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DIAGNOSTIC VALUE OF THE DUTCH VERSION OF THE MCLEAN SCREENING INSTRUMENT FOR BPD (MSI-BPD)

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Borderline personality disorder (BPD) often goes unrecognized, and therefore a short but accurate screening tool is desired. The present study investigated the psychometric properties of the 10-item McLean Screening Instrument for BPD (MSI-BPD) in 159 well-diagnosed female participants. The MSI-BPD showed excellent internal consistency (α = .90). When compared to BPD diagnoses based on a structured clinical interview (SCID-II), the MSI-BPD showed substantial congruent validity (receiver operating characteristic area under the curve = 0.96). The cutoff point proposed by the developers of the MSI-BPD (7 or more) showed high specificity (.96) and good sensitivity (.71). The optimal cutoff point in the present study (5 or more) showed somewhat lower specificity (.86), but importantly better sensitivity (.94). Taken together, the Dutch version of the MSI-BPD demonstrated good psychometric properties for a screening tool.

Borderline personality disorder (BPD) is a life-threatening mental disorder that emerges during adolescence and is characterized by chronic emotional instability. Following the *DSM-V* (American Psychiatric Association, 2013), BPD is manifested by a pervasive pattern of instable personal relationships, distorted self-image, self-harm, and dysregulated affect. BPD is associated with serious comorbidity with other personality disorders and clinical syndromes such as eating disorders, substance use disorder, suicide attempts, depression, and anxiety disorder (Chanen, Jovev, & Jackson, 2007). Adolescents and young adults with BPD commonly seek help and make use of (mental) health resources, but due to the high comorbidity BPD often goes unrecognized (Zanarini et al., 2003).

Accurately identifying the presence of BPD in mental and medical health care would benefit patients and professionals. Patients would receive appropriate treatment faster, thereby reducing global health care costs. In order for this to be feasible, it is essential that professionals routinely screen for BPD.

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Different authors (Siefert, 2010; Widiger & Samuel, 2005) have recommended a two-step diagnostic procedure for BPD. In the first step, a short and economic screening instrument based on self-report should be implemented and in case of a positive result an extended and psychometric well-investigated structured interview should be administered, such as the Structured Clinical Interview for *DSM-IV*, Axis II (SCID II; First, Spitzer, Gibbon, Williams, & Benjamin, 1994). While structured clinical interviews are generally more valid than self-report scales (Widiger & Samuel, 2005), the advantage of such a two-step procedure is that it requires less time and work.

A promising screening instrument, the McLean Screening Instrument for Borderline Personality Disorder (MSI-BPD; Zanarini et al., 2003), was developed to screen for BPD in an economic, yet reliable and valid way (for other screening instruments such as the SCID-II-Q, see Taylor, James, Bobadilla, & Reeves, 2008). The MSI-BPD is a true-false self-report questionnaire that consists of 10 items, based on the *DSM-IV* BPD criteria. Each endorsed item is worth 1 point on a scale that ranges from 0 to 10. The initial validation with 200 gender-mixed subjects favored a cutoff point of 7 out of 10 items and yielded both good sensitivity (percentage of correctly identified BPD cases) and specificity (percentage of correctly identified non-BPD cases) (Zanarini et al., 2003). Various studies were conducted in different settings using the MSI-BPD: two inpatients studies (Kröger, Huget, & Roepke, 2011; Zanarini et al., 2003), three outpatient studies (Chanen et al., 2008; Kröger, Vonau, Kliem, & Kosfelder, 2011; Melartin, Häkkinen, Koivisto, Suominen, & Isometsä, 2009), and one sample from an ethnically diverse community (Patel, Sharp, & Fonagy, 2011). Overall these studies showed moderate to high diagnostic efficiency of the BPD-MSI, except for the inpatient study by Kröger, Huget, et al. (2011), which revealed a very low specificity among non-personality disordered patients. An important limitation of these studies is that none examined the full array of clinical syndromes and personality disorders.

To address these limitations and inconsistencies, the current study investigated the psychometric and screening properties of the Dutch translation of the MSI-BPD in a diverse clinical and nonclinical control sample. This is an advantage compared to other studies that used only participants with psychiatric history (e.g., Zanarini et al., 2003) or only a community-based sample (e.g., Patel et al., 2011). A further strength of the current study was that compared to former studies, the researchers used a well-diagnosed sample, with clinical syndromes and personality disorders assessed by means of validated structured clinical interviews (SCID I and II; First, Spitzer, Gibbon, & Williams, 1997; First et al., 1994).

METHOD

PARTICIPANTS

The sample consisted of 159 women from clinical and community settings. Screening took place in three different clinical settings: a psychiatric center (14 inpatients), and two ambulatory mental health centers (82 outpatients).

TABLE 1. Demographic Characteristics of the Sample

	BPD (n = 55)	Non-BPD[a] (n = 104)	Total (N = 159)	p value
Mean age (*SD*)	31.50 (9.89)	37.79 (14.68)	34.81 (13.14)	p = .005
Education (%)				p = .03
Primary school	4 (7.3%)	5 (4.8%)	9 (5.7%)	
High school	26 (47.3%)	34 (32.7)	60 (37.7%)	
MBO/HBO	16 (29.1%)	24 (23.1%)	40 (25.2%)	
University	9 (16.4%)	41 (39.4%)	50 (31.4%)	

[a]This sample consists of both patients without BPD and nonclinical controls. MBO/HBO = polytechnic or university of applied sciences.

Sixty-three nonclinical participants were recruited from the general population via snowball sampling. Irrespective of where they were recruited, participants were assigned to the BPD group (n = 55; patients only) or the non-BPD group (n = 104; both clinical controls and nonclinical controls). Compared to participants without BPD, participants with BPD were younger, $t(157) = 2.85$, $p = .005$, and less educated, $\chi^2(3) = 9.01$, $p = .03$ (see Table 1). Furthermore, the BPD sample showed on average more clinical syndromes and personality disorders compared to the non-BPD participants (see Tables 2 and 3 for details). Exclusion criteria were psychotic disorders or being under the influence of alcohol or drugs at the time of testing. All participants signed informed consent forms.

MEASURES

MSI-BPD. The MSI-BPD consists of 10 true-false items, with the sum score providing an indication of BPD symptomatology. The developers of the MSI-BPD proposed to use scores of 7 or more as indicative of BPD (Zanarini et al., 2003). Preliminary data using only nonpatients indicated that the Dutch version assesses a single construct, has adequate internal consistency (α = .76), and a high 4-month test-retest reliability (r = .80) (Verschuere & Tibboel, 2011).

Axis I and II Pathology. The Dutch versions of the Structured Clinical Interview for *DSM-IV* clinical syndromes and personality disorders were used to assess clinical syndromes and personality disorder diagnoses (SCID I and II; First et al., 1997; First et al., 1994). The SCID I is organized by the main clinical syndromes categories of *DSM-IV* and revealed adequate interrater reliability, with kappa values ranging from 0.61 to 0.83 (M = 0.71). The SCID II covers 10 personality disorders and the kappa values varied between 0.77 and 0.94, with a mean value of 0.84, indicating an overall excellent interrater reliability (Lobbestael, Leurgans, & Arntz, 2010).

PROCEDURE

Participants were recruited in different Dutch health care settings. Patients on the waiting list for therapy received an information letter about the study, and patients in therapy were verbally informed by their therapist about the study. During the intake, SCID diagnoses were made either by the therapists

TABLE 2. Number of Clinical Diagnoses (SCID I) in Participants With and Without BPD

Clinical Syndromes	BPD (n = 55)	Non-BPD[a] (n = 104)	Total (N = 159)	p value
Anxiety Disorders	31 (56.4%)	27 (26.0%)	58 (36.5%)	p < .001
Mood Disorders	37 (67.3%)	24 (23.1%)	61 (38.4%)	p < .001
Psychotic Disorders	0 (0%)	0 (0%)	0 (0%)	NA
Substance-Related Disorders	11 (20.0%)	1 (1.0%)	12 (7.5%)	p < .001
Eating Disorders	10 (18.2%)	3 (2.9%)	13 (8.2%)	p = .001
Somatoform Disorders	5 (9.1%)	10 (9.6%)	15 (9.4%)	p = .91

[a]This sample consists of both patients without BPD and nonclinical controls.

of the health care settings or by the researchers. The researchers interviewed the control group. Before the researchers conducted the interviews, they received 2 days of theoretical training and then, under supervision, scored audiotapes of 10 SCID interviews before they conducted testing independently. Previous implementation of this training showed raters to display excellent interrater agreement (Lobbestael et al., 2010). Controls were recruited from the general population via snowball sampling of the social network of the experimenter. After the administration of SCID I and II, participants filled in the MSI-BPD screening list (Zanarini et al., 2003). The experiments were approved by the psychology ethics committee of Maastricht University, the Netherlands.

STATISTICAL ANALYSIS

First, a principal component analysis (PCA) was conducted to investigate whether the MSI-BPD measures a single construct, and the internal consistency (Cronbach's alpha) of the MSI-BPD was calculated.

Second, the correspondence between the MSI-BPD and the SCID-II was examined using Spearman correlation coefficients between the MSI-BPD total score and the SCID-II sections.

Third, accuracy in classifying participants as BPD versus non-BPD based upon the preestablished cutoff of the MSI-BPD was assessed in three ways: (a) Cohen's kappa, (b) specificity and sensitivity, and (c) the receiver operating characteristic (ROC). The ROC is used because any cutoff point is in essence arbitrary, and the ROC provides a measure of diagnostic efficiency that is independent of any specific cutoff. The ROC plots the relation between sensitivity and the false positive rate (1 – specificity). The area under the ROC curve (AUC) can range from 0.50 (random performance) to 1.0 (perfect performance). According to Swets (1988), values of $0.50 < AUC \leq 0.70$ indicate a low, $0.70 < AUC \leq 0.90$ a moderate, and $0.90 < AUC \leq 1.0$ a high discriminatory ability of the measure.

TABLE 3. Number of Personality Disorder Diagnoses (SCID II) in Participants With and Without BPD

Personality Disorder	BPD (n = 55)	Non-BPD[a] (n = 104)	Total (N = 159)	p value
Avoidant PD	24 (43.6%)	18 (17.3%)	42 (26.4%)	$p < .001$
Dependent PD	5 (9.1%)	7 (6.7%)	12 (7.5%)	$p = .59$
Obsessive-Compulsive PD	8 (14.5%)	6 (5.8%)	14 (8.8%)	$p = .06$
Passive-Aggressive PD	3 (5.5%)	0 (0%)	3 (1.9%)	$p = .02$
Depressive PD	21 (38.2%)	7 (6.7%)	28 (17.6%)	$p < .001$
Paranoid PD	10 (18.2%)	1 (1%)	11 (6.9%)	$p < .001$
Schizotypal PD	0 (0%)	0 (0%)	0 (0%)	NA
Schizoid PD	1 (1.8%)	0 (0%)	1 (0.6%)	$p = .17$
Histrionic PD	0 (0%)	0 (0%)	0 (0%)	NA
Narcissistic PD	0 (0%)	0 (0%)	0 (0%)	NA
Borderline PD	55 (100%)	0 (0%)	55 (34.6%)	$p < .001$
Antisocial PD	7 (12.7%)	0 (0%)	7 (4.4%)	$p < .001$

[a]This sample consists of both patients without BPD and nonclinical controls.

RESULTS

FACTOR STRUCTURE OF MSI-BPD AND INTERNAL CONSISTENCY

The Kaiser-Meyer-Olkin measure (0.91) and Bartlett's test of sphericity (χ^2 (45) = 769.69, $p < .001$) verified the sampling adequacy for this analysis. The PCA indicated one component with an eigenvalue over Kaiser's criterion of 1 that explained 53.43% of the variance. The scree plot showed a clear bend between the first and second components and supported the choice of one component. The internal consistency for the MSI-BPD scale was excellent (α = 0.90).

CONVERGENT VALIDITY

The MSI-BPD scale was significantly correlated, $\tau s = 0.85$, $p < .001$, with the SCID-II BPD section. The MSI-BPD scale was less but significantly correlated with the following SCID-II personality disorders: Depressive PD ,$\tau_s = 0.68$, $p < .001$; Paranoid PD, $\tau_s = 0.64$, $p < .001$; Avoidant PD, $\tau_s = 0.53$, $p < .001$; Dependent PD, $\tau_s = 0.50$, $p < .001$; Passive-Aggressive PD, $\tau_s = 0\ .49$, $p < .001$; Antisocial PD, $\tau_s = 0.43$, $p < .001$; Obsessive-Compulsive PD, $\tau_s = 0.37$, $p < .001$; Schizotypal PD, $\tau_s = 0.29$, $p < .001$; Narcissistic PD, $\tau_s = 0.26$, $p = .001$; Histrionic PD, $\tau_s = 0.23$, $p = .003$; and Schizoid PD, $\tau_s = 0.16$, $p = .05$.

CRITERION VALIDITY

The ROC analysis demonstrated that the MSI-BPD had high effectiveness as a screening tool (AUC = 0.96, CI 95%: 0.92 < AUC < 0.99). This means that there is a 96% chance that a randomly chosen participant with BPD scores higher on the MSI-BPD than a randomly chosen participant without BPD.

Using the preestablished cutoff score of 7, kappa (0.71) showed good correspondence between MSI and SCID diagnoses. Specificity (0.96) was

TABLE 4. Cutoff Points and Diagnostic Efficiency

Cutoff point	SENS	SPEC	PLR	NLR
≥ 5 (Optimal cutoff in present sample)	0.94	0.86	7.02	0.063
≥ 7 (Zanarini et al., 2003)	0.71	0.96	18.44	0.30

Note. SENS = sensitivity; SPEC = specificity; PLR = positive likelihood ratio; NLR = negative likelihood ratio.

better than sensitivity (0.71) (see Table 4). In total, 139 participants were accurately identified, with 4 false-positives and 16 false-negatives.

For exploratory purposes, we examined whether 7 indeed proved to be the best possible cutoff point. Using the ROC analysis to evaluated sensitivity, specificity, and positive and negative likelihood ratios of all possible cutoff points, we determined that 5 was the best possible cutoff point. Compared to the previously proposed cutoff point of 7, this cutoff had somewhat lower specificity, but importantly better sensitivity, which is an attractive feature for a screener (see Table 4). Kappa rose to 0.77.

A separate ROC analysis, comparing clinical controls with BPD patients, revealed an AUC of .92 with a sensitivity of .95 and a specificity of .74 for the favored cutoff of 5. With the proposed cutoff point of 7, the sensitivity dropped (.71), but the specificity rose (.91). Comparing nonclinical controls with BPD patients, we obtained an AUC of .98 with a sensitivity of .95 and a specificity of .97 for the favored cutoff point of 5. With the proposed cutoff point of 7, the sensitivity dropped (.71), but the specificity rose (1.0).

DISCUSSION

This study investigated the diagnostic value of the Dutch MSI-BPD in a diverse clinical and nonpatient control sample in order to resolve methodological limitations in previous studies. To our knowledge, this was the first study to evaluate the MSI-BPD as a screening tool in a mixed sample that assessed all clinical syndromes and personality disorders. The one-factor structure of the MSI-BPD was replicated, and excellent internal reliability was found.

We found that the MSI-BPD demonstrated high diagnostic efficiency (ROC = 0.96), with the previously proposed cutoff point of 7 showing good correspondence with the SCID (sensitivity = 0.71; specificity = 0.96; kappa = 0.71). Overall the value of sensitivity is comparable to that of previous studies (0.69–0.91). The specificity in our study was higher than the range of previous studies (0.39–0.85) and indicates that the MSI-BPD may indeed be useful as a screening instrument. Notably, we found that a cutoff of 5 even increased the diagnostic efficiency of the MSI-BPD, with particularly better sensitivity. So it seems important for future studies to explore whether the cutoff value needs to be lowered when screening heterogeneous samples. Specificity proved to be lower when restricting the comparison to the clinical control group.

Several methodological limitations should be noted. First, we assessed women only. This choice was made because BPD is more common among women (Distel, de Moor, & Boomsma, 2009). However, it would be informative to assess the screening effectiveness of MSI-BPD in men as well,

especially because a recent study suggested that BPD may also often go unrecognized in men (Grant et al., 2008). Second, we used selective samples to assure enough BPD cases in our relatively small sample. Thus, it would be informative to assess the predictive value of the MSI-BPD in samples with lower—perhaps more realistic—base rates of BPD. Third, there was substantial variation in the time between MSI-BPD screening and the structured clinical assessment (from hours to weeks), which could not be statistically evaluated. Although this is typical for a naturalistic setting, it is possible that the criterion validity is higher in the more proximal measurement of the MSI-BPD and SCID-II-BPD than in the more distant measurements.

Notwithstanding these limitations, the current study adds to the growing number of studies suggesting that the MSI-BPD appears to be a feasible screening tool for BPD. Although screening does not replace the use of semi-structured interviews as a standard of clinical practice, the findings support the value of BPD screening using the MSI-BPD.

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