism are rated to give a "broad brush" depiction of a patient's primary trait structure. Some of these trait domains and facets are close to DSM-IV-TR PDs. The domains figure prominently in the six PD types proposed for DSM-5, as well, for example, a combination of traits from the antagonism and the DS domains make up the trait profile of the antisocial/psychopathic type.^[33] Noteworthy, in the study, we examine and report the trait domains and facets that based on DSM-5 related with ASPD.

The concurrent validity of DSM-5 Clinicians Personality Trait Rating Form is evaluated with a structured interview tool and has good validity (Skodol *et al.*, 2011). In terms of content validity, pathological trait domains and facets in DSM-5 are achieved based on extensive statistical analysis and have good experimental background (APA, 2012c; Berghuis *et al.*, 2012; Hopwood *et al.*, 2012; Skodol *et al.*, 2011).

Amini *et al.*^[34] have been translated DSM-5 Clinicians Personality Trait Rating Form to Farsi and developed a semi-structured interview. Interrater reliability for DSM-5 Clinicians Personality Trait Rating Form items was above 0.78. The DSM-5 Personality Traits and trait domains correlation with DSM-IV were between 0.22 and 0.67. The duration of the DSM-5 Trait Rating semi-structured is 30-60 min.

Procedure

In the implementation process, the researcher applied three postgraduated in Clinical Psychology, and the colleagues were trained to use the instruments. To avoid probable bias, they were not informed of the exact goal of the research in detail, and they were told that the research goal is to study PDs. They were entirely uninformed of the concerned disorder types to control the probable bias, and the research associates began to collect data periodically in per steps while they were quite blinded to the outcome of the previous or next steps.

The assistants were trained to use these instruments. After training under the supervision of the researcher, some people were actually interviewed, and interviewers bug was fixed. As already mentioned above, there were two groups of patients (patients with PDs and normal subjects). Prior to the research onset, the subjects got aware of the research

and the process and signed the consent form. To avoid fatigue and reduced motivation in subjects, study for each subject was conducted in 2 days. In the days following the completion of the demographic questionnaire, participants were completed SCID-II-PQ. The cases that had symptoms of ASPD, in the same day, were examined by SCID-II PDs. On the definitive diagnosis of ASPD, they were invited to attend the next stage of the interview process based on DSM-5 personality traits and domains, levels of personality functioning. The ethics approval was obtained by University of Social Welfare and Rehabilitation Sciences Research Ethics Committee, and registered ethical is 92/801/2/3110.

We calculated bivariate correlations in order to examine the relationship between FFM and DSM-5 personality traits. All statistical analyses were performed using the SPSS 16 for Windows package (Version 16.0, Chicago, SPSS Inc.).

RESULTS

Mean and standard deviation for NEO-PI-R and DSM-5 personality traits are shown in Table 1. The results showed that there were not any significant differences between NEO-PI-R domain/facets and DSM-5 personality domain/traits.

Pearson correlation has been used for data analysis. First, the relation of NEO-PI-R domains/facets with ASPD personality traits in DSM-5 has been examined. Then, the relationship between NEO-PI-R domains and DSM-5 ASPD traits with DSM-IV ASPD symptoms has been conducted. The relation of NEO-PI-R domains/facets with ASPD personality traits in DSM-5 is presented in Table 2.

According to Table 2, there has positive significant relationship between N and hostility, deceitfulness, manipulateness ($P < 0.01$), and impulsivity ($P < 0.05$). Also, there has negative significant relationship between N and risk taking ($P < 0.01$). In addition, there is a positive relationship between E with manipulateness and deceitfulness ($P < 0.01$). As shown in Table 2, there has negative significant relationship between A and risk taking ($P < 0.05$). Similarly, there has negative significant relationship between C with deceitfulness, manipulateness, and hostility ($P < 0.05$, $P < 0.01$).

Table 3 represents the relationship between NEO-PI-R domains and DSM-5 ASPD traits with the DSM-IV ASPD symptoms. Table 3 indicates that there is positive significant relationship between N, E, and O with DSM-IV ASPD symptoms ($P < 0.05$, $P < 0.01$), and negative relation between A and C with ASPD symptoms ($P < 0.05$, $P < 0.01$).

Also, Table 3 shows that, except manipulateness, deceitfulness, and callousness, there is positively significant

Table 1: Means and SD for the domain and facets of the NEO-PI-R and DSM-5 ASPD personality traits

NEO-PI-R	
Domain and facets	Mean (SD)
Neuroticism	102.11 (1.35)
N1 – Anxiety	13.30 (3.89)
N2 – Angry hostility	19.95 (3.96)
N3 – Depression	15.32 (3.60)
N4 – Self – consciousness	15.52 (3.92)
N5 – Impulsiveness	18.23 (2.70)
N6 – Vulnerability	19.67 (4.44)
Extraversion	98.16 (1.88)
E1 – Warmth	15.47 (3.47)
E2 – Gregariousness	16.93 (8.35)
E3 – Assertiveness	16.88 (5.43)
E4 – Activity	16.56 (5.02)
E5 – Excitement – seeking	17.31 (3.49)
E6 – Positive emotions	15.14 (3.09)
Openness	97 (1.44)
O1 – Fantasy	16.82 (3.41)
O2 – Esthetics	15.05 (5.29)
O3 – Feeling	16.00 (3.38)
O4 – Actions	13.79 (4.14)
O5 – Ideas	15.92 (3.60)
O6 – Values	16.48 (3.63)
Agreeableness	95.95 (1.39)
A1 – Trust	13.67 (3.94)
A2 – Straightforwardness	15.70 (5.23)
A3 – Altruism	17.68 (4.21)
A4 – Compliance	14.62 (3.80)
A5 – Modesty	17.18 (3.97)
A6 – Tender – mindedness	17.13 (3.75)
Conscientiousness	85 (1.72)
C1 – Competence	13.36 (2.93)
C2 – Order	13.74 (4.17)
C3 – Dutifulness	12.77 (4.36)
C4 – Achievement striving	12.60 (3.12)
C5 – Self – discipline	10.96 (3.13)
C6 – Deliberation	16.74 (5.58)

DSM – 5 personality traits

Domain and traits	Mean (SD)
Negative affectivity	30.79 (1.41)
NA1 – Emotional lability	3.86 (2.37)
NA2 – Anxiousness	5.62 (3.54)
NA3 – Separation insecurity	1.80 (1.92)
NA4 – Perseveration	2.60 (1.53)
NA5 – Submissiveness	2.04 (1.31)
NA6 – Hostility	6.45 (3.35)
NA7 – Depressive	4.19 (3.45)
NA8 – Suspiciousness	4.16 (2.06)
Detachment	12.46 (8.52)
D1 – Restricted affectivity	2.40 (2.11)
D2 – Withdrawal	4.81 (2.55)
D3 – Anhedonia	2.86 (2.68)
D4 – Intimacy avoidance	2.38 (2.42)
Antagonism	22.58 (7.74)
A1 – Manipulativeness	4.74 (2.96)
A2 – Deceitfulness	4.54 (2.38)

Table 1: (Continued)

NEO-PI-R	
Domain and facets	Mean (SD)
A3 – Grandiosity	3.00 (2.47)
A4 – Attention seeking	4.23 (2.38)
A5 – Callousness	6.04 (2.87)
Disinhibition	31.82 (1.04)
DS – Irresponsibility	4.89 (2.70)
DS – Impulsivity	9.50 (4.15)
DS – Distractibility	4.24 (2.82)
DS – Risk taking	7.55 (3.06)
DS – Lack of rigid perfectionism	5.36 (2.97)
Psychoticism	3.56 (5.11)
PSY1 – Unusual beliefs and experiences	1.62 (2.97)
PSY2 – Eccentricity	0.82 (1.35)
PSY3 – Cognitive and perceptual dysregulation	1.11 (2.48)

n = 122. SD = Standard deviation; NEO-PI-R = NEO Personality inventory; DSM-5 = Diagnostic and statistical manual of mental disorders, Fifth Edition; ASPD = Antisocial personality disorder

relationship between DSM-5 ASPD traits and DSM-IV-TR ASPD symptoms ($P < 0.05$, $P < 0.01$).

DISCUSSION

The authors extended previous work on the hypothesis that ASPD can be understood as a maladaptive variant of personality traits included within the FFM of personality. This study evaluated the relation between FFM and DSM-5 pathological traits for ASPD.

There were several findings. First, ASPD features correlated positively with neuroticism, extraversion and openness, and negatively with agreeableness and conscientiousness. These results indicate that, in consistent with the findings of Pereira and Huband,^[35] DeShong and Kurtz,^[23] Terracciano and McCrae,^[10] and Decuyper *et al.*,^[25] FFM has significant relation with ASPD. Second, except callousness, irresponsibility, and impulsivity, other DSM-5 antisocial personality pathological traits significantly related with FFM, especially with neuroticism and extraversion. In consistent with Trull and Widiger,^[17] Thomas *et al.*,^[36] and Widiger^[16] that investigated and depicted the relation between dimensional personality traits and FFM, these findings revealed that ASPD traits can be explained in terms of FFM and FFM correlated as highly with DSM-5 traits of ASPD. Third, significant and positive relationship found between FFM dimensions especially N, E, and O, with DSM-IV-TR ASPD symptoms, also there was negatively significant relation between A and C with ASPD symptoms. Fourth, the results indicate that, except manipulativenes, deceitfulness and callousness, there is significantly positive relation between DSM-5 personality traits and DSM-IV-TR ASPD symptoms. This relation showed that DSM-5 personality traits have a good validity to ASPD diagnosis, and this finding is in consistent with

Table 2: Coefficient correlations between NEO-PI-R domains/facets with ASPD personality traits in DSM-5

NEO-PI-R domains/facets	DSM-5 personality traits						
	Hostility	Manipulativeness	Deceitfulness	Callousness	Irresponsibility	Impulsivity	Risk taking
Neuroticism	0.33**	0.25**	0.23**	-0.13	0.02	0.20*	-0.23**
N1 - Anxiety	-0.17	0.13	0.09	-0.29**	-0.06	0.22*	-0.07
N2 - Angry hostility	0.23**	0.11	0.15	-0.13	0.06	0.13	-0.08
N3 - Depression	-0.11	0.23**	0.17	-0.05	-0.06	0.11	-0.22*
N4 - Self-consciousness	-0.10	0.11	0.20*	-0.04	0.11	-0.07	-0.03
N5 - Impulsiveness	-0.09	0.09	-0.06	0.12	-0.05	0.24*	-0.03
N6 - Vulnerability	-0.01	0.39**	0.24**	0.05	0.05	-0.01	-0.28**
Extraversion	-0.09	0.28**	0.32**	0.0	0.02	.070	-0.13
E1 - Warmth	-0.05	0.15	0.09	-0.03	-0.09	0.02	-0.19*
E2 - Gregariousness	-0.09	0.20*	0.19*	0.01	0.16	0.02	-0.04
E3 - Assertiveness	-0.05	0.20*	0.18*	0.13	0.07	0.13	-0.11
E4 - Activity	-0.09	-0.07	0.16	-0.05	0.01	0.03	0.05
E5 - Excitement-seeking	0.05	0.08	0.04	-0.15	-0.31**	-0.06	0.29**
E6 - Positive emotions	-0.04	0.08	0.29**	0.08	0.04	0.17	-0.02
Openness	-0.13	0.09	0.16*	-0.12	-0.11	-0.04	-0.13
O1 - Fantasy	-0.09	0.13	0.11	-0.14	-0.20*	-0.10	-0.22*
O2 - Aesthetics	-0.14	-0.06	0.07	-0.20*	0.01	-0.09	-0.03
O3 - Feeling	-0.14	0.25**	0.28**	0.13	0.10	0.14	-0.03
O4 - Actions	-0.07	0.18*	0.18*	-0.07	-0.00	-0.05	-0.07
O5 - Ideas	0.07	-0.06	-0.00	0.01	-0.23**	0.02	-0.08
O6 - Values	-0.10	-0.06	0.04	-0.12	-0.13	-0.04	-0.06
Agreeableness	-0.13	0.14	0.21*	-0.15	-0.07	-0.13	-0.29**
A1 - Trust	-0.07	0.02	0.09	-0.33**	-0.07	-0.20*	-0.11
A2 - Straightforwardness	0.01	-0.14	0.06	-0.04	0.04	0.05	0.03
A3 - Altruism	-0.18*	0.26**	0.12	-0.13	-0.07	-0.14	-0.15
A4 - Compliance	-0.14	0.060	0.04	0.19*	-0.03	0.12	-0.03
A5 - Modesty	0.01	0.13	0.16	-0.15	-0.08	-0.22*	-0.23*
A6 - Tender-mindedness	-0.10	0.16	0.20*	-0.05	-0.04	-0.05	-0.17
Conscientiousness	-0.19*	-0.33**	-0.27**	-0.16	-0.01	-0.10	-0.12
C1 - Competence	0.05	-0.04	0.13	-0.15	-0.13	0.01	-0.14
C2 - Order	-0.13	0.00	0.16	-0.16	0.07	-0.02	0.0
C3 - Dutifulness	-0.16	-0.18*	0.15	-0.04	-0.01	-0.14	-0.04
C4 - Achievement striving	-0.09	0.19*	0.19*	-0.10	-0.06	-0.03	-0.19*
C5 - Self-discipline	-0.18*	-0.10	-0.03	-0.12	0.01	0.00	-0.06
C6 - Deliberation	-0.26**	-0.13	0.17	-0.17*	0.01	-0.18*	-0.09

*P < 0.05, **P < 0.01. n = 122. ASPD = Antisocial personality disorder; NEO-PI-R = NEO personality inventory; DSM-5 = Diagnostic and statistical manual of mental disorders, Fifth edition

other studies.^[9,11,16,20,37] Also, the results revealed that the dimensional model of DSM-5 is an adequate approach to ASPD diagnosis on Iranian patients.

Thus overall, the hypothesis, that FFM and DSM-5 personality traits are related with one another, was approved. These results are consistent with the findings of other studies in this field that showed ASPD is maladaptive representation of extreme versions of the same traits that describe normal personality. Also, findings indicate that normal personality traits, such as those assessed by the FFM, share a common structure and obtain reasonably predictable correlations with the ASPD. Further, these results indicate that DSM-5 criteria for ASPD have good theoretical background.

This finding provides further evidence for dimensional

Table 3: Correlation between NEO-PI-R domains and DSM-IV ASPD symptoms

NEO-PI-R domains	DSM-IV-TR ASPD symptoms	DSM-5 ASPD traits	ASPD symptoms in DSM-IV-TR
N - Neuroticism	0.26**	Hostility	0.22*
		Manipulativeness	-0.09
E - Extraversion	0.33**	Deceitfulness	0.07
		Callousness	0.13
O - Openness	0.31**	Irresponsibility	0.28**
A - Agreeableness	-0.19*	Impulsivity	0.22*
C - Conscientiousness	-0.30**	Risk taking	0.24**

*P < 0.05, **P < 0.01. n = 122. DSM-IV-TR = Diagnostic and statistical manual of mental disorders, Fourth edition, Text revision; ASPD = Antisocial personality disorder; NEO-PI-R = NEO personality inventory; DSM-5 = Diagnostic and statistical manual of mental disorders, Fifth edition

understanding of personality pathology and suggests that a trait model in DSM-5 should span normal and abnormal

personality functioning, but focus on the extremes of these common traits. The authors' findings indicate that the traits, specified in criterion B for the DSM-5 ASPD, have significant relation with ASPD symptoms in DSM-IV-TR. It may be explained that DSM-5 traits are used to depict this disorder, were generally adequate. These results are in consistent with findings of Hopwood *et al.*,^[37] Thomas *et al.*,^[38] Krueger and Derringer,^[39] Thomas *et al.*,^[36] Trull and Widiger^[17] and Krueger and Markon.^[40]

This is the first study of DSM-5 dimensional model of PDs on Iranian sample. We investigate the relation of FFM and DSM-5 personality traits together and with DSM-IV-TR ASPD symptoms on Iranian patients. The findings were same as the other studies. It means that dimensional model of DSM-5 is a valid approach to personality diagnosis in Iranian patients. Overall, the present study helps to understand the adequacy of dimensional approach to the evaluation of personality pathology, specifically for ASPD on Iranian sample.

However, the study also has several limitations and future research is needed. First, the results are based on a relatively small number of cases, and so caution should be used in interpreting the data. Second limitation was that the nature of the sample which was drawn from patients with ASPD. Future research should replicate findings in larger samples and with multiple PDs. Third limitation of the current study was the fact that data gathered by a semi-structured interview and future work should focus on other relevant instruments. Fourth, all participants in the study were male, and so other research is needed to investigate the relation between FFM and DSM-5 pathological traits on female. A fifth limitation is about sampling method that may be influential to satisfying statistical tests assumptions (such as normality, etc.). Therefore, future research should replicate findings with other sampling methods.

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AUTHOR'S CONTRIBUTION

All authors had equal role in design, work, statistical analysis, and manuscript writing.

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