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BRIEF COMMUNICATION

Investigating the Spectra constellations of the Hierarchical Taxonomy of Psychopathology (HiTOP) model for personality disorders based on empirical data from a community sample

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Objective: The Hierarchical Taxonomy of Psychopathology (HiTOP) posits that psychopathology is hierarchically structured. For personality disorder (PD) traits, there are five spectra: internalizing, thought disorder, disinhibited externalizing, antagonistic externalizing, and detachment. Empirical findings suggest a sixth group, compulsivity. In this research, we tried to recover the five HiTOP spectra, plus compulsivity, specifically for PD traits.
Methods: The sample was composed of 4,868 Brazilians (54.9% women, age ranging from 18 to 70; mean = 25.7; SD = 9.64). All participants answered the Dimensional Clinical Personality Inventory 2 (IDCP-2), a self-report inventory for adults, developed in Brazil, for assessment of pathological personality traits.
Results: Parallel analysis yielded up to nine factors. On exploratory structural equation modeling (E-SEM), the balance between interpretability and fit index suggested the six-factor solution as the best solution. The fit indexes for the confirmatory factor analysis were slightly less adjusted in comparison to the empirical model.
Conclusion: The hypothesis was confirmed, as we did find the groups proposed at the spectrum level of the HiTOP. We also found a compulsivity factor, encompassing the main traits from the conscientiousness dimension of IDCP-2, which is related to obsessive-compulsive PD. Finding the six groupings of traits in the HiTOP model contributes to the validity of this model, and confirms the existence of proposed spectra.

Keywords: Personality disorders; internal structure; diagnostic classification

Introduction

Psychiatric classifications have been substantially refined in recent decades, a process that can be seen in successive versions of DSM (since DSM-III[1]) and ICD (ICD-10[2]). Nevertheless, these classification systems also have significant limitations: dealing with mental disorders as categories, despite evidence suggesting a continuum[3]; limited reliability[4]; high heterogeneity across categories[5]; and high rates of comorbidity,[6] as well as inadequate coverage of disorders, which entails frequent use of the Other Specified/Unspecified (formerly Not Otherwise Specified) categorization.

Recently, the Hierarchical Taxonomy of Psychopathology (HiTOP[7]) model was proposed as an effort to address these limitations. It constructs psychopathological syndromes and their components/subtypes based on the observed covariation of symptoms, grouping related symptoms together; combines co-occurring syndromes into spectra; and characterizes these phenomena dimensionally, which addresses boundary problems and diagnostic instability. The HiTOP is primarily an evidence-based model, considering the most relevant publications in the field. In the present study, we shall focus on the spectrum level of HiTOP. Spectra, which constitute the fifth level from the bottom up in the model, are larger constellations of disorders (e.g., the internalizing spectrum is composed of disorders from fear, distress, eating pathology, and sexual problems subfactors).

In the HiTOP model, five groups are related to personality disorders (PDs) at the spectrum level: internalizing, thought disorder, disinhibited externalizing, antagonistic externalizing, and detachment. Almost all PDs contained in DSM-5 section 2 are listed in the HiTOP model, except dependent and obsessive-compulsive PD. The HiTOP proponents did not provide a reason for the omission of these two PDs.

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In the present study, we analyzed the five spectra from the HiTOP model which specifically relate to PD traits, using a self-report measure (the Dimensional Clinical Personality Inventory 2[8]) based on the DSM-5 Alternative Model for PD (AMPD[9]) and other leading models and measures from the literature. As the HiTOP model does not cover traits of two PDs (dependent and obsessive-compulsive), we also used empirical evidence encompassing these disorders, aligning it with the HiTOP model.[10] Considering the robustness of the HiTOP model, our hypothesis was that all five groups pertinent to PD disorders would emerge in our analyses, alongside a sixth factor representing obsessive-compulsive PD traits, according to empirical evidence.[10]

Methods

Participants

The sample consisted of 4,868 Brazilians. Over half (54.9%) were women, and ages ranged from 18 to 70 years (mean = 25.7; standard deviation = 9.64). Regarding educational attainment, 1.6% had only a primary education, 19.7% had a secondary education, 41.8% had completed undergraduate studies, and 10.7% had completed graduate studies. All 26 states of Brazil and the Federal District, covering all five regions of the country, were represented in the sample. A plurality of participants were from the state of São Paulo (22.7% of the sample), followed by Minas Gerais (10%), Paraná (7.8%), and Rio de Janeiro (7.2%). The least represented states were Acre, Alagoas, Amapá, Piauí, Rondônia, Roraima, Sergipe, and Tocantins, each accounting for less than 1% of the sample. The distribution of sex, age, and education in this sample was representative of Brazil.[11]

Although we did not collect data on clinical variables, a PD prevalence of approximately 10% was expected.[9]

Measures

Dimensional Clinical Personality Inventory 2 (IDCP-2)

This self-report inventory for adults, developed in Brazil, was originally based on Millon's personality theory and DSM-IV-TR Axis II,[12] and was designed to be used for clinical purposes. In our study, we used a revised version, the IDCP-2.[8] This new version is composed of 206 items to be answered by the participant on a Likert-type scale of 1 (''it has nothing to do with me'') to 4 (''it has a lot to do with me''), wherein higher scores are indicative of pathology. There are 47 factors representing 12 dimensions (dependency, aggressiveness, mood instability, eccentricity, attention seeking, distrust, grandiosity, isolation, criticism avoidance, self-sacrifice, conscientiousness, and inconsequence). Only two items are shared between dimensions: one item is both in the attention seeking and grandiosity dimensions, respecting the manipulation trait, and one item is both in eccentricity and criticism avoidance, related to preference for being alone.

The 47 factors of IDCP-2 should be seen as representative of the syndromes/disorders level of HiTOP, which shapes the spectrum level. For instance, the Eccentric Style factor is related to schizotypal PD, thus representing one of the traits composing the thought disorder spectrum.

For our sample, Cronbach's alpha coefficients for the domains ranged from 0.83 to 0.91. Previous studies[13-15] reported evidence of validity, including coherent correlations between IDCP-2 dimensions and factors with the Personality Inventory for DSM-5 (PID-5[16]). In addition, studies with each IDCP-2 dimensions[15,17-20] found evidence of validity based on internal structure (i.e., exploratory structural equation modeling) as well as external criteria (e.g., correlations with the NEO Personality Inventory Revised and PID-5).

Procedures and statistical analyses

This study was approved by the ethics committee of Universidade Estadual de Londrina. Potential subjects were invited to participate via social networks. All instruments were administered online. On first access to the study website, participants were presented with a consent form that explained the goals of the study. If they agreed to participate, they were asked to create a password-protected account using their email address, and only then were presented with the IDCP-2. This procedure is recommended internationally in order to prevent multiple responses.[21] To preserve confidentiality, no information was collected other than email address, birthday, state, educational attainment, and gender.

We performed exploratory structural equation modeling (E-SEM) and confirmatory factor analysis, both showing fit indices,[22] using MPLUS version 7. The number of factors to be considered for the exploratory analysis was verified on the basis of parallel analysis for polychoric variables[23,24] using R software version 2.15.3. For factor analyses, a robust maximum likelihood (MLR) extraction method was used. We also computed Cronbach's alpha for the exploratory and confirmatory analyses.

Results

Parallel analysis yielded up to nine factors presenting expressive non-random eigenvalues. Subsequently, E-SEM analysis forced one-to-nine-factor solutions, and we investigated the interpretability for each solution. Solutions encompassing more than six factors were not interpretable. Fit indices were better when the number of factors increased. The balance between interpretability and fit index suggested the six-factor solution as best (RMSEA = 0.06, CFI = 0.87, TLI = 0.83, SMR = 0.03, BIC = 412208.304, AIC = 409865.034).

In addition, we used confirmatory factor analysis to verify the fit of the 47 factors from IDCP-2 to the HiTOP model. According to data, the fit indexes (RMSEA = 0.09, CFI = 0.65, TLI = 0.63, SMR = 0.11, BIC = 442565.527, AIC = 441585.378) were slightly less adjusted in comparison to the empirical model first established. Factor loadings and internal consistency (i.e., Cronbach's alpha) for the empirical model are presented in Table 1. We also

Table 1 Exploratory structural equation modeling and confirmatory analyses with IDCP-2 factors according to the HiTOP model

IDCP-2 factors	Confirmatory	Intern.	Detach	Ant. E.	Disi. E.	Thought	Comp.
Self-devaluation	F1	**0.85**	0.40	0.01	0.44	0.12	0.05
Self-driven hopelessness	F1	**0.80**	0.46	0.08	0.47	0.09	0.01
Abandonment avoidance	F1	**0.78**	0.04	0.12	0.34	0.21	0.14
Anxious worry	F1	**0.77**	0.21	0.15	0.46	0.23	0.29
Depressivity	F1	**0.74**	0.49	0.12	0.47	0.12	0.10
Insecurity	F1	**0.64**	0.07	-0.08	0.17	0.04	0.05
Vulnerability	F1, F2	0.63	0.31	0.21	**0.75**	0.40	0.13
Anxiety	F1	**0.61**	0.25	0.12	0.44	0.22	0.44
Hopelessness	F1	**0.59**	0.48	0.13	0.49	0.20	0.00
Generalized avoidance	F1	0.59	**0.73**	0.14	0.49	0.01	0.30
Masochism	F1	**0.56**	0.02	0.00	0.12	0.37	0.23
Submissiveness	F1	**0.55**	0.05	0.01	0.09	0.19	0.15
Attention seeking	F2	**0.52**	-0.06	0.33	0.21	0.28	0.20
Emotional intensity	F2	**0.50**	0.15	0.24	**0.52**	**0.53**	0.16
Need for routine	F5	**0.43**	**0.35**	0.19	**0.36**	0.04	0.32
Impulsiveness	F3	0.41	0.23	0.39	**0.53**	0.33	-0.15
Depersonalization	F6	0.36	**0.42**	0.33	0.38	**0.46**	0.09
Angry distrust	F2	0.32	0.43	0.42	**0.68**	0.10	0.31
Persecutoriness	F6	0.31	0.38	**0.46**	0.37	0.40	0.40
Deceitfulness of others	F2	0.30	**0.46**	**0.41**	**0.42**	0.17	0.38
Violence	F2, F3	0.29	0.41	0.65	**0.79**	0.25	0.17
Eccentric style	F6	0.29	**0.51**	0.28	0.38	0.35	0.10
Need for recognition	F2	0.29	0.26	**0.56**	0.28	0.23	0.43
Concern with details	F5	0.27	0.18	0.21	0.17	0.30	**0.64**
Distrust in relationships	F4	0.26	**0.50**	0.39	0.37	0.10	**0.46**
Suspiciousness	F6	0.25	**0.54**	0.55	0.41	0.18	0.40
Interpersonal detachment	F4	0.23	**0.75**	0.16	0.36	0.04	0.25
Individualism	F4	0.19	**0.56**	0.39	0.41	0.19	0.41
Control	F3	0.18	0.31	**0.69**	0.33	0.22	0.42
Emotional apathy	F4	0.18	**0.68**	0.31	0.27	-0.05	0.17
Self-directed perfectionism	F5	0.16	0.46	0.46	0.26	0.10	**0.58**
Intimacy avoidance	F4	0.15	**0.79**	0.23	0.34	-0.07	0.29
Dominance	F3	-0.12	0.05	**0.70**	0.02	0.48	0.22
Antagonism	F2, F3	0.11	0.46	**0.76**	0.57	0.08	0.14
Misleading	F3	0.11	0.33	**0.77**	0.33	0.23	0.06
Work compulsion	F5	0.11	0.32	0.39	0.20	0.07	**0.57**
Paranormality	F6	0.10	0.11	0.21	0.16	**0.50**	0.17
Seduction and manipulation	F3	-0.08	-0.05	**0.61**	0.04	**0.55**	0.12
Social isolation	F4	0.08	**0.66**	0.21	0.18	-0.05	0.33
Intimate relationships avoidance	F4	0.08	**0.61**	0.20	0.21	0.05	0.14
Risk taking	F3	0.06	0.20	**0.49**	0.26	0.39	-0.12
Thoroughness	F5	-0.06	0.06	0.12	-0.04	0.09	**0.63**
Interpersonal superficiality	F2	0.04	-0.28	0.28	-0.01	**0.48**	-0.03
Indifference	F3	0.04	**0.55**	**0.57**	0.32	-0.07	0.17
Emotional inexpressiveness	F4	0.02	**0.70**	0.40	0.25	0.00	0.14
Emotional constriction	F5	-0.01	**0.50**	0.25	0.06	-0.04	**0.45**
Superiority	F3	0.00	0.13	**0.63**	0.09	0.31	0.46
Cronbach's alpha		0.91 (0.92)	0.91 (0.87)	0.89 (0.87)	0.82 (0.81)	0.71 (0.77)	0.79 (0.76)
Number of items		13 (14)	15 (8)	12 (10)	7 (9)	6 (5)	6 (6)
Pearson's r		0.98	0.96	0.95	0.91	0.79	0.96

F1/Intern. = internalizing traits; F2/Ant. E. = antagonistic externalizing traits; F3/Disi. E. = disinhibited externalizing traits; F4/Detach = detachment traits; F5/Comp. = compulsivity traits; F6/Thought = thought disorders traits; HiTOP = Hierarchical Taxonomy of Psychopathology; IDCP-2 = Dimensional Clinical Personality Inventory 2.
Within the parentheses are the confirmatory factors information.
IDCP-2 variables considered in each empirical factor are in bold.

present, in the Confirmatory column, the confirmatory factor considered for each IDCP-2 factor.

The six-factor structure is presented in the table, along with the confirmatory items, factors information, internal consistency, number of items, and correlations between exploratory and confirmatory factors. The interpretation for each factor is located in the factors' name, which were given according to the HiTOP model. The number of items and the internal consistency were similar in all factors, considering the exploratory-confirmatory comparison. These consistency across the exploratory factors in relation to the confirmatory factors can be confirmed by the correlations, which were higher than 0.90 for five of the six cases, but also high for the thought disorders traits factor. Nevertheless, eight IDCP-2 factors (emotional intensity, need for routine, depersonalization, persecutoriness, deceitfulness of others, distrust in relationships, suspiciousness, seduction and manipulations, indifference, and emotional constriction) presented cross-loadings with some of the factors of the exploratory model.

Discussion

Despite its limitations, this study provides some of the first empirical evidence conferring validity to the HiTOP model. Indeed, we found only one study with this explicit goal (among other objectives).[10] Our initial hypothesis was that we would find the five groupings of traits proposed in the HiTOP model.[7] However, we also expected to find a sixth factor, characterized by the typical traits of obsessive-compulsive PD. The hypothesis was confirmed, as we did find the groups proposed at the spectrum level of the HiTOP. As in previous research,[10] we also found a compulsivity factor, encompassing the main traits from the conscientiousness dimension of IDCP-2, which is related to obsessive-compulsive PD.[12] Finding the six groupings of traits in the HiTOP model[7] simultaneously corroborates the validity of this model and confirms the existence of spectra as proposed.

Regarding exploratory analysis, according to the literature,[23] RMSEA values were good to acceptable, CFI and TLI values were slightly below the acceptable range, and SMR was good. Moreover, data fit the exploratory structure better than the confirmatory structure. Nevertheless, some cross-loadings were observed. Although this is not desirable, in some cases we observed coherence in the cross-loadings; e.g., depersonalization and eccentric style (probably because of its relationship with the schizo spectrum (i.e., thought disorders), there is some rationality in the observed loadings in detachment factor), others deception (a trait associated with tendencies to not have relationships with others [detachment], to be antagonizing [antagonist externalizing], and to be aggressive toward others [disinhibited externalizing]), and emotional constriction (a trait associated with not being close to people [detachment] and experiencing difficulty in expressing emotions [compulsivity]). Other cross-loadings, however – such as emotional intensity and seduction and manipulation loading in the thought disorder factor – did not appear coherent.

Notable strengths of this study are its sample size and the use of a measure which has been used extensively in published research. Nevertheless, our findings should be interpreted in light of the following methodological considerations: this was a non-clinical sample, restricted to participants from the community; we used only one instrument, and despite the similarity of the IDCP-2 to scales cited by the proponents of HiTOP[7] (e.g., PID-5, Five-Factor Model Personality Disorder Scales, Personality Assessment Inventory), a multimethod assessment is recommended; we did not control for several demographic and clinical variables; and we did not control for general psychopathology and/or an acquiescence factor. These limitations should be addressed in future research.

In conclusion, our findings support the HiTOP model, with addition of the compulsivity factor, based on empirical data from a community sample.

Disclosure

The authors report no conflicts of interest.

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