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Original Article

The Relationship between the Structures of Personality Inventory for the Diagnostic and Statistical Manual, Fifth Edition (PID-5) and Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF)

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Abstract

Objective: The Personality Inventory for the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (PID-5), is a trait-based measure of pathological personality designed to assess Criterion B of an alternative diagnostic system for personality disorders (PDs). In this study, we aimed to evaluate the relations among the PID-5 and the Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF); a commonly used self-report instrument with a hierarchical structure.
Method: We examined the joint structure of the PID-5 scales along with levels of the MMPI-2-RF hierarchy to understand whether conceptually expected structures tend to be loaded with each other. Data were collected from 536 participants from the general population of Iran.
Results: Findings of Pearson's correlation analyses exhibited the generally expected patterns between the two mentioned measures on most scales, with some divergences. Similarly, although applying a set of joint exploratory structural equation modeling (ESEM) exhibited some factor loadings for PID-5 facets within the hierarchical framework of MMPI-2-RF scales that were different to what was theoretically expected, both measures were generally loaded in a conceptually expected way, indicating that they have a similar dimensional structure.
Conclusion: Our findings provide support for adequate convergence of maladaptive personality traits and psychopathology structures, as well as for utilizing MMPI-2-RF to measure personality psychopathology from a dimensional perspective. The implications of these results are discussed by the authors.

Key words: *Equation Modeling; MMPI; Psychometrics; Personality Disorders; Personality Inventory*

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According to epidemiological studies, personality disorders (PDs) have a high prevalence among the general population. These rates are even much higher in the patient population (1-3), which could result in functional impairments and behavioral problems and can increase the risk factors for self-injury (4). In this regard, an exhaustive, cost-effective, and reliable measurement approach to the evaluation of PDs would provide noteworthy data that is highly likely to help clinicians develop the best possible treatment plan for clients with these disorders (5, 6). Self-report personality inventories are among the common sources for measuring PDs; howbeit, some researchers have critically appraised these types of psychological instruments, mainly because of their diagnostic uncertainty in which patients generally deny, belittle, or externalize the symptoms (5, 7, 8). Despite the concern we have highlighted, self-report personality inventories are still the most common measurement method in the social sciences (9-11), indicating the importance of research on the structures of personality measures.

Among a wide variety of personality inventories, the Personality Inventory for DSM-5 (PID-5) (12) and the Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) (13) are the personality assessment tools which are designed to cover the contemporary theories of personality (12, 13); the PID-5 has been created by the DSM-5 Personality and Personality Disorders (P&PD) committee to assess PDs through a dimensional lens (1, 12). More precisely, in response to clinicians' increased discontent with traditional nosology, the P&PD workgroup proposed an alternative model with a combination of problems in personality functioning (namely criterion A) as well as pathological personality traits (namely criterion B) for the diagnosis of six PDs (schizotypal, borderline, narcissistic, antisocial, avoidant, and obsessive-compulsive PDs) (1, 12). This new system for assessment and classification of PDs addresses many shortcomings identified in the categorical model including co-occurrences of PDs, diagnostic instability, poor coverage of personality pathology, heterogeneity within the personality, and arbitrary diagnostic thresholds (1, 12, 14, 15). However, despite the serious concerns raised about the categorical model, the traditional approach which classifies ten PDs into three clusters according to the descriptive similarities was located in DSM-5Section II and considered as a formal method for diagnosing PDs and the alternative model was eventually located in Section III of DSM-5, indicating that further research is needed before formally using it.

To address this need, the PID-5 is designed for assessing Criterion B of the alternative dimensional model. This inventory measures the 25 pathological personality traits that are arranged into five domains (i.e., negative affectivity, antagonism, disinhibition, detachment, and psychoticism) (1, 12) and highly resembles the Five-Factor Model (FFM); negative affectivity is equivalent to neuroticism, detachment is a negative pole of extraversion, disinhibition is a negative pole of conscientiousness, and antagonism is a negative pole of agreeableness (16-18). Psychoticism is the only domain that has no counterpart in the FFM because of its weak association with the fifth FFM domain of openness to experience. Research has suggested that this lack of association is because the openness to experience domain focuses on adaptive states, with no clear method to examine the pathological characteristics of personality (19). In contrast, psychoticism manifests primarily as a measure of maladaptive states, and is thus classified as one of the domains of pathology in the alternative model of PDs. Findings of the meta-analytic study empirically confirmed the 5-factor model (20), indicating the considerable utility of this model in the assessment of PDs (1, 12). Although the primary purpose of designing the PID-5 was to assess PDs through the lens of dimensional concept, we should note that clinicians generally prefer to rely on more universal assessment tools, including MMPI measures (9, 11).

The restructured form of MMPI-2, developed by Ben-Porath and Tellegen (13), is the most commonly used personality tool that consists of 51 scales arranged in a hierarchical procedure. This measure, with the strong research background, is used by clinicians and researchers in a wide variety of settings (9-11), aimed at responding to a number of criticisms (13). This structure provides an important step towards reducing the complexity of personality disorders by providing comprehensive information on the general areas of disorder, clinical problems, interpersonal problems, physical complaints, psychological abilities, and personality traits (13). We should also highlight that as the MMPI-2-RF has been developed to examine sustainable behavioral patterns, it could help therapists to anticipate the possibility of continuing the treatment by the patient, recognize patient capabilities, arrange treatment planning decisions based on important diagnostic indicators, and predict the outcome of treatment and potential problems during the treatment process (9, 13). Most importantly, because of its hierarchical dimensional structure of psychopathology, the test findings could highly associate with recent dimensional models such as the alternative model of personality disorders (AMPD) (9). The raised issues have frequently caused clinicians to count on this measure for the evaluation of psychopathology in health-care contexts.

According to the emphasis of the dimensional perspective in the evaluation of personality disorders, evaluating associations between dimensional measures would provide evidence for the convergence validity of these tools. Accordingly, several studies on PDs have focused on the better understanding of the association between PID-5 and other personality dimensional

questionnaires. To give an example, Ashton and colleagues (21) evaluated the joint factor structures of PID-5 and HEXACO-PI-R (Honesty-Humility, Emotionality, Extraversion, Agreeableness, Conscientiousness, Openness to experience - Personality Inventory-Revised (22), in which the expected scales loaded together, reflecting the strong resemblance of the measures. Likewise, the generally expected factors were found following the performance of factor examination for the PID-5 and Dimensional Assessment of Personality Pathology (DAPP-BQ) (23-24).

Despite the widespread use of both MMPI-2-R and PID-5 measures, their associations are less pursued by researchers, notably in non-Western cultures. To our knowledge, a study published by Anderson and colleagues (9) confirmed convergence between PID-5 and MMPI-2-RF, such that the expected correlations were generally yielded. Employing factor analyses through the combination of these two aforementioned instruments have also shown expected patterns (9).

However, as noted earlier, Western cultures have been much noted in many researches on personality (9, 11, 25); but evidence on non-Western cultures is still weak, indicating a need for research in different cultural contexts. Indeed, there is a need to understand whether each of these measures represents a common structure. Based on this concern, in this study, we aimed to find out whether PID-5 and MMPI-2-RF measure the same/different personality structures. This evaluation will help to better understand the consistency of the dimensional model across these two measures. We evaluated the correlations among MMPI-2-RF and PID-5 scales in an Iranian community to obtain integrated information on these two instruments. This study provided an understanding of the relations among MMPI-2-R and PID-5 in this sample. We focused on inter-correlations and joint factor analysis of MMPI-2-R and PID-5. Examining the association between the hierarchical structures of the MMPI-2-RF and the PID-5 can provide empirically-based information to answer the question of whether these two measures cover each other adequately and represent the same model or different models of the pathological structure in the Iranian sample. We hypothesized that a common structure underlies both measures in the Iranian sample, and thus, may be used interchangeably. Furthermore, as both measures were designed to measure in a dimensional state, results could be helpful in formulating the future version of the DSM.

Materials and Methods

Participants and Procedure

Participants included 724 adults ranging in age from 18 to 55 years and were recruited from Tehran, Iran. This sample was aggregated by quota sampling. Of these, 188 individuals were removed from the study because of Cannot Say (CNS) > 15, which included 3% of participants; Variable Response Inconsistency (VRIN) > 80T, which included 10% of participants; True Response Inconsistency (TRIN) > 80T, which included 6% of participants; Infrequent Responses > 120T, which included 8% of participants; and Infrequency Psychopathology Responses > 100T, which included 11% of participants (13). The final sample included 536 participants; 61% of whom were women and 39% were men, with a mean age of 34.19 years (SD = 9.78). Most participants were either single (45.1%) or married (52.2%). One hundred and ninety-four (36.2%) participants reported a history of referral to a psychiatrist or psychologist. Approximately half of the participants had college degrees (46.9%). The majority of participants were Persian (59.7%), 19.4% were Turkish, 6.3% were Kord, 5.4% were Lur, and the remaining participants had other ethnicities.

Measures

PID-5

The PID-5 (12) is a dimensional tool that consists of 220 items in a 4-point Likert scale, ranging from 0 to 3, covering 25 facets of pathological personality traits, organized around five domains of negative affectivity, antagonism, psychoticism, detachment, and disinhibition (1). The Persian translation of the inventory whose psychometric properties had been previously tested by Ghamkhar Fard and colleagues (26), was used in the current study. According to the study by Ghamkhar Fard and colleagues (26), the conceptually expected five-factor model showed a generally appropriate fitness with data. Cronbach's alphas ranged from 0.54 to 0.93 (mean = 0.78); 23 of 25 PID-5 facets had alphas greater than the acceptable range (i.e., $\alpha \geq 0.70$) (26). The Cronbach's alpha reliabilities of negative affectivity, antagonism, psychoticism, detachment, and disinhibition domains were 0.70, 0.75, 0.81, 0.64, and 0.74, respectively. Except for intimacy avoidance (0.69), irresponsibility (0.65), restricted affectivity (0.65), submissiveness (0.68), and suspiciousness (0.49), adequate Cronbach's alpha was found for all the other PID-5 facets, ranging from 0.70 (Manipulativeness) to 0.92 (Eccentricity).

MMPI-2-RF

The MMPI-2-RF includes 338 items developed to assess 51 scales. The psychometric properties of its Persian version had been previously assessed in a research (10) in which the theoretically expected models were confirmed. In terms of internal consistency, the mean of the Cronbach's alpha values was 0.70, which was mostly within the acceptable range (10). With the exception of interest scales, all the other RF scales were used in our study. The mean of Cronbach's alpha coefficients were 0.79 for Higher Order (HO) scales, 0.77 for (Restructured Clinical) RC scales, 0.64 for (Specific Problems) SP scales, and 0.71 for Personality Psychopathology-Five (PSY-5) scales, respectively.

Data Analysis

First, to evaluate the relations among PID-5 scales and all MMPI-2-RF scales, Pearson correlation analyses

were calculated. Because of the broad sample size of this study, we were able to detect small effect sizes (e.g., the correlation of 0.09 was deemed to be statistically significant). Accordingly, we considered correlations of a medium (r = ±0.30-±0.49) or large (r ≥ ±0.50; see 27) degree as meaningful.

We next conducted exploratory structural equation modeling (ESEM) using Mplus, with ML estimator and Geomin rotation (the default rotation in Mplus), to detect the joint structure of these two measures. Indeed, due to the results of the dual loading, which could be accounted by the ESEM analysis, the variables could be defined with not just one factor, supporting the utility of ESEM compared to confirmatory factor analysis in assessing personality psychopathology (10, 26). It is of note that because of identical items across levels of the MMPI-2-RF hierarchy, four sets of ESEMs were analyzed such that MMPI-2-RF HO, RC, SP, and PSY-5 were conducted separately along with 25 PID-5 facets. In each analysis, several factor analyses with different numbers of factors were tested to choose the theoretical and statistical best-fitting model. we initially assumed that the factor solutions proposed by the MMPI-2-RF guideline would provide an adequate fit to our data (13). More precisely, a three-factor solution for MMPI-2-RF HO and RC scales, a four-factor solution for MMPI-2-RF SP scale, and a five-factor solution for MMPI-2-RF PSY-5 scale were assumed to be best fitted with data. The fit indices we employed included the Tucker Lewis Index) TLI (≥ 0.90, the Comparative Fit Index) CFI (≥ 0.90, the Standardized Root Mean Square Residual (SRMR) ≤ 0.08, and the Root Mean Square Error of Approximation (RMSEA) ≤ 0.08.

Results

Correlation Analyses

Pearson correlation analyses among MMPI-2-RF scales and PID-5 scales are presented in Tables 1 to 3. Results of associations among the MMPI-2-RF HO scales and PID-5 facet and domain scores presented quite expected patterns of correlation; Emotional/Internalizing Dysfunction (EID) evinced the largest relations with PID-5 negative affectivity and detachment. However, this scale was unexpectedly related to psychoticism and disinhibition, with relations approaching moderate and large effect sizes, respectively. As anticipated, Thought Dysfunction (THD) was associated with PID-5 psychoticism and its facets with the largest effect sizes. However, it was also moderately correlated with PID-5 negative affectivity, antagonism, and disinhibition domains and several of their respective facets. Finally, the Behavioral/Externalizing Dysfunction (BXD) generally evinced its highest associations with antagonism and disinhibition domains and their facets, which was theoretically expected. These findings are presented in Table 1.

Table 1. Correlations between Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Higher Order and Restructured Clinical Scales and PID-5 Facets and Domains Scales

PID-5 Facets / Domains	EID	THD	BXD	RCd	RC1	RC2	RC3	RC4	RC6	RC7	RC8	RC9
Negative Affectivity	**0.60**	0.41	0.32	**0.64**	0.37	0.14	0.48	0.32	0.42	**0.69**	0.40	0.47
Anxiousness	**0.64**	0.32	0.23	**0.65**	0.37	0.27	0.44	0.26	0.34	**0.67**	0.30	0.33
Depressivity	**0.80**	0.32	0.26	**0.81**	0.42	0.47	0.40	0.36	0.33	**0.58**	0.30	0.24
Emotional Lability	0.38	0.39	0.35	0.45	0.29	-0.03	0.37	0.30	0.36	**0.51**	0.41	**0.52**
Hostility	**0.54**	0.40	0.48	**0.55**	0.31	0.08	0.49	0.44	0.43	**0.58**	0.34	**0.53**
Perseveration	**0.50**	0.44	0.27	**0.57**	0.28	0.13	0.47	0.29	0.41	**0.59**	0.46	0.40
Separation Insecurity	0.34	0.29	0.20	0.38	0.20	0.01	0.32	0.21	0.31	0.43	0.27	0.31
Submissiveness	0.29	0.20	0.15	0.34	0.10	0.06	0.30	0.13	0.20	0.34	0.19	0.18
Suspiciousness	0.41	0.46	0.32	0.41	0.27	0.08	**0.50**	0.34	**0.55**	0.41	0.31	0.35
Antagonism	0.09	0.34	0.50	0.17	0.07	-0.29	0.37	0.39	0.37	0.26	0.31	**0.56**
Attention Seeking	0.23	0.29	0.32	0.28	0.10	-0.12	0.34	0.29	0.28	0.35	0.30	0.43
Callousness	0.34	0.35	0.42	0.36	0.18	0.10	0.40	0.41	0.42	0.33	0.30	0.37
Deceitfulness	0.25	0.26	0.49	0.31	0.13	-0.08	0.36	0.45	0.31	0.35	0.25	0.46

Grandiosity	-0.03	0.36	0.29	0.04	0.03	-0.32	0.27	0.16	0.38	0.15	0.30	0.44
Manipulativeness	-0.09	0.19	0.42	-0.01	-0.02	-0.37	0.25	0.30	0.19	0.07	0.20	0.47
Detachment	**0.58**	0.21	0.10	**0.54**	0.24	0.49	0.37	0.18	0.25	0.41	0.17	0.07
Anhedonia	**0.69**	0.22	0.13	**0.67**	0.33	**0.54**	0.36	0.24	0.28	0.43	0.17	0.09
Intimacy Avoidance	0.18	0.10	-0.07	0.17	0.06	0.21	0.10	-0.01	0.08	0.13	0.10	-0.08
Restricted Affectivity	0.21	0.21	0.15	0.25	0.04	0.11	0.32	0.18	0.25	0.20	0.19	0.16
Withdrawal	0.39	0.14	0.11	0.34	0.14	0.35	0.33	0.15	0.18	0.32	0.12	0.10
Disinhibition	**0.54**	0.34	0.40	**0.63**	0.30	0.18	0.40	0.44	0.35	0.54	0.37	0.41
Distractibility	**0.56**	0.28	0.30	**0.65**	0.28	0.22	0.37	0.35	0.29	0.55	0.31	0.34
Impulsivity	0.33	0.32	0.33	0.39	0.25	0.03	0.33	0.36	0.31	0.39	0.34	0.38
Irresponsibility	0.35	0.24	0.38	0.41	0.17	0.13	0.24	0.39	0.26	0.32	0.24	0.27
Rigid Perfectionism	0.12	0.32	0.12	0.16	0.10	-0.16	0.25	0.08	0.26	0.27	0.32	0.31
Risk Taking	-0.06	0.17	0.42	-0.04	0.01	-0.16	0.05	0.25	0.11	-0.05	0.23	0.30
Psychoticism	0.30	**0.64**	0.44	0.40	0.30	-0.08	0.42	0.38	0.53	0.43	**0.69**	**0.54**
Eccentricity	0.24	0.47	0.43	0.31	0.19	-0.06	0.34	0.37	0.43	0.32	**0.51**	0.49
Perceptual Dysregulation	0.42	**0.60**	0.35	**0.52**	0.39	0.02	0.43	0.33	0.49	**0.54**	**0.66**	0.44
Unusual Beliefs & Experiences	0.09	**0.63**	0.31	0.18	0.23	-0.20	0.33	0.23	0.47	0.25	**0.67**	0.46

Note. Underlined correlations are of moderate effect sizes; Bolded correlations are of large effect sizes; EID = Emotional/Internalizing Dysfunction; THD = Thought Dysfunction; BXD = Behavioral/Externalizing Dysfunction; RCd = Demoralization; RC1 = Somatic Complaints; RC2 = Low Positive Emotions; RC3 = Cynicism; RC4 = Antisocial Behavior; RC6 = Ideas of Persecution; RC7 = Dysfunctional Negative Emotions; RC8 = Aberrant Experiences; RC9 = Hypomanic Activation.

In terms of MMPI-2-RF RC scales, as evident from Table 1, the majority of correlations were moderate to large (RC1 and RC2 being the exceptions). Therefore, we focused on the highest correlations; RCd and RC7 had the highest correlation with the PID-5 negative affectivity domain and its facets. RC2 had its highest correlation with the anhedonia facet, indicating good convergent validity for this RC scale. Similarly, RC3 only had a high relation with the PID-5 suspiciousness facet, which was conceptually anticipated. Except with the PID-5 detachment domain, RC4 had a moderate correlation with the other PID-5 domains and most of their facets. However, this scale had its highest relations with the PID-5 hostility, callousness, and deceitfulness facets that are reflective of antisocial behavior. The Patterns of associations in RC6 and RC8 were somewhat expected. These two scales showed their highest correlations with the PID-5 psychoticism domain and its facets, which are in line with our previous expectations. RC6 was also largely correlated with the PID-5 suspiciousness facet, as anticipated. Similarly, while RC9 had moderate to large relations with PID-5 disinhibition and antagonism domains and their facets, it was also meaningfully correlated with the PID-5 negative affectivity and psychoticism domains.

The relations among MMPI-2-RF SP scales and PID-5 facet and domain scores adhered generally to a conceptually expected pattern (see Tables 2 and 3). With respect to the somatic/cognitive SP scales, the Cognitive Complaints (COG) reached a meaningful effect size in the anticipation of a large group of the PID-5 scales, particularly with negative affectivity, disinhibition, and psychoticism domains and their facets, indicating the occurrence of high levels of cognitive problems in these domains. Similarly, Malaise (MLS) was related to the highest effect size in the prediction of depression and anhedonia, reflecting the coincidence of boredom and depressed mood. In terms of internalizing SP scales, overall, these scales were most strongly correlated with the PID-5 negative affectivity domain and its facets, which were conceptually expectable. However, no clear pattern was found for the externalizing SP scales. Unexpectedly, AGG correlated meaningfully with some of the PID-5 negative affectivity facets, notably the PID-

5 hostility facet. In terms of ACT, this SP scale had meaningful correlations with some PID-5 facets that had an eccentric and impulsive nature. Among these correlations, the ACT had the largest association with the PID-5 emotional lability, which was expected. The most expected correlations were for JCP; this scale moderately correlated with PID-5 callousness, deceitfulness, and irresponsibility. In terms of the SP scales of an interpersonal content, the pattern of correlations was conceptually expected such that they generally showed their largest associations with the facets that had the nature of internalizing problems. For instance, Social Avoidance (SAV) and Disaffiliativeness (DSF) had their highest correlations with the PID-5 detachment domain and its facets.

Table 2. Correlations between Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Somatic/Cognitive and Internalizing Specific Problems Scales and PID-5 Facets and Domains Scales

PID-5 Facets / Domains	MLS	GIC	HPC	NUC	COG	SUI	HLP	SFD	NFC	STW	AXY	ANP	BRF	MSF
Negative Affectivity	0.39	0.20	0.29	0.32	**0.51**	0.30	0.49	**0.51**	**0.53**	**0.59**	**0.51**	**0.51**	0.45	0.39
Anxiousness	0.45	0.20	0.27	0.31	0.48	0.36	0.52	0.51	**0.51**	**0.62**	**0.57**	0.44	0.35	0.30
Depressivity	**0.61**	0.27	0.27	0.35	**0.53**	**0.61**	**0.64**	**0.71**	0.49	**0.55**	0.40	0.39	0.25	0.12
Emotional Lability	0.24	0.18	0.23	0.30	0.40	0.19	0.29	0.34	0.35	0.38	0.30	0.47	0.28	0.19
Hostility	0.38	0.17	0.20	0.31	0.40	0.31	0.41	0.35	0.38	**0.53**	0.34	**0.63**	0.22	0.10
Perseveration	0.31	0.14	0.21	0.30	0.45	0.23	0.42	0.41	**0.52**	0.45	0.37	0.32	0.31	0.17
Separation Insecurity	0.18	0.08	0.18	0.15	0.31	0.13	0.29	0.33	0.38	0.36	0.28	0.30	0.43	0.30
Submissiveness	0.17	0.06	0.07	0.13	0.29	0.07	0.25	0.29	0.39	0.24	0.13	0.17	0.16	0.16
Suspiciousness	0.26	0.16	0.20	0.23	0.28	0.23	0.31	0.26	0.31	0.39	0.23	0.35	0.20	0.05
Antagonism	0.03	0.01	0.07	0.13	0.17	0.11	0.08	0.04	0.14	0.24	0.11	0.25	0.07	-0.03
Attention Seeking	0.12	0. 02	0.03	0.15	0.22	0.07	0.22	0.22	0.25	0.32	0.18	0.28	0.17	0.06
Callousness	0.24	0.06	0.13	0.22	0.30	0.19	0.25	0.21	0.25	0.30	0.19	0.33	0.08	-0.01
Deceitfulness	0.16	0.02	0.10	0.19	0.30	0.15	0.20	0.19	0.25	0.31	0.15	0.27	0.09	0.04
Grandiosity	-0.07	0.00	0.05	0.03	0.00	0.03	-0.02	-0.09	0.03	0.14	0.08	0.17	0.08	-0.05
Manipulativeness	-0.08	0.01	-0.02	0.05	0.04	0.06	-0.02	-0.08	0.00	0.08	0.01	0.15	-0.02	-0.12
Detachment	0.40	0.15	0.14	0.22	0.33	0.32	0.42	0.36	0.40	0.35	0.22	0.21	0.14	0.05
Anhedonia	**0.57**	0.21	0.17	0.28	0.40	0.42	**0.50**	**0.50**	0.41	0.43	0.29	0.29	0.15	0.09
Intimacy Avoidance	0.12	0.04	0.04	0.09	0.14	0.12	0.15	0.07	0.13	0.09	0.04	0.04	-0.01	-0.06
Restricted Affectivity	0.14	0.06	-0.02	0.07	0.17	0.19	0.19	0.15	0.26	0.14	0.11	-0.02	0.00	-0.09
Withdrawal	0.19	0.09	0.09	0.11	0.20	0.18	0.27	0.21	0.32	0.24	0.14	0.13	0.15	0.07
Disinhibition	0.42	0.16	0.20	0.33	**0.65**	0.26	0.43	0.49	0.55	0.45	0.28	0.38	0.26	0.12
Distractibility	0.43	0.17	0.16	0.29	**0.64**	0.28	0.42	**0.50**	**0.59**	0.47	0.30	0.33	0.27	0.13
Impulsivity	0.23	0.10	0.21	0.28	0.42	0.11	0.30	0.27	0.33	0.30	0.23	0.38	0.19	0.09

Irresponsibility	0.31	0.08	0.15	0.24	0.44	0.19	0.27	0.34	0.32	0.26	0.11	0.20	0.14	0.05
Rigid Perfectionism	0.05	0.08	0.06	0.08	0.03	0.14	0.11	0.09	0.15	0.23	0.19	0.17	0.17	0.04
Risk Taking	-0.06	-0.04	0.05	0.08	0.01	0.07	-0.06	-0.05	-0.12	0.00	-0.07	0.07	-0.20	-0.30
Psychoticism	0.19	0.14	0.21	0.34	0.44	0.28	0.25	0.27	0.28	0.31	0.31	0.27	0.20	0.01
Eccentricity	0.15	0.06	0.12	0.26	0.32	0.24	0.22	0.22	0.22	0.26	0.21	0.22	0.09	-0.07
Perceptual Dysregulation	0.29	0.21	0.27	0.39	**0.56**	0.31	0.33	0.36	0.39	0.37	0.38	0.30	0.29	0.13
Unusual Beliefs & Experiences	0.02	0.13	0.18	0.25	0.26	0.17	0.07	0.06	0.10	0.16	0.25	0.16	0.20	0.00

Note. Underlined correlations are of moderate effect sizes; Bolded correlations are of large effect sizes; MLS = Malaise; GIC = Gastrointestinal Complaints; HPC = Head Pain Complaints; NUC = Neurological Complaints; COG = Cognitive Complaints; SUI = Suicide/Death Ideation; HLP = Hopelessness/Helplessness; SFD = Self-Doubt; NFC = Inefficacy; STW = Stress/Worry; AXY = Anxiety; ANP = Anger Proneness; BRF = Behavior-Restricting Fears; MSF = Multiple Specific Fears.

Table 3. Correlations between Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Externalizing, Interpersonal Specific Problems, and Personality Psychopathology Five Scales and PID-5 Facets and Domains Scales

PID-5 Facets / Domains	JCP	SUB	AGG	ACT	FML	IPP	SAV	SHY	DSF	AGGR-r	PSYC-r	DISC-r	NEGE-r	INTR-r
Negative Affectivity	0.18	0.08	0.38	0.38	0.47	-0.06	-0.04	0.40	0.12	0.11	0.41	0.20	**0.68**	-0.09
Anxiousness	0.13	0.06	0.34	0.20	0.44	0.04	0.07	0.39	0.21	0.02	0.34	0.13	**0.68**	0.08
Depressivity	0.16	0.09	0.32	0.12	**0.53**	0.06	0.18	0.41	0.29	-0.00	0.34	0.20	**0.56**	0.25
Emotional Lability	0.15	0.08	0.34	**0.53**	0.39	-0.17	-0.07	0.22	0.13	0.21	0.35	0.25	0.48	-0.22
Hostility	0.23	0.18	**0.53**	0.28	0.47	-0.26	0.08	0.26	0.28	0.37	0.39	0.37	**0.61**	-0.01
Perseveration	0.15	0.08	0.29	0.33	0.44	-0.14	0.05	0.41	0.25	0.14	0.45	0.21	**0.51**	-0.02
Separation Insecurity	0.15	0.06	0.22	0.24	0.28	-0.06	-0.12	0.29	-0.07	0.07	0.30	0.12	0.42	-0.15
Submissiveness	0.06	0.09	0.11	0.12	0.20	-0.03	-0.03	0.34	0.07	0.02	0.20	0.12	0.26	-0.02
Suspiciousness	0.22	0.13	0.33	0.15	0.39	-0.16	0.11	0.26	0.20	0.24	0.41	0.27	0.41	0.04
Antagonism	0.29	0.17	0.31	0.33	0.24	-0.39	-0.10	0.08	0.11	0.47	0.33	0.47	0.22	-0.29
Attention Seeking	0.18	0.07	0.24	0.33	0.29	-0.23	-0.05	0.19	0.08	0.25	0.31	0.28	0.33	-0.19
Callousness	0.32	0.21	0.34	0.18	0.34	-0.17	0.18	0.19	0.34	0.30	0.32	0.35	0.29	0.09
Deceitfulness	0.32	0.21	0.29	0.25	0.30	-0.22	-0.02	0.20	0.11	0.30	0.26	0.46	0.29	-0.13
Grandiosity	0.13	0.03	0.21	0.29	0.16	-0.33	-0.07	0.05	0.11	0.40	0.33	0.26	0.14	-0.29
Manipulativeness	0.24	0.16	0.27	0.28	0.09	-0.44	-0.20	-0.13	0.02	**0.50**	0.20	0.40	0.07	-0.33
Detachment	0.03	0.08	0.18	-0.03	0.31	0.04	**0.50**	0.43	**0.50**	-0.01	0.24	0.06	0.35	0.48
Anhedonia	0.07	0.08	0.18	-0.07	0.40	0.04	0.30	0.36	0.31	-0.02	0.25	0.09	0.44	0.42
Intimacy Avoidance	-0.04	0.00	0.04	-0.02	0.08	0.00	0.28	0.17	0.40	-0.01	0.12	-0.08	0.07	0.29

Restricted Affectivity	0.06	0.10	0.09	0.05	0.20	-0.06	0.16	0.24	0.27	0.08	0.24	0.20	0.09	0.11
Withdrawal	0.03	0.08	0.17	0.02	0.18	0.03	**0.52**	0.41	0.46	0.00	0.17	0.08	0.25	0.38
Disinhibition	0.27	0.22	0.32	0.32	0.43	-0.07	0.04	0.41	0.22	0.12	0.36	0.34	0.45	-0.01
Distractibility	0.18	0.13	0.28	0.27	0.42	-0.04	0.06	0.44	0.22	0.06	0.32	0.25	0.46	0.03
Impulsivity	0.22	0.19	0.29	0.35	0.35	-0.11	-0.06	0.23	0.14	0.16	0.29	0.27	0.35	-0.10
Irresponsibility	0.30	0.25	0.22	0.17	0.25	-0.05	0.07	0.24	0.15	0.10	0.24	0.34	0.23	0.03
Rigid Perfectionism	0.02	0.00	0.19	0.21	0.16	-0.26	-0.01	0.10	0.20	0.26	0.31	0.10	0.27	-0.14
Risk Taking	0.25	0.22	0.16	0.15	0.03	-0.20	-0.03	-0.08	0.04	0.28	0.13	0.48	-0.06	-0.12
Psychoticism	0.29	0.13	0.32	0.49	0.38	-0.22	-0.02	0.21	0.25	0.30	**0.65**	0.42	0.35	-0.17
Eccentricity	0.29	0.12	0.28	0.41	0.34	-0.21	0.04	0.17	0.25	0.28	0.46	0.43	0.26	-0.11
Perceptual Dysregulation	0.24	0.12	0.31	0.42	0.38	-0.11	-0.03	0.31	0.23	0.18	**0.65**	0.30	0.44	-0.13
Unusual Beliefs & Experiences	0.19	0.09	0.24	0.45	0.24	-0.24	-0.12	0.05	0.15	0.30	**0.64**	0.31	0.21	-0.25

Note. Underlined correlations are of moderate effect sizes; Bolded correlations are of large effect sizes; JCP = Juvenile Conduct Problems; SUB = Substance Abuse; AGG = Aggression; ACT = Activation; FML = Family Problems; IPP = Interpersonal Passivity; SAV = Social Avoidance; SHY = Shyness; DSF = Disaffiliativeness; AGGR-r = Aggressiveness; PSYC-r = Psychoticism; DISC-r = Disconstraint; NEGE-r = Neuroticism/Negative Emotionality; INTR-r = Introversion/Low Positive Emotionality.

The most expected findings were those that included PSY-5 scales and PID-5 scales, in which every PSY-5 scale generally had its highest relation with its PID-5 domain counterpart. These results are displayed in Table 3. However, we should note that the pattern of associations for Disconstraint (DISC-r) was quite different. Although the correlation of this scale with PID-5 risk taking and irresponsibility (facets of disinhibitions) was meaningful, it did not reach a meaningful correlation with other PID-5 disinhibitions facets. In contrast, it had an unexpectedly meaningful correlation with PID-5 psychoticism and its facets.

Exploratory Structural Equation Modeling (ESEM)

We also aimed to evaluate the joint factor analysis for the PID-5 and MMPI-2-RF defined by levels of the MMPI-2-RF hierarchy (i.e., HO, RC, SP, and PSY-5). In terms of the MMPI-2-RF HO scales and PID-5 facets, three ESEM models with three to five factors were tested for these scales. Findings showed that a three-factor model fit the data well (TLI = 0.91, CFI = 0.94, SRMR = 0.04, and RMSEA = 0.06); albeit, the factor loadings were somewhat different compared to the three general structures of psychopathology (see Table 4). In this study, the first factor comprised of scales with the nature of thought and externalizing problems. A second factor included the MMPI-2-RF EID scale and the PID-5 facets with the negative emotionality nature. For the third factor, a series of PID-5 facets with an isolation meaning emerged (i.e., PID-5 withdrawal, restricted affectivity, and intimacy avoidance).

Table 4. Joint Factor Structure of PID-5 Facets and Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Higher Order Scales

	Factor 1	Factor 2	Factor 3
PID-5			
Manipulativeness (A)	**0.92**	-0.52	-0.02
Grandiosity (A)	**0.83**	-0.39	0.00
Eccentricity (P)	**0.77**	-0.10	0.10
Unusual Beliefs & Experiences (P)	**0.66**	-0.21	0.06
Deceitfulness (A)	**0.65**	0.01	-0.08
Callousness (A)	**0.60**	0.05	0.29
Attention Seeking (A)	**0.59**	0.13	-0.30

Risk Taking (DI)	**0.57**	-0.39	0.05
Perceptual Dysregulation (P)	**0.48**	0.30	-0.02
Emotional Lability (NA)	**0.48**	0.31	-0.23
Hostility (NA/A)	**0.46**	0.41	0.01
Rigid Perfectionism (lack of DI)	**0.45**	-0.03	0.00
Irresponsibility (DI)	**0.40**	0.22	0.03
Suspiciousness (NA/DT)	**0.33**	0.31	0.08
Anxiousness (NA)	0.00	**0.77**	-0.15
Depressivity (NA/DT)	0.06	**0.73**	0.10
Anhedonia (DT)	0.00	**0.63**	0.36
Distractibility (DI)	0.19	**0.61**	0.03
Perseveration (NA)	0.33	**0.53**	-0.11
Separation Insecurity (NA)	0.12	**0.47**	-0.43
Submissiveness (NA)	0.18	**0.33**	-0.09
Impulsivity (DI)	0.30	**0.31**	-0.19
Intimacy Avoidance (DT)	0.09	0.06	**0.57**
Restricted Affectivity (DT/NA)	0.41	0.00	**0.57**
Withdrawal (DT)	0.27	0.12	**0.56**
MMPI-2-RF HO Scales			
BXD	**0.60**	-0.05	0.03
THD	**0.40**	0.18	-0.05
EID	-0.18	**0.93**	0.02

Note. NA = PID-5 Negative Affectivity Facets; DT = PID-5 Detachment Facets; A = PID-5 Antagonism Facets; DI = PID-5 Disinhibition Facets; P = PID-5 Psychoticism Facets; Bold type represents highest factor loading; Underlined type represent factor loadings of ±0.30 or greater; EID = Emotional/Internalizing Dysfunction; THD = Thought Dysfunction; BXD = Behavioral/Externalizing Dysfunction.

For MMPI-2-RF RC scales and PID-5, among three to seven-factor models, a four-factor model provided a theoretically and statistically better fit (TLI = 0.90, CFI = 0.93, SRMR = 0.04, and RMSEA = 0.06). The four-factor solution mirrored the three general structures of psychopathology plus a detachment factor (see Table 5).

Table 5. Joint Factor Structure of PID-5 Facets and Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Restructured Clinical Scales

	Factor 1	Factor 2	Factor 3	Factor 4
PID-5				
Unusual Beliefs & Experiences (P)	**0.81**	0.13	-0.11	0.03
Perceptual Dysregulation (P)	**0.54**	0.20	0.32	0.03
Manipulativeness (A)	-0.03	**0.78**	-0.39	-0.07
Deceitfulness (A)	-0.08	**0.71**	0.01	0.03
Grandiosity (A)	0.16	**0.64**	-0.31	-0.01
Hostility (NA/A)	-0.10	**0.62**	0.35	0.03
Callousness (A)	0.06	**0.60**	0.03	0.35
Attention Seeking (A)	0.01	**0.54**	0.09	-0.11

Emotional Lability (NA)	0.05	**0.51**	0.29	-0.10
Eccentricity (P)	0.41	**0.47**	-0.03	0.17
Impulsivity (DI)	0.01	**0.45**	0.24	-0.01
Irresponsibility (DI)	-0.06	**0.48**	0.19	0.21
Risk Taking (DI)	0.19	**0.35**	-0.31	0.07
Suspiciousness (NA/DT)	0.08	**0.31**	0.28	0.08
Anxiousness (NA)	-0.02	0.10	**0.73**	-0.08
Depressivity (NA/DT)	0.05	0.08	**0.69**	0.24
Anhedonia (DT)	0.06	-0.01	**0.57**	0.44
Distractibility (DI)	-0.06	0.39	**0.48**	0.15
Perseveration (NA)	0.16	0.29	**0.47**	0.02
Separation Insecurity (NA)	-0.06	0.24	**0.40**	-0.22
Withdrawal (DT)	0.11	0.08	0.23	**0.44**
Intimacy Avoidance (DT)	0.16	-0.01	0.05	**0.41**
Restricted Affectivity (DT/NA)	0.17	0.28	0.01	**0.39**
Submissiveness (NA)	-0.07	0.29	0.27	0.00
Rigid Perfectionism (lack of DI)	0.23	0.25	0.02	-0.08
MMPI-2-RF RC Scales				
RC8 (T)	**0.76**	-0.03	0.25	-0.17
RC6 (T)	**0.40**	0.23	0.21	-0.04
RC9 (E)	0.19	**0.58**	0.08	-0.33
RC4 (E)	0.01	**0.46**	0.17	0.03
RCd (I)	0.07	-0.01	**0.86**	0.07
RC7 (I)	0.12	0.08	**0.79**	-0.25
RC2 (I)	-0.07	-0.44	**0.63**	0.49
RC1 (I)	0.29	-0.20	**0.54**	-0.03
RC3 (T)	0.14	0.32	**0.34**	-0.14

Note. NA = PID-5 Negative Affectivity Facets; DT = PID-5 Detachment Facets; A = PID-5 Antagonism Facets; DI = PID-5 Disinhibition Facets; P = PID-5 Psychoticism Facets; T = MMPI-2-RF Thought RC Scales; I = MMPI-2-RF Internalizing RC Scales; E = MMPI-2-RF Externalizing RC Scales; Bold type represents highest factor loading ; Underlined type represent factor loadings of ±0.30 or greater; RCd = Demoralization; RC1 = Somatic Complaints; RC2 = Low Positive Emotions; RC3 = Cynicism; RC4 = Antisocial Behavior; RC6 = Ideas of Persecution; RC7 = Dysfunctional Negative Emotions; RC8 = Aberrant Experiences; RC9 = Hypomanic Activation.

For MMPI-2-RF SP scales and PID-5, following running three to seven-factor models, a six-factor model had the best theoretical and statistical fit with these scales (TLI = 0.90, CFI = 0.93, SRMR = 0.03, and RMSEA = 0.05).

The first factor is defined by a series of scales with the negative emotionality nature across MMPI-2-RF SP scales and PID-5. PID-5 restricted affectivity, withdrawal, and intimacy avoidance along with the MMPI-2-RF DSF scale loaded together onto the second factor. Given this content, this factor could be defined in isolation. The third factor referred to some scales with a typically externalizing nature. However, there were few unexpected findings; both PID-5 rigid perfectionism and separation insecurity loaded onto this factor. A fourth factor was best represented by scales with a disinhibition nature. A fifth factor was represented by a series of scales with contents generally concerning thought problems contents. Finally, PID-5 distractibility, submissiveness, perseveration, and MMPI-2-RF Inefficacy (NFC), Shyness (SHY), Multiple Specific Fears (MSF), Cognitive Complaints (COG), and Behavior-Restricting Fears (BRF) loaded onto a six-factor solution, which could be interpreted as obedience. This result is shown in Table 6.

Table 6. Joint Factor Structure of PID-5 Facets and Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Specific Problems Scales

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5	Factor 6
PID-5						
Depressivity (NA/DT)	**0.87**	0.11	0.07	0.11	-0.04	-0.03
Anhedonia (DT)	**0.68**	0.34	0.02	0.07	-0.02	-0.01
Anxiousness (NA)	**0.52**	-0.02	0.25	-0.08	0.00	0.29
Restricted Affectivity (DT/NA)	-0.05	**0.71**	0.00	0.05	-0.03	0.13
Withdrawal (DT)	0.04	**0.64**	0.02	-0.15	-0.08	0.27
Intimacy Avoidance (DT)	0.01	**0.56**	-0.24	-0.02	0.03	0.07
Attention Seeking (A)	0.01	-0.09	**0.71**	0.09	-0.01	0.18
Grandiosity (A)	-0.18	0.22	**0.62**	-0.02	0.16	-0.05
Manipulativeness (A)	-0.12	0.01	**0.54**	0.27	0.14	-0.21
Deceitfulness (A)	0.00	0.00	**0.48**	0.42	-0.01	0.08
Rigid Perfectionism (lack of DI)	0.11	0.22	**0.45**	-0.34	0.18	-0.02
Separation Insecurity (NA)	0.17	-0.26	**0.44**	0.01	-0.04	0.35
Hostility (NA/A)	0.35	0.11	**0.42**	0.17	0.03	0.09
Suspiciousness (NA/DT)	0.30	0.16	**0.40**	0.00	0.00	0.06
Emotional Lability (NA)	0.10	-0.03	**0.31**	0.19	0.26	0.24
Irresponsibility (DI)	0.04	0.03	0.00	**0.68**	-0.02	0.18
Risk Taking (DI)	0.01	-0.01	0.03	**0.43**	0.28	-0.40
Callousness (A)	0.10	0.31	0.22	**0.37**	0.01	0.01
Impulsivity (DI)	-0.02	-0.04	0.02	**0.41**	0.25	0.28
Unusual Beliefs & Experiences (P)	-0.05	0.28	0.08	0.02	**0.65**	-0.11
Eccentricity (P)	0.00	0.30	0.13	0.31	**0.44**	-0.05
Perceptual Dysregulation (P)	0.09	0.20	0.05	0.21	**0.40**	0.22

Distractibility (DI)	0.09	0.19	0.00	0.35	0.03	**0.51**
Submissiveness (NA)	-0.06	0.08	0.25	0.16	-0.14	**0.44**
Perseveration (NA)	0.06	0.31	0.24	0.05	0.14	**0.45**
MMPI-2-RF SP Scales						
SUI (I)	**0.77**	0.08	-0.05	0.00	0.13	-0.33
MLS (SC)	**0.64**	-0.04	-0.06	0.10	-0.06	0.07
HLP (I)	**0.58**	0.03	0.03	0.01	0.00	0.15
STW	**0.44**	-0.05	0.18	-0.06	0.13	0.28
SFD (I)	**0.43**	-0.03	-0.05	0.10	-0.01	0.36
FML (IN)	**0.43**	-0.03	0.11	0.01	0.21	0.13
AXY (I)	**0.36**	-0.01	0.00	-0.18	0.35	0.16
ANP (I)	**0.36**	-0.17	0.19	-0.03	0.25	0.15
GIC (SC)	**0.31**	0.01	0.11	-0.09	0.23	0.00
DSF (IN)	0.17	**0.38**	-0.06	-0.02	0.11	0.03
IPP (IN)	0.11	-0.06	**-0.31**	0.01	-0.23	0.13
JCP (E)	0.06	-0.07	0.10	**0.35**	0.13	-0.07
ACT (E)	-0.26	-0.01	0.02	0.03	**0.68**	0.30
NUC (SC)	0.27	-0.01	-0.15	0.12	**0.37**	0.08
NFC (I)	0.03	0.13	-0.04	0.02	0.09	**0.74**
SHY (IN)	-0.01	0.23	-0.03	-0.02	-0.04	**0.64**
MSF (I)	-0.01	-0.17	0.01	-0.20	0.06	**0.50**
COG (SC)	0.16	0.03	-0.23	0.29	0.29	**0.46**
BRF (I)	0.02	-0.01	0.02	-0.19	0.24	**0.46**
SUB (E)	0.03	0.00	-0.03	0.28	0.08	-0.04
SAV (IN)	0.24	0.29	-0.06	0.01	-0.28	-0.07
AGG (E)	0.27	-0.02	0.17	0.03	0.29	-0.01
HPC (SC)	0.28	-0.08	-0.08	-0.03	0.28	0.05

Note. NA = PID-5 Negative Affectivity Facets; DT = PID-5 Detachment Facets; A = PID-5 Antagonism Facets; DI = PID-5 Disinhibition Facets; P = PID-5 Psychoticism Facets; SC = MMPI-2-RF Somatic/Cognitive SP Scales; I = MMPI-2-RF Internalizing SP Scales; E = MMPI-2-RF Externalizing SP Scales; IN = MMPI-2-RF Interpersonal SP Scales; Bold type represents highest factor loading ; Underlined type represent factor loadings of ±0.30 or greater; MLS = Malaise; GIC = Gastrointestinal Complaints; HPC = Head Pain Complaints; NUC = Neurological Complaints; COG = Cognitive Complaints; SUI = Suicide/Death Ideation; HLP = Hopelessness/Helplessness; SFD = Self-Doubt; NFC = Inefficacy; STW = Stress/Worry; AXY = Anxiety; ANP = Anger Proneness; BRF = Behavior-Restricting Fears; MSF = Multiple Specific Fears.

Finally, as it is evident in Table 7, for MPI-2-RF PSY-5 scales and PID-5, following the implementation of the three to five-factor models, a five-factor model showed an adequate fit to the data, and this was theoretically expected (TLI = 0.92, CFI = 0.95, SRMR = 0.03, and RMSEA = 0.05). The factor loadings were generally similar to the framework of PID-5 domains (negative affectivity, antagonism, psychoticism, disinhibition, and detachment). Also of note is that the MMPI-2-RF DISC-r scale was loaded on the antagonism factor rather than the disinhibition factor. However, this factor loading was not unexpected.

Table 7. Joint Factor Structure of PID-5 Facets and Minnesota Multiphasic Personality Inventory-2-Restructured Form (MMPI-2-RF) Specific Problems, and Personality Psychopathology Five Scales

	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
PID-5					
Anxiousness (NA)	**0.82**	-0.02	-0.02	0.00	0.01
Separation Insecurity (NA)	**0.56**	0.01	0.03	0.13	-0.28
Depressivity (NA/DT)	**0.54**	0.02	-0.05	0.24	0.25
Perseveration (NA)	**0.52**	0.19	0.10	0.16	0.14
Attention Seeking (A)	**0.52**	-0.04	0.51	-0.03	-0.23
Hostility (NA/A)	**0.51**	-0.07	0.41	0.15	0.08
Emotional Lability (NA)	**0.44**	0.14	0.20	0.27	-0.19
Suspiciousness (NA/DT)	**0.39**	0.03	0.33	-0.02	0.17
Submissiveness (NA)	**0.30**	-0.03	0.09	0.24	0.00
Unusual Beliefs & Experiences (P)	-0.01	**0.81**	0.15	-0.02	0.00
Perceptual Dysregulation (P)	0.28	**0.57**	-0.03	0.36	0.00
Eccentricity (P)	0.01	**0.41**	0.32	0.26	0.12
Manipulativeness (A)	-0.10	0.04	**0.72**	0.05	-0.14
Deceitfulness (A)	0.14	-0.07	**0.56**	0.30	-0.04
Grandiosity (A)	0.02	0.19	**0.63**	-0.12	0.01
Callousness (A)	0.06	0.00	**0.42**	0.29	0.30
Risk Taking (DI)	-0.32	0.16	**0.33**	0.24	-0.02
Irresponsibility (DI)	0.02	-0.03	0.16	**0.67**	0.06
Impulsivity (DI)	0.22	0.10	0.05	**0.51**	-0.13
Distractibility (DI)	0.38	0.03	0.03	**0.51**	0.15
Rigid Perfectionism (lack of DI)	0.33	0.23	0.30	**-0.37**	0.03
Withdrawal (DT)	0.17	0.00	0.17	-0.12	**0.65**
Restricted Affectivity (DT/NA)	-0.03	0.14	0.20	0.04	**0.64**
Intimacy Avoidance (DT)	-0.08	0.11	-0.01	-0.01	**0.54**

Anhedonia (DT)	0.39	-0.03	-0.01	0.11	**0.52**
MMPI-2-RF PSY-5 Scales					
NEGE-r	**0.84**	0.09	-0.03	-0.09	-0.04
PSYC-r	0.30	**0.70**	-0.04	0.01	-0.01
AGGR-r	-0.03	0.27	**0.45**	-0.13	-0.09
DISC-r	-0.07	0.08	**0.43**	0. 26	-0.02
INTR-r	0.01	-0.30	-0.11	-0.01	**0.66**

Note. NA = PID-5 Negative Affectivity Facets; DT = PID-5 Detachment Facets; A = PID-5 Antagonism Facets; DI = PID-5 Disinhibition Facets; P = PID-5 Psychoticism Facets; PSY-5 = MMPI-2-RF PSY-5 Scales; Bold type represents highest factor loading; Underlined type represent factor loadings of ±0.30 or greater; AGGR-r = Aggressiveness; PSYC-r = Psychoticism; DISC-r = Disconstraint; NEGE-r = Neuroticism/Negative Emotionality; INTR-r = Introversion/Low Positive Emotionality.

Discussion

In this study, we first investigated the correlations among MMPI-2-RF scales and maladaptive personality traits. Overall, the findings showed consistency with previous research which used samples from different cultural contexts (9, 11). To identify the pattern of loadings of PID-5 facets and MMPI-2-RF scales, we further conducted ESEM to understand whether the factor structure of these two tools would resemble each other. The findings generally supported earlier research that identified the scales with closely related content loaded into identical factors. However, there were several unexpected findings that could be due to the characteristics of this sample. The results of our study add impressively to our understanding of the joint structure of these two measures.

As noted, the overall pattern of relations was conceptually anticipated, such that the effect sizes of expected associations were generally the highest across the MMPI-2-RF hierarchy. It is noteworthy that although the MMPI-2-RF scales mostly had the strongest relations with their respective PID-5 counterparts, the unexpected correlations also had their own unique patterns. For instance, The MMPI-2-RF Internalizing scales had typically their strongest relations with the PID-5 negative affectivity domain and its facets. This finding was generally consistent with the results of references 9, 21 and 24, which reported conceptually expected associations, reflecting support for dimensional structures of personality assessment measures. However, there were some unexpected findings. A number of these unexpected correlations were also reported by Anderson and colleagues (9). For instance, the PID-5 distractibility (a facet of disinhibition) was generally associated with MMPI-2-RF internalizing scales with a large magnitude. This unexpected finding could be attributed to the fact that PID-5 distractibility is more connected to the PID-5 negative affectivity domain and should be located on negative affectivity rather than disinhibition (28). Congruent with our finding, Millon and colleagues (29) suggested that individuals with internalizing problems distract themselves to decrease the cognition clarity of their psychological distress. This leads to fragmented and incoherent thoughts, and therefore, to problems in modulating concerns (30).

Similarly, PID-5 psychoticism facets were unexpectedly Associated with a broad range of MMPI-2-RF scales. Consistent with this finding, Anderson and colleagues (9) suggested that although PID-5 psychoticism had the highest relations with MMPI-2-RF scales with the nature of psychoticism, it was generally related with a great number of other MMPI-2-RF scales, as well. Additionally, we should note that some studies suggested that there could be issues with discriminant validity of the PID-5 psychoticism domain (31, 32); the low discriminant validity of the PID-5 psychoticism domain has probably caused its meaningful correlations with different types of MMPI-2-RF scales. Moreover, a great number of meaningful correlations of PID-5 psychoticism facets with various ranges of MMPI-2-RF scales could be explained by the higher severity of psychoticism. Indeed, the severe disorganization in psychoticism most likely leads to other ranges of various psychological problems such as internalizing and externalizing problems (33).

Interestingly, at the MMPI-2-RF SP level, the Gastrointestinal Complaints (GIC) and Head Pain Complaints (HPC) did not show any meaningful correlations with PID-5 scales, indicating that these two SP scales are more somatic notions and it appears that no PID-5 scale can cover this range of constructs. Similarly, for Substance Abuse (SUB), this SP scale did not reach a meaningful correlation with any of the PID-5 scales. This finding could be because the consumption of alcohol and drugs is strictly banned for all age groups in Iran, which probably lead to less reports of use by Iranians.

Next, we examined the factor loadings of PID-5 facets along with MMPI-2-RF scales using ESEM, to understand whether these two measures were loaded in a

conceptually expected way. Factor analyses of PID-5 facets and MMPI-2-RF HO scales revealed that three higher-order factors were loaded. In this regard, while the scales with the isolation nature were extracted as a separate factor, the scales with though and externalization natures were loaded together. Consistent with this finding, Eysenck and Eysenck (34) suggested that externalizing and thought problems appear generally together. Besides, this finding about factor loadings was highly consistent with the findings of the research by Wright and colleagues (35), in which the three higher-order domains, namely negative affectivity, detachment, and externalization, were defined. Therefore, these factors might represent the three general structures of psychopathology in the Iranian community.

The variance in PID-5 facets and MMPI-2-RF SP scales were more clearly accounted for. The unexpected findings at this level of analyses were the loadings of PID-5 separation insecurity and rigid perfectionism with a series of externalizing scales including PID-5 grandiosity and attention seeking. However, these findings could be explained conceptually. Consistent with our findings, Anello and colleagues (36) found that the simultaneous loading of PID-5 separation insecurity with grandiosity could be due to vulnerable traits such as low self-esteem that were generally covered by grandiosity (36). Similarly, the simultaneous loading of PID-5 rigid perfectionism and grandiosity on the identical factor is not surprising, reflecting the manifestation of perfectionism and expecting others to be perfect, which is represented well in individuals with a grandiose personality (37). Additionally, ACT had its strongest loadings on the thought factor, which was somewhat consistent with previous reports (38, 39). Indeed, although this finding was theoretically unexpected, it can be explained by the fact that odd thinking may eventually lead to odd behaviors and impulsive actions (39).

The most expected findings were found on ESEM analyses of PID-5 facets and MMPI-2-RF PSY-5 scales, which strongly resembled the five-factor model. This finding was highly in line with prior research in this field that found the convergence among PSY-5 scales and respective PID-5 scales (9, 40-42). However, it should be noted that although PID-5 attention seeking loaded secondarily onto the externalizing factor, the first loading of this PID-5 facet was on the negative emotionality factor. We proposed that the location of this PID-5 facet may be dependent on cultural factors and the ways members of a culture interact or communicate.

Limitation

Our study had certain limitations. First, although a sample that covers a larger age range could be more representative of the world's population, for example compared to a sample of students, the results found from the general community are not always generalizable to a clinical setting. Moreover, we should note that although the purpose of this study was to report the joint factor analysis of the PID-5 facets and MMPI-2-RF scales, we, however, did not assess factor loadings for each of these two measures as separate analyses to identify their unique factor load paths.

Conclusion

Our analysis adds to a body of empirical research on the PID-5 measure and its correlation with MMPI-2-RF, a commonly applied tool in psychopathology studies. Overall, we can conclude that the PID-5 facets are generally covered by the MMPI-2-RF scales. More precisely, although a few results were found that were different to expectations, the general pattern was congruent with what we had initially hypothesized. These findings provide support for adequate convergence of maladaptive personality traits and psychopathology structures, as well as for utilizing MMPI-2-RF to measure personality psychopathology from a dimensional perspective.

Acknowledgment

None.

Conflict of Interest

None.

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