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Parent-Adolescent Concordance in Borderline Pathology and why it Matters

Kiana Wall[1] · Yusra Ahmed[1] · Carla Sharp[1]

Abstract

The aims of the current study were to: 1) identify patterns of agreement between parent-adolescent dyads on reports of adolescent borderline personality features utilizing latent class analysis (LCA) and 2) examine the clinical implications of class membership for indices of psychiatric severity and internal psychological resources. The sample included 643 adolescent inpatients. Borderline personality features were assessed by both adolescents and parents using the Borderline Personality Features Scale - Child (BPFS-C; Crick et al. 2005) and Borderline Personality Features Scale – Parent (BPFS-P; Sharp et al. 2010), respectively. Following recommended statistical approaches for evaluating rater concordance, LCA was utilized to identify distinct classes of parent-adolescent dyads based on concordance/discrepancy in BPFS reports. The subsequent classes were then related to outcome measures of psychiatric severity and internal psychological resources (emotion regulation and experiential acceptance). LCA identified 3 classes of parent-adolescent dyads: 2 convergent classes demonstrating BPFS-P and BPFS-C agreement at a moderate and high level and a divergent class consisting of dyads reporting clinically significant scores on the BPFS-P but clinically negligible BPFS-C scores. Both convergent classes evidenced higher rates of psychiatric severity and lower access to internal resources. The current study is the first to use LCA to examine the relation between informant concordance on reports of DSM-based adolescent borderline pathology in a clinical sample. The significance of the discrepancies within and between classes is discussed with relation to psychosocial outcomes, the diagnosis of borderline personality disorder and implications for what it means when parents and adolescents disagree.

Keywords Borderline personality disorder · Adolescents · Informants · Informant agreement

Introduction

Research has advocated for the use of multiple sources of information (i.e. self, informant or clinician report) when assessing or diagnosing personality disorders (PD's), given our longstanding view of PD's as being pervasive and persistent across contexts (American Psychiatric Association 2013), and the self-reflective difficulties inherent in the disorders. While our views are no longer as conservative and self-report is regarded as a valid assessment component for PD's (Samuel et al. 2016), divergence (disagreement) between informant reports is frequently encountered by both researchers and clinicians who must attempt to reconcile discrepant reports. Historically, informant report discrepancies have widely been disregarded as measurement and informant error. However, recent research has demonstrated that informant report discrepancies are often statistically and clinically significant if appropriately interpreted (De Los Reyes et al. 2013).

For decades, it has been demonstrated that reporting discrepancies and weak informant agreement is common among child-informant dyads (Achenbach et al. 1987). Recently, literature has shown that patterns of report divergence can provide important information about an informants' perspective

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or context (De Los Reyes et al. 2009), a clinicians' interpretation and use of informant reports (De Los Reyes et al. 2011) and family functioning (De Los Reyes and Ohannessian 2016). Finally, parent-youth reporting patterns on measures of life stress, family perceptions, impulsivity traits and symptoms of psychopathology have been utilized to predict and account for variance in adolescent temperament and psychopathology (Kushner and Tackett 2015), adolescent anxiety (Ohannessian and De Los Reyes 2014), dysfunctional behavior (Zapolski and Smith 2013), and delinquent behavior (Ferdinand et al. 2006), respectively. In summary, investigating concordance between parents and their child or adolescent appears to be meaningful for identifying youth at a greater risk for emotional or behavioral problems, determining severity or prognosis of youth psychopathology and for informing diagnoses.

Despite the potential usefulness of discrepancy analyses, much of the research discussed above has focused on internalizing and externalizing problems, with a clear gap in the literature for evaluating patterns of informant concordance and its clinical utility in adolescent personality pathology. Informant concordance for personality pathology has been studied in adults and has focused on concordance between subjects and their clinicians or spouses and friends. Although these studies in adult personality pathology vary greatly in terms of assessment tool, informant type and sample, a review of this literature concluded that informant concordance overall was modest at best, and appeared to increase with age and was higher for cluster B traits (Klonsky and Oltmanns 2002). Moreover, while self-report has been suggested to be at least as valid as clinician administered tools for the assessment of personality pathology (Samuel et al. 2016), the authors emphasized the value of informant data and how measurable discrepancy between informants has potential clinical utility for the assessment of personality pathology, as demonstrated by literature examining childhood internalizing and externalizing psychopathology.

Many fewer studies have examined informant concordance and discrepancy on measures of personality pathology in adolescence; however, some of these studies have investigated the clinical utility of the discrepancy – something not seen in adult literature. Furr et al. (2007) found that adolescents with conduct disorder (CD) were less accurately "judgeable" (overall had greater discrepancies between self and informant report) than control adolescents on the Revised NEO Personality Inventory (NEO-PI-R; Costa and McCrae 1992). However, dyads in the CD group showed greater agreement than controls on specific traits relevant to CD, suggesting that there may be a relation between level of informant agreement and the relevance of a trait to a given disorder. Sharp et al. (2010) found significant, but modest concordance in a community sample of parent and child reports on the Borderline Personality Features Scale (BPFS; Crick et al. 2005), however significant mean differences also emerged with children

scoring higher in borderline traits than their parents. This aim of this study, however, was not to specifically investigate dyadic concordance or the utility of discrepancy patterns. Tromp and Koot (2010) found moderate agreement between parent and adolescent reports on the Dimensional Assessment of Personality Pathology – Basic Questionnaire for Adolescents (DAPP-BQ-A; Tromp and Koot 2008), with discrepancy patterns revealing more internalizing symptoms reported by children and more externalizing symptoms by parents. Severity also partially predicted informant discrepancy, with inpatient adolescents having lower informant agreement than outpatients. Tackett (2011) analyzed the reports of mothers and fathers on their children's personality using the Inventory for Child Individual Differences (ICID; Halverson et al. 2003) and found trait-specific patterns of high vs. low agreement between parents. Additionally, these discrepancies, conceptualized as standard difference scores (DZ), predicted children's internalizing problems. Tackett et al. (2013) found modest agreement in a community sample of parents and adolescents on the Dimensional Personality Symptom Item Pool (DIPSI; De Clercq et al. 2006; Tackett and De Clercq 2009) with higher adolescent reported means on all personality pathology traits. In addition, they revealed patterns of concordance between parent and child reports that suggested greater agreement for externalizing over internalizing PD traits. Parent-adolescent discrepancy, conceptualized as DZ and analyzed via polynomial regression, was also predictive of adolescent externalizing problems. Finally, Wall et al. (2017) found high diagnostic concordance for adolescent borderline personality disorder (BPD) between inpatient adolescents and their parents on the Revised Diagnostic Interview for Borderlines (DIB-R; Zanarini et al. 1989) and the Childhood Interview for Borderline Personality Disorder (CI-BPD; Zanarini 2003), with lower concordance observed when the interview-measures were dimensionally scored compared to when they were categorically scored. Standardized difference scores between parents and adolescents on both measures of BPD were also significantly correlated with parent report of adolescent Axis 1 diagnoses. While informative (as the first clinical sample to examine concordance based on interview-based measures of BPD) the impact of the study is limited by the fact that adolescents were included in the study only if they fully met DSM-IV criteria for BPD based on adolescent self-report. Therefore, the study evaluates parent deviation from adolescent diagnosis, rather than true concordance or discrepancy.

In summary, limitations of prior work with adolescents include an over-reliance on broad-band measures of personality pathology not specifically tied to DSM-disorder based measures. While the former holds enormous advantage for conceptualization of personality pathology in youth, most clinicians still rely on more traditional approaches to diagnosing

personality pathology and need guidance as to how to interpret concordance and/or discrepancy as no guidance currently exists in this regard. A second major limitation of prior work is reliance upon largely invalid or incomplete statistical techniques for examining informant concordance. For example, while two studies (Sharp et al. 2010; Wall et al. 2017) have examined informant discrepancies in BPD specifically, the analysis of Sharp et al. (2010) was of a descriptive nature and Wall et al. (2017) did not utilize statistical techniques recommended for the study of informant discrepancy and outcomes (Laird and De Los Reyes 2013). Although basic difference scores are useful for assessing an individual dyads level of agreement on a measure and the nature of the discrepancy, difference scores are not reliable indexes of concordance or divergence when employed sample-wide in correlations as they are inherently mathematically problematic (Laird and De Los Reyes 2013). A third major limitation of prior work is that almost all studies published thus far have used community-based samples, of which only a very small percentage of adolescents would be seen in the clinic. Therefore, studies examining discrepancy and concordance in clinical samples of adolescents are needed to translate some of the findings using community-based typically developing adolescents for application in clinical settings. A fourth limitation relates to the fact that only four studies have addressed the clinical utility or relation of informant discrepancy (in any PD) to criterion variables. Moreover, these studies predominantly relied upon correlational analysis, mean differences and standard difference scores to conceptualize informant concordance, while improved statistical techniques are now available to better allow for drawing conclusions from discrepancy analysis. In addition, the only criterion variables utilized in these studies have been broadband measures of internalizing and externalizing psychopathology or indices of severity such as number of diagnoses. Although highly relevant to the study of personality pathology, these criterion measures only illuminate the additional risk and severity of psychopathology present in personality pathology. Alternative constructs may instead reveal what is resilient in or protective for individuals without personality pathology. These may include measures related to emotion regulation capacity, theory of mind and experiential acceptance.

With these limitations in mind, the current paper had two aims. First, to identify general patterns of agreement between parent and adolescent reports of borderline personality disorder features, using latent class analysis (De Los Reyes et al. 2013, De Los Reyes et al. 2015). Second, to examine the relation between informant convergence or divergence and (1) psychiatric severity operationalized as total raw scores on the Achenbach scales (the YSR and CBCL; Achenbach and Rescorla 2001), number of interview-based diagnoses for which full criteria was met, as reported by parents and adolescents themselves assessed using the NIMH DISC IV (Shaffer et al. 2000), and self-harm as

assessed with the Deliberate Self-harm Inventory (DSHI; Gratz 2001); as well as (2) internal psychological resources (emotion regulation capacity and experiential acceptance) highly relevant to the study of borderline personality. These internal psychological resources were chosen as indices of potential clinical relevance based on developmental theories of BPD and empirical studies which have identified emotion dysregulation (Linehan 1993; Crowell et al. 2009), and experiential avoidance (Hayes et al. 1996; Schramm et al. 2013) as important correlates of BPD.

With regard to our first aim, we hypothesized that, compared to parents, adolescents would report more borderline features overall (Sharp et al. 2010), and that general parent-adolescent concordance on the BPFS would be modest. Due to the complex nature of BPD symptomology, it was difficult to predict what type of discrepancy pattern the BPFS would follow, if any. Following studies of internalizing and externalizing disorders (Ferdinand et al. 2004, 2006), we suspected LCA would reveal up to five classes (Y > P; P > Y; high converging; moderate converging; low converging). We expected that convergent dyads high in BPD features would demonstrate higher scores on measures of general psychopathology and self-harm as well as less access to internal resources compared to convergent dyads lower in BPD features. We had no a-priori hypotheses about relations with outcome measures for discrepant groups.

Methods

Participants

The study sample consisted of adolescents admitted to a private psychiatric hospital between October 2008 and June 2016, and their parents. Informed consent was obtained from parents and adolescents provided assent to participate in a larger study. Participation criteria included the following: adolescent age between 12 and 17 and English fluency. Exclusion criteria included the following: active psychosis, schizophrenia or other psychotic disorder diagnosis, an IQ < 70, autism spectrum disorder (ASD) diagnosis or lack of English fluency. Based on these parameters, eligible adolescents completed the study protocol and ineligible participants were excluded before participation. All procedures were approved by local ethics boards (the University of Houston Committee for the Protection of Human Subjects and the Institutional Review Board for Baylor College of Medicine and Affiliated Hospitals).

In total, 643 adolescent participants (M_{age} = 15.30 years, SD = 1.45) were included in current analysis after exclusion for study criteria (N = 151) and for missing data (N = 9) on both BPFS scales. The sample was 64% female and 36% male and consisted of the following racial and/or ethnic

backgrounds: < 1% American Indian/Alaskan Native, 2.4% Black or African-American, 3.1% Asian, 6.3% Multiracial or other, 87.8% Caucasian and 0.2% unspecified. On average, adolescents had 1.76 diagnoses as determined by the Diagnostic Interview Schedule for Children – Computerized Version (NIMH DISC IV; Shaffer et al. 2000). 51% of participants met criteria for a depressive disorder, 52% for any anxiety disorder, 38% for any externalizing childhood disorder (ADHD, ODD, CD), 8% for any eating disorder and 7% for any bipolar disorder. Parental reports were predominantly completed by mothers ($N = 531$) although 18% of reports were completed by fathers ($N = 116$) and 5 participants parent genders were not reported.

Measures

The child and parent versions of the Borderline Personality Features Scale (BPFS-C; Crick et al. 2005; BPFS-P; Sharp et al. 2010) were used to assess adolescent borderline features and to determine each dyad's latent class membership. Criterion variables to evaluate the clinical utility of report convergence or divergence included scores on the Childhood Interview for DSM-IV Borderline Personality Disorder (CI-BPD; Zanarini 2003), Youth Self Report (YSR; Achenbach and Rescorla 2001), Child Behavior Checklist (CBCL; Achenbach and Rescorla 2001), Deliberate Self-harm Inventory (DSHI; Gratz 2001), Difficulties in Emotion Regulation Scale (DERS; Gratz and Roemer 2004), Avoidance and Fusion Questionnaire for Youth (AFQY; Greco et al. 2008) and number of diagnoses on the NIMH DISC IV (Shaffer et al. 2000).

Adolescent Borderline Features

The Borderline Personality Features Scale for Children (BPFS-C; Crick et al. 2005) is a self-report instrument used to assess BPD features in children as young as 9. The measure was adapted from the borderline subscale of the Personality Assessment Inventory (PAI; Morey 1991) and includes 4 subscales itself: affective instability, identity problems, negative relationships and self-harm. Children and adolescents use the BPFS-C to rate their feelings about themselves and others on a 5-point Likert scale (1 – "not at all true" – 5 – "always true") where higher scores indicate higher levels of BPD features. Parents completed an adapted version of the BPFS (BPFS-P; Sharp et al. 2010) where items from the original measure were transformed from a first to third person point of view (i.e. "I feel very lonely" was replaced with "My child seems to feel very lonely"). Beyond the original development samples (Crick et al. 2005; Sharp et al. 2010), prior research has demonstrated adequate psychometric properties for the both the BPFS-C and BPFS-P. Chang et al. (2011) found the youth and parent report scales to have adequate internal consistency

(Cronbach's alpha = 0.892 and 0.885, respectively) in a sample of 51 adolescent inpatients ages 12 to 18. Additionally, the BPFS-P and BPFS-C demonstrated strong construct validity as they were at least moderately accurate in discriminating between adolescents with and without a diagnosis of BPD, as determined by diagnostic interview (Chang et al. 2011). In the current sample, both the BPFS-C (24 items; $\alpha = 0.89$) and BPFS-P (24 items; $\alpha = 0.89$) were found to be highly reliable.

Indices of Psychiatric Severity

The Childhood Interview for DSM-IV Borderline Personality Disorder (CI-BPD; Zanarini 2003) is a semistructured interview designed to assess BPD in children and adolescents. Items were adapted from the Diagnostic Interview for Personality Disorders (DIPD) and modified (Zanarini 2003) to contain age appropriate content and structure. The interview includes 9 criteria reflecting symptoms of BPD and each is scored on a 0–2 scale (0 – symptom is absent; 1 – symptom probably present; 2 – symptom definitely present). Five criteria at a score of "2" is required for a diagnosis of BPD. In a sample of 190 inpatient adolescents ages 12 to 17, the CI-BPD demonstrated good internal consistency ($\alpha = 0.80$) and excellent interrater reliability ($\kappa = 0.89$; Sharp et al. 2009). Additionally, the CI-BPD was found to have strong convergent and criterion validity. Continuous scores on the CI-BPD were significantly correlated with scores on the BPFS-C ($r = 0.60$, $p < 0.001$), BPFS-P ($r = 0.28$, $p < 0.001$), and borderline scale of the adolescent PAI ($r = 0.66$, $p < 0.001$; Morey 2007) and independent sample t-tests confirmed that CI-BPD diagnoses were significantly related to each measure of BPD (Sharp et al. 2012). In the current sample, 3-way agreement ($\kappa = 0.627$, $p < 0.0005$) between raters on item 10 of the CI-BPD (0 – BPD absent; 1 – subthreshold for BPD criteria; 2 – meets five or more BPD criteria) and two-way ($\kappa = 0.779$, $p < 0.0005$) agreement between raters (0 – BPD absent or sub-threshold; 1 – BPD present) was good. In the current study, only the CI-BPD continuous score (each item scored 0–2 and summed) was utilized as an index of psychiatric severity.

The Youth Self Report and Child Behavior Checklist (YSR & CBCL; Achenbach and Rescorla 2001) are self- and parent-report questionnaires intended for adolescents aged 11–18 and their parents. The YSR has 112 items and the CBCL has 113, assessing the youth's problem behaviors. Each item is rated on a 3-point scale (0 – not true; 1 – somewhat or sometimes true; 2 – very or often true). Each measure contains subscales related to specific concerns (i.e. somatic complaints, thought problems, aggressive behavior) and subscales which summarize scores in general problem areas (i.e. internalizing vs. externalizing problems). Finally, a total problem score is computed by summing the internalizing and

externalizing problem subscales. In the current study, only the total problems raw score was utilized in analyses.

The Diagnostic Interview Schedule for Children – Computerized Version (NIMH DISC IV; Shaffer et al. 2000) is a structured clinical interview assessing DSM-IV Axis 1 diagnoses in children in adolescents (ages 9–17). The DISC-IV parent and youth interviews demonstrated generally adequate validity ($\kappa = 0.23$–0.79) in a community sample of 247 parent-child pairs. Further, generally adequate diagnostic test-retest reliability was found for both parent ($\kappa = 0.43$–0.96) and youth ($\kappa = 0.25$–0.92) interviews in a clinical sample of 84 parents and 82 children ages 9 to 17 (Shaffer et al. 2000). In the current study, interviews were administered by trained research staff to both parents and adolescents and each diagnosis was subsequently coded: $0 =$ no diagnosis, $1 =$ intermediate diagnosis, $2 =$ positive diagnosis. Diagnoses were combined into five dichotomous "yes or no" categories, indicating whether an adolescent had any depressive, bipolar, eating, externalizing or anxiety disorder. This resulted in a continuous total score (out of 5) on both the Y-DISC and P-DISC, which were used as two indices of psychiatric severity.

The Deliberate Self-Harm Inventory (DSHI; Gratz 2001) is a 17-item self-report questionnaire which assesses frequency, severity, duration and type of self-harm behavior. For each form of self-harm, adolescents respond yes or no whether they have engaged in that type of self-harm. If yes, they then indicate the age they first engaged in this behavior, how many times they have done this, the last time, for how many years and whether this behavior has ever resulted in hospitalization or required medical treatment. Total scores are then calculated indicating how many types of behavior the adolescent has engaged in. In the measure development study of 150 students ages 18 to 64, the DSHI was found to have high internal consistency ($\alpha = 0.82$) and adequate test-retest reliability ($\varphi = 0.68$, $p < 0.001$; Gratz 2001). Additionally, the DSHI was significantly, moderately correlated with measures of self-harm ($r = 0.35$–0.49, $p < 0.001$) and borderline personality ($r = 0.48$, $p < 0.001$) and less significantly correlated with unrelated variables such as number of suicide attempts ($r = 0.20$–0.21, $p < 0.05$) or age (-0.11, $p <$ NS) demonstrating adequate construct, convergent and discriminant validity for the measure (Gratz 2001).

Internal Psychological Resources

The Difficulties in Emotion Regulation Questionnaire (DERS; Gratz and Roemer 2004) is a 36-item self-report questionnaire assessing 6 components of emotion regulation: nonacceptance of emotional responses, difficulties engaging in goal directed behavior, impulse control challenges, lack of emotional awareness, deficits in emotion regulation strategies and lack of emotional clarity. Each item is rated on a 5-point Likert scale (1 – almost never/0–10% - 5 – almost always/91–

100%). Higher subscale and total scores reflect greater difficulties within an area of emotion regulation or greater difficulties overall. In the current sample, the DERS demonstrated excellent internal consistency ($\alpha = 0.95$). In the current study, only the DERS total score was utilized as an index of internal psychological resources.

The Avoidance and Fusion Questionnaire for Youths (AFQ-Y; Greco et al. 2008) is a 17-item self-report questionnaire assessing two components of psychological inflexibility in youth: cognitive fusion and experiential avoidance. It was adapted from a measure assessing the same construct in adults: The Acceptance and Action Questionnaire (Hayes et al. 2004). Each item is rated on a 5-point Likert scale ranging from 0 (not at all) to 4 (very true). Sample items include: "The bad things I think about myself must be true" and "I am afraid of my feelings". Items are summed to compute one total score where higher scores indicate greater cognitive fusion and experiential avoidance. In the current sample, the AFQ-Y demonstrated nearly excellent internal consistency ($\alpha = 0.89$).

Data Analysis Plan

Latent class/profile analysis (LCA) was performed using M-Plus 7 (Muthén and Muthén 1998-2014) to test for sub-group structures among parent-adolescent dyads on the BPFS-C and BPFS-P. LCA segregates data into classes within which the child-parent dyads are statistically different from one another. In most LCA applications, the objective is finding classes that differ with respect to their means (Vermunt & Magidson 2002). Allowing different correlations implies that correlations may be class specific. Several models were estimated with varying parameterizations (Pastor & Gagné 2013). Specifically, we evaluated a) incremental models where means and/or the correlation between parent and child report of psychopathology were freely estimated within class and b) multiple models to determine class enumeration (number of classes). A combination of criteria can be used to guide the decision of number of classes in LCA along with theoretical viability and clinical significance (Vermunt & Magidson 2002; Pastor & Gagné 2013). We used the following criteria to evaluate overall model adequacy; however, the optimum and most parsimonious model was determined by the best match between lower model fit (sample-adjusted BIC) and loglikelihood (LL), and number of parameters estimated as these indices are superior to other information criteria and likelihood statistics (Nylund et al. 2007; Tofighi and Enders 2008; Yang 2006). (1) Akaike's information criteria (AIC), the Bayesian information criterion (BIC) and the sample-adjusted BIC (SABIC) were used to evaluate relative model fit, where smaller values indicate a better fit to the data. (2) The Vuong-Lo-Mendell (VLM) and the Lo-Mendell-Rubin Adjusted (LMR) Likelihood Ratio tests, which test the superiority of a k-class model versus a k-1 class model. Non-significant

p-values on the VLM and LMR LRT indicate adequate model fit of the k-class model. (3) Number of parameters estimated, where lower numbers indicate more parsimonious models. (4) Entropy, where higher values indicate better separation of classes. Missing data were handled using maximum likelihood estimation with robust standard errors in M-Plus as this approach provides the least biased estimates when data are missing at random. As a second step, to determine whether class membership made unique contributions to each outcome variable, the latent classes from LCA, along with gender, parent gender and age, were entered into generalized linear models (GLM) using SAS PROC GLM. A total of eight univariate GLM models were estimated. Note that the interaction between adolescent and parent gender was not significant in any of the models, and was therefore excluded from the final models.

Results

Descriptive Statistics

Sample wide, the average total BPFS-C score was 70.05 ($SD = 15.64$; range: 30–113) and 71.63 for the BPFS-P ($SD = 14.27$; range: 31–116). Paired sample t-tests of the BPFS-P and BPFS-C revealed this mean difference was non-significant (t (576) = 1.602, $p < 0.110$, $d = 0.08$). The correlation between the BPFS-C and BPFS-P was moderate but significant ($r = 0.26$, $p < 0.0001$), but this correlation is due to mixing classes of convergent and divergent responses. The correlation was higher and significant for the convergent groups ($r = 0.41$, $p < 0.0001$) and non-significant for the divergent group ($r = -0.07$, $p = 0.17$) from the final model described below. Sample descriptive statistics for all measures are presented in Table 1.

Latent Class Analysis

Table 2 provides the model fit statistics for models ranging from a 2-class to 10-class solution. We report the results of models in which classes differed with respect to their means rather than means and correlations because the latter set of models estimated additional parameters and did not result in substantively different solutions. All models were evaluated to assess for the presence of ordered classes (i.e., classes that are not qualitatively distinct but are ordered classes of the same form; Lubke et al. 2007). Based on the SABIC, the 3-, 4- and 5-class solutions provided the best fit to the data. The 4-class model resulted in 3 convergent classes and one divergent class. The 5-class model resulted in an additional divergent class. We chose the 3-class solution (k) as the final model because it estimated the lowest numbers of parameters, and because the additional classes in the 4-class (k + 1) and 5-class

(k + 2) models represented qualitatively similar classes to the 3-class models but at different levels of severity (viz., the convergent classes (described below) were separated into moderate, moderate-to-high and high severity). In addition, the models with higher number of classes included class proportions <0.06. Thus, the 3-class solution represented lowest number of classes required to optimally account for the parent-adolescent dyads. Furthermore, we re-ran the GLM analyses from the second step with the 4 classes and the pattern of results remained similar as when the number of classes were 3.

In the final model, three significant classes of dyads emerged (see Fig. 1). Overall, divergence was observed in the lower end of the BPD distribution. Class 1 ($N = 98$) consisted of divergent parent-adolescent dyads, where paired sample t-tests revealed significantly higher means on the BPFS-P ($M = 67.54$, $SD = 15.30$) than the BPFS-C ($M = 45.08$, $SD = 5.71$); t (86) = 12.67, $p < 0.001$, $d = 1.95$. Class 2 ($N = 140$) consisted of convergent parent-adolescent dyads, with both informants reporting high levels of borderline features but adolescents reporting significantly more on the BPFS-C ($M = 89.75$, $SD = 7.66$) than parents on the BPFS-P ($M = 82.74$, $SD = 11.06$); t (135) = 5.77, $p < 0.001$, $d = 0.74$. Class 3 ($N = 405$) consisted of convergent parent-adolescent dyads reporting moderate levels of borderline features, where no significant differences existed between parents ($M = 68.55$, $SD = 12.97$) and adolescents ($M = 69.42$, $SD = 8.00$) on the BPFS; t (353) = 1.03, $p < 0.302$, $d = 0.08$. As shown in Fig. 1, adolescents in the divergent class (Class 1) reported lower levels of BPD features than adolescents in either of the convergent classes. However, parents in Class 1 reported levels of BPD features similar to parents in the moderate convergent class (Class 3). Descriptive statistics for each class are presented in Tables 3, 4 and 5. Table 6 contains the standardized solutions for all GLM models.

Relation between Latent Classes, Indices of Psychiatric Severity and Internal Resources

Evaluation of Potential Variables to Be Controlled for in Predictive Models For all variables, the effect of age was not significant. The effect of gender was significant for five out of eight outcome measures, including CIBPD ($F_1 = 25.19$, $p < 0.001$), Y-DISC ($F_1 = 12.31$, $p < 0.001$), DSHI ($F_1 = 11.49$, $p < 0.001$), AFQ ($F_1 = 10.93$, $p < 0.001$) and DERS ($F_1 = 11.44$, $p < 0.001$), and approached statistical significance on the YSR ($F_1 = 3.95$, $p = 0.05$). The results indicated that female adolescents scored significantly higher than males on these measures. Parent gender was only significant for the CBCL ($F_1 = 8.11$, $p < 0.001$). The results indicated that mothers rated adolescents significantly higher than fathers did on the CBCL.

Table 1 Sample descriptive statistics

	N	Minimum	Maximum	Mean	Std. deviation
Age in years	643	12	17	15.30	1.45
BPFS-C total score	623	30	113	70.05	15.64
BPFS-P total score	597	31	116	71.63	14.27
CI-BPD total score	619	0	18	8.42	4.90
YSR total problems raw score	619	5	155	75.58	29.17
CBCL total problems raw score	604	8	157	71.98	25.94
Y-DISC total	572	0	5	1.76	1.16
P-DISC total	603	0	5	1.75	1.03
DSHI total score	418	0	15	3.19	3.20
DERS total score	619	38	177	108.17	28.79
AFQ-Y total score	618	0	62	30.17	14.11
Valid N (listwise)	347				

BPFS-C: Borderline Personality Features Scale – Child; BPFS-P: Borderline Personality Features Scale – Parent; CI-BPD: Childhood Interview for Borderline Personality Disorder; YSR: Youth Self Report; CBCL: Child Behavior Checklist; Y-DISC: Youth Diagnostic Interview Schedule for Children; P-DISC: Parent Diagnostic Interview Schedule for Children; DSHI: Deliberate Self-Harm Inventory; DERS: Difficulties in Emotion Regulation Questionnaire; AFQ-Y: Avoidance and Fusion Questionnaire-Youth

Differences between Classes on Indices of Psychiatric Severity and Internal Psychological Resources Class membership was significant for all outcome variables: CBCL ($F_2 = 18.28$, $p < 0.001$), YSR ($F_2 = 210.11$, $p < 0.001$), CIBPD ($F_2 = 120.94$, $p < 0.001$), DSHI ($F_2 = 25.20$, $p < 0.001$), Y-DISC ($F_2 = 45.12$, $p < 0.001$), AFQY ($F_2 = 101.58$, $p < 0.001$), DERS ($F_2 = 160.14$, $p < 0.001$) and P-DISC ($F_2 = 4.85$, $p < 0.05$). As shown in Table 6, the pattern of results suggested the high convergent class (Class 2) scored highest on all variables, followed by the moderate convergent class (Class 3) and the divergent class (Class 1), respectively. Class 2 was significantly different from Class 1 on all eight variables. Class 3 was significantly different from Class 1 only on the CIBPD, DSHI, YSR, Y-DISC, AFQ and DERS (see Table 6).
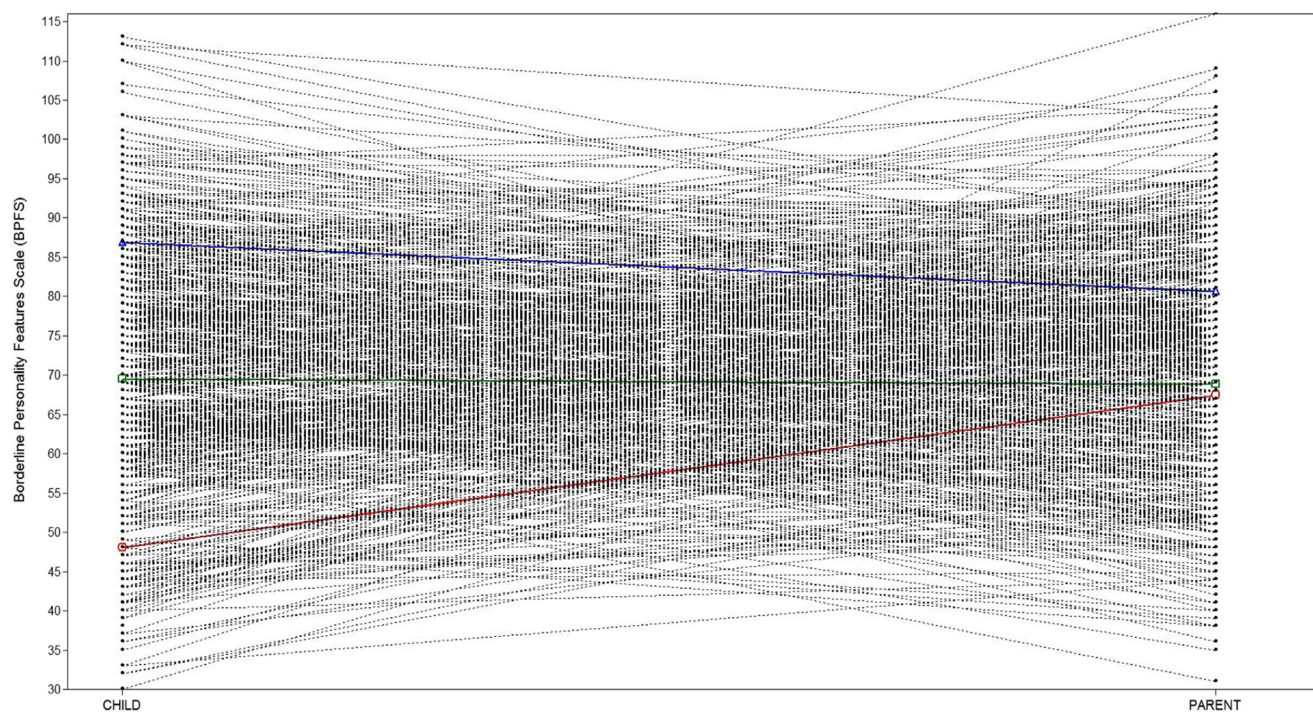
Discussion

It has long been known that reporting discrepancies and weak informant agreement is common among child-informant dyads (Achenbach et al. 1987). Recently, it has been demonstrated that convergence or divergence between informant reports is often statistically and clinically significant if appropriately interpreted (De Los Reyes et al. 2013). Investigating concordance between parents and children or adolescents on reports of psychopathology appears to be meaningful for identifying youth at a greater risk for emotional or behavioral problems, determining severity or prognosis of youth psychopathology and for informing diagnoses (De Los Reyes et al. 2016; De Los Reyes et al. 2015). However, a clear gap exists in the literature for evaluating patterns of informant

Table 2 Model fit indices and number of convergent and divergent classes

Classes	Parameters	SABIC	AIC	BIC	LL	Entropy	VLM LRT	LMR LRT	Convergent	Divergent
2	7	10,035.27	10,026.23	10,057.50	−5006.12	0.45	0.00	0.00	2	0
3	10	10,033.76	10,020.85	10,065.51	−5000.43	0.59	0.13	0.14	2	1
4	13	10,029.65	10,012.86	10,070.92	−4993.43	0.72	0.10	0.11	3	1
5	16	10,033.08	10,012.42	10,083.88	−4990.21	0.52	0.19	0.17	3	2
6	19	10,037.87	10,013.33	10,098.19	−4987.67	0.72	0.48	0.49	3	3
7	22	10,041.75	10,013.34	10,111.60	−4984.67	0.61	0.61	0.63	4	3
8	25	10,045.67	10,013.39	10,125.05	−4981.70	0.63	0.31	0.32	5	3
9	28	10,050.36	10,014.21	10,139.26	−4979.10	0.67	0.06	0.06	4	5
10	31	10,055.64	10,015.61	10,154.06	−4976.81	0.68	0.45	0.46	4	6

A cut-off score of 15 points on the BPFS was used to determine convergent (range = 1–14 points) and divergent (range = 15–40 points) classes. AIC = Akaike information criteria; BIC = Bayesian information criteria; SABIC = sample-adjusted BIC; LL = loglikelihood; VLM LRT = Vuong-Lo-Mendell likelihood ratio test; LMR LRT = Lo-Mendell-Rubin likelihood ratio test

note. class 1 = circle - red line; class 2 = triangle – blue line; class 3 = square - green line.

Fig. 1 Estimated means and observed individual values

concordance and its predictive value in adolescent personality pathology. Therefore, the current paper had two aims. The first was to identify general patterns of agreement between parent and adolescent reports of borderline personality features. The second was to examine the relation between informant convergence or divergence and clinically-relevant outcomes.

Latent-class analysis of adolescent borderline personality features identified three classes of parent-adolescent dyads.

Class 1 consisted of divergent parent-adolescent dyads with parents reporting significantly higher levels of borderline features than adolescents. Class 2 consisted of convergent parent-adolescent dyads where both informants reported high levels of adolescent borderline features. Although adolescents in Class 2 reported statistically significantly more borderline features than parents, as determined by paired-sample t-test, this difference was not clinically significant. Parent and adolescent reports in

Table 3 Class 1 (divergent class) descriptive statistics

	N	Minimum	Maximum	Mean	Std. deviation
Age in years	98	12	17	15.35	1.49
BPFS-C total score	98	30	54	44.83	6.05
BPFS-P total score	87	38	108	67.54	15.30
CI-BPD total score	96	0	17	4.21	3.81
YSR total problems raw score	95	5	105	41.03	20.51
CBCL total problems raw score	88	20	128	67.67	25.67
Y-DISC total	93	0	3	0.91	0.95
P-DISC total	90	0	4	1.60	1.03
DSHI total score	68	0	8	1.09	1.85
DERS total score	97	38	126	72.88	22.55
AFQ-Y total score	98	0	44	15.36	11.59
Valid N (listwise)	56				

BPFS-C: Borderline Personality Features Scale – Child; BPFS-P: Borderline Personality Features Scale – Parent; CI-BPD: Childhood Interview for Borderline Personality Disorder; YSR: Youth Self Report; CBCL: Child Behavior Checklist; Y-DISC: Youth Diagnostic Interview Schedule for Children; P-DISC: Parent Diagnostic Interview Schedule for Children; DSHI: Deliberate Self-Harm Inventory; DERS: Difficulties in Emotion Regulation Questionnaire; AFQ-Y: Avoidance and Fusion Questionnaire-Youth

Table 4 Class 2 (convergent-high class) descriptive statistics

	N	Minimum	Maximum	Mean	Std. deviation
Age in years	140	12	17	15.08	1.47
BPFS-C total score	139	73	113	89.71	7.59
BPFS-P total score	137	50	116	82.80	11.04
CI-BPD total score	135	0	18	12.90	3.84
YSR total problems raw score	139	45	155	103.06	22.68
CBCL total problems raw score	135	10	157	85.52	26.84
Y-DISC total	120	0	5	2.39	1.10
P-DISC total	132	0	4	1.98	1.02
DSHI total score	95	0	13	4.79	3.21
DERS total score	139	57	175	129.29	19.73
AFQ-Y total score	136	9	60	38.97	11.52
Valid N (listwise)	78				

BPFS-C: Borderline Personality Features Scale – Child; BPFS-P: Borderline Personality Features Scale – Parent; CI-BPD: Childhood Interview for Borderline Personality Disorder; YSR: Youth Self Report; CBCL: Child Behavior Checklist; Y-DISC: Youth Diagnostic Interview Schedule for Children; P-DISC: Parent Diagnostic Interview Schedule for Children; DSHI: Deliberate Self-Harm Inventory; DERS: Difficulties in Emotion Regulation Questionnaire; AFQ-Y: Avoidance and Fusion Questionnaire-Youth

this Class differed by only 7 points and both informants indicated that adolescents demonstrated clinically significant borderline features as determined by a cutoff of 66 and 72 on the BPFS-C and BPFS-P, respectively. This contrasts with the results of divergent Class 1 where there was an informant difference of nearly 23 points. This difference in parent and adolescent reports was clinically significant. Adolescents indicated that they had low levels of borderline features, while parent reports indicated they had moderate (subthreshold) levels of borderline features. Based on this interpretation, Class 2 was deemed a convergent Class, despite the statistical difference between BPFS-C and BPFS-P scores. Class 3 consisted of

convergent parent-adolescent dyads where both informants reported moderate levels of adolescent borderline features.

With regard to our first hypothesis, parents reported higher levels of borderline features than adolescents, overall. However, this difference was not statistically significant and overall informant concordance on the BPFS was modest. Consistent with our second hypothesis, the convergent class high in BPD features (Class 2), compared with the other two classes, showed significantly higher levels of psychopathology as indexed by elevated scores on measures of internalizing and externalizing psychopathology, interview-based measures of psychiatric syndromes and borderline pathology and self-

Table 5 Class 3 (convergent-moderate class) descriptive statistics

	N	Minimum	Maximum	Mean	Std. deviation
Age in years	405	12	17	15.36	1.43
BPFS-C total score	386	54	90	69.38	7.95
BPFS-P total score	373	31	101	68.48	12.95
CI-BPD total score	388	0	18	7.89	4.24
YSR total problems raw score	383	12	136	73.95	22.40
CBCL total problems raw score	381	8	157	71.98	25.94
Y-DISC total	358	0	4	1.76	1.09
P-DISC total	377	0	5	1.70	1.02
DSHI total score	255	0	15	3.15	3.16
DERS total score	383	43	177	109.45	24.35
AFQ-Y total score	384	0	62	30.83	12.48
Valid N (listwise)	213				

BPFS-C: Borderline Personality Features Scale – Child; BPFS-P: Borderline Personality Features Scale – Parent; CI-BPD: Childhood Interview for Borderline Personality Disorder; YSR: Youth Self Report; CBCL: Child Behavior Checklist; Y-DISC: Youth Diagnostic Interview Schedule for Children; P-DISC: Parent Diagnostic Interview Schedule for Children; DSHI: Deliberate Self-Harm Inventory; DERS: Difficulties in Emotion Regulation Questionnaire; AFQ-Y: Avoidance and Fusion Questionnaire-Youth

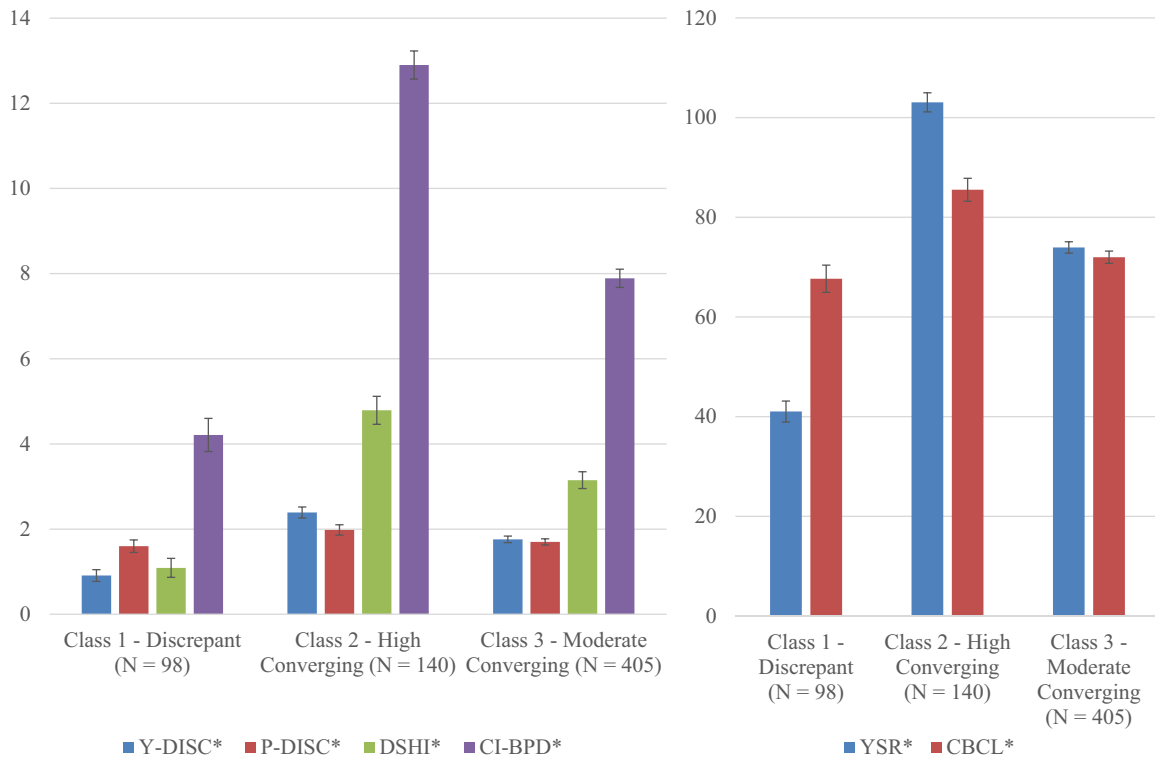**Table 6** Parameter estimates [B (SE)] of GLM models by outcome variable

	Indices of psychiatric severity						Internal resources	
	CIBPD	YSR	CBCL	Y-DISC	P-DISC	DSHI	DERS	AFQ-Y
Intercept	3.42 (0.58)**	37.80 (3.18)**	60.51 (4.00)**	0.68 (0.16)**	1.60 (0.15)**	0.56 (0.50)	70.21 (3.24)**	12.99 (1.70)**
Gender (female)	1.74 (0.35)**	3.80 (1.91)*	0.42 (2.36)	0.31 (0.09)**	−0.13 (0.09)	1.04 (0.31)**	6.70 (1.98)**	3.44 (1.04)**
Age	0.06 (0.12)	−0.18 (0.63)	−0.76 (0.77)	0.00 (0.03)	−0.05 (0.03)	−0.03 (0.10)	−0.31 (0.65)	0.12 (0.34)
Parent gender (female)	−0.21 (0.44)	1.35 (2.39)	8.45 (2.97)*	0.07 (0.12)	0.09 (0.11)	−0.01 (0.38)	−1.19 (2.45)	0.58 (1.29)
Class 2 (convergent - high) vs. Class 1	8.27 (0.55)**	61.10 (2.99)**	17.57 (3.78)**	1.41 (0.15)**	0.39 (0.14)*	3.42 (0.48)**	54.68 (3.08)**	22.84 (1.62)**
Class 3 (convergent - moderate) vs. Class 1	3.62 (0.46)**	32.69 (2.55)**	1.51 (3.23)	0.82 (0.12)**	0.11 (0.12)	1.99 (0.41)**	36.22 (2.62)**	15.25 (1.37)**

$* p < 0.05$; $** p < 0.001$; CI-BPD: Childhood Interview for Borderline Personality Disorder; YSR: Youth Self Report; CBCL: Child Behavior Checklist; Y-DISC: Youth Diagnostic Interview Schedule for Children; P-DISC: Parent Diagnostic Interview Schedule for Children; DSHI: Deliberate Self-Harm Inventory; DERS: Difficulties in Emotion Regulation Questionnaire; AFQ-Y: Avoidance and Fusion Questionnaire-Youth

harm, as well as more limited access to internal resources as evidenced by higher scores in emotion dysregulation and experiential avoidance. The discrepant class (Class 1) showed the lowest levels of overall psychopathology and greater access to internal psychological resources.

The current studies first major finding (that concordance for high levels of BPD features is related to poorer outcomes), is not surprising given the often-severe nature of BPD symptomology. It is to be expected and frequently observed that adolescents reporting high levels of borderline features also report high levels of general internalizing and externalizing symptomology, as well as significant problems with emotion dysregulation and self-harm. However, even dyads in the concordant class with moderate levels of BPD features (Class 3) reported clinically significant levels of general psychopathology on both the YSR and CBCL, and had only slightly lower incidences of self-harm and scores on other outcome measures.

Compared to the two convergent classes (Class 2 and 3), adolescents in the divergent class (Class 1) evidenced clinically low levels of BPD features, benign levels of general psychopathology and increased access to internal psychological resources, even though their parents rated them moderately high on levels of borderline pathology and general psychopathology. Given prior data suggesting that parents take notice of and report on their teens externalizing problems more than their internalizing problems, it is possible that adolescents in Class 1 were rated higher in BPD features by their parents based on externalizing features of their psychopathology. However, on average, adolescents in Class 1 demonstrated low levels of general psychopathology as evidenced by their scores on the YSR, Y-DISC, CI-BPD and DSHI – each of which contains large externalizing components. Therefore, there was no evidence to suggest that youth in Class 1 displayed any more externalizing features than their counterparts in Class 2 or 3. On the CBCL, parents in Class 1 scored their adolescents much higher than teens did themselves on the YSR. Finally, in Class 1, the average number of diagnoses endorsed on the P-DISC was higher than C-DISC. In summary, in Class 1, all comparable parent-adolescent measures displayed a clear pattern (Figs. 2 and 3) of higher reports of psychopathology by parents (BPFS-P > BPFS-C; CBCL > YSR; P-DISC > Y-DISC). This pattern contrasts with the reporting pattern seen in Class 2 and 3, where adolescents consistently reported higher levels of psychopathology than parents on all measures. Additionally, adolescents in Class 1 demonstrated the greatest capacity for emotion regulation and emotional acceptance as measured by the DERS and AFQ-Y, respectively. This further suggests that adolescents in Class 1 have low levels of borderline features, given that emotion dysregulation and experiential avoidance are strong correlates of BPD and given high borderline
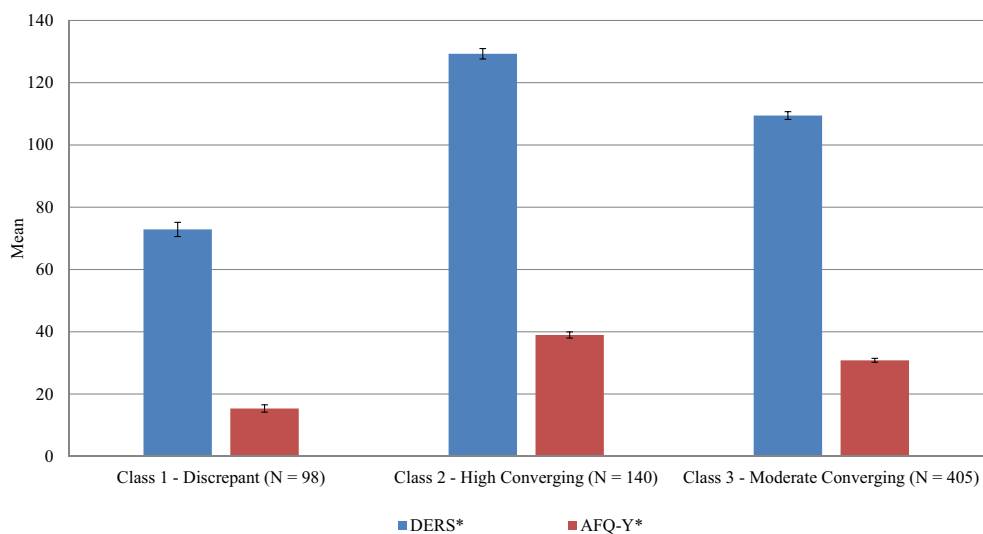
note. CI-BPD: Childhood Interview for Borderline Personality Disorder total score; Y-DISC: Youth Diagnostic Interview Schedule for Children total; P-DISC: Parent Diagnostic Interview Schedule for Children total; DSHI: Deliberate Self-Harm Inventory total score; YSR: Youth Self Report raw total problems score; CBCL: Child Behavior Checklist raw total problems score

Fig. 2 Bar chart of means and standard errors by class for indices of psychiatric severity

features, one would expect an individual to concurrently exhibit challenges with both emotion regulation and emotional acceptance.

Although it is possible that adolescents in Class 1 simply under-reported their psychopathology across all domains, it is

unlikely that these youth admitted to an inpatient psychiatric unit could uniformly under-report symptomology and over-report adaptive skills in both self-report and interview assessment across a number of psychopathological domains. Additionally, it is important to note that although adolescents

*'s indicate indices of internal psychological resources significantly predicted by latent class membership

note. DERS: Difficulties in Emotion Regulation Questionnaire total score; AFQ-Y: Avoidance and Fusion Questionnaire-Youth total score

Fig. 3 Bar chart of means and standard errors by class for internal psychological resources

in Class 1 do appear to have lower levels of borderline features and clinical severity compared to their peers, they have not altogether disavowed symptomology and do indeed experience clinically significant levels of internalizing and externalizing distress. Our findings do not indicate that these adolescents are healthy, but rather that they exhibit overall less severe psychopathology and appear to have greater access to beneficial psychological resources. Together, these findings suggest that adolescents in the discrepant class (Class 1) do indeed have low levels of borderline features, but that their parents are inflating their personality pathology and internalizing-externalizing psychopathology for some reason that the current data cannot answer. What exactly may be causing this inflation should be a focus of future research. Consistent with Sharp et al. (2010), it appears that when considering BPD, adolescents themselves may be the most reliable informant, and if a clinician can only use self-report or parent report, the former might more accurately identify the adolescent's level of borderline features.

Limitations and Future Directions

The current study makes significant contributions to the study of parent-adolescent concordance and the utility of informant report discrepancy in adolescent personality pathology.

However, the current study does contain some limitations. As an inpatient sample, these findings may not generalize to community or outpatient samples. Additionally, the current sample was lacking in diversity, being predominantly Caucasian. It is possible that parents and adolescents of differing races, ethnicities or SES may report on borderline features differently. Future studies may conduct similar analyses in diverse population samples to replicate findings.

The current study also has some methodological limitations. First, it is unable to answer questions raised regarding the discrepant classes (Class 1) parental inflation of personality pathology. Here, we have speculated about the possible causes of this result based on interpretation of all outcome variables, however this finding was unexpected and therefore the current study was not designed to investigate this further. Future studies may aim to replicate these patterns of parent-adolescent concordance and/or investigate parental variables which could explain the significant inflation of personality pathology seen in Class 1. Secondly, the independent variable used to determine parent-adolescent concordance (the BPFS) and most outcome measures were self-report by the same two informants (parent and adolescent). This may contribute to criterion contamination of results as both predictor and outcome measures were completed by the same informant. Somewhat mitigating these concerns is the fact that two of the outcome measures used in the current study (the DISC and CI-BPD) were clinician-rated interviews and

similar patterns of results were maintained as when self-report measures were used as outcomes. Still, future research should aim to conduct similar analyses using predictors and outcomes from fully independent sources. For example, studies may conduct similar analyses using an interview-based measure of BPD as the independent variable and measure of informant concordance as opposed to self-report on the BPFS.

Future research should continue to examine parent-adolescent concordance on measures of personality pathology in clinical samples. As discussed in the introduction of the current paper, the topic of parent-adolescent concordance for personality pathology has produced mixed findings, most probably due to differences in study designs employed in prior work. For instance, studies have typically made use of only community samples, compared inpatients to outpatients, employed interview-based or dimensional personality measures, or used inappropriate analytic techniques. For instance, Sharp et al. (2010) demonstrated higher levels of endorsement of borderline traits by adolescents compared to their parents – the opposite of what was found in the current study overall, and in the divergent class. It is therefore possible that discrepancies may manifest differently in typical and atypical samples. As more research in this area replicates findings, it will be easier to draw firm conclusions about discrepancy. Another valuable avenue for future research in this regard are direct comparisons of discrepancy in the context of personality pathology compared to internalizing and externalizing pathology. It may also be informative to include a third informant when conducting LCA. For example, the inclusion of a clinician-administered measure of BPD could reveal different latent classes and reveal more detailed patterns of parent-adolescent, parent-adolescent-clinician, adolescent-clinician or parent-clinician concordance.

Notwithstanding the above limitations, the current study makes significant contributions to literature investigating adolescent personality pathology, parent-adolescent concordance on reports of psychopathology as well as literature surrounding the utility and validity of informant report. Findings suggest that both parents and adolescents tend to agree when an adolescent's level of borderline features are high. Additionally, these adolescents on average appear to meet interview-based criteria for BPD and exhibit greater clinical severity than their peers who report lower levels of borderline features. Together, these findings suggest that the concordance between parents and adolescents on brief, questionnaire-based measures of borderline features may be a clinically useful approach for assessing psychiatric severity in high-volume, time-restrictive settings. Additionally, patterns of informant concordance and their relation to clinical severity suggest that preference may be reliably granted to adolescent self-report of BPD when it disagrees with parental report.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval 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.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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