Latent Profiles of Patients with Borderline Pathology Based on the Alternative DSM-5 Model for Personality Disorders

Dominick Gamache (dominick.gamache@uqtr.ca)
Université du Québec à Trois-Rivières: Université du Québec à Trois-Rivières
https://orcid.org/0000-0002-8735-712X

Claudia Savard
Université Laval

Philipp Leclerc
Universite du Quebec a Trois-Rivieres

Maude Payant
Universite du Quebec a Montreal

Alexandre Côté
Université du Québec à Trois-Rivières

Jonathan Faucher
Universite du Quebec a Trois-Rivieres

Mireille Lampron
Université Laval

Marc Tremblay
CIUSSS-Capitale-Nationale

Research article

Keywords: DSM-5, Alternative Model for Personality Disorders, borderline personality disorder, Criterion A, Criterion B, latent profile analysis

DOI: https://doi.org/10.21203/rs.3.rs-90278/v1

License: © This work is licensed under a Creative Commons Attribution 4.0 International License. Read Full License
Abstract

Background

There have been multiple attempts to try to parse out heterogeneity within borderline pathology by identifying patient subtypes; thus far, these works have yielded few consistent results. Recent developments in the operationalization of borderline pathology may provide new opportunities to identify clinically and conceptually meaningful subgroups of patients. The Alternative DSM-5 Model for Personality Disorders (AMPD) offers a categorical-dimensional operationalization of Borderline personality disorder (BPD) that has yet to be tested for identification of patient subgroups. The purpose of the present study is to test whether the combination of the Criterion A elements (pertaining to level of severity) and the seven pathological traits from Criterion B that define BPD in the AMPD can yield meaningful patient profiles.

Methods

A total of 211 outpatients from a specialized PD treatment program (133 women, $M_{age} = 33.66, SD = 10.97$) were selected based on the presence of at least moderate borderline pathology according to cutoffs recently proposed for the Borderline Symptom List-23. Valid Criterion A (Self and Interpersonal Functioning Scale) and B (Personality Inventory for DSM-5-Short Form) self-reports were administered to measure elements and traits that define BPD in the AMPD model; these variables were used as indicators in a Latent profile analysis (LPA).

Results

The optimal solution generated by LPA yielded four distinct profiles: (a) Borderline traits; (b) Low borderline pathology with Impulsivity; (c) Moderate borderline pathology with Identity problems and Depressivity; and (d) Severe borderline pathology. Clinically meaningful distinctions emerged between profiles on AMPD indicators and external variables relevant to PD, especially aggression and impulsivity.

Conclusions

Profiles reflected both the "severity" and "style" components imbedded within Criterion A and B of the AMPD, as they were mainly distinguished by a continuum of severity but also by some meaningful qualitative differences that may have important clinical implications for treatment planning and contracting. Results also suggest that the four Criterion A elements have independent value to identify important differences in patients with borderline pathology. They also highlight that some Criterion B traits that define BPD in the AMPD may be especially important to identify subgroups of patients, mainly Impulsivity and Depressivity.

Background

The definition of borderline pathology has remained somewhat elusive and contentious over the years (see, e.g., [1]). Part of the difficulty in identifying the core feature(s) of “borderlineess” [2] may be attributable to its highly heterogeneous nature; such heterogeneity has been identified as a potential impediment to efforts aiming to elucidate its etiology, as well as to identify possible biomarkers and endophenotypes [3]. This heterogeneity stems from conceptual, theoretical, and empirical issues. For instance, the introduction of a polythetic approach to diagnose Borderline personality disorder (BPD) in successive editions of the Diagnostic and Statistical Manual of Mental Disorders (DSM) since its third version [4] entails that up to 256 different permutations of its nine defining criteria can lead to a diagnosis. In various psychoanalytic-psychodynamic models (e.g., [5-6]), borderline pathology holds a “double status”, as it has been defined both as a distinct disorder and as a level of personality organization comprising many of the usual categorical disorders (e.g., narcissistic, antisocial), which may also contribute to the elusiveness of a consensual definition and operationalization of “borderlineess”.

Page 2/24
Over the past years, multiple endeavors have focused on trying to parse out the heterogeneity within borderline pathology by identifying patient subtypes. These efforts can be categorized as either “variable-centered” or “person-centered” [7]. The former approach has typically focused on DSM BPD criteria, using exploratory (EFA) and confirmatory (CFA) factor-analytic strategies in order to reduce the number of criteria to a few core dimensions. Unfortunately, EFA studies have yielded unstable solutions that often pose conceptual challenges in terms of interpretability, while CFA studies have failed to find definitive support for multidimensional models over a single-factor solution (see [7] for a summary). To complicate the matter even further, a factor-analytic study by Sharp et al. [8] which included a bifactor analysis found that the nine DSM BPD criteria loaded only on a general personality pathology factor, suggesting that BPD criteria may represent core features of general PD severity instead of a discrete disorder.

The “person-centered” approach, on the other hand, has used strategies such as latent class (or profile) analysis (LPA) or cluster analysis in order to identify meaningful subgroups of patients with BPD pathology. Most studies have focused on DSM criteria to determine profiles (e.g., [9-11]), yielding subgroups that were mostly distinguishable based on a gradient of severity, calling into question whether they really correspond to qualitatively different “profiles” stricto sensu [12]. Other studies have rather focused on indicators deemed relevant for borderline pathology (e.g., affect experience/regulation, interpersonal patterns, PD comorbidity, levels of antisocial behavior and aggression, mistrustfulness [7, 13-17]), which yielded two to four profiles/clusters. While no consensus emerged regarding their composition, most categorizations seem to feature subtype(s) with elements of internalizing and externalizing pathology, as outlined by Smits et al. [16]. Of note, a recent study using a combination of models (Factor analysis, Latent class analysis, Factor mixture modeling) on a large (> 20,000) sample of undergraduates found support for two subtypes with subthreshold borderline symptomatology, along with an asymptomatic group: an Unstable subtype with recklessness and self-damaging behaviors, and an Empty subtype with emptiness, dissociation, emotional distress, and attachment avoidance [18].

In sum, the heterogeneity within borderline pathology is far from resolved, and efforts aimed at parsing it have yielded few consistent results. However, the recent “paradigmatic shift” in the conceptualization of personality pathology (e.g., [19]), with the field decisively moving towards a dimensional framework, provides new opportunities to study heterogeneity in patients with borderline pathology. One of the most influential dimensional models that emerged over the past few years is the Alternative Model for Personality Disorders (AMPD). It was introduced in Section III of the fifth edition of the DSM (DSM-5 [20]) in response to the well-documented shortcomings of the traditional, categorical model of personality disorders (e.g., see [21] for a review). The model includes two main components. The first, Criterion A, includes four elements pertaining to impairments in one’s sense of self (Identity and Self-direction) and in interpersonal relationships (Empathy and Intimacy); it was conceived as a “severity” indicator [22]. The second, Criterion B, includes 25 maladaptive personality traits hierarchically organized into five broader domains, i.e., Negative Affectivity, Detachment, Antagonism, Disinhibition, and Psychoticism [23]; it was meant to be a “style” indicator. The model also retains six specific personality disorders which can be diagnosed on “algorithms” represented by a combination of Criterion A elements (scores ≥ 2 on at least two of the four Criterion A elements must be present to diagnose a personality disorder) and Criterion B trait facets (a polythetic approach similar to Section II PDs is retained, with the notable exception that for some disorders, some facets are given more weight, as they must be present in order to diagnose a given PD); as such, the AMPD model might better be described as a “hybrid” rather than a purely dimensional model.

The BPD diagnosis was retained in the AMPD, along with Antisocial, Avoidant, Narcissistic, Obsessive-compulsive, and Schizotypal PD diagnoses. BPD diagnosis is given in presence of moderate or greater impairment in two or more Criterion A elements, and in presence of four or more of the following Criterion B traits (one of which must be e, f, or g): (a) Emotional lability; (b) Anxiousness; (c) Separation insecurity; (d) Depressivity; (e) Impulsivity; (f) Risk taking; and (g) Hostility. Research on the AMPD BPD diagnosis has shown adequate continuity with Section II BPD diagnosis (see [24] for a summary).

As works on the AMPD have continuously accumulated since its initial introduction in the DSM-5 [20], various conceptual and/or clinical arguments have emerged with respect to both Criterion A and Criterion B. For instance, there is an ongoing debate regarding the very nature of Criterion A and its conceptualization (see, e.g., [25-29]). Its four elements are believed to be closely interrelated, with dysfunction within one element being likely to impact functioning in others [22]; in consequence, some AMPD scholars have been adamant [26, 30] that Criterion A should be conceptualized as a single core dimension. Factor-analytic studies on Criterion A measures have not solved the debate, as they have yielded inconsistent results, ranging from a single dimension
(e.g., [30]) to two dimensions (e.g., [31]) to a second-order model consisting of the four Criterion A elements and an overarching personality pathology factor [32-33]. Other empirical results appear to support the unidimensionality claim. Indeed, very high intercorrelations between the four elements within Criterion A self-reports have been documented (see McCabe et al. [34]); furthermore, general severity appears to be a valid index that represents a strong predictor of current or future adjustment [35-36], can account for the comorbidity among Section II PD diagnoses [8], and appears to be sensitive to change [37]. Nonetheless, other researchers in the field have expressed their dissatisfaction with the simplification of Criterion A to a single core dimension and have challenged this notion, claiming that Criterion A elements have a meaningful independent value. These challenges are based on some conceptual grounds (e.g., the aforementioned requirement of impairments in two or more of the four Criterion A elements to diagnose a PD in the AMPD; [27-28, 32]). Other empirical results support the multidimensionality of Criterion A, e.g., the four elements having distinctive nomological networks and specific associations with multiple types of dysfunction (e.g., [32-33, 38]) and with specific daily patterns of oscillations in personality impairment [39]. There also appears to be meaningful interactions between Criterion A elements and Criterion B domains [40].

Additionally, the inclusion-exclusion of some Criterion B facets in the AMPD operationalization of BPD has been recently disputed; a meta-analytic study by Watters, Bagby, et al. [41] showed that most Criterion B trait facets (17 out of 25) are significantly associated with AMPD BPD, even if only seven were retained as defining facets by the DSM-5 Personality and Personality Disorder Work Group; furthermore, one of these seven defining facets (Risk taking) was not significantly associated with the diagnosis, while other facets with strong associations (most notably, Cognitive and perceptual dysregulation from the Psychoticism domain) were not retained. In another recent study, Mulay et al. [42] found that four facets (Anxiousness, Depressivity, Emotional lability, and Impulsivity) were identified by a group of expert clinicians as the key Criterion B indicators for borderline pathology, setting aside Hostility, Risk taking, and Separation insecurity as “weaker” indicators.

**The Present Study**

The aim of the present study is to use the AMPD conceptualization in order to identify subtypes of patients with borderline pathology using LPA. Previous LPA research, often based on DSM Section II criteria, has yielded mixed results in BPD subtyping, i.e., generating latent profiles mostly distinguishable by a gradient of severity (see, e.g., [9]) rather that by qualitative differences. Therefore, the LPA approach for subtyping patients with borderline pathology should be considered as a stringent evaluation of the capacity of the AMPD to generate clinically meaningful (e.g., for clinical orientation and treatment planning) and theoretically sound subgroups that would be qualitatively distinct from one another. By combining a gradient of severity (Criterion A) with a “stylistic” element (Criterion B), AMPD-based profiles might be able to generate qualitatively distinct profiles distributed along a severity continuum, which other approaches (e.g., based on DSM Section II criteria) could not readily achieve. As a secondary objective, the use of the four Criterion A elements and the seven Criterion B BPD trait facets as latent indicators should allow (a) to add to the current debate regarding the nature of Criterion A, by determining whether the four Criterion A elements are independently useful to uncover conceptually and clinically meaningful profiles of BPD patients; and (b) to contribute to ongoing efforts [41-42] aiming to identify which Criterion B trait facets are the most relevant and clinically useful in the description of BPD.

**Methods**

**Participants and Procedures**

Participants were selected from a database of French-Canadian outpatients recruited during the intake procedure at a psychiatric outpatient clinic specialized for PD assessment and treatment, in Quebec City, Canada. All were referred to the treatment center for an initial evaluation of suitability in the outpatient treatment program, following a reference by a psychiatrist or general physician for a suspected PD. Patients were first asked to complete a computerized self-report battery of questionnaires, and then took part in a clinical interview led by one of the team's psychologist, who produced a detailed evaluation report. In line with the objectives of the present study, a total of 211 patients[1] (133 women, $M_{age} = 33.66, SD = 10.97$) were selected based on the presence of at least moderate borderline pathology according to cutoffs recently proposed by Kleindienst et al. [43] for the short version of the Borderline Symptom List ([44]; see below). According to the proposed grades of borderline symptom severity, 26.5% had a moderate level of pathology (score 0.7–1.7; $n = 56$), 40.8% had a high level of pathology (1.7–2.7; $n = 86$), 25.1% had a very high level of pathology (2.7–3.5; $n = 53$), and 6.6% had an extremely high level of pathology (3.5–4; $n = 14$). Almost all participants
(97.2%) were of Caucasian-White ethnicity. Half (49.8%) were unemployed or on disability leave, while the others were full-time or part-time workers (34.6%), students (12.8%), or pensioners (2.8%). A majority (66.4%) were single, divorced, or widowed.

**Measures**

*Self-reported Variables*

The short version of the Borderline Symptom List (BSL-23 [44]; French validation by Nicastro et al. [45]) is a 23-item self-rating instrument assessing Borderline PD symptomatology. The instrument was used to guide participant selection, i.e., to identify prospective participants with at least moderate borderline pathology; it was also used as an external comparator between profiles. The BSL-23 covers DSM Section II BPD diagnostic criteria (e.g., affective instability, suicidality, transient psychotic symptoms) in addition to other affective experiences typical of borderline pathology (e.g., proneness to shame, self-criticism, loneliness, mistrustfulness, and helplessness), which should provide a large span of borderline pathology clinical presentations. The severity grades proposed by Kleindienst et al. [43] received robust empirical support from established assessments for psychopathology across three independent samples. Items are scored on a five-point Likert scale. The global score (MacDonald's Omega $\omega = .91$) was used in the present study.

The Self and Interpersonal Functioning Scale [32] is a 24-item self-report measure of the AMPD Criterion A. Items are rated on a five-point Likert scale (higher scores indicate higher dysfunction). It provides a global personality dysfunction score ($\omega = .80$) and four subscale scores: Identity ($\omega = .60$), Self-direction ($\omega = .68$), Empathy ($\omega = .66$), and Intimacy ($\omega = .68$). Previous research on the SIFS using CFA yielded a second-order model, with four elements organized into a higher-order personality dysfunction factor [32]; meaningful patterns of associations with related psychological constructs were found for the four SIFS subscales. Content validity analysis of the SIFS items also showed promising results, and the severity level assessed by its items makes it very well suited to study populations with greater psychopathology [46]. In the present study, the four elements were used as LPA indicators, while the global score was used to contrast profiles.

The short form of the Personality Inventory for DSM-5 (PID-5-SF [47]; French validation by Roskam et al. [48]) is an abbreviated 100-item self-report version, based on item-response theory, of the original 220-item PID-5 [49]. It covers 25 pathological personality facets, hierarchically organized into five domains: Negative Affectivity ($\omega = .72$), Detachment ($\omega = .84$), Antagonism ($\omega = .91$), Disinhibition ($\omega = .74$), and Psychoticism ($\omega = .85$). The official American Psychiatric Association scoring method (i.e., using only three facets per domain; see [50]) was used to determine domain scores. Items are rated on a four-point Likert scale. In the present study, the seven facets ($\omega$ range $= .74$ [Depressivity] to $= .89$ [Impulsivity]) that define BPD in the AMPD model were used as latent indicators, whereas the other 18 facets ($\omega$ range $= .66$ [Irresponsibility] to $= .91$ [Attention-seeking]) and the five domains were used in subsequent analyses to describe and contrast profiles.

Along with a sociodemographic questionnaire, other instruments were used to assess internalized as well as externalized pathological features commonly encountered in BPD, for profile characterization and comparison:

The 12-item short-form Buss-Perry Aggression Questionnaire (BPAQ-SF [51-52]; French validation by Genoud and Zimmerman [53]) covers four manifestations of aggression: Verbal ($\omega = .63$), Physical ($\omega = .86$), Anger ($\omega = .80$), and Hostility ($\omega = .70$). It also yields a global Trait Aggression score ($\omega = .86$). Items are scored on a seven-point scale.

The 28-item Interpersonal Reactivity Index–French Version (IRI [54]; French validation by Gilet et al. [55]) measures empathy and its components. Two of its subscales were used in the present study: Perspective taking (the ability to adopt others’ point of view; $\omega = .83$), which assesses the cognitive component, and Empathic concern (the motivation to care about others; $\omega = .80$), which focuses on the affective component. Items are scored on a seven-point scale.

The Barratt Impulsiveness Scale (BIS-11 [56]; French validation by Baylé et al. [57]) is a 30-item questionnaire designed to assess three components of impulsiveness: Attentional ($\omega = .60$), Motor ($\omega = .75$), and Nonplanning ($\omega = .69$). Items are scored on a four-point scale.

*File-Rated Variables*
Patient files were reviewed by two authors of the present study (DG, CS), to retrieve information pertaining to aggression, suicide attempts, and self-harm. Both raters have significant clinical experience with PD treatment (respectively 17 and 12 years). They both scored 20 randomly selected files for interrater agreement purposes (intra-class correlation [ICC] for aggression = 1.00; suicide attempts: ICC = .98, 95% CI [.94 – .99]; self-harm: ICC = .84, 95% CI [.60−.94]). All remaining files were then scored by only one of the authors (DG). Most files included at least one detailed evaluation report with information pertaining to the three target clinical indicators. Detailed evaluation reports were missing from 43 files. The reason for this absence was either (a) that prospective patients only completed the first portion of the intake procedure from the clinic (i.e., self-report computerized questionnaires); or (b) the evaluation report had not been completed or archived yet by the psychologist. For each indicator, raters used a three-point scale to assess antecedents of aggression, suicide attempts, and self-harm, inspired by the Historical Clinical Risk Management-20, Version 3 (58): no prior aggression/suicide attempts/self-harm (0); possible (1), corresponding to rare or minor acts (i.e., one or two minor acts of violence or self-harm that did not cause/intend to cause serious injury or that did not result in a hospitalization); or confirmed (2), corresponding to repeated or severe acting outs (i.e., at least three occurrences of minor acts, or one severe act causing/ intending to cause injuries, death, or that resulted in a hospitalization). Raters were allowed to score mid-points (i.e., 0.5 and 1.5) to maximize score discrimination.

Statistical Analyses

A Latent profile analysis was performed to determine the presence of distinct profiles of personality functioning using Mplus version 8.4[2] [59]. Latent profiles were evaluated using the four SIFS elements (Identity, Self-direction, Empathy, and Intimacy) and the seven AMPD BPD facets (Anxiousness, Depressivity, Emotional lability, Hostility, Impulsivity, Risk taking, Separation insecurity) as parameters. After data standardization, latent models for six different class solutions were evaluated. Optimal class solution was determined based on model entropy (with a score between .8 and 1.0 indicating adequate classification precision), Akaike (AIC) and Bayesian (BIC) Information Criterion, Sample-Size Adjusted-BIC (SABIC), and Lo-Mendell-Rubin Adjusted Likelihood Ratio Test (LMRT). Lower values for the AIC, BIC, and SABIC metrics are indicative of a better-fitting model, while a significant difference on the LMRT between consecutive class solutions (i.e., k vs. k − 1) suggests that the k class solution shows a better fit than the k − 1 solution [60]. Interpretability of the solution also factored in the decision for model selection.

In a second step, latent profiles from the retained solution were contrasted on sociodemographic variables, comorbid AMPD personality disorders, and on multiple variables meaningful for BPD (PID-5 domains and non-borderline facets; BPAQ-SF scales; IRI Perspective taking and Empathic concen; BIS-11 impulsiveness scales; and clinician-rated aggression, suicidality, and self-harm), using Kruskal-Wallis tests considering the sample size differences and that normality assumption was not met for multiple variables. For contingency tables involving categorical data, Chi-square analyses were used.

[1] An additional participant was excluded from further analyses, as he was deemed uncooperative upon careful examination of his scores (with a highly implausible score of 0 on all four Criterion A elements).

[2] All other analyses were executed with SPSS 26.0, with the exception of ω computation, which was done with JASP 0.13.1.

Results

Latent Profile Analysis

Fit and quality indices from the six tested profile solutions are presented in Table 1; Fig. 1 displays the six solutions, which allows to draw tentative designation of how profiles were formed from one solution to another. The four-profile solution was retained as the best fitting model with the current sample; LMTR was the most decisive factor, as results showed that the four-profile solution fit significantly better than the three-profile solution, and that neither the five- nor the six-profile solution were an improvement over the preceding solution. Entropy (.80) and interpretability for the four-profile solution were also adequate, although entropy figures for the five- and six-profile solutions were slightly higher. Results from the AIC, BIC, and SABIC values were less definitive (AIC and SABIC decreased across all six profile solutions; BIC figure from the three-profile solution was the best, although by a very narrow margin).
The four profiles were labeled: (a) **Borderline traits**, (b) **Low borderline pathology with Impulsivity**, (c) **Moderate borderline pathology with Identity problems and Depressivity**, and (d) **Severe borderline pathology** (see Fig. 2 for a summary of the four profiles). Classification probabilities for the most likely latent profile membership were respectively .85, .83, .93, and .95.

Participants from the **Borderline traits** profile \( n = 38 \) (18.0% of the sample) showed standardized scores below the total sample mean for all indicators but Anxiousness \((z\text{-score} = .16)\), whereas PID-5 Impulsivity \((-1.50)\) and SIFS Self-direction \((-1.14)\) standardized scores were remarkably low. The **Low borderline pathology with Impulsivity** profile \( n = 45 \) (21.3%) was also characterized by \(z\)-scores below the total sample mean for almost all indicators, except for Impulsivity \((-2.8)\). The **Moderate borderline pathology with identity problems and Depressivity** profile \( n = 51 \) (24.2%) showed scores around the total sample mean for most indicators, with relatively higher elevations for SIFS Identity \(.54\) and PID-5 Depressivity \(.37\), and lower elevations for PID-5 Impulsivity \(-.45\) and Hostility \(-.37\). Finally, the **Severe borderline pathology** profile \( n = 77 \) (36.5%) showed scores above the total sample mean on all indicators, the highest elevations being observed for PID-5 Impulsivity \(.86\), PID-5 Hostility \(.74\), SIFS Empathy \(.74\), and SIFS Self-direction \(.73\).

In a final step, presence of an AMPD BPD diagnosis was determined using DSM-5 AMPD guidelines [20]. No patient from the **Borderline traits** profile had an AMPD BPD diagnosis; the proportion of patients from the remaining profiles with the diagnosis were as follows: **Low borderline pathology with Impulsivity**: \( n = 18 \) (40.0%); **Moderate borderline pathology with identity problems and Depressivity**: \( n = 23 \) (45.1%); and **Severe borderline pathology**: \( n = 70 \) (90.9%); there was a significant difference in the number of patients with AMPD BPD between profiles, \( \chi^2 = 91.51, p < .001, d = 1.75 \).

**Discussion**

The present study aimed to identify subtypes of patients with borderline pathology based on the recent operationalization of BPD proposed in the DSM-5 Alternative Model for Personality Disorders. The four Criterion A elements and the seven Criterion B traits that define BPD in the AMPD were used as indicators in a Latent profile analysis. A four-profile solution was deemed optimal based on quantitative indices and interpretability.

A **Borderline traits** group (18.0% of the sample) was identified. No patient in that group would qualify for a formal BPD diagnosis according to AMPD algorithms. It showed the lowest levels of pathological functioning for the vast majority of latent indicators and external variables; such differences were most apparent with the **Moderate borderline pathology with Identity problems and Depressivity** and the **Severe borderline pathology** profiles. Of note, however, there were only few AMPD differences between this profile and the **Low borderline pathology with Impulsivity** profile—even though other external measures did show a number of significant and clinically meaningful differences, notably in self-reported aggression and impulsivity. PID-5 Impulsivity and Risk taking and SIFS Self-direction, which could all be considered indices of externalized pathology, were the three AMPD indicators allowing to discriminate between the two profiles with the lowest severity. This suggest that these components may be important to distinguish patients with, arguably, quite different treatment prognoses, as impulsivity [62–63] and aggression (e.g., [64]) have been identified as dropout predictors in previous research with PD patients.

A **Severe borderline pathology** profile, which was the largest profile in the sample (36.5%), was also identified. The vast majority (90.9%) had a diagnosable BPD according to AMPD algorithms. This profile showed evident markers of severe dysfunction and pathological functioning according to most AMPD indicators and external variables. Indicators of externalized pathology (aggression, impulsivity) and antagonism (hostility, poor empathy) were especially high within this profile, which suggests that patients corresponding to this profile may have the poorest and gloomiest treatment prognosis of all profiles (e.g., [64]). Of note, while most of these conclusions are based on self-reports, file-rated aggression was also significantly higher in contrast with two other profiles, mitigating concerns about their results being mainly driven by a response style bias (e.g., over-reporting, faking bad).

In between stand two profiles with low to moderate severity. The **Low borderline pathology with Impulsivity** profile (21.3% of the sample) included 40% of patients who would qualify for a formal BPD diagnosis in the AMPD framework. This is in sharp contrast with the **Borderline traits** profile (0%) but on par with the **Moderate borderline pathology with Identity problems and Depressivity** profile (45.1%). Patients from the **Low borderline pathology with Impulsivity** had lower indices of borderline pathology, level of personality pathology, and negative affectivity; however, their file-rated aggression levels were on par with the
most severe profile. These signs point to a more "externalized" profile with less general personality pathology (and, arguably, a better adjustment) but still with some potential for destructive acting outs (e.g., interpersonal aggression). On the other hand, the Moderate borderline pathology with Identity problems and Depressivity subgroup shows a profile more consistent with internalizing pathology, with indices of subjective distress and poorer mental health on AMPD indicators and external variables. This subgroup is akin to the Severely Disturbed-Internalizing profile identified in a previous research on BPD subtypes by Digre et al. [65]. From a conceptual standpoint, the combination of elements and traits which are the most distinctive in this profile highlight how Criterion A Identity appears to be closely intertwined with Criterion B Negative affectivity, as found in previous works (see, e.g., [34, 66]), which may be important in the discussion regarding how AMPD relates to other major influent models of personality (e.g., whether identity impairments can be understood as an extreme, maladaptive variant of neuroticism; see [34]).

Comparison of the present results with previous research that aimed to identify profiles of patients with borderline pathology is a bit challenging, as significant theoretical and methodological discrepancies can be observed between studies (e.g., choice of indicators for profile formation; theory- versus data-driven approaches; "variable-centered" versus "person-centered" approaches; [16]). Nonetheless, the internalizing-externalizing dimension appears to be important in distinguishing between two intermediate subgroups in terms of severity and dysfunction, one with higher externalizing features, the other with higher internalizing features. BPD is one of the very few diagnoses that would appear to belong to both an "internalized" (distress) and an “externalized” (antagonistic) spectra according to the recently developed Hierarchical Taxonomy of Pathology (HiTOP; [67, p. 462]), a dimensional nosology of mental disorders based on their observed covariation across empirical studies; the present result tend to support the validity of this distinction for BPD. Our results also bear some resemblance with those reported by Clark et al. [68] in the only study thus far, to our best knowledge, that used the AMPD framework to identify subgroups of outpatients (although not specifically borderline); they found evidence for three profiles, (a) a group with primarily interpersonal problems, (b) one with self-pathology and emotional dysregulation/negative affectivity; and (c) a more severe group with both types of problems. While there are evident resemblances between our Moderate borderline pathology with Identity problems and Depressivity profile and Clark et al.'s self-pathology/negative affectivity profile, and between the severe profiles found in both studies, there are also divergences between the two classifications, as impulsivity (in our study) and interpersonal pathology (in Clark et al.'s) appeared to have inconsistent value across studies to assign patients to profiles. Our results also echo findings from Johnson and Levy [18] who obtained, using Finite mixture modeling, an Unstable (with externalized problems) and an Empty (with internalized problems) subtype of subthreshold BPD in an undergraduate sample. Of note, while the authors from the aforementioned study did not retain the four-profile solution yielded by Latent class analysis as their optimal solution, it showed remarkable parallels with our own findings (their profiles were labeled Asymptomatic, Affective/impulsive, Empty/identity disturbed, and Highly symptomatic “BPD”).

Ultimately, the defining test of the validity of the profiles identified in the present analysis will rely on their clinical usefulness, i.e., whether they are clinically helpful for treatment planning and contracting; whether they provide relevant information on treatment trajectories, including response to treatment and dropout risk; and whether some treatment approaches might be better suited for one patient profile or another [16]. Clark et al. [68] have suggested that AMPD-based profiles can be useful for differential treatment planning based on transdiagnostic treatment targets (e.g., emotional dysregulation, interpersonal issues), a suggestion with which we concur. An intriguing avenue for future research based on our profiles would be to determine whether the Low borderline pathology with Impulsivity or the Moderate borderline pathology with Identity problems and Depressivity has a better treatment prognosis, and whether tailoring the treatment to these categories (e.g., focusing on impulsivity/disinhibition with the former and on identity/depressivity issues with the latter) might prove effective. While clinical wisdom and some previous research on treatment dropout (e.g., [62–64]) might suggest, at initial glance, that the Low borderline pathology with Impulsivity group has a poorer prognosis (based, e.g., on their levels of aggression and impulsivity), a previous study by Digre et al. [65] suggests otherwise, as patients from their Severely Disturbed-Internalizing profile did not show any therapeutic improvement. Furthermore, in a recent study conducted in a large sample of psychiatric patients, higher levels of AMPD Antagonism were associated with a lower dropout risk—although AMPD Disinhibition, for its part, was associated with a twofold increase in dropout risk [69]. Finally, Berghuis et al. [70] did not find any evidence that Antagonism and Disinhibition domains and facets played a role in dropout in an intensive clinical setting for the treatment of Cluster C and mild Cluster B PDs.
Our results tend to support the claim that the four Criterion A elements have a value on their own and that some important clinical information might be lost by reducing it to a single continuum of severity (e.g., in contrast with what is suggested by Morey [26, 30]). Indeed, SIFS Identity, Self-direction, and Empathy all played a significant role to discriminate between profiles. The present results, however, did not support theoretical propositions (e.g., [71]) that a lack of integration between functioning domains (e.g., low impairment in Self-direction coupled with severe impairment in Empathy) might be more indicative of increased severity in personality pathology; the most severe profile, on the contrary, showed an indiscriminate pattern of elevations on Criterion A elements (and on most Criterion B pathological traits).

The present results also add to the ongoing discussion regarding the optimal combination of Criterion B traits that are the most descriptive of borderline pathology. The PID-5 facets of Impulsivity and Depressivity were the most useful, as notably shown by their ability to discriminate between the two intermediate profiles; this is in line with experts’ judgement about which facets are the most important for BPD description in the AMPD operationalization [42], as the two were among the four facets identified as the most salient. Hostility and Risk taking also appeared to make some contribution to profile formation in the present study. Of note, Anxiousness did not contribute at all to the distinction between the profiles, despite being identified by PD scholars as one of the four most important BPD traits in the AMPD definition [42]. A “ceiling effect” might be in cause here, as all profiles showed very high elevations (range 2.13–2.49 out of 3.0) for this trait. This might suggest that Anxiousness has poor discriminant value in samples where severity of borderline pathology is moderate or greater, but that it is nonetheless a highly significant feature of the clinical presentation in all of these patients; perhaps its discriminant value is more obvious between BPD and other AMPD diagnoses, and not “within” BPD. One important caveat regarding the present work is that we used the seven AMPD traits as indicators even though meta-analytic data [41] and expert ratings [42] suggested that other combination of traits might offer a better representation of borderline pathology. While we believe that testing the actual AMPD model was the adequate initial step, future research should also investigate whether a more empirically-driven set of traits can generate meaningful, and perhaps even more clinically useful, profiles.

This study has noteworthy limitations. There are methodological choices that might limit the value of some of the present findings. Although the present study was based on a dimensional framework, some categorical decisions had to be made (an irony which is not lost on Clark et al. [68]); this required to select thresholds which, in retrospective, might not have been optimal. The most glaring example of this is the so-called “rational method” of ≥ 2 to determine the presence of a Criterion B trait (e.g., [61]). Using this threshold led to a somewhat surprising “floor effect” for a number of facets; this resulted in very low prevalence estimates for some other AMPD diagnoses, the most patent being Narcissistic PD, as this floor effect severely affected the Grandiosity facet (one of the two facets which must be present for the diagnosis to be given). Using a “rounded” approach for scores of 1.5 and above, which was implemented in other studies (e.g., [42]), might be indicated in future studies. The underwhelming comparisons between profiles for AMPD comorbidity should therefore be interpreted with this caveat in mind. Also, the external validity of conclusions is obviously contingent upon the extraction of the optimal number of profiles; it must be acknowledged that our retained four-profile solution was not completely unambiguous (as shown by other plausible alternatives; see Table 1 and Fig. 1). Some measures, including the SIFS elements used for profile formation, had suboptimal internal consistency figures in the present study according to usual guidelines (e.g., [72]). Data were mostly collected through self-report questionnaires, which comes with the risk of dishonesty and/or poor insight in some cases; however, evidence supporting the validity and usefulness of self-ratings of personality pathology is accumulating [73], as most patients seem to report considerable levels of personality pathology through self-report assessment (i.e., even higher than their therapist [74]). While file-rated aggression showed meaningful distinctions between profiles, the absence of significant results for file-rated suicidality and self-harm might point to a lack of sensitivity of the scales designed to rate them, to a lack of power in contrast with other indicators and variables (as there were a number of missing data), or to an “authentic”—albeit surprising—absence of difference between profiles on these critical outcome variables. Finally, future studies should include a wider coverage of indices of internalized pathology relevant to borderline pathology (e.g., trauma).

Conclusion

This study used a “person-centered” approach to tackle the issue of heterogeneity in patients with borderline pathology, using Latent profile analysis to generate subtypes based on the emerging Alternative DSM-5 Model for Personality Disorders.
operationalization of BPD. Four profiles were identified, which reflected both the "severity" and "style" components imbedded within Criterion A and B of the AMPD: they were mainly distinguished by a continuum of severity but also by some meaningful qualitative differences, especially at an intermediate level of severity, that may have important clinical implications, notably for treatment planning and contracting. Results also contribute to the healthy ongoing discussions regarding the optimal conceptualization of Criterion A, suggesting that its four constituent elements have independent value and that they can be useful to identify important differences in patients with borderline pathology. They also highlight that some Criterion B facets that define Borderline PD in the AMPD may be especially important to identify subgroups of patients, mainly Impulsivity and Depressivity. Replication, and perhaps more importantly demonstration of the clinical utility of the profiles identified in the current study (e.g., for treatment planning-contracting, for tailoring treatment to key pathological dimensions, and for prediction of treatment course and outcome), will be of utmost importance in determining the value of the present findings.

**Abbreviations**

AIC: Akaike Information Criterion

AMPD: Alternative DSM-5 Model for Personality Disorders

BIC: Bayesian Information Criterion

BIS-11: Barratt Impulsiveness Scale

BPAQ-SF: Buss-Perry Aggression Questionnaire Short Form

BPD: Borderline personality disorder

BSL-23: Borderline Symptom List-23

CFA: Confirmatory factor analysis

CI: Confidence interval

DSM: *Diagnostic and Statistical Manual of Mental Disorders*

EFA: Exploratory factor analysis

HiTOP: Hierarchical Taxonomy of Pathology

ICC: Intra-class correlation

IRI: Interpersonal Reactivity Index

LMRT: Lo-Mendell-Rubin Adjusted Likelihood Ratio Test

LPA: Latent profile analysis

PID-5-SF: Personality Inventory for DSM-5 Short Form

PD: Personality disorder(s)

ROC: Receiver Operating Characteristic

SABIC: Sample-Size Adjusted Bayesian Information Criterion

SIFS: Self and Interpersonal Functioning Scale

VIF: Variance inflation factor
Declarations

Ethics approval and consent to participate

This research was approved by the Comité d’éthique de la recherche sectoriel en neurosciences et santé mentale [Sectoral Research Ethics Committee in Neurosciences and Mental Health] of the CIUSSS-Capitale-Nationale [Integrated University Health and Social Services of the National Capital] in Quebec City, Canada. All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Written informed consent was obtained from all individual participants included in the study, and their access to treatment was not contingent upon their decision to participate in the study.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available based on the terms on which the study was approved by the ethics committee but are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interest.

Funding

This research was supported by a research grant for a project entitled “A computer-based assessment procedure to improve services accessibility and to establish profiles of clients with dysfunctional personality traits” from the Social Sciences and Humanities Research Council of Canada, and by a sponsorship from the Integrated University Health and Social Services of the National Capital, Quebec City, Canada.

Authors’ contributions

DG co-designed the study, carried out most of the statistical analyses, and wrote the initial draft of the manuscript. CS co-designed the study, wrote the grant applications and ethical consent forms, revised statistical analyses, and co-coordinated the recruitment of participants (acquisition of data). PL substantively revised the manuscript. MP made substantial contributions to acquisition of data. AC and JF substantively revised the manuscript. ML made substantial contributions to acquisition of data. MT co-coordinated the recruitment of participants (acquisition of data). All authors read and approved the final manuscript.

Acknowledgements

We gratefully thank Dr Evens Villeneuve, Renée-Claude Dompierre, Marie-Audrey Lavoie, and the clinical staff at the Centre de traitement le Faubourg Saint-Jean for their invaluable assistance in data collection. We also heartfully thank all patients who generously gave access to their data.

References

1. Gunderson JG, Fruzzetti A, Unruh B, Choi-Kain L. Competing theories of borderline personality disorder. J Pers Disord. 2018;32(2):148-67.
2. Sharp C. Calling for a unified redefinition of “borderlineness”: Commentary on Gunderson et al. J Pers Disord. 2018;32(2):168-74.
3. Gottesman II, Gould TD. The endophenotype concept in psychiatry: Etymology and strategic intentions. Am J Psychiatry. 2003;160(4):636-45.
4. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 3rd ed. Washington, DC: Author; 1980.

5. Kernberg OF, Caligor E. A psychoanalytic theory of personality disorders. In: Lenzenweger MF, Clarkin JF, editors. Major theories of personality disorders. 2nd ed. New York, NY: Guilford Press; 2005. p. 114-56.

6. Lingiardi V, McWilliams N, editors. Psychodynamic diagnostic manual: PDM-2. 2nd ed. New York, NY: Guilford Press; 2017.

7. Hallquist MN, Pilkinson PA. Refining the phenotype of borderline personality disorder: Diagnostic criteria and beyond. Personal Disord. 2012;3(3):228-46.

8. Sharp C, Wright AG, Fowler JC, Frueh BC, Allen JG, Oldham J, et al. The structure of personality pathology: Both general ('g') and specific ('s') factors? J Abnorm Psychol. 2015;124(2):387-98.

9. Bornovalova MA, Levy R, Gratz KL, Lejuez CW. Understanding the heterogeneity of BPD symptoms through latent class analysis: Initial results and clinical correlates among inner-city substance users. Psychol Assess. 2010;22(2):233-45.

10. Clifton A, Pilkinson PA. Evidence for a single latent class of Diagnostic and Statistical Manual of Mental Disorders borderline personality pathology. Compr Psychiatry. 2007;48(1):70-8.

11. Fossati A, Maffei C, Bagnato M, Donati D, Namia C, Novella L. Latent structure analysis of DSM-IV borderline personality disorder criteria. Compr Psychiatry. 1999;40(1):72-9.

12. Markon KE, Krueger RF. Information-theoretic latent distribution modeling: Distinguishing discrete and continuous latent variable models. Psychol Methods. 2006;11(3):228-43.

13. Critchfield KL, Clarkin JF, Levy KN, Kernberg OF. Organization of co-occurring Axis II features in borderline personality disorder. Br J Clin Psychol. 2008;47(2):185-200.

14. Lenzenweger MF, Clarkin JF, Yeomans FE, Kernberg OF, Levy KN. Refining the borderline personality disorder phenotype through finite mixture modeling: Implications for classification. J Pers Disord. 2008;22(4):313-31.

15. Salzer S, Streeck U, Jaeger U, Masuhr O, Warwas J, Leichsenring F, et al. Patterns of interpersonal problems in borderline personality disorder. J Nerv Ment Dis. 2013;201(2):94-8.

16. Smits ML, Feenstra DJ, Bales DL, de Vos J, Lucas Z, Verheul R, et al. Subtypes of borderline personality disorder patients: A cluster-analytic approach. Borderline Personal Disord Emot Dysregul. 2017;4:16.

17. Zittel Conklin C, Bradley R, Westen D. Affect regulation in borderline personality disorder. J Nerv Ment Dis. 2006;194(2):69-77.

18. Johnson BN, Levy KN. Identifying unstable and empty phenotypes of borderline personality through factor mixture modeling in a large nonclinical sample. Personal Disord. 2020;11(2):141-50.

19. Widiger TA, Trull TJ. Plate tectonics in the classification of personality disorder: Shifting to a dimensional model. Am Psychol. 2007;62(2):71-83.

20. American Psychiatric Association. Diagnostic and statistical manual of mental disorders. 5th ed. Washington, DC: Author, 2013.

21. Hopwood CJ, Kotov R, Krueger RF, Watson D, Widiger TA, Althoff RR, et al. The time has come for dimensional personality disorder diagnosis. Personal Ment Health. 2018;12(1):82-6.

22. Bender DS, Morey LC, Skodol AE. Toward a model for assessing level of personality functioning in DSM–5, part I: A review of theory and methods. J Pers Assess. 2011;93(4):332-46.

23. Krueger RF, Eaton NR, Derringer J, Markon KE, Watson D, Skodol AE. Personality in DSM–5: Helping delineate personality disorder content and framing the metastructure. J Pers Assess. 2011;93(4):325-31.

24. Zimmermann J, Kerber A, Rek K, Hopwood C, Krueger R. A brief but comprehensive review of research on the Alternative DSM-5 Model for Personality Disorders. Curr Psychiatry Rep. 2019;21(9):1-19.

25. Meehan KB, Siefert C, Sexton J, Huprich SK. Expanding the role of levels of personality functioning in personality disorder taxonomy: Commentary on “Criterion A of the AMPD in HiTOP”. J Pers Assess. 2019;101(4):367-73.

26. Morey LC. Thoughts on the assessment of the DSM–5 Alternative Model for Personality Disorders: Comment on Sleep et al. (2019). Psychol Assess. 2019;31(10):1192-9.
27. Sleep CE, Lynam DR, Widiger TA, Crowe ML, Miller JD. An evaluation of DSM–5 Section III personality disorder Criterion A (impairment) in accounting for psychopathology. *Psychol Assess*. 2019;31(10):1181-91.

28. Sleep CE, Lynam DR, Widiger TA, Crowe ML, Miller JD. Difficulties with the conceptualization and assessment of Criterion A in the DSM–5 Alternative Model of Personality Disorder: A reply to Morey (2019). *Psychol Assess*. 2019;31(10):1200-5.

29. Widiger TA, Bach B, Chmielewski M, Clark LA, DeYoung C, Hopwood CJ, et al. Criterion A of the AMPD in HiTOP. *J Pers Assess*. 2019;101(4):345-55.

30. Morey LC. Development and initial evaluation of a self-report form of the DSM-5 Level of Personality Functioning Scale. *Psychol Assess*. 2017;29(10):1302-8.

31. Hutsebaut J, Feenstra DJ, Kamphuis JH. Development and preliminary psychometric evaluation of a brief self-report questionnaire for the assessment of the DSM-5 Level of Personality Functioning Scale: The LPFS Brief Form (LPFS-BF). *Personal Disord*. 2016;7(2):192-7.

32. Siefert CJ, Sexton J, Meehan K, Nelson S, Haggerty G, Dauphin B, et al. Development of a short form for the DSM–5 Levels of Personality Functioning Questionnaire. *J Pers Assess*. 2020;102(4):516-26.

33. Gamache D, Savard C, Leclerc P, Côté A. Introducing a short self-report for the assessment of DSM–5 Level of Personality Functioning for Personality Disorders: The Self and Interpersonal Functioning Scale. *Personal Disord*. 2019;7(2):192-7.

34. McCabe GA, Oltmanns JR, Widiger TA. Criterion A scales: Convergent, discriminant, and structural relationships. *Assessment*. 2020.

35. Buer Christensen T, Eikenaes I, Hummelen B, Pedersen G, Nysæter TE, Bender DS, et al. Level of personality functioning as a predictor of psychosocial functioning-Concurrent validity of Criterion A. *Personal Disord*. 2020;11(2):79-90.

36. Hopwood CJ, Malone JC, Ansell EB, Sanislow CA, Grilo CM, McGlashan TH, et al. Personality assessment in DSM-5: Empirical support for rating severity, style, and traits. *J Pers Disord*. 2011;25(3):305-20.

37. Wright AGC, Hopwood CJ, Skodol AE, Morey LC. Longitudinal validation of general and specific structural features of personality pathology. *J Abnorm Psychol*. 2016;125(8):1120-34.

38. Dowgwillo EA, Roche MJ, Pincus AL. Examining the interpersonal nature of Criterion A of the DSM–5 Section III Alternative Model for Personality Disorders using bootstrapped confidence intervals for the interpersonal circumplex. *J Pers Assess*. 2018;100(6):581-92.

39. Roche MJ, Jacobson NC, Pincus AL. Using repeated daily assessments to uncover oscillating patterns and temporally-dynamic triggers in structures of psychopathology: Applications to the DSM-5 Alternative Model of Personality Disorders. *J Abnorm Psychol*. 2016;125(8):1090-102.

40. Sexton J, Hilton M, Benson S, Rosen A. Exploring Kernberg's model of personality functioning as a moderator of traits: Focus on DSM-5's Section III Alternative Model of Personality Disorder. *J Am Psychoanal Assoc*. 2019;67(6):1047-55.

41. Watters CA, Bagby RM, Sellbom M. Meta-analysis to derive an empirically based set of personality facet criteria for the Alternative DSM-5 Model for Personality Disorders. *Personal Disord*. 2019;10(2):97-104.

42. Mulay AL, Waugh MH, Fillauer JP, Bender DS, Bram A, Cain NM, et al. Borderline personality disorder diagnosis in a new key. *Borderline Personal Disord Emot Dysregul*. 2019;6:18.

43. Kleindienst N, Jungkunz M, Bohus M. A proposed severity classification of borderline symptoms using the Borderline Symptom List (BSL-23). *Borderline Personal Disord Emot Dysregul*. 2020;7(1).

44. Bohus M, Kleindienst N, Limberger MF, Stieglitz R-D, Domsalla M, Chapman AL, et al. The short version of the Borderline Symptom List (BSL-23): Development and initial data on psychometric properties. *Psychopathology*. 2009;42(1):32-9.

45. Nicastro R, Prada P, Kung A-L, Salamin V, Dayer A, Aubry J-M, et al. Psychometric properties of the French Borderline Symptom List, short form (BSL-23). *Borderline Personal Disord Emot Dysregul*. 2016;3:4.

46. Waugh MH, McClain CM, Mariotti EC, Mulay AL, DeVore EN, Lenger KA, et al. Comparative content analysis of self-report scales for level of personality functioning. *J Pers Assess*. 2020;1-13.

47. Maples JL, Carter NT, Few LR, Crego C, Gore WL, Samuel DB, et al. Testing whether the DSM-5 personality disorder trait model can be measured with a reduced set of items: An item response theory investigation of the Personality Inventory for DSM-5. *Psychol Assess*. 2015;27(4):1195-210.
48. Roskam I, Galdiolo S, Hansenne M, Massoudi K, Rossier J, Gicquel L, et al. The psychometric properties of the French version of the Personality Inventory for DSM-5. *PLoS One*. 2015;10(7).

49. 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;42(09):1879-90.

50. Watters CA, Sellbom M, Bagby RM. Comparing two domain scoring methods for the Personality Inventory for DSM–5. *Psychol Assess*. 2019;31(9):1125-34.

51. Bryant FB, Smith BD. Rening the architecture of aggression: A measurement model for the Buss-Perry Aggression Questionnaire. *J Res Pers*. 2001;35(2):138-67.

52. Buss AH, Perry M. The Aggression Questionnaire. *J Pers Soc Psychol*. 1992;63(3):452-9.

53. Genoud PA, Zimmermann G. French version of the 12-item Aggression Questionnaire: Preliminary psychometric properties. Poster presented at the 11th congress of the Swiss Psychological Society, Neuchâtel, Switzerland 2009.

54. Davis MH. Measuring individual differences in empathy: Evidence for a multidimensional approach. *J Pers Soc Psychol*. 1983;44:113–26.

55. Gilet A-L, Mella N, Studer J, Grühn D, Labouvie-Vief G. Assessing dispositional empathy in adults: A French validation of the Interpersonal Reactivity Index (IRI). *Can J Behav Sci*. 2013;45(1):42-8.

56. Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt Impulsiveness Scale. *J Clin Psychol*. 1995;51(6):768-74.

57. Baylé F, J., Lôo H, Caci H, Adés J, Chignon J-M, Gorwood P, et al. Structure factorielle de la traduction française de l’Échelle d’impulsivité de Barratt (BIS-10) [Factor structure of the French version of the Barratt Impulsiveness Scale-10]. *Can J Psychiatry*. 2000;45(2):156-65.

58. Douglas KS, Hart SD, Webster CD, Belfrage H. HCR-20V3 Historical, Clinical, Risk Management (Version 3): Professional guidelines for evaluating risk of violence: Mental Health, Law, and Policy Institute, Simon Fraser University; 2013.

59. Muthén LK, Muthén BO. Mplus. Statistical analysis with latent variables. Los Angeles, CA: Author; 2019.

60. Nylund KL, Asparouhov T, Muthén BO. Deciding on the number of classes in latent class analysis and growth mixture modeling: A Monte Carlo simulation study. *Struct Equ Modeling*. 2007;14(4):535-69.

61. Samuel DB, Hopwood CJ, Krueger RF, Thomas KM, Ruggero CJ. Comparing methods for scoring personality disorder types using maladaptive traits in DSM-5. *Assessment*. 2013;20(3):353-61.

62. Black DW, Allen J, St. John D, Pfohl B, McCormick B, Blum N. Predictors of response to Systems Training for Emotional Predictability and Problem Solving (STEPPS) for borderline personality disorder: An exploratory study. *Acta Psychiatr Scand*. 2009;120(1):53-61.

63. Cottraux J, Note ID, Boutitie F, Milliery M, Genouihlac V, Yao SN, et al. Cognitive therapy versus Rogerian supportive therapy in borderline personality disorder: Two-year follow-up of a controlled pilot study. *Psiychother Psychosom*. 2009;78(5):307-16.

64. Gamache D, Savard C, Lemelin S, Côté A, Villeneuve E. Premature psychotherapy termination in an outpatient treatment program for personality disorders: a survival analysis. *Compr Psychiatry*. 2018;80:14-23.

65. Digre EI, Reece J, Johnson AL, Thomas RA. Treatment response in subtypes of borderline personality disorder. *Personal Ment Health*. 2009;3(1):55-67.

66. Clark LA, Ro E. Three-pronged assessment and diagnosis of personality disorder and its consequences: Personality functioning, pathological traits, and psychosocial disability. *Personal Disord*. 2014;5(1):55-69.

67. 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;126(4):454-77.

68. Clark LA, Nuzum H, Shapiro JL, Vanderbleek EN, Daly EJ, Simons AD, et al. Personality profiles as potential targets for intervention: Identification and replication. *Personal Ment Health*. 2020;14(1):142-63.

69. Rodriguez-Seijas C, Morgan TA, Zimmerman M. Associations between maladaptive personality domains and premature termination in an acute clinical setting. *Personal Disord*. 2020;11(5):339-47.

70. Berghuis H, Bandell CC, Krueger RF. Predicting dropout using DSM–5 Section II personality disorders, and DSM–5 Section III personality traits, in a (day)clinical sample of personality disorders. *Personal Disord*. 2020.
71. Meehan KB, Clarkin JF, Lenzenweger MF. Conceptual models of borderline personality disorder, Part 1: Overview of prevailing and emergent models. *Psychiatr Clin North Am.* 2018;41(4):535-48.

72. Simms LJ, Watson D. The construct validation approach to personality scale construction. In Robins RW, Fraley RC, Krueger RF, editors. Handbook of research methods in personality psychology New York, NY: Guilford; 2007. p. 240-58.

73. Stanton K, Brown MFD, Bucher MA, Balling C, Samuel DB. Self-ratings of personality pathology: Insights regarding their validity and treatment utility. *Curr Treat Options Psychiatry.* 2019;6(4):299-311.

74. Samuel DB, Suzuki T, Bucher MA, Griffin SA. The agreement between clients’ and their therapists’ ratings of personality disorder traits. *J Consult Clin Psychol.* 2018;86(6):546-55.

**Tables**

**Table 1**

*Latent Profile Analysis for Class Solutions 1 to 6 Using the Four Self and Interpersonal Functioning Scale Elements and the Seven Borderline Traits from the DSM-5 Alternative Model for Personality Disorders as Latent Profile Indicators*

| Classes (k) | LMRT         | AIC     | BIC     | Sample-Size Adjusted BIC | Entropy |
|------------|--------------|---------|---------|--------------------------|---------|
| 1          | —            | 6328.252| 6401.993| 6332.283                 | —       |
| 2          | 264.706*     | 6083.425| 6197.388| 6089.655                 | .75     |
| 3          | 70.131       | 6036.201| 6190.387| 6044.630                 | .77     |
| 4          | **57.393**   | **6001.915** | **6196.323** | **6012.543** | **.80** |
| 5          | 38.713       | 5986.600| 6221.230| 5999.426                 | .83     |
| 6          | 41.678       | 5968.273| 6243.125| 5983.298                 | .81     |

*Note.* LMRT = Lo-Mendell-Rubin Adjusted Likelihood Ratio Test. AIC = Akaike Information Criteria. BIC = Bayesian Information Criteria. Retained solution in **bold**.

* p < .001. ** p < .0001.

**Table 2**

*Between-Group Comparisons on the 11 Latent Indicators from the Self and Interpersonal Functioning Scale and the Personality Inventory for DSM-5 Short Form (N = 211)*
| Latent profile indicators | Profile 1: Borderline traits *(n = 38)* | Profile 2: Low borderline pathology with Impulsivity *(n = 45)* | Profile 3: Moderate borderline pathology with Identity problems and Depressivity *(n = 51)* | Profile 4: Severe borderline pathology *(n = 77)* | Post-hoc comparisons (two-tailed, using Bonferroni’s correction for multiple comparisons) following a significant Kruskall-Wallis test |
|---------------------------|----------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------------------------------------|
| **SIFS Identity**         | M (Raw/z) 2.41/- .50 .50/.78 70.59 | S (Raw/z) 2.15/- .90 .51/.80 49.06 | MR 3.08/.54 .48/.61 139.42 | M (Raw/z) 3.03/.47 .50/.78 | 1 < 3***, 4*** 2 < 3***, 4*** |
| **SIFS Self-direction**   | M (Raw/z) 1.20/-1.14 .52/.62 36.17 | S (Raw/z) 1.94/-2.5 .57/.68 88.59 | MR 2.12-/4 .58/.69 104.87 | M (Raw/z) 2.76/.73 .69/.83 151.38 | 1 < 2**, 3***, 4*** 2 < 4*** 3 < 4*** |
| **SIFS Empathy**          | M (Raw/z) .82/- .83 .53/.68 58.22 | S (Raw/z) 1.14/- .43 .57/.73 80.20 | MR 1.40/- .09 .60/.77 101.95 | M (Raw/z) 2.05/.74 .72/.91 149.81 | 1 < 3**, 4*** 2 < 4*** 3 < 4*** |
| **SIFS Intimacy**         | M (Raw/z) 1.67/- .28 .87/1.01 87.30 | S (Raw/z) 1.59/- .37 .76/1.01 83.27 | MR 1.89/- .03 .75/.86 104.33 | M (Raw/z) 2.26/.40 .87/1.00 129.62 | 1 < 4** 2 < 4*** |
| **PID-5 Anxiousness**     | M (Raw/z) 2.49/.16 .59/.89 | S (Raw/z) 2.13/- .39 .79/1.20 | MR 2.44/.08 .62/.95 | 2.43/.07 .61/.93 | 8.33* n.s. |
| **PID-5 Depressivity**    | M (Raw/z) 1.49/- .39 .71/.96 | S (Raw/z) 1.26/- .7 .66/.89 | MR 2.06/.37 .55/.74 | 2.09/.42 .66/.89 | 47.55*** 1 < 3**, 4** 2 < 3***, 4*** |
| **PID-5 Emotional lability** | M (Raw/z) 1.88/- .43 .74/1.09 | S (Raw/z) 1.85/- .46 .71/1.04 | MR 2.25/.12 .62/.92 | 2.47/.45 .47/.69 | 34.52*** 1 < 4*** 2 < 3*, 4*** |
| PID-5 Hostility | M (Raw/z) | SD (Raw/z) | MR |
|----------------|-----------|------------|----|
|                | 1.01/-0.75| 0.68/0.87  | 61.95 |
|                | 1.49/-0.14| 0.64/0.82  | 95.58 |
|                | 1.30/-0.37| 0.60/0.76  | 80.76 |
|                | 2.18/0.74 | 0.62/0.80  | 150.99 |
|                | 73.16***  | 3 < 4***   |      |

| PID-5 Impulsivity | M (Raw/z) | SD (Raw/z) | MR |
|-------------------|-----------|------------|----|
|                   | 0.42/-1.50| 0.38/0.45  | 22.42 |
|                   | 1.91/0.28 | 0.47/0.56  | 120.76 |
|                   | 1.30/-0.45| 0.38/0.46  | 71.13 |
|                   | 2.40/0.86 | 0.41/0.49  | 161.72 |
|                   | 156.13*** | 1 < 2***, 3**, 4*** |

| PID-5 Risk taking | M (Raw/z) | SD (Raw/z) | MR |
|-------------------|-----------|------------|----|
|                   | 0.63/-0.85| 0.80/0.89  | 55.26 |
|                   | 1.48/0.11 | 0.89/0.99  | 112.77 |
|                   | 1.22/-0.18| 0.85/0.95  | 95.49 |
|                   | 1.78/0.44 | 0.70/0.78  | 134.05 |
|                   | 44.90***  | 1 < 2***, 3*, 4*** |

| PID-5 Separation insecurity | M (Raw/z) | SD (Raw/z) | MR |
|-----------------------------|-----------|------------|----|
|                             | 1.39/-0.40| 0.83/0.98  | 81.03 |
|                             | 1.52/-0.25| 0.81/0.94  | 89.32 |
|                             | 1.86/0.16 | 0.71/0.83  | 113.28 |
|                             | 1.95/0.26 | 0.89/1.05  | 123.25 |
|                             | 16.73**   | 2 < 4*     |      |

Note. SIFS = Self and Interpersonal Functioning Scale; MR = Mean Rank; ID = Identity; SD = Self-direction; EMP = Empathy; INT = Intimacy; PID-5 = Personality Inventory for DSM-5 Short Form. Higher scores indicate more severe dysfunction. Mean rank not shown in the absence of significant post-hoc comparisons.

* p < .05. ** p < .01. *** p < .001.

Table 3

Between-Profile Comparisons on the Personality Inventory for DSM-5 Domains and Non-Borderline Facets (N = 211)
| PID-5 Domains and non-borderline facets | Profile 1: Borderline traits $(n = 38)$ | Profile 2: Low borderline pathology with Impulsivity $(n = 45)$ | Profile 3: Moderate borderline pathology with Identity problems and Depressivity $(n = 51)$ | Profile 4: Severe borderline pathology $(n = 77)$ | $H$ | Post-hoc comparisons (two-tailed, using Bonferroni’s correction for multiple comparisons) following a significant Kruskall-Wallis test |
| --- | --- | --- | --- | --- | --- | --- |
| **Domains** | | | | | | |
| **Negative Affectivity** | $M$ (Raw/z) 1.92/-.36 | 1.83/-.54 | 2.18/.17 | 2.28/.38 | 34.50*** | 1 < 4*** 2 < 3**, 4*** |
| | $SD$ (Raw/z) .47/.96 | .47/.97 | .45/.92 | .44/.90 | | |
| | MR 81.16 | 72.34 | 115.68 | 131.37 | | |
| **Detachment** | $M$ (Raw/z) 1.44/-21 | 1.39/-29 | 1.62/.10 | 1.68/.20 | 8.69* | n.s. |
| | $SD$ (Raw/z) .63/1.06 | .61/1.02 | .50/.85 | .60/1.01 | | |
| **Antagonism** | $M$ (Raw/z) .32/-64 | .70/-05 | .58/-24 | 1.07/.51 | 37.44*** | 1 < 2*, 4*** 2 < 4* 3 < 4*** |
| | $SD$ (Raw/z) .30/.47 | .61/.94 | .54/.84 | .70/1.09 | | |
| | MR 65.67 | 104.78 | 92.35 | 135.66 | | |
| **Disinhibition** | $M$ (Raw/z) .92/-1.26 | 1.69/.08 | 1.49/-27 | 2.07/.75 | 105.79*** | 1 < 2***, 3**, 4*** 2 < 4*** 3 < 4*** |
| | $SD$ (Raw/z) .46/.80 | .39/.68 | .39/.69 | .39/.67 | | |
| | MR 34.72 | 108.99 | 84.31 | 153.79 | | |
| **Psychoticism** | $M$ (Raw/z) .67/-50 | .94/-04 | .92/-08 | 1.17/.33 | 20.22*** | 1 < 4*** |
| | $SD$ (Raw/z) .49/.81 | .72/1.19 | .51/.85 | .58/.95 | | |
| | MR 78.97 | 100.21 | 103.12 | 127.10 | | |
| **Non-borderline facets** | | | | | | |
| **Anhedonia** | $M$ (Raw/z) 1.75/-35 | 1.66/-48 | 2.12/.17 | 2.24/.34 | 23.36*** | 1 < 4** 2 < 3*, 4*** |
|                          | MR    | 85.04 | 79.01 | 114.02 | 126.80 |
|--------------------------|-------|-------|-------|--------|--------|
| **Attention-Seeking**    |       |       |       |        |        |
| M (Raw/z)                | .85/-.56 | 1.33/-06 | 1.32/-.06 | 1.73/-.36 | 21.45*** | 1 < 4*** |
| SD (Raw/z)               | .85/.87 | .96/.98 | .84/.86 | 1.00/1.03 |        |        |
| MR                       | 71.78 | 102.98 | 102.53 | 126.95 |        |        |
| **Callousness**          |       |       |       |        |        |
| M (Raw/z)                | .26/-.52 | .56/-.10 | .37/-.37 | 1.04/-.56 | 48.85*** | 1 < 4*** |
| SD (Raw/z)               | .53/.74 | .68/.95 | .49/.69 | .75/1.05 | 2 < 4**  |        |
| MR                       | 69.71 | 100.68 | 83.94 | 141.63 | 3 < 4*** |        |
| **Cog./percept.dysregulation** |       |       |       |        |        |
| M (Raw/z)                | .33/-.39 | .61/.06 | .57/-.00 | .68/-.16 | 8.12*   | 1 < 4*  |
| SD (Raw/z)               | .47/.73 | .70/1.10 | .54/.84 | .71/1.11 |        |        |
| MR                       | 81.89 | 106.46 | 111.36 | 114.08 |        |        |
| **Deceitfulness**        |       |       |       |        |        |
| M (Raw/z)                | .45/-.64 | .89/-.03 | .78/-.24 | 1.29/-.49 | 37.87*** | 1 < 2**, 4*** |
| SD (Raw/z)               | .45/.47 | .74/.96 | .74/.80 | .91/1.09 | 3 < 4*** |        |
| MR                       | 64.90 | 105.99 | 94.05 | 134.65 |        |        |
| **Distractibility**      |       |       |       |        |        |
| M (Raw/z)                | 1.71/-.50 | 2.11/00 | 2.12/02 | 2.29/24 | 13.76** | 1 < 4*  |
| SD (Raw/z)               | .89/1.14 | .61/.78 | .82/1.05 | .73/93  |        |        |
| MR                       | 85.21 | 109.39 | 98.89 | 118.99 |        |        |
| **Eccentricity**         |       |       |       |        |        |
| M (Raw/z)                | 1.13/-.46 | 1.32/-.23 | 1.48/-.04 | 1.95/-.38 | 21.00*** | 1 < 4*** |
| SD (Raw/z)               | .76/.91 | .96/1.16 | .80/.96 | .89/83  | 2 < 4**  |        |
| MR                       | 78.59 | 92.88 | 103.20 | 129.05 |        |        |
| **Grandiosity**          |       |       |       |        |        |
| M (Raw/z)                | .24/-.39 | .46/-.05 | .36/-.20 | .73/-.36 | 12.76** | 1 < 4*** |
| SD (Raw/z)               | .38/.59 | .68/1.05 | .50/76  | .76/1.16 | 3 < 4*  |        |
| MR                       | 87.84 | 102.37 | 95.83 | 123.82 |        |        |
| **Intimacy avoidance**   | M     | 1.11/-.06 | 1.13/-.03 | 1.24/08  | 1.15/-.01 | 0.67 n.s. |

Page 19/24
|                          | $M$ (Raw/z) | $SD$ (Raw/z) | $MR$ |
|--------------------------|-------------|--------------|------|
| **Irresponsibility**    |             |              |      |
| $SD$ (Raw/z)             | .93/1.03    | .89/.99      | .88/.98 | .92/1.02 |
| $SD$ (Raw/z)             | .63/-69     | 1.04/-14     | 1.04/-14 | 1.52/.51 | 37.96*** | 1 < 4*** |
| $SD$ (Raw/z)             | .69/.92     | .74/.99      | .74/.99 | .74/.99 |
| MR                       |             |              |      |
| **Manipulativeness**     |             |              |      |
| $SD$ (Raw/z)             | .45/-58     | .89/-05      | .79/-18 | 1.29/.43 | 26.20*** | 1 < 4*** |
| $SD$ (Raw/z)             | .45/.55     | .74/.90      | .74/.90 | .74/.90 | .91/1.12 |
| MR                       |             |              |      |
| **Perseveration**        |             |              |      |
| $SD$ (Raw/z)             | 1.34/-54    | 1.49/-31     | 1.84/.18 | 1.94/.33 | 27.53*** | 1 < 3**,4*** |
| $SD$ (Raw/z)             | .65/.93     | .65/.93      | .63/.90 | .63/.90 | .69/.99 |
| MR                       |             |              |      |
| **Restricted affectivity**|             |              |      |
| $SD$ (Raw/z)             | .82/-35     | 1.11/.03     | 1.00/-12 | 1.26/.23 | 8.82*    | 1 < 4* |
| $SD$ (Raw/z)             | .75/.99     | .69/.91      | .68/.89 | .68/.89 | .81/1.07 |
| MR                       |             |              |      |
| **Rigid perfectionism**  |             |              |      |
| $SD$ (Raw/z)             | 1.79/.03    | 1.56/-26     | 1.80/.05 | 1.85/.10 | 4.83     | n.s. |
| $SD$ (Raw/z)             | .78/.97     | .76/.94      | .80/.99 | .80/.99 | .85/1.05 |
| MR                       |             |              |      |
| **Submissiveness**       |             |              |      |
| $SD$ (Raw/z)             | 1.43/-08    | 1.25/-30     | 1.90/.53 | 1.38/-13 | 17.66**  | 1 < 3* |
| $SD$ (Raw/z)             | .73/.94     | .74/.95      | .74/.95 | .74/.95 | .76/.97 |
| MR                       |             |              |      |
| **Suspiciousness**       |             |              |      |
| $SD$ (Raw/z)             | 1.15/-31    | 1.18/-28     | 1.25/-18 | 1.71/.44 | 23.08*** | 1 < 4** |
| $SD$ (Raw/z)             | .61/.83     | .75/.102     | .64/.87 | .64/.87 | .73/1.00 |
| MR                       |             |              |      |
| Unusual beliefs and experiences | $M_{\text{Raw/}}$   | .55/-.39 | .91/.11 | .72/-1.15 | 1.00/.23 | 11.19* | 1 < 4** |
|--------------------------------|---------------------|----------|---------|-----------|----------|--------|--------|
|                                | $SD_{\text{Raw/}}$ | .64/.87  | .78/.57 | .58/.80   | .78/1.07 |        |        |
|                                | MR                  | 80.66    | 111.49  | 100.17    | 119.16   |        |        |

| Withdrawal | $M_{\text{Raw/}}$   | 1.45/-.09 | 1.37/-.21 | 1.51/-.01 | 1.65/1.17 | 4.41  | n.s.  |
|------------|---------------------|-----------|-----------|-----------|-----------|-------|-------|
|            | $SD_{\text{Raw/}}$ | .78/1.05  | .79/1.06  | .63/.85   | .76/1.02  |       |       |

*Note.* PID-5 = Personality Inventory for DSM-5 Short Form; MR = Mean rank; Cog./percept.dysregulation = Cognitive and perceptual dysregulation. Higher scores indicate more severe dysfunction. Mean rank not shown in the absence of significant post-hoc comparisons.

* $p < .05$. ** $p < .01$. *** $p < .001$.

**Table 4**

*Between-Profile Comparisons on Sociodemographic, Diagnostic, and Clinical Variables (N = 211)*
| Sociodemographic, diagnostic, and clinical variables | Profile 1: Borderline traits ($n = 38$) | Profile 2: Low borderline pathology with Impulsivity ($n = 45$) | Profile 3: Moderate borderline pathology with Identity problems and Depressivity ($n = 51$) | Profile 4: Severe borderline pathology ($n = 77$) | $H$ or $\chi^2$ | Post-hoc comparisons (two-tailed, using Bonferroni's correction for multiple comparisons) following a significant Kruskall-Wallis test, or Fisher Exact Test for $\chi^2$

| Age | $M$ (Raw/z) | 36.84/.29 | 34.84/.11 | 33.73/.01 | 31.36/.21 | 8.72 | n.s. |
| SD (Raw/z) | 11.33/1.03 | 10.69/.97 | 11.68/1.07 | 10.15/.92 | |

| Gender | Female | 24 | 28 | 30 | 51 | .74 | n.s. |
| | Male | 14 | 17 | 21 | 26 | |

| Marital status | Single | 22 | 29 | 34 | 55 | 2.18 | n.s. |
| | Married/in a relationship | 16 | 16 | 17 | 22 | |

| Occupational status | Unemployed | 20 | 21 | 22 | 42 | 1.60 | n.s. |
| | Work/school | 18 | 22 | 27 | 33 | |
| | Pensioned | 0 | 2 | 2 | 2 | |

| Comorbid ASPD (AMPD) | Yes | 0 | 1 | 0 | 9 | 13.30** | 1 < 4* |
| | No | 38 | 44 | 51 | 68 | 3 < 4* |

| Comorbid AVPD (AMPD) | Yes | 7 | 11 | 17 | 28 | 4.85 | n.s. |
| | No | 31 | 34 | 34 | 49 | |

| Comorbid NPD (AMPD) | Yes | 0 | 3 | 0 | 5 | 6.06 | n.s. |
| | No | 38 | 42 | 51 | 72 | |

| Comorbid OCPD (AMPD) | Yes | 0 | 2 | 2 | 10 | 12.70** | 1 < 4* |
| | No | 38 | 43 | 49 | 67 | |

| Comorbid SZPD (AMPD) | Yes | 2 | 4 | 5 | 20 | 8.67* | 1 < 4* |
| | No | 36 | 41 | 46 | 57 | 2 < 4* |
| | | | | | | 3 < 4* |

| BSL-23 | $M$ (Raw/z) | 1.68/.77 | 1.95/.43 | 2.60/.40 | 2.58/.37 | 51.34*** | 1 < 3***,4*** |
| | SD (Raw/z) | .54/.68 | .77/.98 | .56/.71 | .79/1.00 | 2 < 3***,4*** |
|                          | MR     | 57.84 | 79.53 | 131.63 | 128.26 |
|--------------------------|--------|-------|-------|--------|--------|
| SIFS Global Score        |        |       |       |        |        |
|                          | M (Raw/z) | 1.56/-1.06 | 1.74/-0.69 | 2.17/1.15 | 2.51/0.83 | 124.21*** | 1 < 3***,4*** |
|                          | SD (Raw/z) | .36/.72 | .30/.59 | .29/.58 | .37/.73 |        | 2 < 3***,4*** |
|                          | MR      | 42.26 | 59.50 | 116.57 | 157.63 |        | 3 < 4** |
| Number of BPD AMPD borderline traits |        |       |       |        |        |
|                          | M (Raw/z) | 2.34/-1.00 | 3.24/-0.37 | 3.41/-0.26 | 5.06/0.88 | 108.81*** | 1 < 2**, 3**,4*** |
|                          | SD (Raw/z) | .53/.37 | 1.11/.77 | 1.04/.72 | 1.12/.77 |        | 2 < 4*** |
|                          | MR      | 43.20 | 84.80 | 92.76 | 158.15 |        | 3 < 4*** |
| IRI Perspective-takinga |        |       |       |        |        |
|                          | M (Raw/z) | 5.21/.52 | 4.81/0.23 | 4.70/0.15 | 3.67/0.59 | 19.60*** | 1 > 4*** |
|                          | SD (Raw/z) | .85/.61 | .83/.60 | 1.36/.99 | 1.57/1.13 |        | 2 > 4* |
|                          | MR      | 70.85 | 58.95 | 57.11 | 36.10 |        | 3 > 4* |
| IRI Empathic concerna   |        |       |       |        |        |
|                          | M (Raw/z) | 5.70/.22 | 5.21/.21 | 5.88/.38 | 5.08/-.33 | 9.61* | 3 > 4* |
|                          | SD (Raw/z) | .95/.85 | 1.08/.97 | .90/.81 | 1.27/1.13 |        |        |
|                          | MR      | 59.83 | 46.17 | 65.36 | 44.04 |        |        |
| BPAQ-SF Physical         |        |       |       |        |        |
|                          | M (Raw/z) | 1.58/-0.68 | 2.83/.07 | 2.03/-0.41 | 3.57/0.57 | 52.87*** | 1 < 2**, 4*** |
|                          | SD (Raw/z) | .85/.51 | 1.50/.89 | 1.28/.76 | 1.77/1.06 |        | 3 < 4*** |
|                          | MR      | 61.93 | 113.76 | 81.45 | 139.67 |        |        |
| BPAQ-SF Verbal           |        |       |       |        |        |
|                          | M (Raw/z) | 2.32/-0.59 | 3.03/-0.00 | 2.49/-0.45 | 3.76/0.59 | 49.42*** | 1 < 2*, 4*** |
|                          | SD (Raw/z) | 1.12/.91 | .89/.72 | 1.03/.83 | 1.20/.97 |        | 2 < 4*** |
|                          | MR      | 68.64 | 109.09 | 78.89 | 140.58 |        | 3 < 4*** |
| BPAQ-SF Anger            |        |       |       |        |        |
|                          | M (Raw/z) | 2.74/-0.91 | 3.80/-0.16 | 3.71/-0.22 | 4.98/0.68 | 72.44*** | 1 < 2*, 3*, 4*** |
|                          | SD (Raw/z) | 1.22/.87 | 1.33/.94 | 1.19/.84 | .99/.70 |        | 2 < 4*** |
|                          | MR      | 53.78 | 94.94 | 89.77 | 149.23 |        | 3 < 4*** |
| BPAQ-SF Hostility        |        |       |       |        |        |
|                          | M (Raw/z) | 3.32/-0.64 | 3.51/-0.48 | 4.10/-0.03 | 4.96/.62 | 57.02*** | 1 < 3*, 4*** |
|                          | SD (Raw/z) | 1.28/.98 | 1.15/.88 | 1.28/.98 | .92/.70 |        | 2 < 4*** |
|                          | MR      | 68.49 | 74.59 | 103.86 | 144.29 |        | 3 < 4** |
| BPAQ-SF Trait            |        |       |       |        |        |
|                          | M (Raw/z) | 2.49/-0.91 | 3.29/-0.17 | 3.08/-0.36 | 4.34/0.79 | 88.20*** | 1 < 2**, 4*** |
|                          | SD (Raw/z) | .75/.69 | .80/.74 | .87/.80 | .88/.81 |        | 2 < 4*** |
|                          | MR      | 49.98 | 96.72 | 83.33 | 154.16 |        | 3 < 4*** |
|                          | M (Raw/z)  | SD (Raw/z) | MR     | 86.70*** | 1 < 2***, 3***, 4*** |
|--------------------------|------------|------------|--------|----------|----------------------|
| BIS-11 Motor             | 1.85/-1.05 | 2.35/-1.11 | 2.31/-0.19 | 2.79/.71 |                      |
|                          | .30/.56    | .44/.83    | .47/.87 | .42/.79  |                      |
|                          | 39.71      | 98.17      | 96.21  | 149.78   |                      |
|                          | 2.35/-0.11 | 2.31/-0.19 | 2.79/.71 | 86.70*** | 1 < 2***, 3***, 4*** |
|                          | .30/.56    | .44/.83    | .47/.87 | .42/.79  |                      |
|                          | 39.71      | 98.17      | 96.21  | 149.78   |                      |

|                          | 2.26/-0.77 | 2.49/-0.31 | 2.63/-0.01 | 2.92/.57 | 51.94*** | 1 < 3**, 4*** |
|                          | .42/.86    | .50/1.02   | .42/.86   | .40/.80  |          | 2 < 4***    |
|                          | 60.93      | 85.13      | 104.80   | 141.23   | 3 < 4**   |
| BIS-11 Attentional       |            |            |          |          |          |             |
|                          | .226/-0.75 | 2.64/.04   | 2.53/-0.17 | 2.85/.45 | 37.02*** | 1 < 2**, 4*** |
|                          | .50/.98    | .42/.82    | .44/.87   | .48/.95  |          | 3 < 4**    |
|                          | 61.90      | 107.40     | 96.15    | 133.52   | 3 < 4**  |
| BIS-11 Nonplanning       |            |            |          |          |          |             |
|                          | .36/-0.38  | .85/.21    | .41/-0.32 | .92/.30  | 16.92**  | 1 < 4**    |
| File-rated aggressionb   | .66/.82    | .93/1.15   | .69/.85   | .80/.98  | 3 < 4**  |
|                          |            |            |          |          |          |             |
|                          | .58/-0.29  | .69/-1.14  | .86/.07   | .97/.20  | 5.56     | n.s.       |
| File-rated suicide attemptsb | .76/.94 | .82/1.02  | .74/.92   | .85/1.05 |          |            |
|                          |            |            |          |          |          |             |
|                          | .55/-1.14  | .60/-0.07  | .68/.03   | .73/.10  | 1.25     | n.s.       |
| File-rated self-harmb    | .67/.90    | .72/.96    | .76/1.03  | .79/1.06 |          |            |

Note. a Higher scores denote better functioning. For all other variables, higher scores denote more severe pathology. b n = 166.
ASPD = Antisocial Personality disorder; AVPD = Avoidant Personality disorder; NPD = Narcissistic Personality disorder; OCPD = Obsessive-compulsive Personality disorder; SZPD = Schizotypal Personality disorder; AMPD = Alternative DSM-5 Model for Personality Disorders; BPD = Borderline personality disorder; SIFS = Self and Interpersonal Functioning Scale; BSL-23 = 23-item Borderline Symptoms List; IRI = Interpersonal Reactivity Index; BPAQ-SF = 12-item version of the Buss-Perry Aggression Questionnaire; BIS-11 = Barratt Impulsiveness Scale; MR = Mean rank; n.s. = Kruskall-Wallis or Chi-square test not significant. Mean rank not shown in the absence of significant post-hoc comparisons.

* p < .05. ** p < .01. *** p < .001.