Prevalence of the alternative model of personality disorders diagnoses in populational and at-risk samples, gender and age groups comparisons, and normative data for the LPFS-SR and PID-5

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Abstract

The Alternative Model of Personality Disorders (AMPD), introduced in Section III of the DSM-5 (APA, 2013), was proposed as a new operationalization of personality disorders (PD) aiming to overcome the several limitations of the traditional symptom-based model (Waugh et al., 2017; Zimmerman et al., 2019). In the AMPD, PD are defined by two dimensional criteria (the level of personality functioning and maladaptive personality traits), but as a hybrid model, it also allows for categorical assessment of PD (i.e. “hybrid types”) to facilitate continuity with clinical practice. The present study aimed to provide normative data for two widely used instruments assessing Criterion A (Level of Personality Functioning Scale – Self-Report; Morey, 2017) and B (Personality Inventory for DSM-5; Krueger et al., 2012) in a large populational French-Canadian sample. Regarding the categorical assessment, Gamache et al. (2022) recently tested scoring approaches for extracting the PD hybrid types from dimensional measures of the AMPD. In the present study, these approaches were used to estimate prevalence rates for these PD hybrid types in two samples. In the populational sample, results showed that prevalence rates varied from 0.2% (antisocial PD) to 3.0% (trait-specified PD), with an overall prevalence of 5.9% to 6.1% for any PD hybrid type. Prevalence was higher in men than in women in the populational sample, but the contrary was observed in the at-risk sample. Prevalence was higher in younger adults than in middle-aged and older adults.

Keywords: Personality Disorders; Alternative Model of Personality Disorders; Prevalence; Epidemiology; Normative data; Assessment.
Prevalence of the Alternative Model of Personality Disorders diagnoses in populational and at-risk samples, gender and age groups comparisons, and normative data for the LPFS-SR and PID-5

Introduction

Almost a decade ago, a new operationalization of personality disorders (PD) was introduced in Section III (Emerging Measures and Models) of the DSM-5 (APA, 2013), labelled the Alternative Model of Personality Disorders (AMPD), aiming to overcome the limitations of the traditional symptom-based model (Waugh et al., 2017; Zimmerman et al., 2019). In this alternative model, PD are defined by two complementary components assessed as dimensional constructs: the level of personality functioning (Criterion A) and a set of maladaptive personality traits that characterize the specific PD presentation (Criterion B) (Morey, 2019; Zimmerman et al. 2019). Despite being primarily a dimensional model, to facilitate continuity with clinical practice, the AMPD also allows for categorical assessment of PD (i.e. “PD hybrid types”).

Criterion A is conceptualized as a generalized severity continuum of personality maladaptation that captures the core impairments in self and interpersonal functioning that are common to all PD, and that distinguish personality pathology from healthy personality (APA, 2013; Bender et al., 2011; Sleep et al., 2019; Waugh et al., 2017). Although the level of personality functioning can be assessed as a single broad dimension, it is further subdivided in two dimensions, which are in turn each separated into two domains. The Self-functioning dimension includes the domains Identity integration and Self-directedness, while the Interpersonal functioning dimension’s domains are the capacity for Empathy and Intimacy (APA, 2013).

Criterion B is operationalized as a set of 25 maladaptive personality traits (see Table 2) that are grouped into five domains (Negative affectivity, Detachment, Antagonism, Disinhibition,
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and Psychoticism; Krueger et al., 2012) similar to the dimensions of the Big Five model of personality (Widiger & McCabe, 2020). These traits “represent the different stylistic differences in the expression of personality disorders” (Zimmerman et al., 2019, p.91). For example, the Antisocial PD hybrid type is characterized by manipulativeness, callousness, deceitfulness, hostility, risk taking, impulsivity, and irresponsibility traits (APA, 2013).

68 Dimensional assessment of the AMPD

Two types of assessment instruments were developed to help clinicians and researchers in assessing the AMPD: structured interviews (e.g. SCID-5-AMPD; First et al., 2018) and self-report questionnaires (e.g. PID-5; Krueger et al., 2012). Perhaps the most widely used method, at least by researchers, is self-report questionnaires, which is also the most effective method for gathering prevalence data for PD in large samples. Withal, an inherent challenge to the assessment of AMPD is making clinical decisions on the presence of personality functioning impairment and maladaptive traits using dimensional assessment instruments (Miller et al., 2022). Thus, normative data for self-report instruments are required for clinical assessment of PD using a dimensional approach. However, few studies provided normative data for Criteria A and B instruments using large populational samples. Such samples are necessary to draw valid inferences from instruments scores, as well as to provide valid prevalence estimates. In this line of thought, Bach et al. (2020) recently called for research investigating AMPD prevalence in large populational samples.

Regarding Criterion A, while normative data from populational samples are available for the LPFS-BF 2.0 (Weekers et al., 2022; Le Corff et al., 2022; Natoli et al., 2022), which is a short 12-item screening instrument, no such data are available for longer instruments allowing a more in-depth assessment, such as the LPFS-SR (Morey, 2017). As for Criterion B, US normative data were provided for the APA-sponsored PID-5 (Krueger et al., 2012), albeit from a relatively small (n = 264) sample of adults with a posteriori weighting on sociodemographic characteristics.
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Normative data from psychiatric and community samples were also recently published (Miller et al., 2022). Additionally, normative data for the shorter 100-item version were drawn from a college student sample (PID-5-FBF; Maples et al., 2015) and as such may not generalize to the general population since personality pathology is known to be higher in college students (Meaney et al., 2016). Consequently, this study aimed to provide additional normative data for two widely used assessment instruments for Criteria A (LPFS-SR) and B (PID-5) in a large French-Canadian populational sample.

Assessment of PD hybrid types

As a hybrid model, the AMPD also allows assessing seven categorical PD hybrid types (instead of 11 in the symptom-based model): Avoidant, Antisocial, Borderline, Narcissistic, Obsessive-compulsive, Schizotypal, and a trait-specified PD for cases that do not fit one of the other six types. In the AMPD, the diagnosis of a PD hybrid type requires the presence of at least moderate levels of impairment on any two of the four Criterion A domains and the presence of a given number of maladaptive personality traits among a disorder-specific subsample of Criterion B traits. For example, Criterion B for the diagnosis of an antisocial PD requires the presence of at least six maladaptive traits among the seven listed above. It is noteworthy that the PD hybrid types from the AMPD have been shown to be closely related to their symptom-based counterparts (Miller et al., 2015; Morey et al., 2016; Rojas et al., 2017; Yam & Simms, 2014), even though they are based on different theoretical foundations and operationalizations.

Despite the impressive amount of research interest that the AMPD has drawn since its publication (Sharp & Miller, 2022; Zimmermann et al., 2019) and the fact that a hybrid model is preferred to strictly dimensional or categorical models by PD experts (Morey & Hopwood, 2020), very few studies focused on the PD hybrid types that can be derived from the dimensional assessment of Criteria A and B (Gamache et al., 2022). It follows that no populational prevalence
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data is available for the PD hybrid types. Yet, prevalence data are useful for guiding public policies and allocation of resources, as well as for gathering knowledge on public mental health (Bach et al., 2020; Simonsen, 2010). Also, there is scientific and clinical interest in comparing prevalence estimates between the two coexisting PD models.

Recently, Gamache et al. (2022) tested three scoring approaches to extract categorical PD hybrid types from self-report measures of Criteria A and B. In all three approaches, empirical cutoffs based on ROC analysis for the Self and Interpersonal Functioning Scale (Gamache et al., 2019) were used to score the presence of moderate impairment on the four level of personality functioning domains. Regarding Criterion B, they proposed three different cutoff scores for the Personality Inventory for DSM-5 (PID-5; Krueger et al., 2012): 1) a “rational” approach in which a trait is considered present/elevated if the scale score is equal or greater than 2 (which indicates that, in average, the participant answered Sometimes or somewhat true to the scale’s items); 2) a “rational rounded up” approach in which the cutoff is set at 1.5 (indicating a mean response situated between Sometimes or somewhat true and Sometimes or somewhat false); and 3) an “empirical” approach setting the cutoff at a T score equal or greater than 65 (an oft-used cutoff in clinical instruments, e.g. Achenbach System of Empirically Based Assessment; Achenbach, 2009), calculated using Maples et al.’s (2015) derivation sample. Thus, these three scoring approaches used the same cutoff for Criterion A but used a different cutoff for Criterion B. Gamache et al. (2022) study included a community sample (n = 239), a private practice (psychologists) sample (n = 240), and a sample recruited at the intake of a clinic specialized in the treatment of PD (n = 287). Their results showed that the rational and empirical approaches both yielded prevalence rates similar to those reported in previous studies assessing traditional symptom-based PD in comparable populations. Prevalence varied from 0% (antisocial) to 2.1% (borderline) in the community sample, from 0% (narcissistic, obsessive-compulsive) to 1.7% (borderline) in the
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private practice sample, and from 2.4% (narcissistic) to 39.7% (borderline) in the PD clinic sample. The rational rounded up approach (i.e., cutoff score of 1.5 for the PID-5), however, yielded implausibly high prevalence for some PD, leading the authors to recommend against this scoring approach. Thus, although Gamache et al. (2022) study provided an initial indication that the categorical PD hybrid types can be extracted from self-report measures, more studies using larger and more representative samples are needed to confirm the validity of the scoring approaches as well as to obtain generalizable prevalence estimates.

The Present Study

This study aims to provide normative data for two widely used measures of Criterion A (LPFS-SR; Morey, 2017) and B (PID-5; Krueger et al., 2012) in a large French-Canadian populational sample, and to compare these normative data with the data from the original validation samples for these instruments. These normative data could be helpful for clinicians and researchers, notably for scoring Criteria A and B for diagnostic purpose (Miller et al., 2022). This study also aims to provide prevalence estimates for the seven categorical PD hybrid types in the populational sample as well as in an at-risk sample of young adults, using both the rational and the empirical approaches to scoring Criterion B (Criterion A was scored using the empirical approach only, as recommended in Morey [2017]). Data are compared across men and women, since gender differences in the prevalence of symptom-based PD were observed in clinical samples (APA, 2013) while large scale epidemiological studies showed mixed results, some reporting similar prevalence across genders (Grant et al., 2008; Lenzenweger et al., 2007; Tomko et al., 2014), and others reporting higher overall prevalence of any PD in men (Coid et al., 2006; Huang et al., 2009; Torgersen et al., 2001). Some authors (De Moor et al., 2009; Lindsay et al., 2000; Widiger, 1998)

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1 The present study was not preregistered.
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suggested that prevalence discrepancies could be due to gender bias in the assessment instruments; given that Criteria A (Le Corff et al., 2022) and B (Leclerc et al., 2023; Suzuki et al., 2019) were shown to be invariant across genders, it is hypothesized that there will be no significant gender differences. PD prevalence is also compared across age groups, since personality pathology is known to be higher in younger adults (Grant et al., 2008; Huang et al., 2009; Meaney et al., 2016).

Material and Methods

Participants

Populational sample. The initial sample consisted of 2,505 French-speaking adults from the Province of Québec (Canada) recruited as part of a larger study on the assessment of the AMPD. Since participation was voluntary, took place online without human proctoring, and came with incentives, it is possible that some participants responded carelessly. To detect invalid response profiles, long strings analyses were conducted. Participants with more than 32 consecutive identical responses to the PID-5 (n = 118) or more than 14 to the LPFS-SR (n = 103) were removed from the sample. The cut-off for the PID-5 was set based on the fact that considering the presence of reversed items, the longest possible sequence of coherent identical responses is 32. The same rationale was applied to the LPFS-SR. Therefore, 163 participants (6.5% of the sample) were removed from the sample due to probable careless responding. To control for inconsistent responding, a response inconsistency scale for the PID-5 (Keeley et al., 2016) was used. This scale includes 20 pairs of similar items, and the total score represents the sum of the discrepancy between these 20 pairs. A total of 117 participants (4.7% of the sample) reached the cutoff score of 17 indicating inconsistent responding and were removed from the sample. Only six participants reached the cutoff's values for both the inconsistency scale and the consecutive identical responses, leading to a final sample of 2231 participants.
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Participants were aged between 18 and 90 years ($M = 46.63; SD = 16.32$). Regarding
gender, 1,154 participants (51.8%) identified as women, 1,074 (48.2%) identified as men, one
identified as trans, and two did not provide their gender identity (which closely resembles census
data for the Quebec population, where 50.8% identify as women, 48.8% as men, and 0.3% as
trans). Regarding education, 39.6% of the sample had a university degree (vs 29.4% in the Quebec adult population), while 33.8% (vs 19.0%) had a technical of pre-university college (CEGEP) diploma, 25.5% (vs 38.3%) had a high school or a specialized trade diploma, and 0.8% (vs 13.3%) did not complete high school. More than half (56.7%) of the sample was married or in a romantic relationship, 32.4% were single, and 10.5% were either widowed, divorced, or separated. Median household annual income was in the 60,000$ to 79,999$ CAN bracket, which is higher than the median of 54,000$ CAN for the year 2019. Thus, underprivileged members of the Quebec population (with lower education and income) were underrepresented in the present sample.

At-risk sample. The at-risk sample consisted of 353 young adults from the Province of Quebec (Canada) with a history of early conduct problems. Eleven participants had to be removed due to incomplete data, while 20 (6.4% of the sample) were excluded following long strings analyses, and 24 (7.0%) were removed due to inconsistent responding. Thus, the final at-risk sample included 298 participants aged between 17 and 22 years ($M = 19.4; SD = 1.0$). Among these participants, 144 (48.3%) identified as women, 150 (50.3%) identified as men, three (1.0%) identified as non-binary, and one did not provide their gender identity. Regarding education, 48.7% did not complete high school, but 38.2% of that group were still in school. A majority (66.1%) of the sample still lived with their parents. Median household annual income was in the 70,000$ to 79,999$ CAN bracket and the median individual annual income of participants was in the 10,000$ to 14,999$ CAN bracket.

Measures
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Criterion A. The Level of Personality Functioning Scale – Self-Report (LPFS-SR; Morey, 2017) is an 80-item questionnaire which includes four scales assessing each domain of Criterion A of the AMPD. Its items are answered on a 4-point Likert-type scale ranging from *totally false*, *not at all true* (1), *slightly true* (2), *mainly true* (3) to *very true* (4). Each item is weighted according to its presumed severity (weighting coefficients vary from -0.5 for items indicative of normal personality functioning to 3.5 for items indicative of an extreme level of impairment). Higher scores indicate a higher level of impairment in personality functioning. It was translated in French for the purpose of the authors’ larger study on the assessment of the AMPD and in collaboration with the author of the LPFS-SR (Morey, 2017), using a forward translation by committee (Iliescu, 2017). Cronbach alphas for the four domain scales ranged from .82 (Empathy) to .89 (Identity) in Morey (2017), from .71 (Empathy) to .86 (Identity) in our populational sample, and from .76 (Empathy) to .88 (Identity) in our at-risk sample.

Criterion B. The French version (Rossi et al., 2012) of the Personality Inventory for DSM-5 (PID-5; Krueger et al., 2012) was used to assess the 25 maladaptive personality traits of Criterion B. Its 220 items are self-rated on a 4-point Likert-type scale ranging from *very false or often false* (0), *sometimes or somewhat false* (1), *sometimes or somewhat true* (2), to *very true or often true* (3). Since the French translation was conducted in Europe and the present study took place in Canada, slight vocabulary adjustments were made to five items to optimise their understandability. Cronbach alphas for the 25 trait scales varied from .72 to .96 for the original version (Krueger et al., 2012), and from .68 to .95 for the French translation in a sample of Belgian, French, and Swiss university students (Roskam et al., 2015). In the present study, they ranged from .75 to .95 in the populational sample and from .65 to .96 in the at-risk sample.

Procedure
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*Populational sample.* Recruitment of participants and data collection were conducted via Léger 360, which is the largest Survey firm in Canada. An email invitation was sent to a randomized sample of Léger 360’s panel of over 200,000 residents from the Province of Québec, Canada. Participants under 18 years of age or who reported a “very poor” understanding of the French language were excluded from the study (age and knowledge of the French language were filter questions). The questionnaires were administered online on Léger 360’s secure servers. Participants had the opportunity to save their responses and come back to complete the questionnaire at a later time. An email reminder was sent to the participants who had not completed the questionnaires one week after the initial invitation. The questionnaire was closed when the target sample size of approximately 2500 completed questionnaires was reached. The data collection began on June 18 and ended on July 15, 2019. Participants who completed the questionnaires received an incentive in the form of points added to their Léger 360 account and that can be exchanged for cash, gifts, or participation in prize draws. There were no missing data in the PID-5 and LPFS-SR items since the online questionnaire did not allow for missing responses (though missing responses were allowed for sociodemographic questions). The study received approval from the ethics board from the first authors’ research institution, and all participants signed an online informed consent form.

*At-risk sample.* The at-risk sample consisted of the participants in the 12th yearly assessment of an ongoing longitudinal study on gender differences in the evolution of conduct problems. The initial sample consisted of 465 French-speaking children (44% girls) from the Province of Québec (Canada) aged between 6 and 10 years ($M = 8.4; \text{SD} = 0.9$) at study inception. These children were recruited in three waves between 2008 and 2010 in 155 schools across the Province of Quebec (Canada). They were selected because they either reached the borderline clinical cutoff score ($T \geq 65$) on the DSM-Oriented Scales for conduct problems and oppositional
defiant problems of the Child Behavior Checklist or the Teacher Report Form (Achenbach & Rescorla, 2001), or were receiving complementary school-based services for conduct problems following a formal evaluation by a professional (e.g., school psychologist, psychoeducator). To include a similar number of girls than boys in the sample, approximately one quarter of eligible boys and all eligible girls (and their parents) were invited to participate in the study.

A total of 353 participants took part in the 12th yearly assessment when AMPD measures were introduced. Attrition rate was approximately 2% per year and was at random. Participants were met by trained research assistants to complete the questionnaires administered via structured interview, either in-person or through videoconferencing. The study received approval from the ethics board from the authors’ research institution. A financial compensation of 80$ CAN was given for participation.

Scoring approaches for PD hybrid types

Two scoring approaches were used to extract categorical PD hybrid types. In both approaches, Criterion A was considered met when the participant had a T score ≥ 65 on any two of the four domain scales of the LPFS-SR (this approach was validated with Morey in a personal communication). In both samples, T scores were calculated using the populational sample data. In the empirical approach, Criterion B was considered met when the participant had a T score ≥ 65 on the required number disorder-specific maladaptive traits as assessed with the PID-5. Of note, Miller et al. (2008) showed that when using “normal” personality traits (i.e. NEO-PI-R facets) to identify the presence of PD, the T ≥ 65 cutoff had good sensitivity and specificity, and had the same diagnostic efficiency than cutoffs based on ROC analyses. Again, T scores were calculated using the populational sample data for both samples. For example, to receive a “diagnosis” of avoidant PD, participants needed to reach a T score of 65 on at least two Criterion A domain scores, on the anxiousness scale, and on two of the other three avoidant PD-specific traits:
Prevalence of AMPD withdrawal, anhedonia, and intimacy avoidance. In the rational approach, Criterion B was considered met when the participant had a mean score $\geq 2$ on the required number of traits.

Results

Normative data for the LPFS-SR

Normative data for the LPFS-SR from our populational sample and from the original validation sample (Morey, 2017) are presented in Table 1, along with Cohen’s $d$ comparing both samples. Scores were higher in our sample for the four domains, as indicated by the moderate (Intimacy; $d = 0.48$) to large (Empathy; $d = 0.85$) effect sizes. Of note, standard deviations were lower in our sample than in Morey’s validation sample. Table 1 also presents the $T \geq 65$ cutoff scores and, as shown of table S5 of the Supplemental Material, 15.2% of participants had a $T \geq 65$ on at least one Criterion A domain while 6.6% reached the cutoff on two or more domains. Separate data for men and women are presented in Table S1. Results show that men score slightly higher than women on the LPFS-SR but effect sizes are small.

Insert Table 1

Normative data for the PID-5

Table 2 presents normative data for the PID-5 from our populational sample as well as from the original validation sample (Krueger et al., 2012) and from the validation sample for the French translation (Roskam et al., 2015), along with Cohen’s $d$ comparing our sample to each of these two other samples. Overall, trait scores tended to be higher in our sample than in Krueger’s American sample, but all effect sizes were small or negligible. Differences between our sample and the European sample went both ways, with 14 traits being lower and 11 being higher in our sample. Effect sizes for these differences varied from negligible to small in most cases, while a few differences had a moderate effect size. Table 2 also presents the $T \geq 65$ cutoff scores and, as shown on table S6, roughly 50% of the sample reached the cutoff on at least one maladaptive trait
Prevalence of AMPD while approximately 25% reached the cutoff for three or more traits. Separate data for men and women are presented in Table S2. Results show that men score higher than women on most of the 25 traits, with effect sizes varying from null to medium. Additionally, Table S3 present normative data from our populational sample for the 100-item PID-5-FBF and their comparison with Maples et al. (2015) data, while table S4 presents gender-specific normative data and gender comparisons.

Insert Table 2

**Prevalence for the PD hybrid types in the populational sample**

Table 3 presents the prevalence data obtained with the two scoring approaches for the whole populational sample as well as separately for genders and age groups. When using the empirical approach to scoring, populational prevalence for varied from 0.5% (antisocial) to 1.7% (borderline), with an overall prevalence rate of 6.1% for any PD hybrid type. Of note, the trait-specified type had a prevalence of 3.0%, and 1.8% of the sample reached the thresholds for two or more PD hybrid types (excluding the trait-specified type since all cases for the other six PD hybrid types automatically meet the criteria for the trait-specified type).

When using the rational approach to scoring, overall prevalence of any PD hybrid type was similar (5.9%), while having two or more PD was slightly less frequent (1.4%). Prevalence rates similar to those from the empirical approach were observed for six of the seven PD hybrid types, while schizotypal PD (1.6% vs 0.7%) showed a lower prevalence with the rational approach. This difference can be explained by the fact that some of the core traits of the schizotypal PD hybrid type (perceptual dysregulation, and unusual beliefs and experiences) had low mean scores and thus a T score of 65 is significantly lower than a raw score of 2 (see normative data in Table 2). It follows that the rational approach cutoff for the “presence” of a maladaptive trait (set at a raw score ≥ 2) is notably higher than the empirical approach cutoff (T ≥ 65) for these traits.

Insert Table 3
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Gender comparisons showed some significant differences in prevalence estimates, albeit of very small effect size. When using the empirical approach, antisocial and narcissistic PD were significantly more prevalent in men (0.8% and 1.7%, respectively) than in women (0.2% and 0.6%). When using the rational approach, only narcissistic PD significantly differed across genders (1.7% in men vs 0.6% in women). Results also suggested that more men than women reached the thresholds for any PD hybrid type when using the empirical (4.1% men vs 2.6% women) as well as the rational approach (3.8% men vs 2.7% women), but the difference was not statistically significant and of very small effect size.

Regarding age, as expected, there was a clear trend indicating a decrease in personality pathology in older participants, as indicated by a statistically significant decrease, albeit of small effect size, in the overall prevalence of PD hybrid types across age groups with both scoring approaches. When using the empirical approach, the overall prevalence of any PD decreased from 10.8% in young adults (aged 18-34 years), to 5.3% in middle-aged adults (aged 35-64 years), to 1.9% in older adults (aged 65+ years). Regarding specific hybrid types, antisocial PD was significantly more prevalent in young adults as compared to middle-aged adults and to older adults, while borderline and schizotypal PD were less prevalent in older adults than in young adults. When using the rational approach, the overall prevalence of any PD went from 10.3% in young adults to 5.1% in middle-aged adults, to 1.9% in older adults. Among the seven AMPD hybrid types, prevalence decreased significantly for borderline (from 2.8% in young adults to 0.0% in older adults), obsessive-compulsive (from 1.5% in young adults to 0.0% in older adults), and trait-specified PD (from 4.8% in young adults to 1.2% in older adults).

Prevalence for PD hybrid types in the at-risk sample

Table 3 also presents prevalence data for the at-risk sample. Age-related data are not presented since the homogeneity in the participants’ age made comparisons irrelevant. When using
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the empirical approach to scoring, prevalence rates varied from 0.0% (antisocial PD) to 3.4% (borderline PD), with an overall prevalence of 8.8% for any PD hybrid type. Of note, 2.0% of the sample had two or more PD hybrid types (excluding the trait-specified PD due to overlap with the other six). When using the rational approach to scoring, prevalence rates similar to those from the empirical approach were observed, although the avoidant PD (2.4% vs 1.3%), trait-specified PD (5.0% vs 4.0%), having two or more PD hybrid types (2.0% vs 1.7%), and having any PD hybrid type (9.1% vs 8.8%) tended to be less frequent than with the empirical approach. The overall PD hybrid types prevalence was thus higher by approximately three percentage points in the at-risk sample compared to the populational sample. This difference appears to be attributable to the higher prevalence of borderline and trait-specified PD hybrid types in the at-risk sample than in the populational sample. However, since the at-risk sample only included young adults, a more valid comparison would be with the young adult group of our populational sample. In that case, the overall prevalence rate of any PD hybrid type appears slightly higher in young adults from the populational sample than in the at-risk sample with both the empirical (10.8% vs 8.8%) and the rational scoring approach (10.3% vs 9.1%).

Contrarily to what was observed in the populational sample, in the at-risk sample, prevalence estimates tended to be higher in women than in men, although these differences were not statistically significant and were of very small effect size. The prevalence rates for any PD hybrid type were higher in men than in women with both the empirical (11.2% vs 6.0%) and the rational approach (11.9% vs 6.0%). This difference appears to be mostly attributable to the prevalence discrepancy across genders for the trait-specified PD hybrid type.

Discussion

Normative data for the LPFS-SR and PID-5
This study provides normative data for two widely used measures of Criteria A and B, the Level of Personality Functioning Scale – Self Report (Morey, 2017) and the Personality Inventory for DSM-5 (Krueger et al., 2012). Such data are useful in clinical and forensic settings where formal diagnosis is often required and are necessary to give meaning to quantitative scores for clinicians and clients (Miller et al., 2022). These normative data were then compared to the normative data from the original development samples and gender comparisons were made.

Regarding the LPFS-SR, personality functioning impairment was higher in our sample than in Morey’s (2017) original sample for the four domain scores, with effect sizes varying from moderate to large. Possible explanations for this discrepancy are cultural differences across the USA and Canada (but a recent study conducted on a similar Criterion A measure supported its invariance across cultures including the USA and Canada; Natoli et al., 2022), a non-equivalence between the original English version and the French translation (although strict measurement invariance was supported across French and English versions of a similar Criterion A measure translated with the same procedure [Le Corff et al., 2022]), and finally, sampling differences across the two studies (Morey [2017] used a relatively small [n = 293] sample).

Interestingly, 15.2% of participants reached the clinical cutoff on at least one of the four Criterion A domains, while 6.6% reached it on two or more domains. Knowing that the overall prevalence for any PD from the symptom-based model is estimated at 11% in the Western population (Volkert et al., 2018), these results suggest that the need for reaching at least moderate levels of impairment on two or more Criterion A domains for diagnosing a PD in the AMPD may be too stringent. It is also possible that the $T \geq 65$ cutoff is somewhat high and may lack sensitivity.

Concerning the PID-5, our normative data are globally equivalent to those of the original US sample (Krueger et al., 2012) and of the European sample (Roskam et al., 2015), with all but four differences being of negligible to small effect sizes. These results support the validity of the
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Canadian normative data provided in the present study and their possible use in different Western countries. Regarding the clinical cutoffs, approximately half of our populational sample reached the clinical cutoff (either $T \geq 65$ or a raw score $\geq 2.0$) on at least one maladaptive trait and approximately 25% reached it on three or more traits. This suggest that either these cutoffs are too low and lack specificity or that more than one elevated trait should be necessary to diagnose a PD. Since prevalence is significantly lower for the PD hybrid types, our results suggest that combining both Criteria A and B may be necessary for reaching acceptable diagnostic specificity.

Populational prevalence for the PD hybrid types

This study also aimed to provide prevalence estimates for the seven categorical PD hybrid types of the AMPD in a large French-Canadian populational sample as well as in an at-risk sample, using two scoring approaches proposed by Gamache et al. (2022). Prevalence across genders and age groups were also compared. Before discussing these results, it is important to reiterate that PD are inherently dimensional constructs and that PD hybrid types are not truly categorical entities; they are archetypes designed to facilitate continuity between the categorical symptom-based model and the AMPD. Thus, the prevalence estimates reported in the present study rely on arbitrary cutoffs on theoretically selected subsets of dimensional indicators of personality pathology and inform on the proportion of individuals with high levels of personality pathology of certain types that are deemed clinically relevant.

Results from the populational sample showed that prevalence estimates based on self-reported measures vary from 0.2-0.5% for the antisocial PD (depending on the scoring approach used) to 2.8-3.0% for the trait-specified PD, for an overall prevalence rate of any PD of 5.9-6.1%. To compare our results to the prevalence rates of the corresponding symptom-based PD, we refer to a recent meta-analysis on their prevalence in the general adult population in Western countries (Volkert et al., 2018). Interestingly, for four of the six PD hybrid types (excluding the trait-
Prevalence of AMPD

specified), our prevalence rates fell within the 95% confidence intervals of Volkert et al. (2018) estimates (avoidant [C.I. = 1.4%-3.4%], borderline [C.I. = 0.4%-2.3%], narcissistic [C.I. = 0.2-1.3], and schizotypal [C.I. = 0.8%-2.4%]), while our results for antisocial (C.I. = 1.8%-3.9%) and obsessive-compulsive (C.I. = 1.4%-5.7%) PD fell below the lower bound of the confidence intervals. Regarding the overall prevalence of any PD, our results fell slightly below the lower bound of Volkert et al. (2018) 95% confidence interval (6.9%-16.1%).

The most straightforward explanation for our much lower rate of any PD is that we assessed seven PD hybrid types while Volkert et al. (2018) included the 11 symptom-based PD. Simply put, assessing a larger variety of disorders leads to a higher overall prevalence. Regarding the antisocial PD, one possible explanation for its lower prevalence in the present study pertains to the use of self-report measures, which are susceptible to a social desirability bias and thus could have led to an underestimation of antisocial personality pathology. A sampling bias may also have occurred, since truly antisocial people may be less likely to participate in studies. Another plausible explanation pertains to the fact that the diagnostic threshold for the antisocial PD hybrid type requires the presence of six traits, while the others require between two and four traits; it is possible that the threshold for antisocial PD is simply too stringent. Beside methodological explanations, it is also possible that the AMPD offers a better conceptualization of antisocial PD than does the symptom-based model (Anderson & Kelley, 2022). In the symptom-based model, antisocial PD manifestations are essentially behavioral, while in the AMPD, antisociality is defined by specific underlying traits, which were shown to be conceptually closer to the well-established construct of psychopathy (Anderson & Kelley, 2022). Thus, the antisocial hybrid type in the AMPD probably is a more valid construct and hence probably offers a more valid assessment of antisocial personality. It follows that our results are possibly a more accurate estimate of the prevalence of clinically significant levels of antisocial personality. Concerning the obsessive-
Prevalence of AMPD

compulsive PD, studies have shown that it is not captured by the AMPD traits as well as are the other five PD hybrid types, and that some of its core features, such as moral scrupulousness and workaholism, are not covered by the AMPD traits (Liggett et al., 2017; Rojas & Widiger, 2017; Samuels et al., 2022). Hence, the narrow coverage of obsessive-compulsive PD in the AMPD, as compared to the symptom-based model, may explain the lower prevalence observed in this study and in Gamache et al. (2022) community and private practice samples.

Interestingly, 1.4% (rational approach) to 1.8% (empirical approach) of the sample reached the thresholds for two or more PD hybrid types (excluding the trait-specified due to overlap with the other six), so approximately half of participants who have a PD hybrid type have two or more. This suggests that even though one of the aims of the AMPD was to reduce overlap across PD (Waugh et al., 2017), there is still significant comorbidity across the categorical hybrid types.

Withal, the results lend support to the validity of the scoring approaches used, since our prevalence data are generally similar to those from Volkert et al. (2018) meta-analysis. However, in the light of this comparison, the empirical approach seems to provide more valid prevalence estimates than the rational approach, at least for some PD hybrid types. Indeed, while the empirical approach prevalence for schizotypal PD (1.6%) fell within Volkert et al. (2018) confidence interval (0.8%-2.4%), the rational approach result (0.7%) fell below the lower bound. Furthermore, empirical approach results for antisocial PD were closer to the meta-analysis estimates than were the rational approach results.

However, contrarily to our results, in Gamache et al. (2022) study, it is the rational rather that the empirical approach that yielded higher prevalence rates. This discrepancy between the two studies can be explained by the fact that Gamache et al. (2022) used Maples et al. (2015) derivation sample of university students. Since personality pathology is known to be higher in young adults (Grant et al., 2008) and in college and university students (Meaney et al., 2016) – as observed
Prevalence of AMPD

again in the current study – the normative scores used to calculate T scores (empirical approach) in Gamache et al. (2022) were higher than our normative scores (see also Table S3 of the Supplemental Material), and thus a same raw score on a given trait would translate in a lower T score in their study than in the present study. Consequently, we recommend that future studies using the empirical approach should use normative scores from the general population, such as those provided in the present study. Nevertheless, more studies are needed to establish the more appropriate scoring approaches and cutoffs for assessing PD hybrid types. A valid and reliable scoring approach is important in clinical and forensic settings where formal diagnostic is often required, as well as for epidemiological research, for comparability of research results, and for bridging research results on the two coexisting DSM-5 models.

**Prevalence for the PD hybrid types in the at-risk sample**

The present study also included a sample of young adults that we considered at higher risk of developing PD, participating in the 12th year of a longitudinal study and who were recruited because they had clinically significant levels of conduct problems at study intake. Surprisingly, only borderline PD had a prevalence rate exceeding the higher bound Volkert et al. (2018) confidence interval. Results for avoidant, narcissistic and schizotypal PD all fell within the meta-analysis confidence intervals. As observed in the populational sample, antisocial PD prevalence fell below the meta-analysis lower bound. This result is quite surprising given that conduct problems are known precursors of antisocial PD (Loeber et al., 2002). Again, the use of a self-report measure may be in cause. However, since more than half of this sample manifested high levels of callous-unemotional traits from childhood to mid-adolescence (Bégin et al., 2019), the absence of a single case of antisocial PD seems to support our previous hypothesis that the threshold for the antisocial PD hybrid type may be too stringent. Obsessive-compulsive PD prevalence was also below the lower bound of the meta-analysis confidence interval, which may
be due to a conceptual difference between the two PD models as explained above. Additionally, borderline PD prevalence (3.4% with both scoring approaches) was higher than Volkert et al. (2018) upper bound (0.4%-2.3%), and higher than the prevalence observed in the young adult subgroup of our populational sample (2.8%-3.0%) but was lower than reported estimates for college students (9.7%; Le Corff et al., 2021; Meaney et al., 2016). While the discussion on the very high prevalence of borderline PD in college students is outside of the scope of this article, the higher prevalence in the at-risk sample as compared to general population may be explained by higher rates of risk factors in this sample. Otherwise, the overall prevalence of any PD was lower by approximately two percentage points in the at-risk sample compared to the young adult subgroup from our populational sample. Again, there was significant comorbidity across PD hybrid types. Regarding the scoring approaches, in this sample, the empirical scoring approach also yielded results closer to Volkert et al. (2018) mean estimates than the rational approach.

**Gender comparisons**

Results from the populational sample showed that men scored systematically higher than women on the measures of Criteria A and B, with small to moderate effect sizes. These differences are coherent with well known gender differences in Big Five personality traits (Murphy et al., 2021). Regarding PD hybrid types, there were few significant gender differences. As could be expected (Dolan & Völlm, 2009; Grijalva et al., 2015), antisocial and narcissistic PD were more frequent in men when using the empirical scoring approach, while the difference for antisocial PD was not statistically significant when using the rational approach. Overall prevalence rate of any PD in the populational sample was also significantly higher in men when using the empirical approach, which is in line with previous epidemiological studies which reported a slightly higher prevalence of any symptom-based PD in men than in women (Coid et al., 2006; Huang et al., 2009; Torgersen et al., 2001). This higher prevalence of PD in men – and especially of antisocial and
Prevalence of AMPD

narcissistic PD – may be explained by basic gender differences in personality (Lynam & Widiger, 2007) whereby men show lower levels of agreeableness (higher levels of antagonism) on the Big Five model of personality (Murphy et al., 2021). Surprisingly, even though on average women score significantly higher than men on the Neuroticism dimension of the Big Five (Murphy et al., 2021), borderline PD was not more prevalent in women and women score only slightly higher than men (small effect size) on the Negative affectivity dimension of the PID-5. To the contrary, in the at-risk sample, the prevalence of any PD hybrid type was twice as high in women than in men, which is probably attributable to sample characteristics as mentioned above. Overall, since previous studies supported measurement invariance across genders for criteria A and B, it is likely that the differences observed in the present study represent real gender-related differences. Future studies should investigate further how the AMPD relates to gender.

Age groups comparisons

Results from the populational sample showed a decrease in the prevalence of PD hybrid types between the younger and older groups, which is in line with previous epidemiological studies on symptom-based PD (Grant et al., 2008; Huang et al., 2009; Meaney et al., 2016). This effect could be explained by age-related physical, cognitive and socio-economic changes that affect the manifestations of personality traits and disorders (Debast et al., 2014). Alternatively, it could be a matter of age-related bias in either the assessment instruments (Debast et al., 2014; Tackett et al., 2009) or in the AMPD constructs themselves. Thus, future studies should investigate measurement invariance of AMPD instruments across age groups. Finally, since our data were cross-sectional, the differences across age groups could be attributable to generational differences.

Limitations and future directions

Perhaps the main limitation of the present study pertains to the at-risk sample. On the one hand, it was limited in size and on the other hand, participants were selected some eleven years
Prevalence of AMPD

prior to PD assessment for having clinical levels of conduct problems. It may be that many of them outgrew their childhood problems and did not develop significant levels of personality pathology. It is also possible that conduct problems during childhood are not a strong predictor of PD. Future studies should investigate the associations between early childhood conduct problems and adult AMPD. Additionally, results from this sample may not generalize to other clinical samples, in which a higher prevalence of PD and more severe personality functioning problems are expected (e.g. Gamache et al., 2022). Another limitation of this study is that PD were assessed with self-report measures only, which can have led to underestimating prevalence, especially for antisocial PD as discussed above. Future studies should investigate the prevalence of AMPD assessed with validated structured assessment protocol, such as the SCID-5-AMPD (First et al., 2018) or the STiP-5.1 (Hutsebaut et al., 2017), and using different informants.
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References


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Prevalence of AMPD diagnoses

Table 1.
*Normative data for the LPFS-SR and comparison with Morey (2017) data.*

<table>
<thead>
<tr>
<th>Domains</th>
<th>Populational sample</th>
<th>Morey (2017)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Identity</td>
<td>87.69</td>
<td>20.16</td>
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<tr>
<td>Self-direction</td>
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<td>16.33</td>
</tr>
<tr>
<td>Empathy</td>
<td>49.75</td>
<td>10.70</td>
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<tr>
<td>Intimacy</td>
<td>73.89</td>
<td>16.93</td>
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<td>Total score</td>
<td>278.06</td>
<td>57.03</td>
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</table>

$N = 2342$. 
Prevalence of AMPD diagnoses

Table 2.
Normative data for the PiD-5 and comparison with the American development sample and the French validation sample.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
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</tr>
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<tbody>
<tr>
<td></td>
<td>$M$</td>
<td>$SD$</td>
<td>$T = 65$</td>
</tr>
<tr>
<td>Anhedonia</td>
<td>0.94</td>
<td>0.60</td>
<td>1.84</td>
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<tr>
<td>Anxiousness</td>
<td>1.27</td>
<td>0.71</td>
<td>2.34</td>
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<tr>
<td>Attention seeking</td>
<td>0.74</td>
<td>0.63</td>
<td>1.68</td>
</tr>
<tr>
<td>Callousness</td>
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<td>0.45</td>
<td>1.18</td>
</tr>
<tr>
<td>Deceitfulness</td>
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<td>0.51</td>
<td>1.39</td>
</tr>
<tr>
<td>Depressivity</td>
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<td>0.61</td>
<td>1.57</td>
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<td>Distractibility</td>
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<td>0.64</td>
<td>1.92</td>
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<tr>
<td>Eccentricity</td>
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<td>1.79</td>
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<tr>
<td>Emotional lability</td>
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<td>0.67</td>
<td>2.13</td>
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<tr>
<td>Grandiosity</td>
<td>0.82</td>
<td>0.55</td>
<td>1.64</td>
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<tr>
<td>Hostility</td>
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<td>0.56</td>
<td>1.76</td>
</tr>
<tr>
<td>Impulsivity</td>
<td>0.87</td>
<td>0.64</td>
<td>1.84</td>
</tr>
<tr>
<td>Intimacy avoidance</td>
<td>0.69</td>
<td>0.63</td>
<td>1.65</td>
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<tr>
<td>Irresponsibility</td>
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<td>1.67</td>
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<td>Perceptual dysregulation</td>
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<td>1.32</td>
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<td>Perseveration</td>
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<td>1.75</td>
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<tr>
<td>Restricted affectivity</td>
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<td>1.93</td>
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<td>Rigid perfectionism</td>
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<td>0.59</td>
<td>2.04</td>
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### Prevalence of AMPD diagnoses

<table>
<thead>
<tr>
<th>Domain</th>
<th>36</th>
<th>0.49</th>
<th>1.85</th>
<th>-0.23</th>
<th>0.12</th>
<th>1.24</th>
<th>0.55</th>
<th>2.07</th>
<th>1.05</th>
<th>0.66</th>
<th>2.04</th>
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<tr>
<td>Risk taking</td>
<td>1.12</td>
<td>0.49</td>
<td>1.85</td>
<td>-0.23</td>
<td>0.12</td>
<td>1.24</td>
<td>0.55</td>
<td>2.07</td>
<td>1.05</td>
<td>0.66</td>
<td>2.04</td>
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<tr>
<td>Separation insecurity</td>
<td>0.81</td>
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<td>1.80</td>
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<td>0.01</td>
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<td>0.80</td>
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<td>Suspiciousness</td>
<td>1.00</td>
<td>0.54</td>
<td>1.81</td>
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<td>0.09</td>
<td>0.70</td>
<td>0.50</td>
<td>1.45</td>
<td>0.95</td>
<td>0.58</td>
<td>1.82</td>
</tr>
<tr>
<td>Unusual beliefs and experiences</td>
<td>0.67</td>
<td>0.58</td>
<td>1.53</td>
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<td>0.05</td>
<td>0.57</td>
<td>0.55</td>
<td>1.40</td>
<td>0.64</td>
<td>0.63</td>
<td>1.59</td>
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<td>0.54</td>
<td>1.54</td>
<td>1.01</td>
<td>0.72</td>
<td>2.09</td>
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### Domains

<table>
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<th>Domain</th>
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<th>0.41</th>
<th>1.74</th>
<th>0.05</th>
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<th>0.40</th>
<th>1.71</th>
<th>1.07</th>
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<td>Negative affectivity</td>
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<td>1.74</td>
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<td>1.11</td>
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<td>1.71</td>
<td>1.07</td>
<td>0.44</td>
<td>1.73</td>
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<td>Detachment</td>
<td>0.87</td>
<td>0.49</td>
<td>1.60</td>
<td>0.29</td>
<td>0.17</td>
<td>0.74</td>
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<td>0.78</td>
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<td>0.00</td>
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<td>0.68</td>
<td>0.41</td>
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<td>0.61</td>
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<td>1.06</td>
<td>0.30</td>
<td>1.51</td>
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<td>Psychoticism</td>
<td>0.67</td>
<td>0.51</td>
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<td>0.00</td>
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<td>0.67</td>
<td>0.49</td>
<td>1.41</td>
<td>0.64</td>
<td>0.57</td>
<td>1.50</td>
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</table>
Prevalence of AMPD diagnoses

**Table 3.**
Prevalence for personality disorders hybrid types in the populational and at-risk samples

<table>
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<tr>
<th>PD</th>
<th>Populational Sample</th>
<th>At-risk Sample</th>
<th>Chi² (df = 1, 2228)</th>
<th>Cramér’s V</th>
<th>Chi² (df = 2, 2230)</th>
<th>Cramér’s V</th>
<th>Chi² (df = 1, 293)</th>
<th>Cramér’s V</th>
</tr>
</thead>
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<tr>
<td>Antisocial</td>
<td>0.5% 0.2% 0.8%</td>
<td>0.5% 0.2%</td>
<td>5.00*</td>
<td>.05</td>
<td>1.2% a 0.3% a 0.0% a</td>
<td>8.28*</td>
<td>.06</td>
<td>0.0% 0.0% 0.0%</td>
</tr>
<tr>
<td>Avoidant</td>
<td>1.6% 1.4% 1.9%</td>
<td>1.6% 1.4%</td>
<td>0.79</td>
<td>.02</td>
<td>2.3% a 1.7% a 0.5% a</td>
<td>5.41</td>
<td>.05</td>
<td>2.4% 2.1% 2.0% 1.00</td>
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<tr>
<td>Borderline</td>
<td>1.7% 1.4% 2.0%</td>
<td>1.7% 1.4%</td>
<td>1.10</td>
<td>.02</td>
<td>3.0% a 1.5% a 0.2% b</td>
<td>12.04*</td>
<td>.07</td>
<td>3.4% 3.5% 2.7% 0.17</td>
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<tr>
<td>Narcissistic</td>
<td>1.1% 0.6% 1.7%</td>
<td>1.1% 0.6%</td>
<td>5.73*</td>
<td>.05</td>
<td>1.8% a 1.1% a 0.2% a</td>
<td>5.73</td>
<td>.05</td>
<td>0.3% 0.0% 0.7% 0.96</td>
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<tr>
<td>Obsessive-compulsive</td>
<td>0.8% 0.6% 1.0%</td>
<td>0.8% 0.6%</td>
<td>1.21</td>
<td>.02</td>
<td>1.2% a 0.9% a 0.0% a</td>
<td>4.55</td>
<td>.05</td>
<td>0.7% 0.7% 0.7% 0.00</td>
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<tr>
<td>Schizotypal</td>
<td>1.6% 1.1% 2.0%</td>
<td>1.6% 1.1%</td>
<td>3.06</td>
<td>.04</td>
<td>2.8% a 1.4% a 0.2% b</td>
<td>11.247*</td>
<td>.07</td>
<td>1.3% 1.4% 0.7% 0.39</td>
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<tr>
<td>Trait-specified²</td>
<td>3.0% 2.7% 3.3%</td>
<td>3.0% 2.7%</td>
<td>0.63</td>
<td>.02</td>
<td>5.3% a 2.5% b 1.0% b</td>
<td>18.65**</td>
<td>.09</td>
<td>4.0% 6.3% 2.0% 3.39</td>
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<tr>
<td>Any PD</td>
<td>6.1% 5.2% 7.2%</td>
<td>6.1% 5.2%</td>
<td>3.74</td>
<td>.04</td>
<td>10.8% a 5.3% b 1.9% c</td>
<td>37.55**</td>
<td>.13</td>
<td>8.8% 11.2% 6.0% 2.53</td>
</tr>
<tr>
<td>2 or more PD³</td>
<td>1.8% 1.4% 2.2%</td>
<td>1.8% 1.4%</td>
<td>2.27</td>
<td>.03</td>
<td>3.3% a 1.6% b 0.2% b</td>
<td>14.20*</td>
<td>.08</td>
<td>2.0% 2.1% 1.3% 0.26</td>
</tr>
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</table>

Rational approach
<table>
<thead>
<tr>
<th>Diagnosis</th>
<th>0.2%</th>
<th>0.1%</th>
<th>0.4%</th>
<th>2.03</th>
<th>.03</th>
<th>0.5%</th>
<th>0.2%</th>
<th>0.0%</th>
<th>3.17</th>
<th>.04</th>
<th>0.0%</th>
<th>0.0%</th>
<th>0.0%</th>
<th>--</th>
<th>--</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antisocial</td>
<td>1.7%</td>
<td>1.4%</td>
<td>2.0%</td>
<td>1.45</td>
<td>.03</td>
<td>2.2%</td>
<td>1.9%</td>
<td>0.5%</td>
<td>4.85</td>
<td>.05</td>
<td>1.3%</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.39</td>
<td>.04</td>
</tr>
<tr>
<td>Avoidant</td>
<td>1.5%</td>
<td>1.2%</td>
<td>1.8%</td>
<td>1.18</td>
<td>.02</td>
<td>2.8%</td>
<td>1.3%</td>
<td>0.0%</td>
<td>14.07*</td>
<td>.08</td>
<td>3.4%</td>
<td>2.8%</td>
<td>3.3%</td>
<td>0.07</td>
<td>.02</td>
</tr>
<tr>
<td>Narcissistic</td>
<td>1.1%</td>
<td>0.6%</td>
<td>1.7%</td>
<td>5.73*</td>
<td>.05</td>
<td>1.8%</td>
<td>1.1%</td>
<td>0.2%</td>
<td>5.73</td>
<td>.05</td>
<td>0.3%</td>
<td>0.0%</td>
<td>0.7%</td>
<td>0.97</td>
<td>.06</td>
</tr>
<tr>
<td>Obsessive-compulsive</td>
<td>0.9%</td>
<td>0.7%</td>
<td>1.1%</td>
<td>1.13</td>
<td>.02</td>
<td>1.5%</td>
<td>0.9%</td>
<td>0.0%</td>
<td>6.29*</td>
<td>.05</td>
<td>1.0%</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.39</td>
<td>.04</td>
</tr>
<tr>
<td>Schizotypal</td>
<td>0.7%</td>
<td>0.4%</td>
<td>1.0%</td>
<td>2.73</td>
<td>.04</td>
<td>1.0%</td>
<td>0.7%</td>
<td>0.2%</td>
<td>2.05</td>
<td>.03</td>
<td>1.3%</td>
<td>1.4%</td>
<td>0.7%</td>
<td>0.39</td>
<td>.04</td>
</tr>
<tr>
<td>Trait-Specified</td>
<td>2.8%</td>
<td>2.5%</td>
<td>3.1%</td>
<td>0.64</td>
<td>.02</td>
<td>4.8%</td>
<td>2.3%</td>
<td>1.2%</td>
<td>14.27*</td>
<td>.08</td>
<td>5.0%</td>
<td>8.3%</td>
<td>2.0%</td>
<td>6.09*</td>
<td>.14</td>
</tr>
<tr>
<td>All PD</td>
<td>5.9%</td>
<td>5.1%</td>
<td>6.8%</td>
<td>2.83</td>
<td>.04</td>
<td>10.3%</td>
<td>5.1%</td>
<td>1.9%</td>
<td>34.56**</td>
<td>.12</td>
<td>9.1%</td>
<td>11.9%</td>
<td>6.0%</td>
<td>3.14</td>
<td>.10</td>
</tr>
<tr>
<td>2 or more PD</td>
<td>1.4%</td>
<td>1.0%</td>
<td>1.8%</td>
<td>2.16</td>
<td>.03</td>
<td>2.3%</td>
<td>1.3%</td>
<td>0.2%</td>
<td>8.01*</td>
<td>.06</td>
<td>1.7%</td>
<td>1.4%</td>
<td>1.3%</td>
<td>0.00</td>
<td>.00</td>
</tr>
</tbody>
</table>

* p > 0.05  ** p > 0.001
a, b, c The mean difference is significant at the 0.05 level.

1 The discrepancies between total sample prevalence and gender-specific prevalence for some AMPD types is due to the inclusion of the five non-binary participants and the one who did not provide their gender identity in the total sample.
2 Since meeting the criteria for any of the other 6 PD hybrid types also automatically meets criteria for the trait-specified type, participants were considered as having a trait-specified PD only if they did not meet the criteria for any of the other 6 PD hybrid types.
3 Prevalence for 2 or more PD hybrid types exclude the trait-specified type since all participants who meet the criteria for one of the six other hybrid types automatically also reach the criteria for the trait-specified type. Thus, including the trait-specified PD would create artificial comorbidity.