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RESEARCH ARTICLE

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The screen for cognitive impairment in psychiatry in patients with borderline personality disorder

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Abstract

Cognitive deficits are common in borderline personality disorder (BPD) and appear to be associated with psychopathology, functioning and outcome. The availability of a cognitive screening instrument could be of use in clinical settings in order to assess neurocognition in BPD patients. The Screen for Cognitive Impairment for Psychiatry (SCIP) proved to be reliable in different psychiatric populations, but it has not yet been validated in personality disorders. The purpose of this study is therefore to evaluate its psychometric properties in a sample of 58 BPD patients. The SCIP was validated against the Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) and the Trail Making Test A and B (TMT A and B). The receiver operator curve analysis displayed an acceptable convergent validity (total score AUC: 0.78, 95% CI: 0.70–0.86; Se: 75%, Sp: 72%). A cut-off total score of 80 identified 81% of patients as cognitively impaired. The exploratory factor analysis displayed a one-factor solution explaining 55.8% of the total variance. The SCIP displayed adequate psychometric properties in BPD and could be integrated in the routine clinical assessment to provide a preliminary evaluation of cognitive features for BPD.

INTRODUCTION

Borderline personality disorder (BPD) is a serious mental disorder with characteristic patterns of instability of affect regulation, behavioural control, interpersonal relationships and self-image (Gunderson et al., 2018). BPD is also burdened by a high suicide rate (Pompili et al., 2005) and severe psychosocial impairment (Gunderson et al., 2011; Mosiolek et al., 2018; Zanarini et al., 2010). Neurocognitive deficits among patients with BPD are receiving growing attention as their role in the pathogenesis of the disorder (Judd, 2005; Minzenberg et al., 2008; Mosiolek et al., 2018; Poletti, 2011) symptoms and psychosocial functioning (McClure et al., 2016) is becoming evident. Notably, a seminal study suggests that cognitive remediation programmes may be effective among patients with BPD (Vita et al., 2016).

Federica Folesani and Martino Belvederi Murri contributed equally to this work.

Cognitive impairments in BPD are common and spread across multiple domains (Galletta et al., 2020; LeGris & van Reekum, 2006; Unoka & Richman, 2016), with executive functions being most frequently impaired (Legris et al., 2012; Lenzenweger et al., 2004; Rentrop et al., 2008; Ruocco, 2005).Furthermore, cognitive deficits could be associated with psychopathological characteristics of the disorders. Often patients with BPD display attention deficits (Gvirts et al., 2012; Judd, 2005; Legris, 2014; Ruocco, 2005; Sprock et al., 2000; Thomsen et al., 2016; Unoka & Richman, 2016), which appear to be linked with low present-moment awareness (Ruocco & Wonders, 2013). Memory deficits are associated with identity disturbances and dissociation (Judd, 2005; LeGris & van Reekum, 2006; Mensebach et al., 2009; Ruocco, 2005; Ruocco & Bahl, 2014; Sprock et al., 2000; Unoka & Richman, 2016). Executive functions are important determinants of self-regulation capacity, and their impairment appears to be related to suicidal and self-destructive behaviour (Bazanis et al., 2002; Legris et al., 2012) and to increased impulsivity (Ghanem et al., 2016; Svaldi et al., 2012). Furthermore neurocognition in general, and especially executive functions, influences global and social functioning (Garcia-Villamisar et al., 2017; Mosiolek et al., 2018), whereas performances on the TMT-B may predict dropout rates in BPD patients (Fertuck et al., 2011), which represent a major obstacle in the treatment of this personality disorder (Skodol et al., 1983). Cognitive skills are also associated with trait-like psychopathological features, suggesting a relationship between neurocognition and core clinical aspects of BPD that could be targeted in therapeutic interventions (Belvederi Murri, Folesani, Costa, Biancosino, Zerbinati, et al., 2020b).

Given the importance of cognitive impairment in BPD, having a validated, flexible tool for routine cognitive assessment may contribute to clinical management and improve the outcomes of psychosocial treatments. Brief cognitive screening tools such as the Mini Mental State Examination (Folstein et al., 1975), however, perform poorly in psychiatric patients (Manning et al., 2007; Rademeyer & Joubert, 2016), whereas longer cognitive instruments specifically developed for psychiatric populations, such as the MATRICS Consensus Cognitive Battery (MCCB) (Kern et al., 2012) require long administration times and trained staff. The Screen for Cognitive Impairment in Psychiatry (SCIP) is a brief and easy-to-administer tool, requiring the test sheet, a clock and a pencil only, specifically targeting psychiatric populations. The SCIP could therefore fill the gap in the preliminary cognitive evaluation of psychiatric populations. It was originally developed as a preliminary and accessible assessment for schizophrenia-spectrum patients (Purdon, 2005a), but proved accurate and reliable also in other populations with mental illnesses, including bipolar disorders and major depression (Guilera et al., 2009; Ott et al., 2016). To our knowledge, however, the SCIP still needs to be evaluated for use among patients with personality disorders, where at present no instrument has been validated.

This study is part of a wider project for the validation of the SCIP in different psychiatric populations in Italy, with the purpose to have a brief and simple instrument to offer a preliminary assessment of cognition in routine psychiatric practice. The goal of this study was to validate the Italian version of the SCIP among patients with BPD. The specific aims were to establish the SCIP: (1) internal consistency; (2) convergent validity, by comparing the SCIP with a reliable cognitive battery; (3) discriminant ability, that is, the SCIP capacity to distinguish between impaired and non-impaired subjects; and (4) factor structure.

METHODS

Sample

This study reports additional results from a larger investigation on cognitive impairments in patients with BPD. Details of the study protocol are reported in Belvederi Murri, Folesani, Costa, Biancosino, Zerbinati, et al. (2020b).

Participants were outpatients from all five community mental health services; from the three residential units of the Integrated Department of Mental Health and Pathological Addiction, Local Health Trust and University of Ferrara; and from residential units of the Integrated Departments of Mental Health and Pathological Addiction in Vicenza and Padua, Northern Italy. We recruited subjects aged between 18 and 65 years, diagnosed with BDP who were clinically stable (without hospital admissions in the previous 3 months). Diagnoses were established through a clinical interview according to the ICD-9 CM criteria for BPD, as the currently used nosological system requested by the regional health trusts, administered by experienced psychiatrists. All patients meeting inclusion criteria and volunteering to participate were included. Patients with comorbid substance abuse according to ICD-9 CM criteria were included considering the high prevalence of substance use in BPD (Trull et al., 2018). Patients with comorbid physical illnesses influencing cognition, such as neurological disorders or acute intoxication, were excluded.

Healthy controls (HC) aged between 18 and 65 years were volunteers among university students and their relatives and friends; exclusion criteria included clinical evidence of neurological or psychiatric disorders.

The study was approved by the Ethics Committee of the University of Ferrara. All subjects received previous information about the content of this study and signed a written consent form before participating.

Assessments

SCIP

The SCIP was designed for a bedside evaluation of key features of cognitive impairment common in psychiatric illnesses. Recently, it proved more accurate than other screening instruments for the identification of cognitive impairments in patients with non-affective psychoses (Belvederi Murri, Folesani, Costa, Biancosino, Colla, et al., 2020a) as well as bipolar disorder (Cuesta et al., 2011; Ott et al., 2021) and major depressive disorder (Tourjman et al., 2018). The SCIP has been translated and validated in Spanish (Pino et al., 2006), French (Tourjman et al., 2016), Japanese (Hirabayashi et al., 2006), Persian (Shirzad et al., 2020), German (Sachs et al., 2021) and Italian (Belvederi Murri, Folesani, Costa, Morelli, Scillitani, et al., 2020). In this study, the Italian validated version of the SCIP (SCIP-IT) was used. The SCIP includes a Verbal Learning Test—Immediate (VLT-I), a Working Memory Test (WMT), a Verbal Fluency Test (VFT), a Verbal Learning Test—Delayed (VLT-D) and a Processing Speed Test (PST). It does not require any additional equipment beyond the test sheet, a pencil and a clock, and it takes approximately 15 min. Three alternative forms of the scale are available in order to allow for repeated testing while minimizing learning effects. A total score of less than 70 indicates cognitive impairment (Rojo et al., 2010).

Other neuropsychological assessments

The Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) (Ponteri et al., 2007; Randolph et al., 1998) is composed of five main cognitive indexes and 12 subtests: Immediate Memory (List Learning and Story Memory); Visuospatial/Constructional (Figure Copy and Line Orientation subtests); Language (Picture Naming and Semantic Fluency); Attention (Digit Span and Coding); Delayed Memory (List Recall, List Recognition, Story Recall and Figure Recall). It requires approximately 20–30 min and yields a total cut-off score of 70. It is a widely used battery in the psychiatric context and has been previously used in BPD patients (Seres et al., 2009).

The Montreal Cognitive Assessment (MoCA) (Nasreddine, 2005; Pirani & Tulipani, 2006) is a brief (15 min) screening instrument for the detection of cognitive impairment. It evaluates visuospatial skills, language, attention, memory, executive functions, abstraction and orientation. The MoCA cut-off score indicating cognitive impairment is less than 26.

The Trail Making Test A and B (TMT A and TMT B) (Reitan, 1955) were administered as measures of visuospatial processing and working memory. Normative Italian values for the general population consider a cut-off of 94 s for TMT A and 283 s for TMT B (Giovagnoli et al., 1996).

The Wisconsin Card Sorting Test (WCST) (Barcelo et al., 1997) evaluates reasoning and set-shifting abilities. We considered perseverative errors as the main index (Laiacona et al., 2000).

All patients were administered these cognitive tests in one session and in the following order: the SCIP, the TMT A and B, the MoCA, the RBANS and the WCST. All neuropsychological tests were administered by researchers after proper training in the neuropsychological batteries and their administration.

Statistical analysis

To evaluate the SCIP validity in the BPD population, first, we assessed internal consistency using Cronbach's alpha.

Second, convergent validity was evaluated with a two-step approach (Gunderson et al., 2018): We computed correlations between each SCIP subtest and the corresponding domains of the neuropsychological battery (Pompili et al., 2005); we performed a t-test to compare the SCIP scores between subjects with or without cognitive deficits for each validated instrument (one SD below the HC mean). Each domain of the SCIP was validated against one domain from the neuropsychological battery: the VLT-I with the RBANS Immediate Memory Index; the WMT with the TMT-B (Sánchez-Cubillo et al., 2009); the VFT with the RBANS Language domain; the VLT-D with RBANS Delayed Memory (including three subtests: List Recognition; Story Recall; Figure Recall); and PST with TMT A (Sánchez-Cubillo et al., 2009); the SCIP total score was compared with RBANS total score.

Third, receiver operating characteristic (ROC) curve analyses were computed for each SCIP domain to assess the capacity to discriminate between cognitively impaired and non-impaired individuals. We reported optimal cut-off scores, sensitivity, specificity and positive and negative predictive values (PPV and NPV). The clinical utility index (CUI) (Mitchell, 2011) was used as an estimate of the clinical value of the diagnostic test.

Fourth, we performed an exploratory factor analysis with Varimax rotation of the five SCIP subtests in order to examine the internal structure validity.

To evaluate BPD cognitive performances, *t*-tests were used to compare the cognitive battery (SCIP, MoCA, RBANS, TMT, WCST) total and subdomain scores between patients and controls, in addition to a comparison of effect size (Hedges' *g*). Bonferroni correction was applied, giving a corrected *p*-value of 0.0018. We also reported the percentage of subjects with impaired performance defined by scores lower than one standard deviation below the HC mean.

Finally, we performed correlation analyses in the BPD sample between the SCIP total score and age and education (Table S1), whereas *t* tests were used to compare cognitive performances between male and female BPD patients (Table S2).

All analyses were conducted using IBM SPSS Version 22.0.

RESULTS

Sample characteristics

A total of 144 participants were recruited, 58 of whom had BPD and 86 were HC. Sample characteristics are reported in Table 1. Patients were comparable with controls except for a lower education.

Internal consistency

The SCIP yielded an adequate level of internal consistency (Cronbach's alpha 0.75 selecting the five SCIP items) according to conventional standards (alpha $<$ 0.5 unacceptable, 0.5 $\leq$ alpha $<$ 0.6 poor, 0.6 $\leq$ alpha $<$ 0.7 questionable, 0.7 $\leq$ alpha $<$ 08 acceptable, 0.8 $\leq$ alpha $<$ 0.9 good, alpha $\geq$ 0.9 excellent) (Kline, 2000).

SCIP convergent validity

We computed the correlations between SCIP subtest scores and the corresponding subtests from other neuropsychological instruments, mainly the RBANS and the TMT A and B (Table 2). All correlations were statistically significant, although with low magnitude (all *R* below 0.5). Total score displayed higher convergent validity ($R = 0.646$).

We divided the sample according to the presence of impairments in each domain, as assessed with the validated instruments (Table 2, left panel). A comparison of the corresponding SCIP domain scores between spared and impaired subjects revealed significant differences of about one standard deviation in magnitude for all domains ranging from 0.81 (WMT) to 1.15 (total SCIP).

TABLE 1 Description of the sample

	Control group		BPD		
Variable	***N***	**%**	***N***	**%**	**Statistics**
Frequency	86	59.7	58	40.3	
Sex					
Males	42	48.8	27	46.6	
Females	44	51.2	31	53.4	
Mean age (SD)	86	34.85 (12.61)	58	37.55 (9.84)	$p = 0.172$
Mean years of education (SD)	86	13.73 (3.46)	58	11.6 (3.47)*	$p < 0.001$
Mean duration of illness in months (SD)	-	-	38	171.37 (114.61)	
Hospitalization in the past year	-	-	21	36.21	
Currently in residential care			19	32.76	
Substance use disorder	-	-	44	75.86	
Medications					
Typical antipsychotic	-	-	13	23.2	
Atypical antipsychotic	-	-	28	50.0	
Anticholinergic	-	-	2	3.6	
Antidepressant	-	-	25	44.6	
Mood stabilizer	-	-	11	19.6	
Benzodiazepines	-	-	38	67.9	
Methadone			9	16.1	

TABLE 2 *T*-test, Pearson correlations and ROC curve analysis to explore convergent validity between the SCIP subtests and total score and other validated instruments (RBANS and TMT) in BPD and HC

Domain	Validated test		SCIP scores Mean ± SD	T	g	R, p	ROC AUC, 95%CI	Cut-off (Se., Sp.)	PPV, NPV
VLT-I	RBANS Imm. Memory	Affected	18.45 (4.85)	−5.421**	−0.94	0.482**	0.768,	<23 (78%, 63%)	54%, 84%
		Not affected	23.01 (4.80)				(0.685–0.851)		
WMT	TMT B	Affected	18.65 (3.44)	−4.275**	−0.81	−0.456**	0.712,	22 (76%, 61%)	41%, 88%
		Not affected	21.22 (3.03)				(0.609–0.815)		
VFT	RBANS Language	Affected	14.77 (5.55)	−5.104**	−0.99	0.404**	0.765,	<19 (83%, 68%)	45%, 92%
		Not affected	19.89 (5.02)				(0.666–0.864)		
VLT-D	RBANS Del. Memory	Affected	4.72 (1.89)	−5.889**	−1.04	0.49**	0.818,	<7 (85%, 69%)	57%, 91%
		Not affected	7.48 (2.91)				(0.750–0.885)		
PST	TMT A	Affected	8.05 (3.85)	−5.320**	−0.96	−0.479**	0.806	<11 (84%, 60%)	47%, 90%
		Not affected	11.63 (3.64)				(0.718–0.895)		
Total	RBANS Tot	Affected	69.67 (15.56)	−6.640**	−1.15	0.646**	0.781	<80 (75%, 72%)	69%, 78%
		Not affected	85.00 (11.06)				(0.703–0.858)		

Note: From left to right, (1) comparison of SCIP scores between subjects with (affected) and without impairment (not affected) in each validated instrument, (2) Pearson correlation between SCIP domain scores and scores of validated instruments and (3) ROC curve analysis to identify optimal cutoff scores for each of the SCIP subtest.

Abbreviations: BPD, borderline personality disorder; HC, healthy controls; PST, psychomotor speed test; RBANS, Repeatable Battery for the Assessment of Neuropsychological Status; TMT, Trail Making Test; VFT, Verbal Fluency Test; VLT, Verbal Learning Test—Immediate; VLT-D, Verbal Learning Test—Delayed; WMT, Working Memory Test.

*$p < 0.05$.

**$p < 0.001$.

SCIP discriminant ability

The SCIP yielded acceptable accuracy discriminating between cognitively impaired and non-impaired subjects for the VLT-I, WMT and VFT domains and for the total score (AUC ROC values > 0.7). It yielded excellent accuracy for the VLT-D and PST (AUC values > 0.80). A SCIP total score lower than 80 appeared to be the optimal cut-off to identify global cognitive impairment with a sensitivity of 75% and a specificity of 72%. At the 80 points cut-off, the NPV was 78% and the PPV was 69%. The clinical utility positive index (CUI+) was 0.514 (fair), and clinical utility negative index (CUI-) was 0.563 (also fair) (Mitchell, 2011). With the 80 points cut-off, 81% of patients and 26.7% of controls would be identified as cognitively impaired. This exceeds the rates that would be obtained using the original cut-off score of 70 (56.9% of patients vs. 11.6% of HC) and also the rates that are obtained using the 'one-SD' criterion (see Table 3 and the paragraph below).

Factor analysis

The Kaiser–Meyer–Olkin measure of sample adequacy was 0.79, indicating that the factor analysis was appropriate. One single factor explaining 55.8% of the total variance emerged form factor analysis. The highest load pertains VLT-I (0.825) followed by VLT-D (0.752) (Table 4).

Comparison of cognitive performance between patients and controls

BPD patients fared worse than HC across all SCIP scores, with effect sizes ranging from 1.50 (Total score) to 0.73 (VLT-D). The majority of patients (63.8%) displayed global cognitive deficits as indicated by a SCIP total score more than one SD below the mean. According to this 'one-SD' criterion, 16.3% of HC could be defined cognitively impaired. All RBANS domain scores were significantly different between BPD and HC, with effect sizes ranging from 1.56 (total score) to 0.68 (visuospatial). According to the RBANS total score, 81% of patients and 20% of controls were cognitively impaired. Patients performed significantly worse also in the MOCA subtests of attention, language, abstraction and delayed recall according to the Bonferroni correction (corrected $p = 0.0018$). Effect sizes ranged from 1.11 (MoCA total score) to 0.03 (naming). According to MOCA total scores, 55.2% of patients and 15.1% of controls were cognitively impaired.

TABLE 3 Comparison of cognitive performance (t test) between HC and BPD according to the SCIP, the MoCA, the RBANS, the TMT A and B and the WCST

		HC		BPD				Subjects with impaired performance ('one-SD' criterion) % (*N*)[a]	
	Subtest	***N***	**Mean (SD)**	***N***	**Mean (SD)**	***p***	**g**	**HC**	**BPD**
SCIP	**VLT-I**	86	23.44 (5.04)	58	18.53 (4.39)	<0.001	1.02	11.6% (10)	48.3% (28)*
	WMT	86	21.84 (2.36)	58	18.69 (3.60)	<0.001	1.07	19.8% (17)	58.7% (34)*
	VFT	86	20.38 (4.56)	58	16.21 (6.15)	<0.001	0.79	12.8% (11)	55.2% (32)*
	VLT-D	86	7.43 (3.06)	58	5.41 (2.24)	<0.001	0.73	12.8% (11)	25.9% (15)
	PST	86	12.31 (3.86)	58	7.97 (2.70)	<0.001	1.25	9.3% (8)	58.6% (34)*
	Total SCIP	86	85.91 (11.18)	58	67.17 (14.09)	<0.001	1.50	16.3% (14)	63.8% (37)*
MoCA	**Visuospatial**	86	4.33 (0.80)	58	3.81 (1.12)	0.002	0.55		32.8% (19)*
	Naming	86	2.91 (0.42)	58	2.90 (0.31)	0.872	0.03	12.8% (11)	10.3% (6)
Attention	Digits	86	1.91 (0.29)	58	1.72 (0.49)	0.006	0.49	5.8% (5)	25.9% (15)*
	Attention letters	86	1.01 (0.33)	58	0.90 (0.31)	0.035	0.34	9.3% (8)	10.3% (6)
	Subtraction	86	2.88 (0.45)	58	2.72 (0.64)	0.081	0.30	3.5% (3)	19.0% (11)*
	Attention total	86	5.80 (0.46)	58	5.34 (1.00)	<0.001	0.63	7.0% (6)	37.9% (22)*
Language	Language	86	1.85 (0.36)	58	1.74 (0.48)	0.127	0.27	17.4% (15)	24.1% (14)
	Fluency	86	0.91 (0.33)	58	0.66 (0.48)	<0.001	0.63	15.1% (13)	34.5% (20)*
	Language total	86	2.76 (0.51)	58	2.40 (0.70)	<0.001	0.60	10.5% (9)	48.3% (28)*
	Abstraction	86	1.83 (0.41)	58	1.48 (0.60)	<0.001	0.70	20.9% (18)	46.6% (27)*
	Delayed recall	86	3.01 (1.75)	58	1.98 (1.56)	<0.001	0.61	16.3% (14)	41.4% (24)*
	Orientation	86	6.00 (0.00)	58	5.84 (0.41)	0.001	0.61	20.9% (18)	13.8% (8)*
	Total MoCA	86	26.97 (2.24)	58	24.16 (2.86)	<0.001	1.11	0% (0)	55.2% (32)*
RBANS	**Immediate memory**	85	101.1 (16.42)	58	79.21 (15.21)	<0.001	1.37	15.1% (13)	62.1% (36)*
	Visuospatial ability	85	99.14 (13.92)	58	88.74 (17.08)	<0.001	0.68		44.8% (26)*
	Language	85	94.61 (12.36)	58	86.16 (9.51)	<0.001	0.74	17.6% (15)	37.9% (22)*
	Attention	85	102.7 (21.65)	58	78.67 (21.08)	<0.001	1.12	17.6% (15)	62.1% (36)*
	Delayed memory	85	98.72 (15.02)	58	79.36 (16.65)	<0.001	1.23	15.3% (13)	58.6% (34)*
	Total RBANS	85	98.14 (14.62)	58	77.16 (11.21)	<0.001	1.56	14.1% (12)	81.0% (47)*
TMT A	(Seconds)	86	28.12 (9.83)	58	42.09 (26.19)	<0.001	−0.76	14.1% (12)	51.7% (30)*
TMT B	(Seconds)	82	62.80 (27.12)	58	103.38 (68.92)	<0.001	−0.82	20.0% (17)	39.7% (23)*
WCST	(Persev.errors)	79	107.9 (20.83)	58	91.47 (19.60)	<0.001	0.80		44.8% (26)*

Notes: Comparison of cognitive performance between participants with BPD and healthy controls. *P*-values for *t*-test are reported along with Hedges' *g* values as a measure of effect size. Bonferroni correction for 28 multiple comparisons displayed a corrected *p*-value of 0.0018.

Abbreviations: MoCA, Montreal Cognitive Assessment; PST, psychomotor speed test; RBANS, Repeatable Battery for the Assessment of Neuropsychological Status; TMT, Trail Making Test; VFT, Verbal Fluency Test; VLT, Verbal Learning Test—Immediate; VLT-D, Verbal Learning Test—Delayed; WCST, Wisconsin Card Sorting Test. WMT, Working Memory Test.

[a]The right panel reports the percentage of subjects scoring more than one standard deviation below the mean performance of healthy controls.

*Difference is statistically significant for $p < 0.05$.

DISCUSSION

To our knowledge, this is the first study evaluating the application of a cognitive screening tool in a sample of patients with BPD. The Italian version of the SCIP demonstrated adequate psychometric properties for the screening of cognitive impairments in this population. Our findings may encourage the assessment of an aspect of mental health, which is increasingly recognized as important in the clinical management of BPD.

The SCIP was originally developed for patients with schizophrenia-spectrum disorders (Purdon, 2005a) and

TABLE 4 Factor analysis

	Component 1
VLT-I	0.825
VLT-D	0.752
VFT	0.729
PST	0.721
WMT	0.702

Abbreviations: PST, psychomotor speed test; VFT, Verbal Fluency Test; VLT, Verbal Learning Test—Immediate; VLT-D, Verbal Learning Test—Delayed; WMT, Working Memory Test.

was previously validated in patients with schizophrenia and bipolar disorder: Although some studies found a cut-off score of 70 to adequately discriminate between cognitively affected and non-affected patients (Jensen et al., 2015; Rojo et al., 2010), a slightly lower cut-off score of 67 was found by other studies (Guilera et al., 2009; Pino et al., 2008). Higher cut-off scores of 74 and 77 were instead identified in a group of patients with major depression (Ott et al., 2016). The Italian validation of the SCIP in non-affective psychoses displayed a cut-off score of 70 yielding a sensitivity of 77% and specificity of 83% (Belvederi Murri, Folesani, Costa, Biancosino, Colla, et al., 2020a) consistent with that of previous validations. The SCIP validity in BPD patients was supported by good internal consistency (Cronbach > 0.75) and fair correlation coefficients with other validated neuropsychological tools (RBANS and TMT). BPD patients performed significantly worse than HC in all the SCIP subtests and total score; a cut-off point of 80 yielded a sensitivity of 75% and a specificity of 72% and identified as cognitively impaired 81% of the patients and 26% of the HC. The factor analysis of SCIP in BPD patients identified one factor, which explained more than half of the variance in this sample. However, our previous study in 120 subjects from the general Italian population detected two factors, namely, memory and executive functions (Belvederi Murri, Folesani, Costa, Morelli, Scillitani, et al., 2020). Given the different sample size, further study is necessary to investigate possible differences in the structure of cognitive data across clinical and non-clinical populations.

The level of reliability of the SCIP in the BPD group was fair, slightly lower than among patients with severe psychoses (Belvederi Murri, Folesani, Costa, Biancosino, Colla, et al., 2020a; Pino et al., 2008). This is consistent with the development and calibration of item difficulty in the latter disorders (Purdon, 2005a), which are characterized by cognitive impairment of greater severity, arguably more variable between subjects, and more widespread across domains. Moreover, BPD patients displayed greater impairment sin executive functions such as response inhibition (Legris et al., 2012; Rentrop et al., 2008), cognitive flexibility (Lenzenweger et al., 2004; Ruocco, 2005) and decision making (Bazanis et al., 2002; Unoka & Richman, 2016) and also social cognition (Fertuck et al., 2005). Despite being such a versatile and easy tool, the SCIP does not include an extensive evaluation of these features. These issues could explain the lower sensitivity and specificity of this instrument in the personality disorder population compared with the psychotic one.

Compared with HC, BPD patients displayed a higher degree of cognitive impairment across various cognitive domains, especially attention, working memory and immediate and delayed memory. These results are consistent with those of a meta-analysis that observed a significant impairment in attention, memory and executive functions (Unoka & Richman, 2016). Up to 63.8% of BPD patients showed a SCIP total score of more than one SD below the mean of HC, the most impaired domain being working memory, followed by psychomotor abilities and verbal fluency.

Because the presence of cognitive disturbances appears to be not only common in borderline patients but also yielding a significant impact on psychopathological, functional and outcome variables (Bazanis et al., 2002; Ghanem et al., 2016; Legris et al., 2012; Ruocco & Wonders, 2013; Svaldi et al., 2012; Unoka & Richman, 2016), the availability of a brief and easy tool for routine cognitive evaluation in day-to-day clinical practice would be of great importance. Moreover, cognitive performances assessed in the SCIP appear to be associated with functioning and disability levels in a sample of patients with major depressive disorder (Tourjman et al., 2018). The SCIP has several advantages that make it useful for the identification of cognitive impairment in the everyday clinical setting such as the brief administration time, the very little training required, its free availability in many languages and the three different forms with a good test–retest reliability (Bakkour et al., 2014; Pino et al., 2008; Purdon, 2005b; Rojo et al., 2010). Furthermore, the International Society for Bipolar Disorders (ISBD) Targeting Cognition Task Force (Miskowiak et al., 2018) recently recommended the use of the SCIP as a screening test for cognitive evaluation in bipolar disorder, and demographically adjusted norm models have been provided for this population (Ott et al., 2021). More comprehensive studies are needed to explore the SCIP psychometric properties in the BPD population; however, this instrument holds promise to be included in routine clinical settings. The SCIP would allow the identification of those patients in need of a more comprehensive

assessment, who require attention to specific clinical issues related to cognitive deficits and who could benefit from cognitive remediation.

This preliminary validity study has some limitations. First, HC displayed a significantly higher educational level than patients, which could represent a bias in the cognitive test results. Second, we used a relatively short battery to validate the SCIP (RBANS, TMTs and WCST) in order to avoid excessively prolonged test sessions. These instruments have however been validated against other cognitive measures (Gold et al., 1999; Koren et al., 1998; Mahurin et al., 2006). Third, test–retest reliability and the impact on cognitive scores of substance use and psychotropic drugs were not evaluated. The impact of some medications such as antidepressant is not associated with worse cognitive performance in BPD (Unoka & Richman, 2016), whereas antipsychotics could display a favourable effect on cognitive performances in psychotic disorders (Baldez et al., 2021), but their effects in BPD have not yet been thoroughly explored. The impact of medications on neurocognition should be further evaluated, especially in BPD patients in which the efficacy of psychotropic drugs is still unclear (Stoffers-Winterling et al., 2020). Fourth, the SCIP was designed to target schizophrenia-spectrum patients and does not include measures of cognitive domains frequently impaired in the BPD population, such as specific subdomains of executive functions and social cognition.

CONCLUSIONS

This study suggests that the SCIP may have value as a screening tool for cognitive deficits among patients with BPD. Furthermore, it is easy to administer and rapidly generates a valuable total score for interpretation. As very few other instruments at present are available, it can be used for the initial evaluation of neurocognitive performances in the BPD population. Because cognitive functions appear to have an important role in the pathogenesis of the disorder, its symptomatologic manifestations and functioning in everyday life, the assessment of neurocognitive features should not be overlooked when dealing with BPD patients. A simple, brief and easy-to-administer tool such as the SCIP could help identify those patients with some kind of impairment to be further addressed with more complex neuropsychological batteries; moreover, a dimensional neuropsychological evaluation would be favoured by the use of a screening instrument, allowing a preliminary and general assessment including different cognitive domains and indicating which domains could benefit for a more comprehensive evaluation.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interests.

ETHICS STATEMENT

All procedures performed in this study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Informed consent was obtained from all individual participants included in the study.

DATA AVAILABILITY STATEMENT

Data are available upon request from the authors.

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SUPPORTING INFORMATION

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