Trends
in Psychiatry and Psychotherapy

JOURNAL ARTICLE PRE-PROOF
(as accepted)

Original Article

Identifying borderline traits in a Brazilian community sample using the Dimensional Clinical Personality Inventory 2 factors

André Pereira Gonçalves, Lucas de Francisco Carvalho

http://doi.org/10.47626/2237-6089-2024-0871

Original submitted Date: 27-May-2024

Accepted Date: 13-Dec-2024

Identifying borderline traits in a Brazilian community sample using the Dimensional Clinical Personality Inventory 2 factors

Running Head: IDCP-2 and BPD traits

André Pereira Gonçalves[1], Lucas de Francisco Carvalho[2]

[1] Instituto Multidisciplinar em Saúde Universidade Federal da Bahia, Salvador, BA, Brazil.

[2]Universidade São Francisco, SP, Brazil.

Corresponding author: Dr. André Pereira Gonçalves
Phone: 55 35 99247-3310
E-mail: andregoncalvespsi@gmail.com
Rua Hormindo Barros, 58 - Quadra 17, Lote 58 | CEP: 45.029-094 - Candeias, Vitória da Conquista – BA

Abstract

Objective: This study aimed to examine the discriminative capacity of Dimensional Clinical Personality Inventory 2 (IDCP-2) factors in identifying individuals with elevated Borderline Personality Disorder (BPD) traits within a Brazilian community sample while proposing an optimal cutoff score for distinguishing high BPD trait levels.

Methods: The participant cohort consisted of 1,469 adults who completed assessments, including the Level of Personality Functioning Scale - Brief Form 2.0 (LPFS), Personality Inventory for DSM-5 (PID-5), IDCP-2, and Structured Clinical Interview for the DSM-IV – Personality Questionnaire (PQ-SCID-II). We categorized participants into three groups by utilizing the traits outlined in the Alternative Model of Personality Disorders (AMPD) from DSM-5 Section III. Furthermore, latent profile analysis based on PID-5 facets revealed the existence of three empirically derived profiles.

Results: Our findings demonstrate that IDCP-2 factors exhibited substantial discriminative power, marked by large effect sizes across most factors. To minimize false negatives, we suggest a conservative cutoff score of 22 as the most effective threshold for identifying individuals with high levels of BPD traits.

Conclusion: The BPD score generated from IDCP-2 factors holds significant promise in clinical practice, offering valuable insights into a patient's propensity to exhibit a BPD profile and provide a comprehensive clinical profile.

Keywords: Personality disorders**;** psychological assessment; dimensional model; screening test.

Introduction

Borderline Personality Disorder (BPD) constitutes a multifaceted mental health disorder that exerts its impact across diverse domains of an individual's life. These domains encompass intricate interpersonal relationships, occupational challenges, and a pronounced diminution of self-esteem.[1-3] Recognizing the presence of BPD holds pivotal significance as an initial stride toward ameliorating the quality of life for the afflicted individual, while concurrently enhancing prognostic trajectories. Moreover, a judicious focus on tailored interventions mitigates the personal toll and potentially alleviates the financial burdens accompanying the comprehensive therapeutic process.[4] To this end, the Dimensional Clinical Personality Inventory 2 (IDCP-2) has been constructed by researchers, signifying a noteworthy stride in this endeavor.[5] The IDCP-2 is a self-report scale that assesses pathological traits, encompassing facets that align with BPD.[6,7] The addition of a borderline score within an existing measure helps the clinician's discrimination in evaluating the clinical difficulties of individuals who have duly completed the IDCP-2. This augmentation thereby expands the scale's clinical utility, particularly accentuating its capacity to identify nuanced impairments such as propensities towards self-harm, impulsivity, feelings of emptiness, relational fragility, an intense apprehension of abandonment, emotional volatility, and compromised emotional regulation. Our study endeavors to examine the discriminatory capacity of the IDCP-2 factors in discriminating individuals within a Brazilian community cohort who exhibit an elevation in prototypical BPD traits. Additionally, an empirical cutoff is proposed herein, poised to demarcate individuals demonstrating elevated BPD tendencies effectively.

Theoretical Background

Individuals diagnosed with Borderline Personality Disorder (BPD) exhibit a pronounced and persistent pattern of functional instability, encompassing a constellation of facets such as difficulty in interpersonal relationships, self-harming behaviors, and self-concept distortions. This intricate presentation is further compounded by impulsive and risky actions that extend to oneself and others.[4,8-11] Empirical insights gathered from antecedent investigations reveal that the prevalence of BPD in the general population ranges between 1.1% and 3%, underscoring its significance within the mental health landscape.[12,13] However, within clinical cohorts, this prevalence escalates, exhibiting a range of 10.2% to 35.6%, thus underscoring its heightened clinical salience.[14,15] An intricate interplay emerges between BPD and suicidal tendencies, with a staggering 60% of diagnosed individuals presenting episodes of suicide attempts, and a critical 8% accomplishing the act of self-deprivation.[8, 16,17] Furthermore, the intricacies of BPD bear relevance to issues of substance abuse and compulsive behaviors.[9,18-20] The diagnosis of BPD is characterized by intricate comorbidities, linking its pathogenesis with other psychiatric illnesses.[21-23]

The diagnostic framework for BPD can be grounded in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR), specifically within the Alternative Model for Personality Disorders explained in Section III (AMPD).[8] AMPD integrates the traditional categorical and dimensional perspectives to evaluate BPD traits. The underpinning of the BPD diagnosis is given upon the manifestation of self and interpersonal dysfunction, delineated as criterion A. Concurrently, criterion B entails high levels of specific pathological traits. The diagnostic threshold necessitates the individual to exhibit trait elevation in at least four of the seven delineated traits, including impulsivity, propensity for risk-taking, and a disposition towards hostility. Supplementary BPD traits in the DSM-5 encompass emotional lability, anxiety, separation insecurity, and an inclination towards depressive tendencies. A worthy advance of the DSM-5 was the incorporation of the AMPD, engendered by the assimilation of insights from taxometric investigations. These studies show a latent dimensional construct underlying BPD and other personality disorders, thus rationalizing the significance of embracing a dimensional framework.[24,25]

In addition to the DSM-5 AMPD framework, empirical research centered on the dimensional perspective highlights distinctive traits characteristic BPD, encompassing impulsiveness, risk-taking, hostility, emotional lability, anxiety, separation insecurity, depressivity, irresponsibility, and deceitfulness.[26-28] Recent advancement in structuring mental disorder taxonomy is evident in the Hierarchical Taxonomy of Psychopathology (HiTOP).[29] This framework proposes that BPD is comprised of pathological traits organized within broad domains labeled Internalizing and Antagonistic Externalizing spectra. Internalizing denotes a disposition toward experiencing negative affect and mood disorder symptoms.[29] Antagonistic Externalizing pertains to maladaptive interpersonal relationships driven by heightened antipathy, conflict, and a capacity for intentional harm without accompanying guilt.[30] The HiTOP model enumerates BPD's characteristics as emotional instability, anxiety, separation insecurity, hostility, fragility, avoidance of abandonment, and vulnerability.

The methodology for assessing characteristic BPD traits involves a two-step approach, commencing with screening and trait mapping, succeeded by an elaborate clinical interview performed by a proficient clinician.[31,32] Self-report scales are commonly employed for initial screening and trait mapping, with the Dimensional Clinical Personality Inventory 2 (IDCP-2)[7] standing as a fine example.

The IDCP-2 is a self-report scale designed to assess pathological traits, drawing from Sections II and III for personality disorders as outlined in the DSM-5. It holds widespread usage in Brazilian scientific literature [33] and adheres to international guidelines[34] for psychological assessment and psychometric criteria. Comprising 210 items categorized into 47 factors and 12 higher-order dimensions, the IDCP-2 reflects concordance with contemporary concepts of mental disorder classification (e.g., HiTOP). Previous investigations have demonstrated the validity of IDCP-2 factors, including those encapsulating the fundamental traits of BPD.[35-37]

Research endeavors were undertaken to assess the discriminative efficacy of IDCP-2 factors in identifying individuals with BPD.[7,38] Specifically, Carvalho and Pianowski[7] appraised the discriminatory potential of IDCP-2 factors for BPD, revealing Hopelessness, Vulnerability, Anxious Worry, Impulsiveness, and Risk-Taking as optimal discriminators for BPD traits. In a related study, Carvalho and Pianowski[38] sought to distinguish BPD from bipolar disorder, highlighting elevated BPD scores within the Vulnerability, Anxious Worry, and Hopelessness factors relative to the bipolar cohort. However, these findings warrant cautious interpretation due to

methodological constraints. Notably, the absence of comparative scales assessing pathological traits to gauge the discriminative prowess of IDCP-2, a desirable approach,[39,40] merits consideration. The studies' samples, comprising fewer than 350 participants, impose limitations on the scope of inference derivable from the outcomes. Furthermore, certain participants responded to the preceding version of IDCP-2, the IDCP characterized by distinct item sets for score computation. To merge the IDCP versions, the researchers employed an equating procedure, potentially introducing substantial measurement error.[41,42]

We endeavor to enhance prior investigations employing IDCP-[27,38]. To our best knowledge, this study is the first to use IDCP-2 without relying on statistical methods to fill in missing cases (e.g., equating procedure), encompassing a substantial sample from the general population, and incorporating comparative data from external measures. Our objectives involve examining the capacity of IDCP-2 factors to discriminate individuals with heightened BPD typical traits within a Brazilian community sample. Moreover, we seek to derive a composite score through IDCP-2 factors and offer a cutoff to pinpoint individuals exhibiting marked BPD tendencies.

We compared IDCP-2 outcomes with findings derived from the Structured Clinical Interview for DSM-IV–Personality Questionnaire (PQ-SCID-II), focusing on items relevant to BPD criteria. We anticipate a substantial contribution from all BPD-associated factors within IDCP-2 toward identifying elevated BPD traits, aligning with established literature.[8,26,29,27]. Furthermore, we posit that the foremost discriminative factors will encompass Vulnerability, Impulsiveness, Risk-Taking, Anxiety, and Depressivity, as derived from prior research.[7,26-29,38,43]

Methods

Sample and Procedure

The initial sample consisted of 2,187 Brazilian adults recruited by convenience specifically for this study. We collected the data over the Internet using Google Forms and shared links on Facebook, WhatsApp, and Instagram. The procedures of this study complied with the provisions of the Declaration of Helsinki regarding research on Human participants (World Medical Association [WMA])[44]. All participants digitally consented to data usage. The online survey conformed to the recommended standards for conducting and reporting web-based surveys, the Checklist for Reporting Results of Internet E-surveys (CHERRIES).[45] The inclusion criterion was age ≥ 18 and at least

elementary school. To ensure the quality of data, we submitted it to a robust variant of the Mahalanobis distance based on the Minimum Covariance Determinant, the Mahalanobis-MCD[46], involving the use of the MCD75 method, which employs subsamples of size h = n/2 and a breakdown point of .001. This method identified 719 multivariate outliers who were excluded from analyses.

The final sample consisted of 1,469 participants with ages varying between 18 and 69 years old (M=24.40; SD = 8.51), the majority being women (89.7%), high school (52.6%), white (54.7%), single (71.1), from the southeast region (47.5%). The information collected about mental health indicated that 24.2% declared psychiatry treatment, 28.2% psychological treatment, and 25.5% with psychiatry diagnoses. An epidemiological study conducted in the megacity of São Paulo (Brazil) found a prevalence in the general population of 2.7% for cluster B, including BPD.[47] Based on these findings, we can estimate that the sample of this study should have at least 13 people with BPD. More specifically, as previous studies indicate a prevalence of BPD between 1.1% and 3% in community samples[12,13], we can assume from 16 to 44 people with BPD in our sample. Table 1 presents details on the sample demographics.

Table 1 - Details on the sample demographics.

Demographic/Category	N	%
Sex		
Female	1317	89.7
Male	152	10.3
Psychiatry Diagnosis		
No	1095	74.5
Yes	374	25.5
Suicidal Attempt		
No	1072	73
Yes	397	27
Suicidal Ideation		
No	387	26.3
Yes	1087	73.7
Ethnicity		
White	803	54.7
Brown	462	31.4
Black	177	12.0
Asian	7	.5
Other	9	.6
Level of education		
Elementary School	66	4.5
High School	773	52.6
Undergraduate	280	19.1
University Education	210	14.3
Graduate	140	9.5
Marital Status		
Single	1044	71.1

Married	316	21.5
Divorced	33	2.2
Widowed	7	.5
Other	69	4.7
Brazil's region of residence		
Southwest	698	24.1
Northeast	354	47.5
South	140	9.5
North	129	8.8
Middle-west	148	10.1

Measures

Level of personality functioning scale – brief form 2.0 (LPFS-BF 2.0)[48]

The LPFS-BF 2.0 is a self-report scale for assessing impairments in the global personality pattern, as proposed in Criteria A of the Alternative Model for Personality Disorders presented in DSM-5. The LPFS-BF 2.0 consists of 12 items that should be answered on a four-point Likert scale and two factors impairment-related: Self and Interpersonal. Evidence supports the psychometric properties of LPFS-BF 2.0.[49,50] The alfa and omega values in your study were Self (α = .88; Ω= 88) and Interpersonal (α = .80; Ω = .81).

Personality Inventory for DSM-5 (PID-5)[51]

The PID-5 is a self-report scale that measures 25 facets of maladaptive personality traits described in section III of the DSM-5, which can be combined into five domains. The items should be responded on a 4-point Likert scale. Studies support the psychometric properties of PID-5 (Krueger et al., 2011). The following facets, based on previous DSM-5 section III were selected: Hostility (α= .89; Ω = .91); Impulsivity (α = .92; Ω = .92), Risk-Taking (α = .85; = Ω = .86) Anxiety (α = .89; Ω = .88), Depression (α = .93; Ω= .93); Emotional Lability (α = .84; Ω = .82) Separation Insecurity (α = .89; Ω= .90).

Dimensional Clinical Personality Inventory 2

IDCP-2 is a self-report scale developed for the evaluation of pathological personality traits based on prominent literature, composed of 206 items on a 4-point Likert scale, grouped in 12 dimensions and respective 47 factors. Previous studies support the psychometric properties of IDCP-2.[52,53] In this study, we administered ten factors reported in the literature as functioning characteristics of borderline personality disorders: Vulnerability (α = .79; Ω = .81), Anxious Worry (α = .77; Ω = .77), Anxious

(α = .81; Ω = 811), Depressivity (α = .89; Ω = 89), Impulsiveness (α = .82; Ω = .83), Risk-taking (α = .84; Ω = 84), Self-devaluation (α = .92; Ω = .93), Deceitfulness (α = .86; Ω = 87) Antagonism (α = .86; Ω = 87) and, Abandonment Avoidance (α = .85; Ω = 85).

Structured Clinical Interview for the DSM-IV – Personality Questionnaire (PQ-SCID-II)[54]

The PQ-SCID-II is a self-report measure developed to evaluate pathological personality based on DSM-IV. The PQ-SCID-II consists of 121 items answered with yes and no, in which each question refers to a diagnostic criterion for personality disorders. Previous studies support the psychometric properties of.[55] In this study, we administered 15 items corresponding to the diagnostic criteria of BPD. This study's alfa and omega values were: (α = .83; Ω = 83).

Data Analysis

We first conducted a descriptive analysis. We separated the sample using two different methods, (a) based on the clinical approach reported in DSM-5 session III and (b) an empirical approach using Latent Profiles Analysis (LPA). We employed the LPFS to assess impairment in personality based on DSM-5 (criterion A) and the PID-5 to assess BPD traits (criterion B).[8] We created three groups: people negative for criterion A and negative for criterion B (healthy; N = 884); people positive for criterion A and negative for criterion B (other PD; N= 437); people positive for criteria A and B (BPD; N= 187). We used the PID-5 facets to determine the groups for the empirical approach (LPA). We created three groups: lower BPD (N= 536), moderate BPD (N= 686), and higher BPD (N = 247).

We compared the scores obtained by each group in the pathological traits using MANCOVA with post hoc (Bonferroni), controlling the effect of the variable biological sex. We controlled this variable because BPD is more prevalent in women than men.[8] We employed the Bonferroni correction using the following formula:[56] $p\text{-value}_{corrected} = p/H$, where p is the standard p cutoff (.05), and H is the number of hypotheses in the study (12). This procedure generated a $p < .004$ employed in our study. We used the partial eta squared as the effect size indicator. The partial eta squared was interpreted as 0.01 (small), 0.09 (medium), and 0.25 (large).[57]

We selected the most discriminant IDCP-2 factors to BPD and created a BPD score. We investigated the intercorrelations among IDCP-2 factors to observe the presence of factor independence. We used the Receiver Operating Characteristic (ROC) to explore the best cutoff to the BPD score and calculate the sensitivity, specificity, true predictive value, negative predictive value, positive probability rates, negative probability rate, and the efficiency test of the scales.[57,58] We compared the values obtained for IDCP-2 with those obtained by the PQ-SCID-II to verify the capability of the IDCP-2 compared to a similar measure. To calculate the positive and negative predictive values, we used the formula proposed by Streiner[59] for samples without known prevalence. These procedures were conducted in the SPSS version 21.

Results

Table 2 presents the MANCOVA with the healthy, other PD, and BPD groups. The findings indicated significant differences in the IDCP-2 factors even after controlling the effect of biological sex.

Table 2 - MANCOVA results for the DSM-5-based group.

IDCP-2 factors	Group	M	95% Confidence Interval		F	p	Partial Eta Squared
			Lower Boud	Upper Bound			
Vulnerability	healthy	1.96	1.92	2.00	445.869	<.004	.38
	other PD	2.62	2.56	2.67			
	BPD	3.21	3.12	3.29			
Anxious worry	healthy	2.40	2.36	2.44	249.099	<.004	.25
	other PD	2.95	2.89	3.01			
	BPD	3.34	3.25	3.42			
Separation Insecurity	healthy	1.65	1.61	1.70	176.382	<.004	.19
	other PD	2.15	2.08	2.21			
	BPD	2.57	2.47	2.66			
Anxious	healthy	2.30	2.25	2.35	268.658	<.004	.24
	other PD	2.91	2.85	2.98			
	BPD	3.41	3.30	3.51			
Depressivity	healthy	1.93	1.88	1.98	514.733	<.004	.41
	other PD	2.98	2.91	3.06			
	BPD	3.55	3.44	3.66			
Impulsivity	healthy	1.50	1.46	1.54	268.658	<.004	.27
	other PD	1.82	1.76	1.87			
	BPD	2.54	2.46	2.62			
Risk-taking	healthy	1.34	1.31	1.38	77.495	<.004	.10
	other PD	1.46	1.41	1.51			
	BPD	1.85	1.78	1.92			
Deceitfulness	healthy	1.50	1.46	1.54	68.589	<.004	.09
	other PD	1.71	1.65	1.77			
	BPD	2.07	1.98	2.16			
Abandonment avoidance	healthy	1.84	1.80	1.89	258.237	<.004	.26
	other PD	2.34	2.28	2.40			
	BPD	2.95	2.86	3.05			

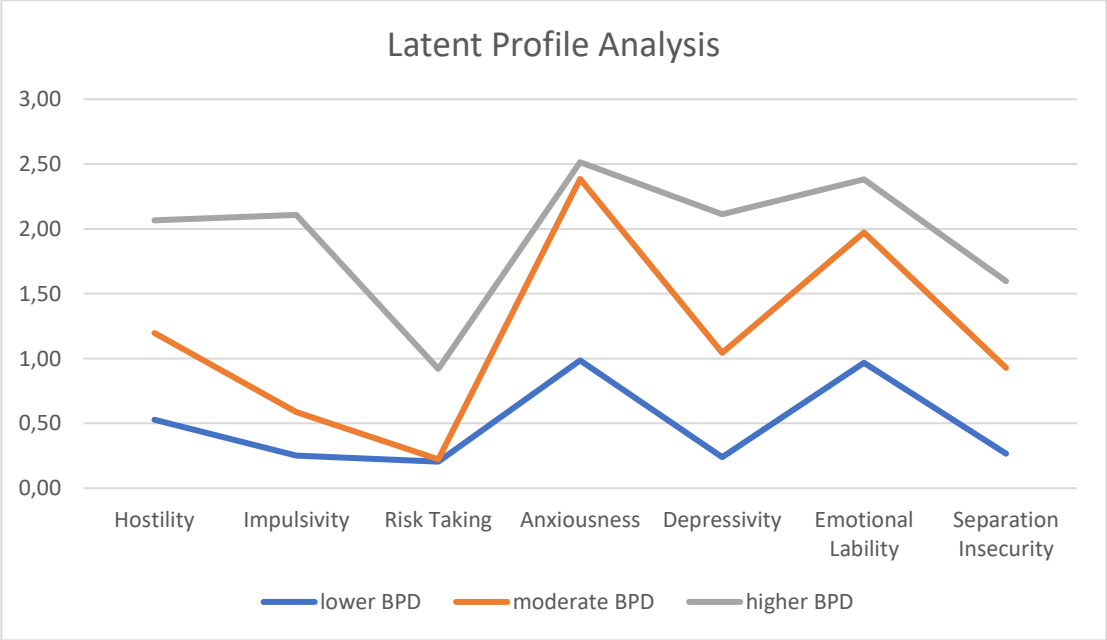
Antagonism	healthy	1.42	1.39	1.46	77.495	<.004	.10
	other PD	1.63	1.58	1.68			
	BPD	1.97	1.89	2.05			
Self-devaluation	healthy	1.89	1.84	1.93	531.679	<.004	.42
	other PD	2.84	2.78	2.91			
	BPD	3.52	3.42	3.62			
Hopelessness	healthy	1.54	1.50	1.59	492.721	<.004	.40
	other PD	2.41	2.35	2.48			
	BPD	3.11	3.01	3.21			

Note: Differences between groups were obtained, controlling for the influence of the biological sex variable.

The BPD group showed the highest means in all IDCP-2 factors compared to the other groups. The pathological group showed the highest means compared to the healthy group. The effect size ranged between .10 and .42, mostly interpreted as large.[57] We conducted a latent profile analysis (LPA) to empirically discriminate groups according to PID-5 facets. The fit for the 3-profiles solution were Loglikelihood = -11033.775 (4); AIC = 22127.550; BIC = 22286.320; aBIC = 22191.019; Vuong-Lo-Mendell-Rubin Likelihood Ratio Test = p <.05; Lo-Mendell-Rubin Likelihood Ratio Test = p <.05; Bootstrapped Likelihood Ratio Test = p <.01; Entropy = .82. We chose the solution with three profiles as it presented a better interpretive possibility. Figure 1 shows the scores of the groups in the seven PID-5 facets.

Figure 1

Means of the groups according to Latent Profile Analysis (PID-5).



The better interpretable solution was three groups: people showing lower levels in BPD traits (means between 0 and 1 in PID-5 facets) compared to other groups (lower BPD; N= 536); people with moderate BPD levels in BPD traits (means between 1 and 2 in mostly PID-5 facets) (moderate BPD; N= 686); people with higher levels in BPD traits compared to other groups (means > 2 in mostly PID-5 facets) (higher BPD; N = 247).

We conducted a second MANCOVA using the LPA groups. MANCOVA's findings indicated that the three LPA groups showed significant differences in IDCP-2 factors even after controlling the effect of biological sex. Table 3 shows MANCOVA results for the LPA-based groups.

Table 3 - MANCOVA with the LPA-based group.

IDCP-2 factors	Group	M (SD)	95% Confidence Interval		F	p	Partial Eta Squared
			Lower Boud	Upper Bound			
Vulnerability	lower BPD	1.77	1.72	1.81	537.873	<.004	.42
	moderate BPD	2.45	2.41	2.49			
	higher BPD	3.12	3.05	3.19			
Anxious Worry	lower BPD	2.11	2.06	2.15	518.794	<.004	.41
	moderate BPD	2.95	2.91	2.99			
	higher BPD	3.20	3.13	3.27			
Insecurity	lower BPD	1.52	1.46	1.58	190.130	<.004	.21
	moderate BPD	2.03	1.98	2.08			
	higher BPD	2.48	2.39	2.56			
Anxious	lower BPD	1.93	1.88	1.99	529.074	<.004	.42
	moderate BPD	2.95	2.90	3.00			
	higher BPD	3.23	3.15	3.31			
Depressivity	lower BPD	1.67	1.60	1.73	544.231	<.004	.43
	moderate BPD	2.72	2.66	2.77			
	higher BPD	3.40	3.31	3.50			
Impulsivity	lower BPD	1.39	1.35	1.43	471.245	<.004	.39
	moderate BPD	1.68	1.64	1.71			
	higher BPD	2.59	2.53	2.66			
Risk-Taking	lower BPD	1.32	1.28	1.36	183.614	<.004	.20
	moderate BPD	1.35	1.31	1.38			
	higher BPD	1.97	1.91	2.03			
Deceitfulness	lower BPD	1.46	1.41	1.51	110.049	<.004	.13
	moderate BPD	1.59	1.54	1.63			
	higher BPD	2.15	2.07	2.22			
Abandonment Avoidance	lower BPD	1.62	1.57	1.67	391.281	<.004	.35
	moderate BPD	2.27	2.22	2.31			
	higher BPD	2.87	2.79	2.94			
Antagonism	lower BPD	1.37	1.32	1.41	129.944	<.004	.15
	moderate BPD	1.53	1.49	1.57			
	higher BPD	2.02	1.96	2.09			
Self-devaluation	lower BPD	1.64	1.58	1.70	573.023	<.004	.44
	moderate BPD	2.60	2.55	2.65			
	higher BPD	3.37	3.28	3.45			

	lower BPD	1.36	1.30	1.41			
Hopelessness	moderate BPD	2.14	2.09	2.19	519.386	<.004	.41
	higher BPD	3.02	2.94	3.11			

Note: Differences between groups were obtained, controlling for the influence of the biological sex variable.

The higher BPD profile showed the highest means in the IDCP-2 factors compared to the other groups. The moderate BPD showed the highest means in the IDCP-2 factors compared to the lower BPD. The ηp2 values ranged between .13 and .44, mostly interpreted as large.[57] We selected all the IDCP-2 factors to compose the BPD score as they were discriminative in our previous comparisons. We first conducted a Pearson correlation to verify the independence of the IDCP-2 factors. The correlation values ranged between .10 and .82 (M = .43; SD = .19), indicating overall independence among factors.

We conducted two Curve ROC analyses and generated accuracy indicators to investigate the best cutoff to the BPD score with the DSM-5-based groups and the LPA empirically-based groups. We performed these analyses with the PQ-SCID-II to compare the results obtained with the BPD score. Table 4 presents the IDCP-2 and PQ-SCID-II results.

Table 4 - *BPD score and PQ-SCID-II discriminative indicators.*

BPD score									
Groups	Cutoff	AUC	Ss	Sp	+PV	-PV	+PR	-PR	AC
DSM-5	25	.96	.94	.85	.66	.98	6.27	.07	.85
LPA profiles	22	.98	.96	.85	.75	.98	6.33	.06	.89
PQ-SCID-II									
DSM-5	9	.95	.92	.81	.52	.98	4.8	.10	.82
LPA profiles	9	.97	.95	.85	.80	.98	6.46	.03	.91

Note. AUC: area under the curve; Ss = sensitivity; Sp = specificity; +PV = positive predictive value; -PV = negative predictive value; +PR = positive probability rates; -PR = negative probability rates; AC = global accuracy.

We chose the cutoff with the best relation between sensibility and specificity for screening scales,[60] i.e., privileging sensitivity over specificity. We employed Streiner's formula[59] for samples without prevalence information to calculate the positive and negative predictive values. The indicators demonstrated the ability of the BPD score to identify the groups, based on the DSM-5 and LPA, mainly to identify the positive cases

correctly. The global accuracy indicated that the BPD score correctly identified 85% of participants in the group based on DSM-5 and 89% based on LPA. The BPD score showed similar indices to PQ-SCID-II to discriminate both groups based on DSM-5 and profiles retrieved from LPA. For instance, the PQ-SCID-II correctly identified 82% (DSM-5-based) and 91% (LPA-based).

Discussion

Extreme levels of BPD traits significantly impede various aspects of patients' lives, leading to difficulties in interpersonal relationship,[61] poor work performance,[1] suicidal tendencies, and substance abuse.[62] These impairments directly jeopardize the quality of life for individuals with pronounced BPD traits, emphasizing the necessity of early screening and identification. Our study, grounded in prior IDCP-2 research and BPD literature, examined the potential of IDCP-2 factors to identify individuals with elevated BPD traits in a general population sample. The findings supported our hypothesis that IDCP-2 factors could distinguish individuals with heightened BPD traits. However, the hypothesis regarding the most discriminative factors was partially sustained, with Vulnerability, Depression, Impulsiveness, Self-devaluation, and Hopelessness emerging as the most distinguishing factors in the AMDP-based group (DSM-5-TR), and Vulnerability, Anxious Worry, Depressivity, Self-devaluation, and Hopelessness demonstrating superior discriminatory power within LPA profiles. This research underscores the pivotal role of specific personality traits in understanding BPD, offering insights into potential targeted interventions and support strategies.

The IDCP-2 factors exhibited robust discriminative ability in identifying individuals with elevated BPD traits in both sample division procedures, based on the AMPD[8] and empirically derived via LPA. Outstandingly, this discriminative capacity remained statistically significant and yielded large effects[57], even after controlling for the influence of biological sex and applying the Bonferroni correction.[56] Consistent with expectations,[8,63] the biological sex variable emerged as a significant factor in nearly all between-group comparisons, affirming its substantial impact on BPD traits. These findings suggest that the IDCP-2 factors effectively capture the variance in levels of typical BPD traits as reported in the existing literature.[8,26-29]

In the context of the DSM-5-based group, the most discriminating traits included Vulnerability, Depression, Impulsiveness, Self-devaluation, and Hopelessness, while for the LPA-based group, the factors were Vulnerability, Anxious Worry, Depressivity,

Self-devaluation, and Hopelessness. These outcomes align with prior research investigating IDCP-2 factors' discriminative potential in identifying BPD.[7,38] Those studies identified Hopelessness, Vulnerability, Anxious Worry, Impulsiveness, and Risk-Taking as the most distinguishing factors, with only Risk-Taking not emerging among the top factors in our study. This factor denotes a more adventurous and risk-prone style[5], a characteristic recognized and documented as central in the pathological pattern of BPD.[8,26-29] As noted earlier, the lower discriminative power of Risk-Taking in our study may be attributed to social undesirability linked to behaviors associated with this trait. This aspect might have led to reduced variability in participants' responses, consequently impacting its expected discriminative capacity compared to other traits.

We derived a BPD score from the IDCP-2 factors, leveraging our findings. Notably, the BPD score demonstrated excellent performance, as evidenced by the AUC results, aligning with established standards,[64,65] in effectively distinguishing between the DSM-5 and LPA groups. In the DSM-5-based group, the BPD score exhibited robust performance, accurately identifying 94% of positive and 85% of negative cases. Similarly, within the LPA group, the BPD score excelled, correctly identifying 96% of positive and 85% of negative cases. These results fall within the expected range for PD screening tests, as Merlatin et al.[66] indicated, where values in the literature typically vary between 92% and 94% for identifying positive cases and between 79% and 85% for identifying negative cases. Moreover, our findings revealed a favorable balance between false negatives and false positives in the BPD score's performance, aligning with the desired attributes of screening scales.[62] Specifically, screening scales should be designed to produce more false positives than false negatives, ensuring that individuals with clinically relevant impairments are not erroneously overlooked, thereby ensuring they receive the necessary treatment and support.

We compared the BPD score with the PQ-SCID-II and found that both scales exhibit comparable abilities to distinguish the DSM-5 and LPA groups, with promising indicators.[62] Despite the BPD score containing more items, it performs on par with the PQ-SCID-II. However, the distinct advantage of the BPD score lies in its capacity not only to screen for BPD but also to pinpoint the specific traits in which the patient exhibits significant alterations, providing valuable insights into the clinical profile.

Our study has methodological limitations that warrant consideration when interpreting and extending the findings. Our sample was drawn exclusively from the

general population, which may limit the generalizability of the results to clinical populations. Although we used two distinct procedures to identify individuals with BPD traits, one of which employed the PID-5 as an external criterion, the inclusion of clinically diagnosed BPD patients using diagnostic interviews would enhance the robustness of group composition. We recommend that future investigations incorporate individuals with confirmed clinical BPD diagnoses to bolster the clinical relevance of findings. Additionally, examining the discriminative capacity of IDCP-2 factors to differentiate BPD from other personality disorders represents an important avenue for future research.

Our results support the clinical utility of the BPD score in identifying individuals with high levels of BPD traits. This score serves as a valuable tool for clinical screening and offers a comprehensive profile of a patient's presentation across 12 typical BPD traits. Notably, our findings indicate the presence of two distinct cutoffs for identifying BPD, contingent on group categorization. To adopt a more conservative approach, we recommend employing a cutoff score of 22 on the BPD scale. This threshold can effectively highlight patients warranting clinical attention and further assessment for potential BPD-related concerns.

Handling Editor: Dr. Karen Jansen

References

1- Juurlink TT, Ten Have M, Lamers F, van Marle HJ, Anema JR, de Graaf R, et al.; Borderline personality symptoms and work performance: a population-based survey. BMC Psychiatry. 2018;18:1-9.

2- Hedrick AN, Berlin HA. Implicit self-esteem in borderline personality and depersonalization disorder. Front Psychol. 2012;91:99-3.

3- Thompson KN, Jackson H, Cavelti M, Betts J, McCutcheon L, Jovev M, et al.; Number of borderline personality disorder criteria and depression predict poor functioning and quality of life in outpatient youth. J Pers Disord. 2020;785:798-34.

4- Paris J. Applying the principles of psychotherapy integration to the treatment of borderline personality disorder. J Psychother Integr. 2015;13:19-25.

5- Carvalho LF, Pianowski G. Dimensional Clinical Personality Inventory 2: antecedents, development, and future improvements. Interação em Psicologia. 2021;35:360-03.

6- Carvalho LF, Pianowski G, Bacciotti J, Reis AM. Assessing borderline personality disorder based on the hierarchical taxonomy of psychopathology (HiTOP): Dimensional clinical personality inventory 2–BPD. Arch Psych Psych. 2018;77:87-4.

7- Carvalho LF, Pianowski G. Dependency, mood instability, and inconsequence traits for discriminating borderline personality disorder. Trends Psychiatry Psychother. 2019;41:78-82-

8- American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition Text Revision (DSM-5-TR). Arlington: American Psychiatric Publishing; 2022.

9- Gunderson JG, Herpertz SC, Skodol AE, Torgersen S, Zanarini MC. Borderline personality disorder. Nat Rev Dis Primers. 2018;1:20-1.

10- Leichsenring F, Leibing E, Kruse J, New AS, Leweke F. Borderline personality disorder. The Lancet. 2011;74:84-9759.

11- Millon T. Disorders of personality: Introducing a DSM/ICD spectrum from normal to abnormal. John Wiley & Sons; 2011.

12- Ten Have M, Verheul R, Kaasenbrood A, van Dorsselaer S, Tuithof M, Kleinjan M, et al.; Prevalence rates of borderline personality disorder symptoms: a study based on the Netherlands Mental Health Survey and Incidence Study-2. BMC Psychiatry. 2016;1:10-249.

13- Zanarini MC, Horwood J, Wolke D, Waylen A, Fitzmaurice G, Grant BF. Prevalence of DSM-IV borderline personality disorder in two community samples: 6,330 English 11-year-olds and 34,653 American adults. J Pers Disord. 2011;607:619-19.

14- Newton-Howes G, Tyrer P, Anagnostakis K, Cooper S, Bowden-Jones O, Weaver T. The prevalence of personality disorder, its comorbidity with mental state disorders, and its clinical significance in community mental health teams. Soc Psychiatry Psychiatr Epidemiol.2010;453:460-60.

15- Zimmerman M, Multach MD, Dalrymple K, Chelminski I. Clinically useful screen for borderline personality disorder in psychiatric out-patients. Br J Psychiatry. 2017;165:166-6.

16- Black DW, Blum N, Pfohl B, Hale N. Suicidal behavior in borderline personality disorder: prevalence, risk factors, prediction, and prevention. J Pers Disord. 2005;226:239-3.

17- Pompili M, Girardi P, Ruberto A, Tatarelli R. Suicide in borderline personality disorder: a meta-analysis. Nord J Psychiatry. 2005;319:324-5.

18- Selby EA, Joiner Jr TE. Cascades of emotion: The emergence of borderline personality disorder from emotional and behavioral dysregulation. Rev Gen Psychol. 2009;219:229-3.

19- Selby EA, Joiner Jr TE. Emotional cascades as prospective predictors of dysregulated behaviors in borderline personality disorder. Pers. Disord.: Theory Res. Treat. 2013;168:174-3.

20- Temes CM, Frankenburg FR, Fitzmaurice GM, Zanarini MC. 2019. Deaths by suicide and other causes among patients with borderline personality disorder and personality-disordered comparison subjects over 24 years of prospective follow-up. J Clin Psychiatry. 2019;4039:1

21- Oldham, JM. "Borderline personality disorder and suicidality." Am J Psychiatry.2006;20:26-1.

22- Skodol AE, Gunderson JG, McGlashan TH, Dyck IR, Stout RL, Bender DS, et al.; Functional impairment in patients with schizotypal, borderline, avoidant, or obsessive-compulsive personality disorder. Am J Psychiatry. 2002;276:283-1.

23- Shah R, Zanarini MC. Comorbidity of borderline personality disorder: current status and future directions. Psychiatr Clin North Am. 2018;583:593-4.

24- Arntz A, Bernstein D, Gielen D, Van Nieuwenhuyzen M, Penders K, Haslam N, et al.; Taxometric evidence for the dimensional structure of cluster-C, paranoid, and borderline personality disorders. J Pers Disord. 2009;606:628-6.

25- Haslam N, McGrath MJ, Viechtbauer W, Kuppens P. Dimensions over categories: A meta-analysis of taxometric research. Psychol Med. 2020; 1418-1432-9.

26- Hopwood CJ, Thomas KM, Markon KE, Wright AG, Krueger RF. DSM-5 personality traits and DSM–IV personality disorders. J Abnorm Psychol. 2012;424:432-2.

27- Morey LC, Benson KT, Skodol AE. Relating DSM-5 section III personality traits to section II personality disorder diagnoses. Psychol Med. 2016;647-655-3.

28- Samuel DB, Lynam DR, Widiger TA, Ball SA. An expert consensus approach to relating the proposed DSM-5 types and traits. Pers. Disord.: Theory Res. Treat. 2012;1:16-1.

29- Kotov R, Krueger RF, Watson D, Achenbach TM, Althoff RR, Bagby RM, et al.;. The Hierarchical Taxonomy of Psychopathology (HiTOP): A dimensional alternative to traditional nosologies. J Abnorm Psychol. 2017;454:477-4.

30Lynam D, Miller J. The basic trait of Antagonism: An unfortunately underappreciated construct [Internet]. PsyArXiv; 2019. Available from: osf.io/preprints/psyarxiv/tgyq6

31- Siefert CJ. Screening for personality disorders in psychiatric settings: Four recently developed screening measures. In: Baer L, Blais MA, editors. Handbook of clinical rating scales and assessment in psychiatry and mental health. 2010. p.125-144.

32- Widiger TA, Samuel DB. Diagnostic categories or dimensions? A question for the Diagnostic and statistical manual of mental disorders. J Abnorm Psychol. 2005;494:504-4.

33- Carvalho LF, Gomes GV, da Silva E. Publications on personality disorders in Brazilian journals: a narrative review. Aval. psicol. 2021;369:378-3.

34- American Educational Research Association (AERA), American Psychological Association (APA), & National Council on Measurement In Education (NCME). Standards for educational and psychological testing. American Educational Research Association.2014.

35- Carvalho LF, Pianowski G, Miguel FK. Revision of the aggressiveness dimension of Dimensional Clinical Personality Inventory. Psicol. teor. prat.. 2015;146:163-3.

36- Carvalho LF, Pianowski G. Revisão da Dimensão Dependência do Inventário Dimensional Clínico da Personalidade. Paidéia.2015;57:65-60.

37- Carvalho LF, Sette CP. Review and verification of the psychometric properties of the mood instability dimension of the Dimensional Clinical Personality Inventory. Acta.colomb.psicol. 2015;115-127-2.

38- Carvalho LF, Pianowski G. Differentiating borderline personality disorder and bipolar disorder through emotional dependency, emotional instability, impulsiveness and aggressiveness traits. Eur J Psychiatry. 2019;91:95-2.

39- Deeks JJ, Wisniewski S, Davenport C. Guide to the contents of a Cochrane Diagnostic Test Accuracy Protocol. In: Deeks JJ, Bossuyt PM, Gatsonis C, editors, Cochrane Handbook for Systematic Reviews of Diagnostic Test Accuracy Version 1.0.0. The Cochrane Collaboration, 2013.

40- Glasser SP. Research methodology for studies of diagnostic tests. In: Glasser SP, editor. Essentials of Clinical Research. Alabama: Springer; 2014. p.245:260.

41- Thomas ML. The value of item response theory in clinical assessment: a review. Assessment. 2011:291:307-3.

42- Wyse AE, Reckase MD. A graphical approach to evaluating equating using test characteristic curves. Appl Psychol Meas.2011;217:234-3.

43- Calvo N, Valero S, Sáez-Francàs N, Gutiérrez F, Casas M, Ferrer M. Borderline personality disorder and personality inventory for DSM-5 (PID-5): dimensional personality assessment with DSM-5. Compr Psychiatry. 2016;105:111-70.

44- World Medical Association. World Medical Association Declaration of Helsinki: ethical principles for medical research involving human subjects. Jama. 2013; 2191:2194-20.

45- Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). J Med Internet Res. 2004;1:6-3.

46- Leys C, Klein O, Dominicy Y, Ley C. Detecting multivariate outliers: Use a robust variant of the Mahalanobis distance. J Exp Soc Psychol. 2018;150:156-74

47- Santana GL, Coelho BM, Wang YP, Chiavegatto Filho AD, Viana MC, Andrade LH. The epidemiology of personality disorders in the Sao Paulo Megacity general population. PloS one. 2018;1:20-4

48- Bach B, Hutsebaut J. Level of Personality Functioning Scale–Brief Form 2.0: Utility in capturing personality problems in psychiatric outpatients and incarcerated addicts. J Pers Assess. 2018:660:670-6.

49 - Gonçalves AP, Franco GC, Machado GM. Internal and External validity evidence for Level of Personality Functioning Scale–Brief Form 2.0. Estudos de Psicologia. 2022;272:229-3.

50- Oliveira SE, Zimmermann J, Krueger RF, Hutsebaut J. Brazilian version of the Level of Personality Functioning Scale-Brief Form 2.0: Evidence of reliability and validity. Psicologia: Teoria e Pesquisa. 2023;39:e39nspe05.

51- Krueger RF, Derringer J, Markon KE, Watson D, Skodol AE. Initial construction of a maladaptive personality trait model and inventory for DSM-5. Psychol Med. 2012; 1879:1890-9.

52- Carvalho LF, Martins DF. Revisão da dimensão desconfiança do Inventário Dimensional Clínico da Personalidade. Psico. 2017:152:162-2.

53- Carvalho LD, Gonçalves PG, Juliana AA, Macedo F. Verification of the internal structure of the dimensional clinical personality inventory 2 in a Brazilian community sample. Rev. Colombiana Psico. 2021;115:125-2.

54- First MB, Gibbon M, Spitzer RL, Williams JB, Benjamin LS. SCID-II personality questionnaire.

55- Bodlund O, Ekselius L, Lindström E. Personality traits and disorders among psychiatric outpatients and normal subjects on the basis of the SCID screen questionnaire. Nord J Psychiatry. 1993;425:433-6.

56 Aslam M, Albassam M. Presenting post hoc multiple comparison tests under neutrosophic statistics. J King Saud Univ Sci. 2020;:2728:2732-6.

57- Miles J, Shevlin M. Applying regression and correlation: A guide for students and researchers. Sage; 2001.

58- Šimundić AM. Measures of diagnostic accuracy: basic definitions. EJIFCC. 2009;203:211-4.

59- Streiner DL. Being inconsistent about consistency: When coefficient alpha does and doesn't matter. J Pers Assess. 2003;217:222-3.

60- Germans S, Van Heck GL, Hodiamont PP. Results of the search for personality disorder screening tools: clinical implications. J Clin Psychiatry. 2012;165:173-2.

61- Trull TJ, Freeman LK, Vebares TJ, Choate AM, Helle AC, Wycoff AM. Borderline personality disorder and substance use disorders: an updated review. Borderline Personal Disord Emot Dysregul. 2018;5:15-2.

62- Gunderson JG. Disturbed relationships as a phenotype for borderline personality disorder. Am J Psychiatry. 2007;1637:1640-11.

63- Skodol AE, Bender DS. Why are women diagnosed borderline more than men?. Psychiatr Q. 2003;349:360-74.

64- Hajian-Tilaki K. Receiver operating characteristic (ROC) curve analysis for medical diagnostic test evaluation. Caspian J Intern Med. 2013;627:635-2.

65- Hosmer DW, Lemeshow S. Applied Logistic Regression (2nd ed.). John Wiley.2000

66- Melartin T, Häkkinen M, Koivisto M, Suominen K, Isometsä E. Screening of psychiatric outpatients for borderline personality disorder with the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD). Nord J Psychiatry. 2009;475:479-6.

Supplementary 2

Correlations

Pearson Correlation

	Vulnerability IDCP-2	Anxious Worry IDCP-2	Anxious IDCP-2	Depressivity IDCP-2	Impulsiveness IDCP-2	Risk-taking IDCP-2	Deceitfulness (IDCP-2	Dep2	Abandonment Avoidance IDCP-2	Hostility PID-5	Impulsivity PID-5	Risk-Taking PID-5	Anxiousness	Depressivity	Emotional Lability	Separation Insecurity	SCID_border
Vulnerability	1																
Anxious Worry	,560**	1															
Anxious	,553**	,717**	1														
Depressivity	,579**	,542**	,521**	1													
Impulsiveness	,562**	,339**	,290**	,397**	1												
Risk-taking	,349**	,105**	,125**	,209**	,565**	1											
Deceitfulness	,355**	,141**	,130**	,216**	,471**	,492**	1										
Abandonment Avoidance	,487**	,669**	,478**	,484**	,390**	,160**	,194**	1									
Antagonism	,415**	,155**	,182**	,265**	,507**	,538**	,705**	,189*	1								
Hostility	,649**	,337**	,418**	,425**	,499**	,322**	,385**	,296**	,497**	1							
Impulsivity	,565**	,342**	,326**	,406**	,763**	,505**	,403**	,402**	,445**	,539**	1						

Risk-Taking	,326**	,085**	,107**	,199**	,524**	,835**	,460**	,140*	,535**	,360**	,544**	1						
Anxiousness	,493**	,708**	,776**	,496**	,258**	,073**	,095**	,469*	,137**	,393**	,333**	,090**	1					
Depressivity	,540**	,436**	,424**	,766**	,383**	,248**	,213**	,429*	,268**	,415**	,467**	,267**	,437**	1				
Emotional Lability	,520**	,442**	,457**	,413**	,361**	,166**	,124**	,412*	,133**	,459**	,419**	,187**	,542**	,377**	1			
Separation Insecurity	,371**	,590**	,383**	,358**	,313**	,101**	,144**	,755*	,117**	,245**	,387**	,124**	,455**	,377**	,379**	1		
SCID_border	,734**	,473**	,470**	,592**	,578**	,374**	,395**	,437*	,442**	,656**	,621**	,385**	,472**	,581**	,525**	,385**	1	

**. Correlation is significant at the 0.01 level (2-tailed).