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High convergent validity among the Five Factor Model, PID-5-SF and PiCD

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Abstract: In the last ten years, two instruments (the PID-5 [Personality Inventory for DSM-5] and the PiCD [Personality Inventory for ICD-11]) have been developed to measure the dimensional approach to personality disorders (PDs). Several studies have analysed the relationships between both instruments and the Five Factor Model (FFM), although the PiCD has received less attention than the PID-5, given its more recent publication. For instance, the PiCD has never been related to the NEO-PI-R. The aims of the present paper were to explore the convergent validity of the NEO-PI-R, a short version of the PID-5 (PID-5-SF), and the PiCD; to compare these dimensional approaches as for their ability to predict categorical PDs measured through the screening questionnaire of the International Personality Disorder Examination (IPDE); and to explore the nature of two controversial pathological domains: Psychoticism (from the PID-5-SF) and Anankastia (from the PiCD). One thousand five hundred sixty-five people from the Spanish general population completed the NEO-PI-R, PID-5-SF and PiCD. Seven hundred fifty-eight also filled out the IPDE. Results show a high convergent validity of the FFM, the PID-5-SF and the PiCD. Especially relevant from a clinical perspective is the great convergence between the two measures of dimensional PDs. In light of the results, the personality correlates of Psychoticism are reconsidered, and the location of Anankastia as the opposite pole of Disinhibition instead of as a separate domain, suggested by previous authors, is supported. The advantages of a dimensional approach to PDs and the practical implications for their assessment are discussed.

Key words: Dimensional approach to Personality Disorders, NEO-PI-R, PID-5-SF, PiCD, IPDE.

The dimensional structure of personality disorders (PDs) has developed from a range of studies that have shown no qualitative differences between personality traits and PDs (Ostendorf, 2000; Saulsman & Page, 2004; Widiger & Costa, 1994; 2002). Hence, the fifth edition of the American Psychiatric Association's (APA) *Diagnostic and Statistical Manual of Mental Disorders (DSM-5; APA, 2013)* included a five-domain dimensional trait model for PDs. The domains were Negative affectivity, Detachment, Antagonism, Disinhibition and Psychoticism, assessed using the Personality Inventory for DSM-5 (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012). A considerable body of research has been conducted with respect to the *DSM-5* trait model reinforcing a five-factor structure (e.g., Al-Dajani, Gralnick, & Bagby, 2016; Fossati, Krueger, Markon, Borroni, & Maffei, 2013; Morey, Krueger, & Skodol, 2013; Roskam, et al., 2015).

This five-factor structure has a strong resemblance with the Five Factor Model (FFM). In general, Negative Affectivity joins with Neuroticism, Detachment with low Extraversion, Antagonism with low Agreeableness, and Disinhibition with low Conscientiousness (Al-Dajani, Gralnick, & Bagby, 2016; De Fruyt, et al., 2013; Griffin & Samuel, 2014; Thimm, Jordan, & Bach, 2016; Thomas, Yalch, Krueger, Wright, Markon, & Hopwood, 2013; Wright & Simms, 2014). Less clear are the relationships with Psychoticism, and whereas some studies pointed out that Openness to Experience could play the most important role (e.g, De Fruyt, et al., 2013; DeYoung, Carey, Krueger, & Ross, 2016), other studies suggested a lack of relationship between both constructs (e.g., Suzuki, Samuel, Pahlen, & Krueger, 2015). Widiger and Crego (2019) have summarized quite well the problematic alignment of Psychoticism with Openness to Experience. In addition, other studies show that the normal personality correlates of Psychoticism are quite complex and involve different traits (Aluja, Sayans-Jiménez, García, & Gutierrez, 2020; García, Cuevas, Lucas, & Aluja, 2020; Zimmermann, et al., 2014).

More recently, the 11th edition of the World Health Organization's (WHO) International Classification of Diseases (ICD-11; WHO, 2017) included a comparable dimensional model, consisting of Negative affectivity, Detachment, Dissocial, Disinhibition, and Anankastia domains (Tyrer, Mulder, Kim, & Crawford, 2019; Tyrer, Reed, & Crawford, 2015). To measure these pathological domains, Oltmanns and Widiger (2018), developed the PiCD [Personality Inventory for ICD-11]. Although the theoretical proposal contains five domains, initial studies show instead a four-factor structure. Thus, Crego and Widiger (2020) replicated four dimensional domains: Negative Affectivity, Detachment, Dissocial and Disinhibition. On the contrary, the fifth theoretical dimension (Anankastia) would not conform its own pathological factor when the PiCD is compared with other pathological instruments (DAPP-BQ and SNAP; Crego & Widiger, 2020). Carnovale, Sellbom, and Bagby (2020) and McCabe and Widiger (2020) also supported a four-factor solution, with the fourth factor representing a bipolar continuum from Anankastia to Disinhibition.

As it happens with the PID-5, the PiCD has been related with the FFM, although given its more recent publication the evidence is scarcer. Prior to the publication of the PiCD, Mulder, Horwood, Tyrer, Carter, and Joyce (2016) used a structured interview to assess the theoretical proposal of five domains for the ICD-11. They reported a great alignment between Negative Affectivity and Neuroticism, Detachment and low Extraversion, Dissocial and low Agreeableness, Disinhibition and low Conscientiousness, and Anankastia and high Conscientiousness. Somma, Gialdi, and Fossati (2020) analysed the relationships between the PiCD and a composite score of the FFM based on the Big Five Inventory and the Five-Factor Model Rating Form. The PiCD Negative Affectivity domain showed a positive relationship with Neuroticism, whereas Detachment, Dissocial, and Disinhibition domains showed a negative convergent validity with the Extraversion, Agreeableness, and Conscientiousness domains, respectively.

Crego & Widiger (2020) confirmed the placement of all four maladaptive trait models, assessed by the DAPP-BQ, SNAP, PID-5, and PiCD, as variants of the domains and facets of the FFM. In regard to Anankastia, Crego, and Widiger (2020), also reported a bipolar maladaptive personality structure for Conscientiousness, with PiCD Anankastia at one pole and PiCD Disinhibition at the other. In this way, Anankastia is conceptualized by the authors of the ICD-11 trait model as being linked to Obsessive-Compulsive diagnosis (Mulder et al., 2016), as was compulsivity by the Chair of the *DSM-5* trait model (Skodol, 2012) and by Krueger et al., (2012). It would seem, therefore, that the relationship between Anankastia and Disinhibition calls for further research before a definite conclusion can be reached.

Carnovale et al. (2020) studied the relationships between the PiCD and other pathological dimensions using the MMPI-2-RF. Consistent with the hypotheses, PiCD Negative Affectivity was strongly related to Emotional/Internalizing Dysfunction, while also being moderately related to Behavioral/Externalizing Dysfunction. Dissocial and Disinhibition were positively related to Behavioral/Externalizing Dysfunction, although Disinhibition was also moderately related to Emotional/Internalizing Dysfunction. Anankastia, however, was only weakly negatively related to Behavioral/Externalizing Dysfunction. It was also found that Detachment was moderately related to Emotional/Internalizing Dysfunction. Thought Disorder Dysfunction, on the other hand, was found to be moderately related to Negative Affectivity, Dissocial, and Disinhibition. With respect to the multiple regression models, PiCD domains accounted for a range of 27% (Thought Disorder Dysfunction) to 64% (Emotional/Internalizing Dysfunction) of variance in the MMPI-2-RF.

It may be important for future studies to compare the PiCD with the PID-5, and with other personality measures in terms of similar (or differential) predictive ability (i.e., to address potential jingle-jangle fallacies), considering the conceptual convergence between the domains of these existing measures. Indeed, in the original validation study, PiCD Negative Affectivity,

Detachment, Dissocial, and Disinhibition domains had a median convergent correlation of $r .80$ with PID-5 Negative Affect, Detachment, Antagonism, and Disinhibition domains, respectively (Oltmanns & Widiger, 2018). Somma, et al. (2020) reported, consistent with Oltmanns and Widiger's (2018) results, large effect size correlations (about .50; Cohen, 1988) between the PiCD and the PID-5-SF domains. Note that the main difference between the PID-5 and the PiCD lies in the absence of Psychoticism in the latter. In the ICD-11 model, trait features of Psychoticism are not included because the WHO considers psychotic phenomena (i.e., schizophrenia spectrum disorders) to be segregated from personality disorders. In the same way, it is theoretically expected that no domain similar to Anankastia is assessed by the PID-5 (or PDI-5-SF).

The present study

Considering the above literature, the main aim of the present study was to explore simultaneously the convergent and divergent validity of NEO-PI-R with the PID-5-SF and the PiCD. Note that previous studies about the relationships between the PiCD and the FFM did not use the predominant measure of the FFM (NEO-PI-R). Besides, the predictive validity of the NEO-PI-R regarding the PID-5 (and PID-5-SF) and the PiCD has never been compared. Another aim is to replicate in a large Spanish community sample previous findings about the convergence of both dimensional approaches to PDs. They should present high convergence as well a similar pattern of relationships with the NEO-PI-R. It would also be useful to explore the different patterns of relationship of Psychoticism and Anankastia with the FFM. In regard to the former, considering the FFM, PID-5-SF and PiCD simultaneously would cast some light on the still inconclusive relationships between Psychoticism and personality (e.g., Widiger, & Crego, 2019). Concerning the latter, it would be helpful to establish whether Anankastia is better understood as part of a bipolar factor along with Disinhibition, or it should be retained as a

separate domain. Finally, although the ICD-11 has removed the categorical system of personality disorders, the DSM-5 has retained it. Hence, further comparison of the NEO-PI-R, dimensional and categorical systems (measured in the present paper through the screening questionnaire of the International Personality Disorder Examination [IPDE]; Loranger, Janca, & Sartorius, 1997) is still required in order to justify a dimensional system of personality disorders that is informed by evidence.

Method

Participants

A sample of 1,565 people from the Spanish general population completed the NEO-PI-R, PID-5-SF and PiCD. Mean age was 36.5 years (*SD*: 17). The age range was between late adolescence (16) to elderly (89 years). 46.2% of the sample were males, and 53.8% females. Educational attainment was as follows: Primary School (about 15%), High School (about 35%), and University student or with some university degree (about 50%). Seven hundred fifty-eight of these 1,565 participants also completed the IPDE. Mean age of this subsample was 37.1 (*SD*: 17). Distribution of sex and educational attainment variables was strongly similar to the total sample. No information about race or ethnicity was collected, but most of the Spanish population are Caucasian.

Measures

The revised NEO Personality Inventory (NEO PI-R). The revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 1992) is a well-known measure of the FFM. Thus, it measures Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C), and their thirty facets: N1 (Anxiety), N2 (Angry Hostility), N3 (Depression), N4 (Self-Consciousness), N5 (Impulsiveness), N6 (Vulnerability), E1 (Warmth),

E2 (Gregariousness), E3 (Assertiveness), E4 (Activity), E5 (Excitement Seeking), E6 (Positive Emotions), O1 (Fantasy), O2 (Aesthetics), O3 (Feelings), O4 (Actions), O5 (Ideas), O6 (Values), A1 (Trust), A2 (Straightforwardness), A3 (Altruism), A4 (Compliance), A5 (Modesty), A6 (Tender-Mindedness), C1 (Competence), C2 (Order), C3 (Dutifulness), C4 (Achievement Striving), C5 (Self-Discipline), and C6 (Deliberation). The subjects answer the 240 items of the questionnaire on a 5-point Likert-type scale (0-4), ranging from "Strongly disagree" to "Strongly agree". The Spanish version of the NEO-PI-R (Aluja, García, García, & Seisdedos, 2005; Costa, & McCrae, 1999) has good psychometric properties, similar to those of the original American version.

Personality Inventory for DSM-5-Short Form (PID-5-SF). The reduced version of the PID-5 (PID-5-SF) developed by Maples, et al. (2015) was applied. The PID-5-SF scores are computed after 100 items taken from the original 220-item self-report inventory (PID-5, Krueger, et al, 2012). Items are rated on a 4-point Likert-type scale ranging from 0 (*very false or often false*) to 3 (*very true or often true*). Like the long PID-5, the PID-5-SF includes 25 facets that are used to compute scores on five domains: Negative Affectivity (NEF), Detachment (DET), Antagonism (ANT), Disinhibition (DIS), and Psychoticism (PSY). Maples et al., (2015) reported that correlational profiles of the original and reduced versions of the PID-5 were nearly identical. Only the five domains, not the facets, were used in the present study. Gutiérrez, et al., (2017) validated the original PID-5 questionnaire in the Spanish national context. Evidence of validity and reliability supporting the use of the short version (PID-5-SF) in the Spanish context has also been provided in a previous study (Aluja, García, Cuevas, & Lucas, 2019).

The Personality Inventory for ICD-11 (PiCD). The Personality Inventory for ICD-11 (PiCD; Oltmanns & Widiger, 2018) is a 60-item self-report measuring the five domains of the dimensional ICD-11 personality model (WHO, 2018): Negative affectivity (NA), Detachment (DT), Dissocial (DL), Disinhibition (DN), and Anankastia (AN). Each domain has 12 items

rated from 1 (*Strongly disagree*) to 5 (*Strongly agree*). The Spanish version of the PiCD proved to be reliable, showed consistent factorial structure, and was able to detect clinical cases with reasonable accuracy (Gutiérrez et al., 2020).

International Personality Disorder Examination (IPDE). The IPDE is a 77- true/false item self-report instrument to assess the 10 DSM-IV Personality Disorders: Paranoid (PAR), Schizoid (SZD), Schizotypal (STP), Histrionic (HTS), Antisocial (ANT), Narcissistic (NAR), Borderline (BOR), Obsessive–Compulsive (OBS), Dependent (DEP), and Avoidant (AVO) (Loranger, Janca, & Sartorius, 1997). Each item corresponds to a specific PD criterion. Given that the IPDE scales are short and the criteria of the DSM-IV heterogeneous, the internal consistencies are usually low (alphas are about 0.50). In this study, we used a validated Spanish version (López-Ibor, Pérez, Rubio, & WHO, 1996).

Procedure

Undergraduate psychology students were trained in the theory and instruments of the FFM. They administered and helped to complete the protocol containing the NEO-PI-R, and several pathology instruments (PID-5-SF, PiCD and, in some cases, also IPDE) to six people with the following characteristics: one male and female with an age between 18 and 30 years, one male and female with an age between 31 and 50 years, and one male and female older than 51 years. The intention was that the sample distribution would be as close as possible to the Spanish general population. It should be noted that participants were informed about the purpose of the research and the expected duration of completing the protocol. They were also informed that the data gathered could be used for research purposes, and that they could decline to participate or withdraw at any time (Garcia, Aluja, Fibla, Cuevas, & García, 2010). Any question about protocols or procedures should be addressed by e-mail to the first author. Note that neither the name nor a personal identification number (such as identity card), nor any other

personal information was recorded. To increase motivation and reliability, a brief report on the Big-Five traits was offered to all participants. Each university student received a random code. Anonymous results were returned indicating the student's code, age and sex of the person. Thus, each student could identify their own protocols, as well as the specific person through the information of sex and age. Databases and all information about this study was saved in a computer protected by a personal password (García et al., 2010). The handling of the information was carried out in accordance with the confidentiality rules set out in the Spanish Organic Law 3/2018 on Data Protection and Guarantee of Digital Rights, Helsinki Declaration, in the Council of Europe Convention on Human Rights according to instructions of the approval of the University ethical commission.

Statistical Analyses

Descriptive statistics (mean, standard deviation, asymmetry and kurtosis) of all variables were computed. Asymmetry and kurtosis are of special relevance to show the normality of variables. Normality is assumed if both indexes are within the -1 and +1 range (Muthen & Kaplan, 1985). Correlations between domains and facets of the NEO-PI-R and domains of the PID-5-SF and PiCD, as well as IPDE scales, were computed.

In order to explore the convergent and divergent validity of the instruments used as well as the nature of some pathological domains, two exploratory factor analyses were conducted. The first one sought to explore the location of the PID-5-SF, PiCD and IPDE scales on the Five Factor space. This factor analysis included NEO-PI-R facets instead of NEO-PI-R domains to conform a more robust five-factor structure. Preceding studies about the relationships between personality traits and PDs used several extraction procedures, such as Maximum Likelihood, Principal Axes or Unweighted Least Squares. In the present study, the last one was selected given that earlier studies with the PiCD have used it (e.g., Somma et al., 2020). Five factors

were explicitly extracted to reproduce the FFM and, therefore, the relationships between all psychopathological scales with the Big Five. All previous papers revised suggest a lack of orthogonality of the PID-5 and PiCD domains, so an oblique procedure (Oblimin) was used to rotate the factors.

One of the aims of the present paper is to explore the convergent nature of both instruments of dimensional PDs: PID-5-SF and PiCD. Since the inclusion of NEO-PI-R facets could somewhat bias the results of the previous factor analysis given that factors are forced to identify with the Big Five, a second exploratory factor analysis was conducted using only 15 variables (NEO-PI-R, PID-5-SF, and PiCD domains). Since the PID-5 is represented by a five-factor structure (e.g., Fossati, Krueger, Markon, Borroni, & Maffei, 2013; Morey, Krueger, & Skodol, 2013; Roskam, et al., 2015), and previous studies suggest a more appropriate four-factor one for the PiCD (Carnovale et al., 2020; Crego, & Widiger, 2020; McCabe, & Widiger, 2020), two solutions of five and four factors were retained. The factor procedure was the same as in the first factor analysis: Unweighted Least Squares with Oblimin rotation. Maximum likelihood was the extraction method used in many papers with the PID-5 (e.g., DeYoung, Carey, Krueger, & Ross, 2016; Thomas et al., 2013). In order to test if extraction method could play some role in the convergent relationships between the PID-5-SF and the PiCD, congruence coefficients between the factors obtained through Unweighted Least Squares extraction method and Maximum Likelihood (also followed by Oblimin rotation) were computed.

In order to compare the predictive ability of NEO-PI-R in regard to PID-5-SF, PiCD and IPDE, two sets of regression analyses were computed. The first set included the NEO-PI-R domains as independent variables. The second one included the NEO-PI-R facets as independent variables. The PID-5-SF and PiCD domains and the IPDE scales were the dependent variables in both cases. Stepwise method was used. Note that both large sample sizes and the presence of many independent variables in the analysis could lead us to an overinclusion of variables in the

final equation, even if association with the criterion variable is almost negligible. Thus, a Bonferroni correction was applied to the likelihood required to introduce a variable in the final equation. The largest number of variables in any regression model is that of the NEO-PI-R facets (30). Since $0.05/30$ is about .001, the likelihood of entering a variable into the final equation for all regression analyses was fixed at .001. Data, syntax, and results files in SPSS format are available upon request from the first author.

Results

Descriptive and correlational analyses

Descriptive statistics (minimum, maximum, mean, standard deviation, skewness, kurtosis, and alpha reliability coefficient) for NEO-PI-R, PID-5 and PiCD domains and IPDE scales were computed (Supplemental Material, Table S1). The results show that almost all variables used in this study were normally distributed, with the exceptions of Dissocial domain of PiCD and Antisocial scale of IPDE, which presented a slight and large positive asymmetry, respectively. The reliability coefficients of the NEO-PI-R, PID-5-SF and PiCD domains were high. On the contrary, the alpha coefficients of the IPDE scales were low (average: .52). The same information for NEO-PI-R facets is presented in Table S2 of the supplementary material. Note that all facets were normally distributed and the average alpha coefficient was .67, higher than the average (.60) reported for the normative Spanish sample (Costa & McCrae, 1999).

Table 1 shows the correlations between NEO-PI-R, PID-5 and PiCD domains, and IPDE scales. The first remarkable point is the similar pattern of relationships observed between the NEO-PI-R domains and the PID-5-SF and PiCD domains. As expected, Negative Affectivity from both instruments correlated mainly with Neuroticism, Antagonism and Dissocial mainly with Agreeableness in negative, and both Disinhibition domains mainly, and also negatively, with Conscientiousness. Detachment from the PiCD only correlated with Extraversion, whereas

the homonym domain from PID-5-SF presented a more complex pattern with significant correlations with Extraversion, Neuroticism, Agreeableness, and Conscientiousness. As expected, the largest difference came from Psychoticism and Anankastia domains; the former correlated mainly with Neuroticism and Conscientiousness, whereas the latter only correlated with Conscientiousness. On the other hand, most of the relationships observed between NEO-PI-R and IPDE scales reproduces the well-known relationships between the FFM and categorical PDs (Aluja, Cuevas, García, & García, 2007, Saulsman, & Page, 2004; Widiger & Costa, 1994; 2002), with some exceptions such as, for instance, the lack of relationship between Obsessive-Compulsive disorder and Conscientiousness (Saulsman, & Page, 2004). Table 2 shows the correlations with each NEO-PI-R facet. It should be highlighted that this more fine-grained analysis allows us to detect non-homogenous patterns of relationships across facets of the same NEO-PI-R domain. For instance, Detachment did not correlate equally with all Extraversion facets.

The present study aims to explore the convergent validity of the PID-5-SF and the PiCD. The correlations between Negative Affectivity, Detachment, Antagonism-Dissocial and Disinhibition were .77, .61, .71, and .81, respectively. Considering that no correction for attenuation was performed, we can state that the corresponding domains of both instruments measure identical constructs, with perhaps the only exception of Detachment. Finally, Psychoticism mainly correlated with Negative Affectivity, Dissocial and Disinhibition PiCD domains, and Anankastia only with PID-5 Disinhibition. It also deserves to be mentioned that the average correlation within the PID-5-SF and the PiCD were .45 and .30, respectively. These coefficients are mainly produced by the high correlations of Negative Affectivity with the other domains. The difference between both instruments seems to come mainly from the high correlations found for the Detachment domain of the PID-5-SF.

Factor analyses

In order to clarify the pattern of relationships between the FFM and dimensional and categorical PDs, an exploratory factor analysis including NEO-PI-R facets and all personality disorder scales was performed extracting five factors. Table 3 shows the pattern matrix of the obliquely-rotated solution. As expected, the five factors reproduce well the FFM structure. This solution also reproduces a simple structure in regard to the relationships between the FFM and the PID-5-SF and PiCD. Note that almost all dimensional personality disorder domains only present a unique primary loading. No secondary loadings are observed, with the exception of PID-5 Detachment on Neuroticism. As correlational analysis suggested, the Psychoticism domain loads on several factors, although with no large loadings. On the other hand, Disinhibition and Anankastia present similar loadings (although with the inverse sign) on the same factor (Conscientiousness). It is remarked that final communalities show that this five-factor solution accounts for about 70% of the variance in most PID-5-SF and PiCD domains. On the contrary, the pattern of loadings of the IPDE scales presents several secondary loadings, although Cluster A PDs are mainly related to low Extraversion (Schizoid and Schizotypal PDs), Cluster B to high Neuroticism (Borderline and Histrionic PDs) or low Agreeableness (Antisocial and Narcissitic PDs), and all Cluster C PDs to high Neuroticism. Note that several personality disorders loaded on the same factor (Neuroticism or Extraversion). The variance accounted for with this five-factor solution is about 40% for categorical PDs.

Table 3 may somewhat bias the relationships reported between the PID-5-SF and the PiCD, given that extracted factors were forced to represent the Big Five by including NEO-PI-R facets. To control for this bias, a second factor analysis was conducted including the NEO-PI-R, PID-5-SF, and PiCD domains. Table 4 shows factor solutions extracting five and four factors that accounted for 72% and 68% of the variance, respectively. Results reproduce largely the high convergent validity of the PID-5-SF and PiCD reported in Table 3. Negative Affectivity

domains of both instruments present an almost equal loading on the first factor, Detachment domains on the second one (although with a smaller loading for the PID-5-SF), Antagonism-Dissocial on the third, and Disinhibition on the fourth. As reported in Table 3, Anankastia presents a large loading on the Disinhibition-Conscientiousness factor. Note that the Anankastia loading is very close to those of the Disinhibition domains but with the opposite sign.

Psychoticism loads on the Negative Affectivity and Antagonism-Dissocial factors in the four-factor solution, but conforms its own factor with Openness in the five-factor solution. This finding seems contrary to the results reported in Table 3. However, Psychoticism loadings on the structure matrix, which includes the correlation matrix among factors (Izquierdo, Olea, & Abad, 2014; Loehlin, 1992), were .48, .25, -.44, .37, and .73 on the first, second, third, fourth, and fifth factors, respectively. This pattern is more congruent with the complex pattern of secondary loadings reported for Psychoticism in Table 3. The congruence coefficients between the five-factor solutions obtained through Unweighted Least Squares and Maximum Likelihood were .99, .98, .99, .99, and .89 for the first, second, third, fourth and fifth factor, respectively. All congruence coefficients were higher than .99 in the four-factor solution.

Regression analyses

Table 5 shows the results of regression analyses considering NEO-PI-R domains as the independent variables. The average R^2 for the PID-5-SF and PiCD domains and IPDE scales were .49, .54, and .29, respectively, when they were predicted after the NEO-PI-R domains, and .54, .62 and .34, respectively, after NEO-PI-R facets. Note that about half of the variance is shared between NEO-PI-R and personality disorder domains, which is about 20% more than the variance predicted for categorical system scales. The pattern of relationships between variables reproduced the same pattern depicted in Tables 1 and 3. Negative Affectivity is mainly predicted by Neuroticism, Antagonism and Dissocial by Agreeableness, and Disinhibition by

Conscientiousness. Whereas Detachment from PID-5-SF is mainly predicted by low Extraversion and high Neuroticism, the homonym domain of the PiCD is almost exclusively predicted by low Extraversion. Psychoticism is predicted by four traits with similar beta coefficients. Finally, Conscientiousness is clearly the most important variable to predict the Anankastia domain. Detailed results for the NEO-PI-R facets used as independent variables (standardized beta coefficients and R^2) are reported in Table 6. This analysis shows the relevant components of each personality domain that account for the variance of PID-5-SF and PiCD domains. Note that some facets did not add predictive power. Besides, the average difference between the amount of variance accounted for domains and facets is only about 6%, but adding many more variables.

Discussion

As expected, results of the present study clearly support the strong relationships between the FFM and both dimensional PDs instruments (PID-5-SF and PiCD). The average R^2 was .50 for the former, and .54 for the latter. Thus, about half of the variance in dimensional personality disorders might be accounted for by the Big Five. In detail, Negative Affectivity of both instruments is clearly linked to Neuroticism, Antagonism-Dissocial to Agreeableness, and Disinhibition represents the opposite pole of Conscientiousness. Detachment is related with low Extraversion in both models, although the relationship is stronger for the PiCD, and Neuroticism seems to play a role in the PID-5-SF Detachment domain (a finding also reported by Maples et al., 2015). Psychoticism presents a multidimensional profile with significant relationships with Neuroticism, Openness, Conscientiousness and Agreeableness, whereas Anankastia is almost entirely predicted by scores on Conscientiousness. Factor analysis reinforces these results, depicting a simple structure with very large loadings on the corresponding personality factor for Negative Affectivity, Detachment, Antagonism-Dissocial, Disinhibition and Anankastia, and a

less clear structure for Psychoticism. This pattern replicates the well-established relationships observed with the PID-5 (e.g., Al-Dajani et al., 2016; Thimm, et al., 2016), and confirms initial studies about the relationships between the FFM and the PiCD (Oltmanns, & Widiger, 2020; McCabe, & Widiger, 2020; Somma, et al., 2020), but using the NEO-PI-R as a measure of the FFM. It should also be remarked that this strong relationship is not observed for categorical personality disorders, with an average R^2 of .29.

A strong convergent validity of the PID-5-SF and the PiCD is observed in the present sample with very high correlations for Negative Affectivity, Antagonism-Dissocial and Disinhibition, and also high for Detachment. Accordingly, the expected perfect alignment is observed for these four domains in factor analysis (an alignment that does not seem to depend on the factor extraction method). Also, this is in agreement with the similar pattern of relationships with the FFM observed for these four domains. Therefore, results reported by Oltmanns and Widiger (2018) and Somma et al. (2020) about the high convergent validity of the PID-5 and the PiCD are clearly confirmed in the Spanish context, with the expected exceptions of the Psychoticism and Anankastia domains.

In spite of this high convergence, results of the present study also suggest that the PiCD slightly outperforms the PID-5-SF. This conclusion is based on the simpler structure of the Detachment domain of the PiCD, and the lower intercorrelations among domains for this instrument. Unlike the PID-5, the PiCD domains were developed by selecting items that had acceptable, if not optimal, discriminant validity across domains (Oltmanns & Widiger, 2018). In this sense, the average correlation (computing after absolute values) among PiCD domains was .30 in the present study. This value is quite similar to the average correlation reported by Somma et al., (2020), and Carnovale et al., (2020): .28 and .22, respectively. And, if we consider that the high negative correlation between Disinhibition and Anankastia makes theoretical sense (Mulder et al, 2016) and delete it from this calculus, the average correlations

come down to .22, .27 and .20 for the present paper, Somma et al., (2020), and Carnovale et al., (2020), respectively. In comparison, the average correlation among PID-5 domains was .45 in the present study. It is noteworthy that the same value was observed by Maples et al., (2015) for the average of intercorrelations of PID-5-SF domains in their validation sample, and it is almost identical to the average of the discriminant validity among the PID-5 domains reported by Quilty, Ayearst, Chmielewski, Pollock, & Bagby (2013) (.46). Thus, the better discriminant validity of the PiCD over the PID-5 (and PID-5-SF) replicates across samples and is, therefore, well-established.

A typical criticism of the categorical system came from the high comorbidity between PDs (Lenzenweger, Lane, Loranger, & Kessler, 2007; Widiger & Costa, 1994; 2002; Widiger, & Rogers, 1989); a comorbidity that is observed across other family disorders (Friborg, Martinussen, Kaiser, Overgård, & Rosenvinge, 2013; Friborg, et al., 2014). In this sense, it has been argued that dimensional approaches greatly reduce this comorbidity (Tyrer, et al., 2011; Widiger, & Costa, 2002). The results of this study do reinforce the lower convergence of the dimensional model versus the categorical model. Note that factor analysis shows an almost perfect simple structure model with only a few secondary loadings, whereas the IPDE scales show an opposite pattern with several secondary loadings, and many scales loading on the same factor (Neuroticism or Extraversion). In spite of this simple structure, the PID-5 and PiCD domains are not orthogonal, leaving room for some convergence among them. Results from the intercorrelations commented above represent this idea. However, a moderate convergence would reflect the true nature of personality disorder domains, which are underlain by common factors and typically form hierarchical structures (Al-Dajani, et al., 2016; Condon & Mroczek, 2016). Marple et al. (2015) and others (e.g., Krueger & Markon, 2014) argued that this does not represent a serious problem, though it could be problematic from several theoretical and practical points of view (Livesley, 2012).

Psychoticism and Anankastia

Results for Psychoticism and Anankastia deserve separate commentaries. In regard to the former, the main relationship with the FFM did not come from Openness (although using the NEO-PI-R as the measure of FFM may partly explain this fact; Widiger, & Crego, 2019), but from Neuroticism. Besides, other traits as Agreeableness and Conscientiousness also predict some variance of the Psychoticism domain (García, et al., 2020; Zimmermann, et al., 2014). Related to this point, results of the present study replicate the nontrivial, positive, and significant relationships with the PiCD Negative Affectivity, Detachment, Dissocial, and Disinhibition domains reported by Somma et al., (2020) and McCabe and Widiger (2020). Therefore, the hypothesis that no convergent validity should be found between Psychoticism and any of the PiCD domains is rejected. In fact, the Negative Affectivity, Detachment, Dissocial, and Disinhibition domains account for 35% of the variance in Psychoticism in regression analysis. Thus, the conclusion reached by Somma et al. (2020) that psychosis-proneness and severity of psychotic symptoms may be associated with high N, low E (although in the present study not with the clinical version of E, Detachment), low A, and low C is supported in our sample. Note that this pattern is congruent with the results reported by Carnovale et al. (2020) using a psychological measure not developed after the FFM.

Psychoticism is defined as a wide range of culturally incongruent odd, eccentric, or unusual behaviors and cognitions, including both process (e.g., perception, dissociation) and content (e.g., beliefs) (Krueger, & Markon, 2014). All the evidence (convergent and discriminant validity with the PiCD and the FFM) clearly suggests that maladaptive behavior assessed by the Psychoticism domain have a more complex aetiology, far beyond an unusual thinking style or fantasy proneness covered by Openness to Experience. This is totally congruent with, for instance, the results from Boyette et al. (2013), which suggest that a profile

of high Neuroticism, low Agreeableness and low Conscientiousness may help to trigger psychotic experiences. On the other hand, this FFM profile is largely true for all forms of Axis I psychopathology, so it could simply reflect nonspecific maladaptivity rather than specific psychotic experiences. So, results for the Psychoticism domain could merely indicate that it is the PID-5-SF domain that most often obtains weak discriminant validity (e.g., Crego, Gore, Rojas, & Widiger, 2015).

Previous studies about the factor structure of the PiCD (e.g., Oltmanns & Widiger, 2018) suggested reducing the five domains of ICD-11 to a four-domain model reconsidering the nature of the Anankastia factor. Carnovale et al. (2020) also suggested that Disinhibition and Anankastia domains might be combined in one domain representing a single bipolar continuum. However, they commented that this may be relatively confusing as the other domains are representative of unipolar constructs. They also recommended further research to clarify some aspects of these domains, such as testing if Anankastia shows evidence of incremental validity in predicting other outcomes. The present study may shed some light on this question. Considering the Anankastia definition and components (Mulder et al., 2016), this domain has a lot to do with Obsessive-Compulsive disorders in a clinical context. In a regression analysis with the present sample, the five PiCD domains account for 27% of the variance of the IPDE Obsessive-Compulsive scale. When Anankastia is not included in the analysis, the percentage of variance is 21%, meaning that Anankastia improves predictive validity by 6%. Note that Anankastia did not correlate with any other categorical PD, so it seems that this clinical usefulness came only from a slight increase in the prediction of Obsessive-Compulsive diagnosis. Given this limited clinical usefulness (as Carnovale et al., 2020, also reported), the high negative correlation with Disinhibition (of both the PID-5-SF and the PiCD), and the large loadings (with the opposite sign) of the Disinhibition and Anankastia domains on the same factor in both factor analyses, the present paper supports the redefinition of Anankastia as the

opposite pole of the Desinhibition domain (Carnovale, et al., 2020; McCabe, & Widiger, 2020), although to reach a final conclusion more research will be necessary on the Anankastia domain to explore its clinical correlates and discriminant validity (Aluja et al., 2020).

Practical implications and limitations

The present study has implications in applied contexts. First of all, both the PID-5-SF and the PiCD show similar results and a large convergent validity, which provides strong support for using either of them in clinical settings to detect PDs. On the other hand, initial studies recommended using normal personality questionnaires as measures of personality disorders. In this way, composite scores of NEO-PI-R facets were suggested to diagnose PDs (Bagby, Costa, Widiger, Ryder, & Marshall, 2005; Widiger, & Costa, 2002). The present study also found a strong convergent validity between NEO-PI-R domains and facets and every domain of the PID-5-SF and PiCD (with the exception of Psychoticism). Note that correlations were above .70 in many cases. Therefore, the present paper suggest that the NEO-PI-R may still be used to detect PDs (Few, et al., 2016)

There is, however, a big discussion about the usefulness of facets in applied settings. The present paper replicates the better predictive ability of facets compared to domains in regard to PDs (Aluja, Blanch, García, García, & Escorial, 2012; Dyce, & O'Connor, 1998), though this greater predictive power has a cost. Note that, for instance, twelve facets only predict a 3% more than two domains for PID-5-SF Negative Affectivity. In fact, the average increase in prediction using facets is 6% for the PID-5-SF and the PiCD. Hence, measuring only traits (and, therefore, applying the short version without facets) may also be quite useful in practical contexts. Reinforcing this idea, Oltmanns and Widiger (2018) obtained comparable results to those of the present study relating the PiCD with the EPQ-R, a normal personality test without facets. It is important to remark the greater measurement accuracy of domains compared to facets, although

the great disadvantage of only using domains is possibly that it prevents the calculation of facet-based scores (Widiger & Costa, 2002).

The present study has some limitations, the first of which refers to the sample itself. Despite being quite large, it is gathered from the general population, and no clinical samples are explicitly assessed. This pattern of results should, therefore, be replicated in clinical samples in the Spanish context. Furthermore, the sample is somewhat biased to low levels of antisocial behavior (low Antisocial PD and Dissocial scores) and high educational attainment. Secondly, the IPDE presents low reliabilities. This may account for the low R^2 coefficients reported for categorical personality disorder scales (average = .29), and the somewhat low correlations between dimensional domains and categorical scales. In the same way, note that Conscientiousness facets did not significantly correlate over $r = .15$ with the Obsessive-Compulsive PD scale of the IPDE, contrary to what has been reported by other authors (Samuel & Widiger, 2008). Congruent with this hypothesis, Fossati et al. (2013) reported higher relationships between the PID-5 and categorical PDs using a more reliable measure of the latter (PDQ-4+; Hyler, 1994).

Conclusions

Summing up, the results of the present paper largely reproduce the patterns of relationships between the FFM, PID-5-SF and PiCD observed in other countries. This is especially relevant to the PiCD given its more recent publication and the reduced availability of data. It is also concluded that both dimensional approaches from DSM-5 and ICD-11 present a high convergent validity (Bach, Kerber, Aluja, Bastiaens, Keeley, Claes, 2020). In fact, three out of five domains (Negative Affectivity, Antagonism-Dissocial and Disinhibition) may be viewed as equivalent, and Detachment domains present a strong relationship. As expected, differences between both dimensional approaches came from the fifth domain (Psychoticism and

Anankastia). Results of the present study suggest a reconsideration of the nature and aetiology of incongruent odd, eccentric, or unusual behaviors and cognitions measured by the PID-5, but support the idea that Anankastia may be defined as the opposite pole of Disinhibition instead of as a separate domain.

The present manuscript also indicates the advantages of the dimensional over the categorical approach, especially the simple factor structure achieved by both the PID-5-SF and the PiCD. Notwithstanding the better behavior of the dimensional PDs measures, there is still a reluctance to discard definitively the categorical model and assume the dimensional one. Tyrer, Mulder, Kim, and Crawford (2019) state, for instance, that Borderline PD has a long history, and applied psychology should retain it until we have a more powerful alternative. In this sense, in the present sample a combination of high Negative Affectivity and high Disinhibition accounts for about 50% of the variance of the rather unreliable Borderline IPDE scale. We might also mention the logical advantages of using the more accurate dimensional measures instead of psychometric measures of categorical PDs, which are often weak. In this sense, as Hopwood et al. (2017) stated, this alternative is already here.

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TABLES

Table 1. Correlations between NEO-PI-R, PID-5-SF and PiCD domains and IPDE scales ^{(a) (b)}.

	NEO-PI-R					PID-5-SF					PiCD					IPDE									
	N	E	O	A	C	NEF	DET	ANT	DIS	PSY	NA	DT	DL	DN	AN	PAR	SZD	STP	HTS	ANT	NAR	BOR	OBS	DEP	AVO
N																									
E	-.25																								
O	.10	.36																							
A	-.17	.07	.00																						
C	-.45	.11	-.10	.25																					
NEF	.74	.01	.14	-.07	-.33																				
DET	.51	-.50	-.11	-.31	-.38	.42																			
ANT	.16	.15	.10	-.64	-.29	.28	.36																		
DIS	.37	.10	.20	-.27	-.75	.42	.38	.48																	
PSY	.40	-.04	.28	-.27	-.40	.46	.53	.46	.52																
NA	.79	-.16	.10	-.13	-.28	.77	.50	.19	.32	.42															
DT	.20	-.67	-.21	-.24	-.19	-.01	.61	.12	.13	.25	.19														
DL	.11	.07	.07	-.70	-.23	.12	.32	.71	.36	.37	.15	.24													
DN	.40	.05	.17	-.33	-.77	.40	.39	.44	.81	.49	.37	.19	.44												
AN	-.02	-.19	-.15	.14	.58	.02	.03	-.15	-.55	-.14	.11	.17	-.12	-.52											
PAR	.40	-.16	.07	-.43	-.16	.30	.43	.31	.21	.34	.36	.23	.37	.26	.07										
SZD	.11	-.52	-.22	-.10	-.02	-.05	.38	-.02	-.06	.09	.08	.47	.05	-.03	.11	.18									
STP	.39	-.37	-.01	-.28	-.28	.24	.55	.26	.27	.48	.35	.49	.28	.29	.02	.44	.46								
HTS	.34	.31	.21	-.21	-.30	.43	.09	.41	.38	.32	.35	-.19	.28	.39	-.16	.23	-.11	.18							
ANT	.18	.14	.10	-.48	-.26	.19	.21	.52	.38	.40	.18	.04	.56	.39	-.22	.36	.07	.29	.34						
NAR	.06	.20	.13	-.44	-.05	.12	.09	.58	.18	.24	.12	.01	.49	.21	.04	.25	-.01	.19	.36	.38					
BOR	.64	.01	.21	-.29	-.43	.57	.41	.30	.46	.43	.60	.09	.29	.52	-.16	.41	.09	.41	.48	.35	.22				
OBS	.33	-.14	-.03	-.21	.07	.29	.28	.18	-.04	.17	.37	.20	.19	.03	.35	.26	.16	.25	.17	.13	.28	.26			
DEP	.45	-.08	-.03	.00	-.27	.49	.32	.16	.27	.29	.43	.10	.08	.27	.09	.21	.09	.29	.33	.12	.15	.41	.22		
AVO	.49	-.43	-.09	-.13	-.12	.35	.49	.11	.12	.21	.46	.49	.11	.15	.26	.42	.30	.45	.07	.06	.16	.31	.40	.38	

(a) NEO-PI-R: Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). PID-5-SF: Negative Affectivity (NEF), Detachment (DET), Antagonism (ANT), Disinhibition (DIS), and Psychoticism (PSY). PiCD: Negative affectivity (NA), Detachment (DT), Dissocial (DL), Disinhibition (DN), and Anankastia (AN). IPDE: Paranoid (PAR), Schizoid (SZD), Schizotypal (STP), Histrionic (HTS), Antisocial (ANT), Narcissistic (NAR), Borderline (BOR), Obsessive–Compulsive (OBS), Dependent (DEP), Avoidant (AVO).

(b) Correlations larger than $\pm .30$ are in boldface.

Table 2. Correlations between the NEO-PI-R facets and the PID-5-SF and PiCD domains, and IPDE scales.

		NEO-PI-R facets																													
		N1	N2	N3	N4	N5	N6	E1	E2	E3	E4	E5	E6	O1	O2	O3	O4	O5	O6	A1	A2	A3	A4	A5	A6	C1	C2	C3	C4	C5	C6
PID-5-SF	Negative Affectivity	.65	.56	.61	.50	.49	.62	.03	.10	-.17	.02	.12	-.06	.15	.16	.35	-.01	-.03	-.11	-.19	-.03	.01	-.15	.06	.06	-.38	-.14	-.25	-.09	-.33	-.26
	Detachment	.32	.39	.55	.45	.20	.43	-.47	-.36	-.28	-.27	-.08	-.54	.02	-.06	-.13	-.09	-.05	-.20	-.42	-.13	-.37	-.14	.01	-.15	-.42	-.17	-.28	-.29	-.36	-.15
	Antagonism	.01	.30	.10	.01	.31	.02	-.12	-.01	.28	.14	.33	-.03	.20	.01	.07	.05	.12	-.12	-.27	-.61	-.34	-.40	-.57	-.35	-.17	-.11	-.37	-.08	-.25	-.27
	Disinhibition	.13	.31	.31	.17	.50	.31	-.05	.05	-.02	.04	.35	-.02	.32	.09	.12	.17	.07	.00	-.15	-.27	-.19	-.23	-.13	-.11	-.54	-.48	-.57	-.40	-.64	-.63
	Psychoticism	.24	.31	.41	.25	.32	.29	-.13	-.12	-.07	-.02	.26	-.11	.29	.23	.20	.10	.23	-.04	-.26	-.24	-.17	-.20	-.10	-.07	-.38	-.23	-.36	-.17	-.37	-.27
PiCD	Negative Affectivity	.69	.60	.69	.54	.43	.66	-.14	-.08	-.23	-.03	.07	-.23	.10	.15	.27	.00	-.04	-.10	-.29	-.05	-.08	-.19	.10	.03	-.37	-.08	-.19	-.07	-.31	-.20
	Detachment	.04	.10	.29	.35	-.03	.16	-.65	-.54	-.39	-.38	-.15	-.57	-.06	-.15	-.37	-.12	-.05	-.17	-.33	-.07	-.43	-.02	.03	-.17	-.24	-.08	-.16	-.24	-.20	.06
	Dissocial	-.06	.31	.09	-.04	.24	-.05	-.19	-.15	.33	.10	.30	-.11	.16	.00	-.01	.03	.15	-.16	-.37	-.64	-.38	-.54	-.47	-.37	-.13	-.11	-.31	-.02	-.20	-.25
	Disinhibition	.15	.36	.35	.17	.51	.32	-.10	.00	-.01	.02	.31	-.07	.30	.07	.10	.14	.07	-.04	-.20	-.31	-.23	-.26	-.17	-.14	-.55	-.53	-.58	-.39	-.65	-.64
	Anankastia	.13	-.08	.04	.18	-.29	-.07	-.05	-.15	-.12	-.11	-.21	-.12	-.24	-.02	-.02	-.24	-.02	-.10	-.03	.15	.12	.14	.10	.11	.36	.39	.42	.33	.35	.64
IPDE	Paranoid	.25	.42	.36	.30	.25	.24	-.32	-.15	-.03	-.04	.13	-.23	.10	.08	.08	.04	.04	-.10	-.52	-.26	-.26	-.35	-.12	-.14	-.14	-.05	-.17	-.02	-.18	-.11
	Schizoid	.04	.06	.15	.20	-.09	.15	-.46	-.44	-.25	-.18	-.28	-.43	-.12	-.12	-.28	-.14	-.10	-.16	-.20	.04	-.26	.05	.05	-.10	-.08	.01	.00	-.08	-.06	.09
	Schizotypal	.23	.34	.37	.37	.18	.30	-.46	-.34	-.20	-.12	-.01	-.36	.08	.01	-.10	-.03	.04	-.13	-.34	-.14	-.33	-.15	-.02	-.12	-.28	-.09	-.23	-.18	-.28	-.14
	Histrionic	.23	.34	.25	.10	.40	.24	.20	.22	.18	.17	.32	.14	.25	.11	.30	.10	.09	-.01	-.07	-.29	.00	-.23	-.20	.00	-.21	-.09	-.27	-.03	-.28	-.39
	Antisocial	.03	.33	.12	.03	.28	.05	-.11	-.03	.19	.17	.29	.02	.15	.02	.09	.10	.06	-.02	-.22	-.45	-.28	-.42	-.30	-.25	-.17	-.07	-.34	-.03	-.17	-.32
	Narcissistic	.00	.22	-.02	.00	.20	-.11	.02	-.05	.33	.18	.23	.10	.16	.06	.12	.02	.18	-.11	-.13	-.47	-.13	-.32	-.51	-.21	.07	-.02	-.14	.10	-.09	-.11
	Borderline	.44	.58	.55	.38	.50	.51	-.11	-.02	-.04	.05	.25	-.11	.21	.17	.26	.11	.10	-.03	-.28	-.24	-.16	-.31	-.04	-.08	-.39	-.15	-.34	-.16	-.38	-.41
	Obsessive-compulsive	.30	.31	.27	.27	.16	.22	-.22	-.19	.03	.04	-.02	-.18	-.07	.02	.06	-.10	.04	-.13	-.22	-.11	-.15	-.18	-.07	-.08	-.07	.15	.01	.13	.01	.07
	Dependent	.34	.24	.39	.41	.24	.44	.00	.06	-.23	-.07	.03	-.14	.04	.00	.07	-.06	-.06	-.14	-.08	-.04	.00	.04	.05	.04	-.30	-.07	-.19	-.18	-.31	-.12
Avoidant	.36	.29	.45	.61	.14	.39	-.38	-.36	-.33	-.20	-.09	-.36	-.01	-.01	-.06	-.14	-.03	-.17	-.27	-.02	-.16	-.06	.07	-.05	-.18	.00	-.10	-.11	-.20	.08	

(a) NEO-PI-R: N1 (Anxiety), N2 (Angry Hostility), N3 (Depression), N4 (Self-Consciousness), N5 (Impulsiveness), N6 (Vulnerability), E1 (Warmth), E2 (Gregariousness), E3 (Assertiveness), E4 (Activity), E5 (Excitement Seeking), E6 (Positive Emotions), O1 (Fantasy), O2 (Aesthetics), O3 (Feelings), O4 (Actions), O5 (Ideas), O6 (Values), A1 (Trust), A2 (Straightforwardness), A3 (Altruism), A4 (Compliance), A5 (Modesty), A6 (Tender-Mindedness), C1 (Competence), C2 (Order), C3 (Dutifulness), C4 (Achievement Striving), C5 (Self-Discipline), and C6 (Deliberation).

(b) Correlations larger than $\pm .30$ are in boldface.

Table 3. Pattern Matrix for NEO-PI-R facets, PID-5-SF and PiCD domains and IPDE scales. The last column also displays final communalities (h^2)^(a).

SCALES		I	II	III	IV	V	h^2
NEO-PI-R	N1: Anxiety	.82	.06	-.01	.16	.09	.62
	N2: Angry Hostility	.61	.03	-.13	-.35	-.06	.58
	N3: Depression	.74	-.22	.11	.16	-.12	.70
	N4: Self-Consciousness	.65	-.29	.00	.20	-.01	.57
	N5: Impulsiveness	.49	.25	-.04	-.20	-.31	.50
	N6: Vulnerability	.72	-.08	-.10	.25	-.25	.68
	E1: Warmth	.03	.74	.16	.16	.05	.65
	E2: Gregariousness	.03	.64	-.07	.06	-.14	.41
	E3: Assertiveness	-.24	.41	.04	-.54	.12	.52
	E4: Activity	.04	.46	-.03	-.29	.09	.29
	E5: Excitement seeking	.05	.25	.35	-.35	-.14	.42
	E6: Positive emotions	-.09	.63	.23	-.04	.04	.54
	O1: Fantasy	.03	-.01	.54	-.13	-.22	.41
	O2: Aesthetics	.12	.00	.66	.05	.11	.44
	O3: Feelings	.39	.40	.45	-.03	.12	.55
	O4: Actions	-.08	.02	.37	-.04	-.21	.21
	O5: Ideas	-.11	-.15	.79	-.13	.09	.61
	O6: Values	-.12	.08	.36	.11	-.05	.18
	A1: Trust	-.20	.35	.09	.38	.01	.38
	A2: Straightforwardness	.06	.02	-.14	.71	.03	.54
	A3: Altruism	.11	.47	.18	.38	.25	.50
	A4: Compliance	-.14	-.04	.01	.64	-.02	.45
	A5: Modesty	.22	-.04	-.05	.66	-.01	.45
	A6: Tender-Mindedness	.17	.22	.14	.46	.11	.30
	C1: Competence	-.30	.10	.11	-.08	.63	.58
	C2: Order	.04	.05	-.13	-.07	.50	.26
	C3: Dutifulness	-.06	.09	-.04	.22	.61	.51
	C4: Achievement Striving	.03	.25	-.01	-.19	.61	.44
	C5: Self-Discipline	-.21	.15	-.15	-.05	.67	.62
	C6: Deliberation.	-.18	-.29	.15	.22	.61	.58
PID-5-SF	Negative Affectivity	.87	.21	-.01	-.01	-.08	.76
	Detachment	.37	-.58	-.01	-.14	-.14	.64
	Antagonism	.04	-.04	.04	-.77	-.15	.69
	Disinhibition	.19	.04	.12	-.21	-.73	.78
	Psychoticism	.31	-.19	.31	-.28	-.21	.47
PiCD	Negative Affectivity	.87	-.01	.01	-.01	.02	.76
	Detachment	-.05	-.84	.03	-.06	-.06	.70
	Dissocial	-.03	-.16	.06	-.82	-.06	.72
	Disinhibition	.23	.02	.07	-.24	-.70	.76
	Anankastia	.21	-.23	.03	.05	.73	.58
IPDE	Paranoid	.35	-.27	.06	-.35	.07	.39
	Schizoid	.02	-.55	-.10	-.01	.05	.34
	Schizotypal	.29	-.50	.06	-.19	-.08	.47
	Histrionic	.40	.31	.06	-.30	-.15	.42
	Antisocial	.09	.00	.00	-.57	-.16	.42
	Narcissistic	.07	.03	.09	-.63	.14	.42
	Borderline	.61	.01	.09	-.20	-.20	.58
	Obsessive-compulsive	.42	-.17	-.03	-.24	.34	.35
	Dependent	.52	-.03	-.03	.05	-.10	.30
	Avoidant	.49	-.47	.03	.00	.15	.52

(a) Loadings larger than $\pm .30$ are in bold face.

Table 4. Pattern Matrix of the NEO-PI-R, PID-5-SF, and PiCD domains for the five and four-factor solutions. The last column of each solution displays final communalities (h^2) ^(a).

DOMAINS	Five-Factor solution						Four-Factor Solution				
	I	II	III	IV	V	h^2	I	II	III	IV	h^2
Neuroticism	.88	.07	.03	-.12	-.11	.80	.82	.11	.10	-.11	.74
Negative Affectivity (PID-5-SF)	.88	-.15	-.01	.01	.10	.80	.92	-.18	.02	.01	.82
Negative Affectivity (PiCD)	.89	.02	-.03	.08	.02	.79	.91	.02	.01	.08	.79
Extraversion	-.06	-.85	-.16	.00	.21	.81	-.07	-.90	-.16	.02	.82
Detachment (PID-5-SF)	.27	.63	-.15	-.05	.20	.72	.41	.54	-.24	-.11	.70
Detachment (PiCD)	-.12	.86	-.08	.00	.11	.72	.02	.78	-.19	-.06	.68
Agreeableness	-.02	-.03	.84	.03	.19	.68	.08	-.09	.75	.01	.57
Antagonism (PID-5-SF)	.03	-.08	-.78	-.02	.15	.72	.06	-.13	-.83	-.02	.74
Dissocial (PiCD)	-.06	.00	-.88	.01	.04	.77	-.08	-.01	-.91	.02	.78
Conscientiousness	-.16	-.17	-.03	.86	.04	.83	-.13	-.17	-.06	.87	.81
Disinhibition (PID-5-SF)	.11	.05	-.10	-.71	.23	.81	.17	-.04	-.15	-.75	.80
Disinhibition (PiCD)	.16	.07	-.18	-.70	.11	.78	.17	.02	-.19	-.72	.79
Anankastia (PiCD)	.19	.15	-.03	.81	.06	.62	.26	.13	-.07	.80	.60
Psychoticism (PID-5-SF)	.13	.26	-.12	-.11	.64	.69	.39	.03	-.31	-.20	.45
Openness	.04	-.27	.03	-.07	.36	.25	.15	-.37	-.05	-.10	.18

(a) Loadings larger than $\pm.30$ are in bold face.

Table 5. Beta standardized coefficients of the NEO-PI-R domains included in the final regression equation predicting PID-5-SF and PiCD domains and IPDE scales ^(a). The last two rows show R^2 for domains (upper) and facets (lower) ^(b).

	PID-5-SF					PiCD					IPDE									
	NEF	DET	ANT	DIS	PSY	NA	DT	DL	DN	AN	PAR	SZD	STP	HTS	ANT	NAR	BOR	OBS	DEP	AVO
N	.80	.31		.09	.25	.83			.10	.24	.33		.29	.33			.57	.43	.45	.41
E	.21	-.39	.21	.21			-.65	.12	.16	-.21		-.52	-.30	.39	.16	.22	.11			-.34
O					.23												.10			
A		-.19	-.62	-.10	-.18		-.18	-.69	-.15		-.37		-.21	-.12	-.44	-.45	-.14	-.20		
C		-.14	-.16	-.71	-.23	.09	-.07	-.07	-.70	.71				-.15	-.16		-.14	.31		
R^2	.60	.47	.47	.61	.30	.62	.50	.51	.64	.45	.29	.27	.27	.31	.27	.25	.49	.21	.20	.35
R^2	.63	.52	.55	.65	.36	.65	.61	.58	.68	.56	.33	.31	.33	.33	.31	.36	.50	.23	.27	.44

(a) A blank box means that this domain was not included in the final equation.

(b) NEO-PI-R: Neuroticism (N), Extraversion (E), Openness to Experience (O), Agreeableness (A), and Conscientiousness (C). PID-5-SF: Negative Affectivity (NEF), Detachment (DET), Antagonism (ANT), Disinhibition (DIS), and Psychoticism (PSY). PiCD: Negative affectivity (NA), Detachment (DT), Dissocial (DL), Disinhibition (DN), and Anankastia (AN). IPDE: Paranoid (PAR), Schizoid (SZD), Schizotypal (STP), Histrionic (HTS), Antisocial (ANT), Narcissistic (NAR), Borderline (BOR), Obsessive–Compulsive (OBS), Dependent (DEP), Avoidant (AVO).

Table 6. Beta standardized coefficients (between parentheses) for the NEO-PI-R facets included in the final regression equation predicting PID-5-SF and PiCD domains and IPDE scales. The last two rows show R^2 coefficients^(a).

PID-5-SF					PiCD				
NEF	DET	ANT	DIS	PSY	NA	DT	DL	DN	AN
N1 (.23)	N3 (.30)	A2 (-.33)	C5 (-.26)	N3 (.21)	N1 (.27)	E1 (-.34)	A2 (-.35)	C5 (-.25)	C6 (-.52)
N6 (.17)	E6 (-.26)	A5 (-.35)	C6 (-.29)	C3 (-.14)	N3 (.25)	E6 (-.21)	A4 (-.21)	C6 (-.30)	C2 (.17)
N5 (.09)	E1 (-.11)	C1 (-.11)	E5 (.15)	O5 (.19)	N2 (.18)	E2 (-.22)	A3 (-.10)	C2 (-.20)	N4 (.17)
O3 (.14)	C5 (-.09)	N2 (.11)	C3 (-.12)	C1 (-.21)	N6 (.21)	E3 (-.16)	A5 (-.10)	A2 (-.12)	C4 (.16)
N3 (.14)	A1 (-.11)	E5 (.10)	C2 (-.14)	A2 (-.12)	O3 (.11)	E5 (.11)	O6 (-.10)	C1 (-.11)	O4 (-.12)
E2 (.11)	E2 (-.11)	A6 (.09)	C1 (-.12)	O3 (.10)	E4 (.80)	O3 (-.12)	E5 (.13)	E5 (.08)	N3 (.15)
N2 (.17)	C1 (-.11)	C3 (-.09)	N5 (.07)	A1 (-.10)	E6 (.07)	N4 (.13)	E6 (-.11)	C3 (-.10)	C3 (.12)
O6 (-.09)	A5 (-.08)		A2 (-.06)	O6 (-.08)		N6 (-.14)	E3 (.15)	N5 (.07)	A5 (-.07)
N4 (.12)				O2 (.09)		C5 (-.06)	E2 (-.10)		
E1 (.17)						N2 (-.11)	C3 (-.09)		
E1 (.12)						A2 (-.08)			
C1 (-.07)						N3 (.10)			
A6 (-.06)									
.63	.52	.55	.65	.36	.65	.61	.58	.68	.56
IPDE									
PAR	SZD	STP	HTS	ANT	NAR	BOR	OBS	DEP	AVO
A1 (-.38)	E1 (-.20)	E1 (-.32)	N5 (.09)	A2 (-.28)	A5 (-.34)	N2 (.26)	N2 (.18)	N6 (.24)	N4 (.52)
N3 (.23)	E2 (-.24)	N3 (.16)	E5 (.12)	C6 (-.13)	A2 (-.25)	N3 (.24)	C6 (.17)	N4 (.27)	E2 (-.19)
A4 (-.16)	E6 (-.20)	C5 (-.15)	C6 (-.16)	A4 (.22)	N5 (.06)	C6 (-.18)	N1 (.19)	E2 (.15)	E6 (-.15)
	E5 (-.11)	N2 (.12)	E1 (.25)	C3 (-.16)	E3 (.17)	O2 (.12)	E1 (-.19)	C5 (-.14)	
		E2 (-.12)	N2 (.13)		N4 (.14)	A2 (-.14)	E3 (.18)		
			A2 (-.19)			N6 (.18)	N4 (.16)		
			N6 (.17)				C4 (.12)		
.33	.31	.33	.33	.31	.36	.50	.23	.27	.44

(a) PID-5-SF: Negative Affectivity (NEF), Detachment (DET), Antagonism (ANT), Disinhibition (DIS), and Psychoticism (PSY). PiCD: Negative affectivity (NA), Detachment (DT), Dissocial (DL), Disinhibition (DN), and Anankastia (AN). IPDE: Paranoid (PAR), Schizoid (SZD), Schizotypal (STP), Histrionic (HTS), Antisocial (ANT), Narcissistic (NAR), Borderline (BOR), Obsessive–Compulsive (OBS), Dependent (DEP), Avoidant (AVO). NEO-PI-R: N1 (Anxiety), N2 (Angry Hostility), N3 (Depression), N4 (Self-Consciousness), N5 (Impulsiveness), N6 (Vulnerability), E1 (Warmth), E2 (Gregariousness), E3 (Assertiveness), E4 (Activity), E5 (Excitement Seeking), E6 (Positive Emotions), O1 (Fantasy), O2 (Aesthetics), O3 (Feelings), O4 (Actions), O5 (Ideas), O6 (Values), A1 (Trust), A2 (Straightforwardness), A3 (Altruism), A4 (Compliance), A5 (Modesty), A6 (Tender-Mindedness), C1 (Competence), C2 (Order), C3 (Dutifulness), C4 (Achievement Striving), C5 (Self-Discipline), and C6 (Deliberation).