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Criterion Validity of the MSI-BPD in a Community Sample of Women

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Abstract The criterion validity of the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., Journal of Personality Disorders 17:568–573, 2003) as a quick screening device for borderline personality disorder (BPD) was evaluated alongside the more established Personality Diagnostic Questionnaire-4+ Borderline subscale (PDQ-BPD; Hyler 1994) using receiver operator characteristic (ROC) analysis. Both instruments demonstrated adequate criterion validity with the diagnosis of BPD derived from a clinician-administered diagnostic interview. Optimal cutoffs for each measure were determined using sensitivity, specificity, and positive and negative likelihood ratios. The previously established cutoff for the MSI-BPD of seven (Zanarini et al., Journal of Personality Disorders 17:568–573, 2003) was confirmed. The current study provides the first support for the use of the MSI-BPD as a screening measure for use in community-based studies of BPD.

Keywords Borderline personality disorder · Screening · Assessment

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Borderline personality disorder (BPD) is a severe psychological disorder characterized by emotion dysregulation, unstable interpersonal relationships, identity disturbance, and impulsivity (American Psychiatric Association [APA] 2000), with a lifetime prevalence of 5.9% (Grant et al. 2008). Individuals with BPD have higher rates of suicide (e.g., Oldham 2006) and utilize significantly more mental health care and crisis intervention (e.g., Sansone et al. 2008) than the general population. Additionally, these individuals are more likely to experience chronic medical illnesses and report higher frequencies of emergency room visits (e.g., Frankenburg and Zanarini 2004). Furthermore, individuals with BPD have shown minimal response to treatment-as-usual therapies and require specific treatments that have demonstrated effectiveness (Bateman and Fonagy 2009; Clarkin et al. 2007; Linehan et al. 2006).

Identifying the presence of BPD beyond initial presenting problems in both mental health and medical settings would benefit patients and professionals. Patients would receive appropriate treatment more rapidly, thereby reducing global health care costs and emergency room overcrowding over time. Thus, it is essential that mental health and medical professionals routinely screen for BPD. In order for this to be feasible, a screening measure should be

psychometrically sound, easy-to-administer, and useful among diverse individuals across a variety of settings. In addition, screening tools should be free from theoretical orientation and conform to the most current standardized definitions of the disorder, such as those provided in the DSM-IV-TR (APA 2000) and the ICD-10 (World Health Organization [WHO] 2004). Among BPD screening measures, many have been either less accurate in identifying BPD than would be desired, based upon outdated criteria, or tied too closely to a specific theoretical orientation (Chanen et al. 2008; Zanarini et al. 2003).

The McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al. 2003) is a relatively new screening measure that was created to address these limitations of existing measures by improving reliability, sensitivity, and specificity in a measure based on DSM-IV criteria. The results of the initial validation (see Zanarini et al. 2003) demonstrated that the MSI-BPD has promise as a case identification instrument in population-based treatment studies and primary care settings, indicating its utility for researchers and clinicians alike. Several studies have utilized this tool to identify BPD individuals in treatment and epidemiological research (e.g., Glenn and Klonsky 2009; Rothrock et al. 2007; Sansone et al. 2008). Gardner and Qualter (2009) found that the MSI-BPD correlated highly with other BPD screening tools in a mixed community and student sample. Additionally, the measure has been translated into other languages for international use (e.g., Kröger et al. 2010; Leung and Leung 2009; Melartin et al. 2009). Despite its growing popularity, the MSI-BPD has demonstrated mixed results in studies investigating its criterion validity (Chanen et al. 2008; Gardner and Qualter 2009). Moreover, very little is known about the MSI-BPD's criterion validity for community samples, as only two criterion validity studies of the MSI-BPD against structured diagnostic interviews have been conducted (Zanarini et al. 2003; Chanen et al. 2008).

In comparing MSI-BPD scores to standardized diagnostic interviews, one study suggested that the MSI-BPD is a sound measure for predicting BPD diagnosis (Zanarini et al. 2003). Specifically, Zanarini et al. (2003) demonstrated a sensitivity of 0.81 and specificity of 0.85 in their study comparing the MSI-BPD to the Diagnostic Interview for DSM-IV Personality Disorders—Borderline Scale (DIPD-BPD). Although not reported by Zanarini and colleagues, diagnostic accuracy (.83) and agreement between the MSI-BPD and DIPD-BPD (kappa=.62) were calculated using the information provided and found to be strong. In contrast, a study of adolescents and young adults found weaker sensitivity (0.68), specificity (0.75), diagnostic accuracy (.73), and kappa (.35) for the MSI-BPD compared to the Structured Clinical Interview for DSM-IV—Axis II (SCID-II; Chanen et al. 2008), suggesting that the MSI-BPD may have only moderate criterion validity in a younger, more heterogeneous sample.

Besides comparison of the MSI-BPD to different diagnostic interviews, there are important differences between these studies that may account for these discrepant findings. The former study recruited from advertisements and postings at McLean Hospital specifically soliciting adults with borderline symptoms and treatment histories, whereas the latter study recruited outpatients from primary care mental health services for adolescents and young adults. In addition, Zanarini et al. (2003) used logistic regression to examine criterion validity, whereas Chanen and colleagues (2008) made use of ROC analyses, which is now considered a more standard approach to criterion validity. Finally, the use of adolescents in the study by Chanen and colleagues (2008) may make it hard to compare across the two studies given the potential for developmental differences in BPD symptomatology between samples.

To address these inconsistencies, the current study evaluated the criterion validity of the MSI-BPD in a community sample of women. In contrast to other studies that used patient samples or participants already in treatment (Chanen et al. 2008; Zanarini et al. 2003), the current sample consisted of individuals recruited from the community. We utilized the same diagnostic interview used in the initial validation study; however, the MSI-BPD was given as a screener several days prior to the administration of the DIPD-BPD in the current study, as opposed to both screener and diagnostic interview being administered on the same day in both of the previous criterion validity studies. We also compared the MSI-BPD to the more established borderline subscale of the Personality Diagnostic Questionnaire-4+ (PDQ-BPD; Hyler 1994) to evaluate concurrent validity. Previous versions of the PDQ have demonstrated utility as screening tools in both clinical (e.g., Dubro et al. 1988) and nonclinical samples (e.g., Johnson and Bornstein 1991). Additionally, our sample was more ethnically diverse compared to the previous studies of criterion validity, allowing for greater ecological validity.

Method

Participants

The final sample consisted of $N=110$ women from an urban Southwestern city with a mean age of 32.17 years ($SD=11.02$, range: 18–63 years). They were primarily Caucasian (40.5%), with a wide distribution among Black American (28%), Hispanic (14.2%), Asian American (6.4%), and mixed race (4.3%). This was roughly similar to the ethnic distribution of the area, except for Hispanics

who were slightly underrepresented in the current sample (U.S. Census Bureau 2000). The majority of participants reported low annual income (54.3% < $20,000), consistent with the average per capita income of $26,158 (U.S. Census Bureau 2006–2008), and had never been married (42.7%).

Procedures

Participants were recruited by newspaper advertisements and pamphlets as part of a larger study evaluating behavioral and neural correlates of social exchange among healthy controls and individuals diagnosed with BPD (King-Casas et al. 2008). Recruitment in the larger study was limited to females only, given the use of fMRI in the study and the wish to control for biological differences between the sexes. Two sets of advertisements were used in order to recruit (1) individuals with past and current difficulties with impulse control, emotional outbursts, and relationships and (2) healthy individuals with no past or current psychiatric difficulties. In response to the advertisements, individuals (N=232) were telephone-screened using the MSI-BPD by trained research staff prior to enrollment in the study. Exclusion criteria for both groups included an IQ < 70 as determined by the Wechsler Test of Adult Reading (WTAR), psychotic symptoms, substance dependence, and Bipolar I disorder. In addition, participants for the normal control group had to be free from all psychiatric disorders as determined by a structured clinical interview. Exclusion criteria resulted in over-representation of the BPD group vs. the normal control group. Only those included after the screening procedures received the DIPD. Eligible participants (N=110) arrived at a psychiatric outpatient clinic where the study was being conducted, provided informed consent, and completed assessments (including the PDQ-4+) and diagnostic interviews (including the DIPD) with a trained clinical psychologist. On average, assessment occurred 16 days after screening (range: 1–57 days).

Measures

MSI-BPD (Zanarini et al. 2003) The MSI-BPD is a 10-item yes/no questionnaire specifically designed to screen for BPD. Positive responses indicate pathology for all items, and suggested cutoffs have been at seven (Zanarini et al. 2003) or greater than seven (Chanen et al. 2008). The MSI-BPD has demonstrated adequate psychometric properties and Cronbach's α was 0.94 in the current sample.

PDQ-BPD (Hyler 1994) The PDQ-BPD contains nine true/false items (with one item requiring selection of 2/6 choices) based on DSM-IV-TR (APA 2000) criteria. Positive responses indicate pathology for all items, and a score of five or greater is suggestive of BPD. Both the PDQ-4+ and its borderline subscale have demonstrated adequate reliability and validity, with Cronbach's α for the PDQ-BPD at 0.87 in the current sample.

Diagnostic Interview for DSM-IV Personality Disorders—Borderline Scale (DIPD-BPD; Zanarini et al. 1996). The DIPD is a semi-structured interview used to diagnose Axis II disorders. The DIPD-BPD consists of nine items corresponding with DSM-IV criteria rated as 0 (*Not present*), 1 (*Possibly present*), or 2 (*Definitely present*). Five ratings of two are necessary to meet criteria for BPD. The DIPD-BPD has been shown to be a reliable and stable measure of BPD and has demonstrated strong concurrent validity (Zanarini et al. 1996, 2003). All interviews were video-recorded with permission from study participants. To determine inter-rater reliability, the video recordings of 19 participants (17% of the total sample) were viewed and coded by two trained and independent raters blind to the group status of participants. Kappa was .88 (p<.001) for the first rater, indicating near perfect agreement, and .79 (p<.001) for the second rater, indicating substantial agreement (Landis and Koch 1977). Cronbach's α was .89 in the current sample.

Results

Descriptive Statistics

Means and standard deviations for the main study variables were as follows: MSI-BPD (M=3.50, SD=3.83), PDQ-BPD (M=3.47, SD=3.01), and DIPD-BPD (M=10.40, SD=6.09). The MSI-BPD identified 75.45% of the sample with a positive diagnosis of BPD vs. 82.73% with the PDQ-BPD and 60.00% with the DIPD-BPD. Comparing MSI-BPD screens to DIPD-BPD diagnosis in the total sample, this resulted in 81 participants being accurately identified as either BPD-positive (n=55) or BPD-negative (n=26). False-positive MSI-BPD screens were seen in 18 participants and false-negative MSI-BPD screens in 11 participants. PDQ-BPD screens accurately identified 81 participants as either BPD-positive (n=59) or BPD-negative (n=22). Twenty-two participants had false-positive PDQ-BPD screens, and seven participants had false-negative PDQ-BPD screens.

Criterion Validity

Receiver operating characteristic (ROC) analysis was conducted using Predictive Analytics Software 17.0 for Windows (PASW 17.0) to assess specificity (Sp) and

sensitivity (Sn) for the MSI-BPD and the PDQ-BPD in predicting DIPD-BPD diagnosis. The area under the curve (AUC) provides a measure of a test's diagnostic ability, such that an AUC of 1.00 would indicate perfect diagnostic ability. ROC analysis demonstrated that both measures had moderate effectiveness as screening tools (PDQ-BPD: AUC=0.75 [*SE*=0.05]; MSI-BPD: AUC=0.77 [*SE*=0.05]). Diagnostic accuracy of both measures was .74, and instrument agreement with the DIPD-BPD (kappa) was .44 for the MSI-BPD and .42 for the PDQ-BPD. A comparison of correlated ROC curves using the approach described by DeLong and colleagues (1988) revealed no significant differences between the two AUCs (r=0.77, z=0.31, p=0.76) and suggested that the measures were equivalent in their ability to screen for BPD (see Fig. 1). Combining the two instruments (AUC=0.79 [*SE*=0.05]) yielded no significant improvement in AUC relative to either measure on its own (MSI-BPD: r=0.90, z=1.073, p=0.28; PDQ-BPD: r=0.82, z=1.52, p=0.13).

Optimal cutoffs were evaluated for each measure using Sp, Sn, and positive and negative likelihood ratios (PLR; NLR). Using the intersection of Sn and Sp lines for each measure (see Fig. 2), the optimal cutoff was seven for the MSI-BPD (Sn=0.69, Sp=0.67, PLR=2.07, NLR=0.46). Consistent with previously established cutoff, the optimal cutoff in the current study was five for PDQ-BPD (Sn=0.83, Sp=0.59, PLR=2.00, NLR=0.29).

Discussion

This study investigated the criterion validity of the relatively understudied MSI-BPD in order to resolve mixed findings in the extant literature. This was the first study to evaluate the MSI-BPD as a screening tool in an ethnically-diverse community sample. We found that the MSI-BPD demonstrated moderate diagnostic efficiency with sensitivity (Sn) and specificity (Sp) values of 0.69 and 0.67, respectively, diagnostic accuracy (Acc) of .74, and instrument agreement (kappa) of .44. These values were weaker than the values shown in the initial validation study (Sn=0.81, Sp=0.85, Acc=.83, kappa=.62; Zanarini et al. 2003). Despite demonstrating only moderate criterion validity in the current study, the MSI-BPD performed equally well as the more established PDQ-BPD screening measure. In making sense of these findings, we must consider why the MSI-BPD was less effective in our study and the implications for research and clinical settings.

The MSI-BPD performed less well than indicated by the initial validation, but the properties were similar to those reported by Chanen and colleagues (2008), who demonstrated moderate criterion validity (Sn=0.68, Sp=0.75, Acc=.73, kappa=.35). Chanen et al.'s (2008) study differed markedly from ours in sample characteristics

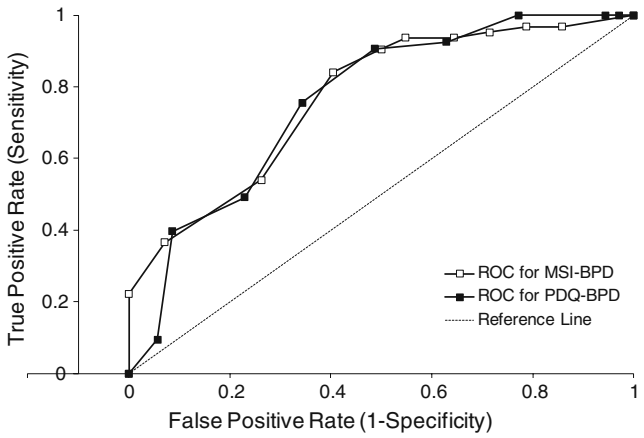

Fig. 1 Receiver operating characteristic (ROC) curves for MSI-BPD and PDQ-BPD demonstrating criterion validity for BPD diagnosis based on the DIPD

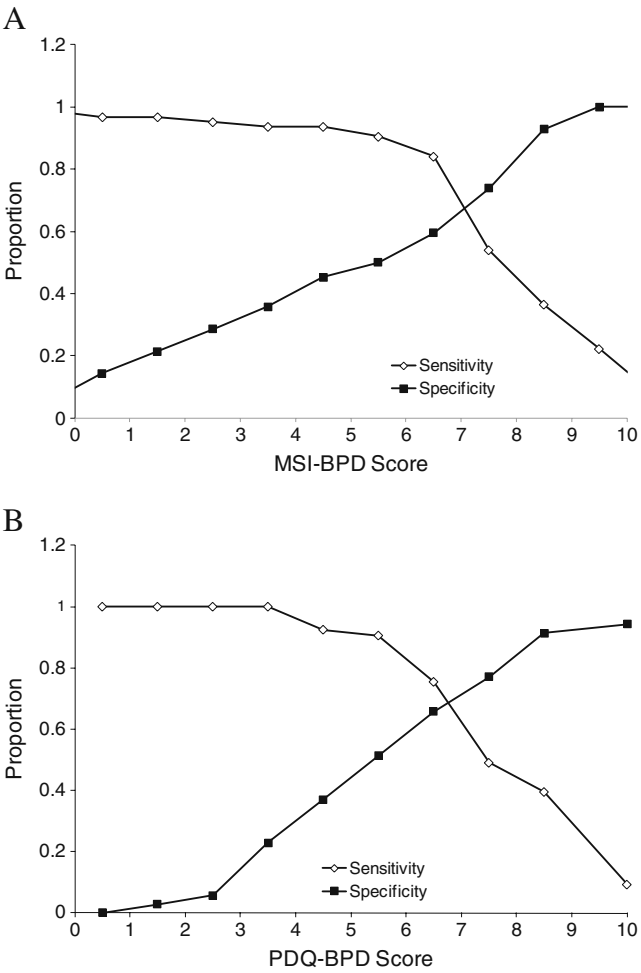

Fig. 2 Sensitivity and specificity plots of **a** MSI-BPD and **b** PDQ-BPD. Point of intersection represents optimal cutoff score

(e.g., outpatient vs. community sample; adolescents/young adults vs. older adults; predominantly female vs. all female); so finding similar results speaks to the utility of the instrument across settings. Further, our findings confirm that Chanen et al.'s (2008) slightly lower estimates for criterion validity compared to the initial validation study were unlikely due to their use of the SCID-II as a criterion measure, as the current study used the DIPD-BPD in the same way that Zanarini et al. (2003) did.

The most likely sources of the discrepancy between the ROC estimates are the differences in recruitment and participant characteristics. The heterogeneity of participants is likely to have been greater in both the current and the Chanen et al. (2008) study. Both the sample of community volunteers in our study and the sample of adolescents and young adults referred to frontline (community-based) mental health services in the Chanen et al. (2008) study are likely to have been less homogeneous than the subjects recruited in Zanarini et al.'s (2003) study, which specifically recruited subjects with previous treatment histories. Evaluating screening measures in diverse samples is important in order to identify which screening measures work best for which settings. Findings from the current study suggest that the MSI-BPD is likely to be valid when used in the community and/or among ethnically diverse populations. We show here that, while the MSI-BPD has optimal sensitivity and specificity for more severe cases of BPD (Zanarini et al. 2003), it continues to have moderate diagnostic ability in the context of community recruitment.

A strength of the study is that we used the MSI-BPD exactly as intended: to screen for possible BPD with follow-up using a structured diagnostic interview. Population screens typically demonstrate a high rate of false positives because they seek to cast a wide net in order to identify individuals eligible for more sophisticated interview-based assessments, usually some weeks after screening. Our results therefore speak to the use of the MSI-BPD in clinical settings, such as outpatient clinics or emergency rooms, where individuals will be referred for further diagnostic evaluation and treatment which may not take place at the time of screening. Our results also demonstrate that using the MSI-BPD as the sole diagnostic tool is beyond its intended scope. Despite finding stronger diagnostic efficiency, Zanarini and colleagues (2003) concluded, "For most research projects, reliance on a semistructured diagnostic interview for BPD seems warranted and well worth the added cost and time involved as the MSI-BPD will probably misidentify a certain number of subjects, particularly those over the age of 30" (pg. 571–572). Thus, researchers would be advised to maintain the MSI-BPD solely for screening purposes and only when diagnosis will occur using an alternative assessment.

The current study has a number of important limitations. These include the nature of self-report assessment, relatively small sample size, the use of only women, and some variation in length of time between screening and assessment. Regarding the latter, the MSI-BPD was given on average 16 days prior to and the PDQ-BPD and the DIPD. Related to this limitation is the fact that exclusion criteria during the screening phase of the study resulted in a lower number of subjects who did not meet criteria for BPD during the assessment phase. Although this is typical for naturalistic settings where screening would precede more in-depth interview-based assessment and therefore speaks to the strong ecological validity of this study, it is possible that a more proximal measurement of the MSI-BPD and the DIPD may have resulted in higher criterion validity. Focusing on women only in the current study was unfortunate given the prevalence of BPD may be higher in men than previously thought (Grant et al. 2008).

Notwithstanding these limitations, the current study adds to the growing number of studies suggesting that the MSI-BPD is an appropriate screening tool for BPD. Given the increasing popularity of the MSI-BPD in outcome research, it is important to examine its psychometric properties in a variety of diverse samples. While the MSI-BPD clearly shows stronger criterion validity in more severely ill samples (those with a treatment history) as demonstrated by Zanarini et al. (2003), we show here adequate criterion validity in a community sample of female adults. Further research is necessary to evaluate these measures in other populations and using other forms of diagnosis of BPD (e.g., clinician diagnosis).

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