Borderline personality disorder in adolescents: evidence in support of the Childhood Interview for *DSM-IV* Borderline Personality Disorder in a sample of adolescent inpatients

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Abstract

Empirical evidence is increasing in support of the validity of the construct of borderline personality disorder (BPD) in adolescence. There is growing consensus that the early identification and treatment of emerging borderline traits may be an important focus. However, few diagnostic (questionnaire- or interview-based) measures specifically developed or adapted for adolescents and children exist. The Childhood Interview for *DSM-IV* Borderline Personality Disorder (CI-BPD) [Zanarini, 2003] is a promising interview-based measure of adolescent BPD. Currently, no studies have explicitly been designed to examine the psychometric properties of the CI-BPD. The aim of the current study was to examine various psychometric properties of the CI-BPD in an inpatient sample of adolescents (n = 245). A confirmatory factor analytic approach was used to examine the internal factor structure of the 9 CI-BPD items. In addition, internal consistency, interrater reliability, convergent validity (with clinician diagnosis and 2 questionnaire-based measures of BPD), and concurrent validity (with Axis I psychopathology and deliberate self-harm) were examined. Similar to several adult studies, the confirmatory factor analytic results supported a unidimensional factor structure for the CI-BPD, indicating that the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*, criteria on which the CI-BPD is based constitute a coherent combination of traits and symptoms even in adolescents. In addition, other validity criteria were excellent. Taken together, the current study provides strong evidence for the validity of the CI-BPD for use in adolescents.
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1. Introduction

Borderline personality disorder (BPD) is a serious disorder that has been linked to high rates of suicide completion in adults, ranging from 4% to 10% [1]. BPD represents a significant burden to society in terms of distress and burden placed on medical and mental health communities, as well as families [2-4]. Despite the fact that BPD typically emerges in adolescence [5], it was not until the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) [6] that the diagnosis of BPD in youth was permitted. The same diagnostic criteria used in diagnosing adult BPD were retained in making this extension, but the duration of symptom presentation was reduced from 2 years to 1, with the qualification that the

characteristic personality traits were expected to be pervasive, persistent, and not limited to the developmental period of adolescence or to an episode of an Axis I disorder.

Despite this allowance, diagnosing youth with BPD has engendered a great deal of reluctance for several reasons. First, the diagnosis of personality disorders in adolescents is associated with controversy [2,7,8] because of the perception that personality is unstable in adolescence [9], the stigma associated with a diagnosis of personality disorder, and the suggestion that symptoms of BPD are better explained by Axis I symptoms [10]. However, there has been a steady increase in evidence supporting the diagnosis of juvenile BPD [11-13], including evidence for longitudinal continuity [14-16], a genetic basis [17-19], overlap in the latent variables underlying symptoms [20-22] and the risk factors [23-25] for adolescent BPD and the full-blown adult disorder, and evidence for marked separation of course and outcome of adolescent BPD and other Axis I and Axis II disorders [10,14,26,27]. As in adults, children and

adolescents diagnosed with the disorder have increased rates of hospitalization because of suicidal ideation or attempts [28]; more severe Axis I pathology [29], as also shown by the work of Chanen et al [30]; and poorer clinical and psychosocial functioning compared with other personality disorders [10]. Together, the work of Chanen et al and the Child in the Community Study have pointed to the importance of early intervention and prevention of the disorder in youth [10,30] because research has suggested the malleability of BPD symptoms in adolescence [31].

Early intervention is, however, hampered by a general lack of valid and reliable measures to identify adolescents with BPD traits. Currently, there is only 1 published interview-based measure specifically adapted for use in children and adolescents. The Childhood Interview for *DSM-IV* Borderline Personality Disorder (CI-BPD) [32] was developed specifically for use with youth, but published studies examining its psychometric properties are lacking. Three published studies that we are aware of have used it, but none of them have explicitly investigated the psychometric properties of the CI-BPD. Zanarini et al [33] used it in a sample of 6410 11-year-old children in the United Kingdom. Children were interviewed in person by a trained rater. This yielded 6330 (98.8%) interviews with complete data. Of those with complete data, 3273 (51.7%) were girls and 3057 (48.3%) were boys. Interrater reliability using taped interviews of 30 children revealed κ values ranging from 0.36 to 1.0, with a median value of 0.88. Overall, 86% of the κ values were in the excellent range of greater than 0.75. The CI-BPD was used in 2 additional studies, both showing significant κ's with clinician ratings of BPD diagnosis [34,35]. Together, these studies are promising for the criterion validity of the CI-BPD, but as yet, no information exists on the internal factor structure of the CI-BPD, its concurrent and convergent validity, and interrater reliability in a study explicitly designed to examine the psychometric properties of the CI-BPD.

To this end, our study aimed to investigate the psychometric properties of the CI-BPD in a sample of adolescent inpatients ages 12 to 17 years. We used latent trait analyses to examine the measure's internal factor structure, expecting a unidimensional factor structure based on 6 studies supporting a unidimensional factor structure in adult patients [36-40], adult community samples [41], and a small adolescent sample of 60 French high school students [42]. Convergent validity was examined through the inclusion of 2 questionnaire-based measures of BPD especially designed for children and adolescents: the Borderline Personality Disorder Feature Scale for Children [27] and the Personality Assessment Inventory for Adolescents [43], in addition to clinician diagnosis. Concurrent validity was determined by examining relations with Axis I psychopathology, which included both parent-report and self-report questionnaire–based measures as well as an interview-based diagnostic measure. We expected that patients identified as borderline by the CI-BPD would have higher prevalence of both internalizing and externalizing problems as found by previous studies of adolescent BPD [44,45]. Concurrent validity was further determined by examining whether those identified as borderline on the CI-BPD had significantly higher frequencies of self-harm, suicidal behavior as suggested in adult [46] and adolescent studies [47], as well as higher levels of emotion dysregulation, as suggested by work in adults [48].

Against the background of a growing trend to view psychiatric disorders, especially personality, from a dimensional perspective rather than categorically [49–53], we examined the performance of the CI-BPD both categorically (5 of more criteria met) and dimensionally (0-2 scale scores on 9 CI-BPD items). A dimensional perspective may be particularly important for conceptualizing BPD pathology among youth because it is better able to account for developmental fluctuations and increased heterogeneity, which have been reported in younger samples [54].

2. Method

2.1. Participants

Consecutive admissions (n = 245) to an adolescent unit at an inpatient psychiatric clinic were administered a battery of self-report and interview-based assessments during the first 2 weeks of their stay. Parent reports were also obtained on this sample of 12- to 17-year olds. The average stay in the hospital was 4 to 6 weeks. In total, 44 subjects were excluded from the final analyses for various reasons. Following institutional review board protocol and ethical considerations, adolescents were not forced to complete all assessments and were not required to explain why they opted out of any individual assessment. On this basis, 20 patients declined participation in research. In addition, 9 were not consented because of language barrier or having an IQ of less than 70. Other exclusions included families who revoked consent (n = 2), psychotic disorder (n = 6), and early discharges before completion of the assessments (n = 7). After exclusions, 201 participants remained, of which an additional 11 were excluded from the final analyses because of missing CI-BPD data.

The final sample size was therefore n = 190, with a mean age of 15.39 years (SD = 1.45), of which 113 were females and 77 were male, and the sample was predominantly middle to upper-middle class, with 91.6% whites (n = 174) and 7.9% nonwhites (n = 15).

3. Measures

3.1. Borderline personality disorder

3.1.1. Childhood Interview for DSM-IV Borderline Personality Disorder

The CI-BPD [32] is a semistructured interview developed specifically for use with children and adolescents to assess

BPD. The interview was adapted from an adult assessment of *DSM-IV* personality disorders, with items modified from the borderline module of the Diagnostic Interview for Personality Disorders [55]. The youth version was adapted by Zanarini [32] for youth in the following ways: (1) the language was simplified, (2) 2 forms of impulsivity (ie, promiscuity and reckless driving) were omitted because it was thought that they would not be applicable to children, and (3) the interview was made more structured than its adult counterpart. A total of 9 criteria reflecting symptoms of BPD are rated using "0" for symptoms that are *absent*, "1" if the symptom is *probably present*, or "2" for symptoms that are *definitely present*. A minimum of 5 criteria scored "2" are required for a full diagnosis of BPD. Similar to the adult criteria for a *DSM-IV* diagnosis of BPD, the 9 criteria on the CI-BPD interview assess for clinical symptoms of inappropriate and intense anger, affective instability, chronic feelings of emptiness, identity disturbance, transient stress-related paranoid ideation or severe dissociative symptoms, fears of abandonment, recurrent suicidal behavior, gestures or threats or self-mutilating behavior, impulsivity, and a pattern of unstable and intense interpersonal relationships. A dichotomous score on the CI-BPD was used in the analyses to establish reliability and validity, with nondiagnosis scored "0" and full diagnosis of BPD scored "1."

Training on the CI-BPD involved several stages, which occurred in the following order: (1) didactic training by the first author (who was trained by the developers of the CI-BPD), (2) shadowing of interviews, (3) a practice interview with nonpatient, (4) interview with experienced interviewer critiquing, and finally, (5) independent interviews. All interviews were video recorded. Monthly consensus meetings were held as booster sessions where video recordings were reviewed as a group to assure fidelity to the interview-based measure.

3.1.2. Clinician diagnosis of BPD

Clinician diagnosis of BPD at discharge was used in this study. Discharge diagnosis was used because clinicians defer Axis II diagnosis at admission to obtain more information over time while adolescents are inpatients. Chart diagnoses were informed by input from multidisciplinary team members over the course of the adolescent stay. Full diagnosis of BPD was coded as "1," and no diagnosis or emerging traits were coded with a "0."

3.1.3. Personality Assessment Inventory for Adolescents

The Personality Assessment Inventory for Adolescents (PAI-A) [43] is a 264-item self-report measure of personality functioning that was adapted from the adult version of the Personality Assessment Inventory (PAI) with the goal of retaining the basic structure of the original test. A normative sample of 707 adolescents from ages 12 to 18 years was used in standardization, and stratification was used according to demographic variables including age, sex, and ethnicity. Items are worded for a fourth-grade reading level, and

adolescents are instructed to rate how true they think each statement is for them based on 4 response options ranging from "*false*," "*slightly true*," "*mainly true*," and "*very true*." Adequate psychometric properties have been demonstrated for the PAI-A [43], and comparable inter-item correlations with the adult version have been established. Similar to the adult version, the PAI-A has 22 nonoverlapping scales that are organized into 4 validity scales, 11 clinical scales, 5 treatment consideration scales, and 2 interpersonal scales. The PAI-A scale raw scores are converted to T scores that have a mean of 50 and SD of 10. We used the T score of the borderline scale (PAI-A BOR) and its relevant subscales (affective instability, BOR-A; identity problems, BOR-I; negative relationships, BOR-N; and self-harm, BOR-S). Research on the PAI BOR scales in the adult version has established adequate validity for all BOR scales [56]. To assess for suicidal ideation, we also use the T score on the PAI-A suicide (PAI-A SUI) scale.

3.1.4. Borderline Personality Features Scale for Children

The Borderline Personality Features Scale for Children (BPFSC) is a self-report measure developed to assess borderline personality features in children as young as 9 years old [27]. The measure was adapted from the borderline scale of the PAI [43] to assess affective instability, identity problems, negative relationships, and self-harm. Adolescents are asked to rate how they feel about themselves and others using a 5-point Likert scale with responses ranging from 1 "not at all true" to 5 "always true." A parent-report version (BPFSP) [45] has been developed from the self-report measure with the original items slightly modified from first person to third person point of view (eg "I feel very lonely" was replaced with "My child seems to feel very lonely"). Adequate psychometric properties have been demonstrated for both parent- and self-reported measures with concordant and concurrent validity established in a community sample [45], and criterion validity demonstrated in an inpatient sample of adolescents [34]. In the current study, dimensional scores were used for both parent- and self-reported borderline features. High scores indicate high levels of BPD symptoms, and low scores reflect low symptoms.

3.2. Axis I psychopathology

3.2.1. Youth Self-Report and Child Behavior Checklist

Parents and adolescents completed ratings of Axis I psychopathology. The Youth Self-Report (YSR) has 112 problem items, whereas the Child Behavior Checklist (CBCL) has 113 [57]. Both are well established self- and parent-report measures of psychopathology. Criterion and construct validity have been demonstrated for both parent and youth reports [57]. Both measures are scored using a 3-point scale with "0" for *not true*, "1" for *somewhat or sometimes true*, or "2" for *very or often true*. Eight syndrome scales make up the 2 broader scales for internalizing and externalizing problems in both adolescent and parent report forms. Anxious/depressed, withdrawn/depressed, and

somatic complaints subscales comprise the internalizing problem scale, and rule-breaking and aggressive behavior subscales are summed for the externalizing problem scale. A total problems scale is derived by summing all subscales including anxious/depressed, withdrawn/depressed, somatic complaints, social, thought, attention problems, aggressive and rule-breaking behaviors. For analyses, we used T scores for the internalizing, externalizing, and total problems scales.

3.2.2. Diagnostic Interview Schedule for Children—Computerized Version

The Diagnostic Interview Schedule for Children—Computerized Version (DISC-IV) [58] is a structured clinical interview used to assess for Axis I psychopathology in children and adolescents ages 9 to 17 years. The computerized version was used for this research, requiring the interviewer to read each question out loud from a computer screen and select a response based on the answer that the adolescent provides. The interviews were administered individually by trained staff in a private assessment room, and the length of interviews ranged from 1 1/2 to 2 hours. Positive diagnoses on the clinical reports of the DISC-IV were coded as "1," whereas both intermediate and negative diagnoses were coded as "0" for the analyses. Dichotomous summary scores were created for "any anxiety disorder" if criteria were met for any of the anxiety modules of the DISC-IV (social phobia, specific phobia, panic disorder, agoraphobia, generalized anxiety disorder, posttraumatic stress, and obsessive-compulsive disorders). A similar strategy was used for other diagnostic categories. A patient met criteria for "any depressive disorder" if s/he met criteria on either of the modules of dysthymia or major depressive disorder. A patient met criteria for "any bipolar disorder" if s/he met criteria on either of the modules of mania and hypomania. Finally, the anorexia and bulimia modules were coded as "any eating disorder," and modules for conduct disorder, oppositional defiant disorder, and attention-deficit/hyperactivity disorder were grouped into "any externalizing disorder."

3.3. Deliberate Self-Harm

The Deliberate Self-Harm Inventory (DSHI) [59] is a self-report measure containing 17 items assessing for the presence and frequency of various self-harm behaviors. Adequate psychometric properties have been reported with high internal consistency and good test-retest reliability [59]. In this study, we use the continuous total score on the DSHI. High scores reflect a high frequency of self-harm, and low scores indicate low frequency.

3.4. Emotion regulation

3.4.1. Difficulties in Emotion Regulation Scale

The Difficulties in Emotion Regulation Scale (DERS) [60] is a 36-item self-report assessment of emotion dysregulation. Adolescents are asked to rate the frequency of each statement using a Likert-type scale ranging from 1 (almost never) to 5 (almost always). A total score of emotion dysregulation is derived by summing all responses, with additional emotion regulation domains assessed for including (1) awareness and understanding of emotions, (2) acceptance of emotions, (3) the ability to engage in goal-directed behavior and refrain from impulsive behavior when experiencing negative emotions, (4) access to emotion regulation strategies perceived as effective, and (5) the flexible use of situationally appropriate strategies to modulate emotional responses [60]. For the purposes of this study, we used the total emotion dysregulation score, with higher scores indicating greater emotion regulation difficulties. Adequate psychometric properties of the measure and good internal consistency ($\alpha = .86$) have been reported [60].

3.5. IQ

The Wechsler Scales [61,62]: Wechsler Intelligence Scale for Children—Fourth Edition (WISC-IV) and Wechsler Adult Intelligence Scale—Fourth Edition (WAIS-IV), were used to assess for IQ in patients. These assessments are well-established, standardized measures for assessing IQ with good psychometric properties [63]. Clinicians administered this assessment to all adolescents unless it was determined that the patient was ineligible for testing because of active psychosis. Older patients 16 to 17 years old typically received the WAIS-IV, whereas younger patients (16 and younger) received the WISC-IV. For this study, we used the Full Scale IQ composite score.

3.6. Procedures

The study was approved by the local institutional review board. Parents and adolescents completed all self-report measures through a secure Web-based system developed by the inpatient facility. A trained research assistant remained in the assessment room to answer questions. Diagnostic interviews were administered individually and in private with patients by licensed clinicians, doctoral-level clinical psychology students, and trained clinical research staff, under the direct supervision of the principal investigator (first author). All assessments were completed by parents and adolescents within the first 2 weeks after admission.

3.7. Data analytic strategy

The factor structure of the 9 BPD criteria was examined using confirmatory factor analysis (CFA), performed using Mplus version 6.0 software Mplus, Los Angeles, CA [64]. Given the ordered categorical response format of the CI-BPD, a robust weighted least squares estimation procedure (WLSMV) was used. WLSMV has been found to perform well for 2 and 3 response categories [65,66]. Confirmatory factor analysis models with categorical indicators generally require large sample sizes to obtain accurate test statistics, parameter estimates, and standard errors [67]. However, for simple models with a modest number of indicators (as in the present investigation), sample sizes of 150 to 200 have been

Table 1
Descriptive statistics for main study variables

Study variable	n	Mean (SD)	Minimum	Maximum
Age	190	15.43 (1.42)	12	17
IQ	128	107.82 (13.12)	77	149
CBCL internalizing	181	70.48 (7.15)	47	86
CBCL externalizing	181	65.49 (9.58)	34	84
CBCL total	181	69.18 (6.76)	45	86
YSR internalizing	186	62.61 (12.59)	30	87
YSR externalizing	186	61.37 (10.99)	29	91
YSR total	186	63.68 (10.58)	36	88
BPFSC total	183	67.08 (18.20)	3	112
BPFSP total	171	72.44 (15.31)	31	116
PAI-A BOR	165	60.79 (12.79)	30	90
PAI-A BOR-A	165	60.12 (12.19)	35	81
PAI-A BOR-I	165	57.70 (11.82)	32	78
PAI-A BOR-N	165	58.94 (11.52)	34	79
PAI-A BOR-S	165	58.90 (15.38)	36	95
PAI-A suicidal ideation	165	63.82 (19.74)	42	101
DSHI	183	3.40 (3.52)	0	13
DERS	190	101.28 (28.79)	38	173

PAI-A subscales: affective instability (PAI-A BOR-A), identity problems (PAI-A BOR-I), negative relationships (PAI-A BOR-N), and self-harm (PAI-A BOR-S).

found to be sufficient [66,67]. Following conventions, goodness of fit for the CFA models was evaluated using a variety of fit statistics. The χ^2 goodness-of-fit statistic provides an index of absolute model fit. A nonsignificant χ^2 value ($P \geq .05$) indicates that the model adequately reproduces the observed covariance matrix. Other commonly reported indices of model fit include the root mean square error of approximation (RMSEA) [68], Bentler CFI [69], and the Tucker-Lewis index (TLI) [70]. For RMSEA, values less than 0.05 indicate good fit and values between 0.05 and 0.08 indicate adequate fit [67,71]. For CFI and TLI, values close to 0.95 or greater suggest good model fit [67,72].

To investigate the CI-BPD's reliability and validity, we ran descriptive analyses to determine means, SDs, and ranges (Table 1). Next, χ^2 tests and independent-samples t tests were conducted to investigate the relation between CI-BPD diagnosis with other measures of BPD (PAI-A and

BPFS scores), and with Axis I psychopathology, suicidal ideation, self-harm behaviors, and emotion dysregulation. BPD diagnoses were also examined in relation to demographic variables including sex and age. Next, a correlational analysis was conducted to examine continuous scores on BPD with Axis I pathology, suicidal ideation, self-harm behaviors, and emotion dysregulation to further verify the CI-BPD's concurrent and convergent validity (Table 2).

Kappa analyses were conducted to examine the agreement between CI-BPD and clinician diagnoses of BPD as well as interrater reliability on the CI-BPD. Internal reliability was determined through Cronbach α. These analyses were carried out using SPSS version 18 (SPSS, Chicago, IL).

4. Results

4.1. Preliminary analyses

Descriptive statistics are reported for main study variables in Table 1. Of the final sample (n = 190), 26% (n = 49) of adolescents met criteria for a diagnosis of BPD. The PAI-A was added to the assessment battery at a later time point, so subjects were grouped into pre- and post-PAI scores to examine systematic differences between those who received PAIs and those who did not. Chi-square analyses revealed no significant differences in CI-BPD scores between those who completed the PAI and those who did not ($\chi^2_1 = 0.02$, $P = .87$). The CBCL, YSR, and DSHI were incomplete for a few cases and were excluded from the analyses. As expected, our sample was composed of significantly more females (83.7%) who met criteria for BPD than males ($\chi^2_1 = 16.04$, $P < .001$).

4.2. Confirmatory factor analysis

Confirmatory factor analysis results revealed that a 1-factor model showed adequate fit: $\chi^2_{27} = 55.22$, $P < .001$; RMSEA = 0.07; CFI = 0.96; TLI = 0.94. Further support of a unidimensional factor structure is evidenced by the magnitude of the first eigenvalue (4.58) extracted from the

Table 2
Pearson correlations between CI-BPD continuous scores with emotion regulation and psychopathology measures

	CI-BPD	YSR internal	YSR external	CBCL internal	CBCL external	DERS	PAI-A BOR	BPFSC	BPFSP	DSHI
CI-BPD	1									
YSR internal	0.416**	1								
YSR External	0.541**	0.324**	1							
CBCL Internal	0.272**	0.442**	0.139	1						
CBCL External	0.264**	−0.161*	0.521**	0.161*	1					
DERS	0.552**	0.664**	0.427**	0.319**	0.057	1				
PAI-A BOR	0.657**	0.655**	0.577**	0.374**	0.207*	0.703**	1			
BPFSC	0.599**	0.548**	0.605**	0.244**	0.269**	0.698**	0.815**	1		
BPFSP	0.279**	−0.045	0.281**	0.297**	0.689**	0.088	0.264**	0.330**	1	
DSHI	0.494**	0.371**	0.343**	0.226**	0.106	0.465**	0.498**	0.464**	0.134	1

If Bonferroni correction is applied, $P = .005$, which means all variables still remain significantly correlated with the CI-BPD continuous score.

  * $P < .05$.
  ** $P < .001$.

polychoric correlation matrix relative to subsequent eigenvalues (1.08 and 0.93 for the second and third eigenvalues, respectively). Standardized factor loadings ranged from 0.60 to 0.79: unstable relationships (0.79), identity disturbance (0.75), abandonment fears (0.74), affective instability (0.74), suicidal behaviors (0.67), uncontrolled anger (0.62), chronic emptiness (0.61), transient paranoid ideation (0.60), and impulsivity (0.60).

4.3. Internal reliability

Internal consistency was good with a Cronbach alpha of .80 for the 9 items on the CI-BPD.

4.4 Interrater reliability

Interrater reliability was performed on 15% of the sample (n = 31), with 2 independent raters trained by the principal investigator of the study. The results of the interrater analyses showed a $\kappa = 0.89$.

4.5. Convergent validity

Clinician diagnoses were significantly related to CI-BPD diagnoses ($\kappa = .34$, $P < .001$). Independent-samples t test with CI-BPD dichotomous scores as the independent variable and scores on the BPFSP, BPFSC, PAI-A BOR, and subscales as dependent variables confirmed that CI-BPD diagnoses were significantly associated with other measures of BPD as reported by patients and parents. Means and standard deviations are reported in Table 3. Patients who met criteria for BPD as assessed by the CI-BPD had significantly higher means on both the BPFSP ($t_{171} = -2.59$, $P = .01$) and BPFSC ($t_{183} = -6.86$, $P < .001$), when compared with patients who did not meet criteria for BPD. As expected, CI-BPD diagnoses revealed significantly higher means on the PAI-A Borderline Features scale ($t_{165} = -7.15$, $P < .001$),

including all PAI-A Borderline subscales: affective instability ($t_{165} = -6.79$, $P < .001$), identity problems ($t_{165} = -5.13$, $P < .001$), negative relationships ($t_{165} = -5.32$, $P < .001$), and self-harm ($t_{165} = -5.37$, $P < .001$).

To examine the above relations dimensionally, continuous scores on the CI-BPD were correlated with scores on the BPFSP, BPFSC, and PAI-A BOR. Results from correlational analyses revealed significant relationships between the CI-BPD and the other measures of BPD (Table 2). These findings support both the convergent and criterion validity of using the CI-BPD in an adolescent inpatient setting.

4.6. Concurrent validity

Next, we assessed concurrent validity by conducting independent-samples t test with CI-BPD diagnoses and Axis I psychopathology, suicidality, self-harm, and emotion dysregulation. Means and standard deviations for borderline and nonborderline patients are reported in Table 3. As expected, adolescents with a BPD diagnosis indicated by the CI-BPD had significantly higher severity in Axis I pathology, scoring higher in CBCL internalizing ($t_{181} = -2.28$, $P = .02$), CBCL externalizing ($t_{181} = -3.00$, $P = .003$), and CBCL total problems ($t_{181} = -3.20$, $P = .002$). The same was found for self-reported Axis I problems on the YSR with internalizing ($t_{186} = -3,59$, $P < .001$), externalizing ($t_{186} = -5.88$, $P < .001$), and total problems ($t_{186} = -6.20$, $P < .001$). Patients who received a diagnosis of BPD also had higher means in suicidal ideation ($t_{165} = -4.78$, $P < .001$) and in deliberate self-harm ($t_{183} = -4.74$, $P < .001$) than non-BPD's. Analyses with CI-BPD scores and emotion regulation confirmed that BPD patients had significantly higher scores on difficulties in emotion regulation ($t_{188} = -6.13$, $P < .001$) compared with non-BPDs. Concurrent validity was also assessed using continuous scores from the CI-BPD with Axis I psychopathology, suicidality, emotion regulation, and self-harm. Correlations revealed significant relations in the expected directions for all measures (Table 2).

Furthermore, χ^2 analyses revealed that patients with a CI-BPD diagnosis were significantly overrepresented for Axis I psychopathology as measured by interview-based diagnosis

Table 3
Convergent and concurrent validity (means and SDs)

Variables	CI-BPD diagnosis					
	BPD			No BPD		
	n	Mean	SD	n	Mean	SD
CBCL internalizing	49	72.45	6.76	132	69.75	7.18
CBCL externalizing	49	68.57	7.81	132	64.34	9.94
CBCL total	49	71.76	5.52	132	68.23	6.94
YSR internalizing	49	67.98	10.85	137	60.69	12.65
YSR externalizing	49	68.65	10.21	137	58.76	10.08
YSR total	49	71.02	8.90	137	61.06	9.91
BPFSC total	46	81.30	14.70	137	62.30	16.74
BPFSP total	46	77.35	15.83	125	70.63	14.77
PAI-A BOR	42	71.45	11.61	133	57.15	11.05
PAI-A BOR-A	42	69.88	9.03	133	56.78	11.33
PAI-A BOR-I	42	65.21	11.19	133	55.13	10.94
PAI-A BOR-N	42	66.50	10.37	133	56.36	10.76
PAI-A BOR-S	42	69.07	15.05	133	55.43	13.93
PAI-A suicidal ideation	42	75.62	17.78	133	59.79	18.80
DSHI	46	5.41	3.39	137	2.72	3.31
DERS	51	120.63	24.31	139	94.19	27.05

Table 4
Percentage of BPD vs non-BPD patients receiving a comorbid diagnosis of any Axis I psychopathology

CDISC diagnoses	CIBPD diagnoses		χ^2 analysis	
	BPD (n = 49)	Non-BPD (n = 141)	χ^2_1	P
Any anxiety	63%	42%	6.43	.01
Any mood	67%	36%	12.81	<.001
Any depressive	61%	36%	8.66	.003
Any bipolar	19%	5%	7.76	.005
Any eating disorder	12%	3%	5.81	.02
Any externalizing	57%	35%	7.48	.006

If Bonferroni corrections for multiple comparisons are applied, alpha is set at .008, which means that all variables except "any anxiety" and "any eating disorder" remain significant.

(Table 4). Those with BPD were significantly more likely to have a diagnoses of any anxiety ($\chi^2_1 = 6.43$, $P = .01$), mood ($\chi^2_1 = 12.81$, $P < .001$), depressive ($\chi^2_1 = 8.66$, $P = .003$), eating ($\chi^2_1 = 5.81$; $P = .02$), and externalizing disorders ($\chi^2_1 = 11.16$, $P = .001$). Patients with BPD were also overrepresented for bipolar disorders ($\chi^2_1 = 7.48$, $P = .006$).

5. Discussion

To our knowledge, this is the only (and largest) inpatient study examining the psychometric properties of a promising diagnostic instrument for BPD in adolescents. Taken together, our findings support the validity and reliability of this instrument. First, the CFA supported a unidimentional factor structure for the CI-BPD, indicating that the *DSM-IV* criteria, on which the CI-BPD is based, constitute a coherent combination of traits and symptoms even in adolescents. This result is consistent with the adult BPD literature in which a unidimensional factor structure has been the predominant and most parsimonious finding [37-41,73,74]. Although a few studies of adult BPD have favored a multidimensional factor structure (Refs [73,75-77], most of these have been conducted with *Diagnostic and Statistical Manual of Mental Disorders*, *Third Edition* or *Revised Third Edition* [ie, 8 vs 9 criteria]). Only Sanislow et al [73] used the *DSM-IV*, and their results also supported a single-factor solution, which was arguably the better model in that it was more parsimonious (ie, the 3-factor model had high factor correlations, with *r*'s exceeding 0.90). The 3-factor model also had conceptual problems (eg, abandonment fears loaded on the "affective dysregulation" factor along with affective instability and uncontrolled anger, rather than the "disturbed relatedness" factor). Thus, it is now the case that a single-factor solution is favored in more studies than a multidimensional factor structure. Notably, this includes studies treating the criteria as ordinal rather than continuous variables and using more robust estimation procedures [39-41].

The CFA further revealed that factor loadings of the magnitude reported are comparable with those reported in the adult literature [37,38,41,73], lending further support for the validity of this instrument. In addition, the percentage of adolescent inpatients identified by the CI-BPD as meeting criteria for BPD reflects findings by other studies in adolescent inpatient settings, which have reported from 33% [78] to as high as 48% to 53% of their sample receiving the BPD diagnosis [79,80].

Third, internal consistency was found to be good, and interrater reliability was excellent. The fact that nonclinicial raters can be trained to use the CI-BPD with high interrater reliability speaks to the practical application of this measure in research settings. Convergent validity was indicated with significant agreement between the CI-BPD and clinician diagnosis. Moreover, patients diagnosed with BPD on the CI-BPD had significantly higher scores on all 3 question-

naire-based measures of BPD, providing additional support for convergent validity. Finally, concurrent validity was demonstrated by higher frequencies of deliberate self-harm, Axis I psychopathology (both questionnaire-based and interview-based), higher levels of emotion dysregulation, and suicidality in the BPD vs the non-BPD groups.

The above findings were also evident for when continuous scale scores of the CI-BPD were used. Although clinicians are unlikely to use continuous scores within the current diagnostic practice, there is now good evidence that a dimensional perspective may add richness to the diagnostic process [49-53]. As mentioned in the introduction, a dimensional perspective may be particularly important for conceptualizing BPD pathology among youth because it is better able to account for developmental fluctuations and increased heterogeneity that have been reported in younger samples [54]. Indeed, the proposed changes for the *DSM-V* incorporate a dimensional approach for classification and diagnosis of personality disorders. The CI-BPD can be easily adapted for *DSM-V* use in that all 9 criteria are retained in the *DSM-V* proposal: criterion A includes identity disturbance, emptiness, dissociation, and unstable relationships, whereas criterion B includes affective instability, abandonment fears (separation insecurity), suicidal behavior (under the depressivity criterion), impulsivity, and anger. The CI-BPD can be expanded to include empathy, self-direction, and anxiousness, which are not currently covered in the *DSM-IV*–based CI-BPD, and used as a dimensional measure.

Despite these promising findings, some limitations to the study should be acknowledged. First, our sample was composed mostly of middle to upper middle-class social class and predominantly of white adolescents. Therefore, it is unknown whether the CI-BPD is a reliable and valid assessment tool for use in other populations such as those with low socioeconomic status and with a more diverse ethnic background. Our study does not address test-retest reliability of the CI-BPD in diagnosis of inpatient adolescents. Furthermore, our participants represented adolescent patients at the severe end of the psychopathology spectrum who failed to respond to previous treatments, so these results may not generalize to adolescent outpatients. It is therefore important to also validate the CI-BPD in nonclinical populations or less severe populations. Finally, BPD is a complex construct, and the heterogeneity of the disorder complicates diagnostic classification. Many researchers have argued that BPD in adolescence is an aspect of Axis I pathology [81,82], yet others have demonstrated that despite association with Axis I disorders, BPD is reliably and validly diagnosed in this age group [54,78,83]. Given that our study aim was to validate the CI-BPD instrument, we cannot directly address the issue of whether BPD is not simply a form of Axis I pathology. Future studies should examine the discriminant validity of BPD in relation to Axis I disorders in adolescence.

In conclusion, the diagnosis of personality disorders in adolescents is still associated with controversy [2,7,8], and

some clinicians continue to appear to be reluctant to consider a diagnosis of personality disorder even in adults [83]. It is therefore imperative that more research is carried out to examine the course, etiology, and phenomenology of adolescent BPD. Doing so requires valid and reliable measures of adolescent BPD. Against this background, the current study is important in that it provides good evidence in support of the validity and the reliability of a relatively new instrument for the interview-based assessment of BPD in youth. In this sense, by demonstrating adequate psychometrics for an interview-based measure of juvenile BPD, the current study contributes to the growing body of evidence in support of the juvenile BPD construct, including evidence for longitudinal continuity [14,15], marked separation of course and outcome of adolescent BPD and other Axis-I and Axis-II disorders [14,26,27], and a genetic basis for adolescent BPD [17-19]. In addition, overlap between adult BPD in the latent variables underlying symptoms [20-22] and the risk factors [23-25,35] associated with adolescent BPD have been demonstrated. These studies can be built on with strong measures such as the CI-BPD.

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