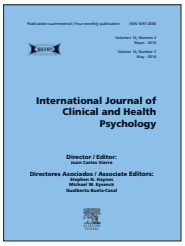
International Journal of Clinical and Health Psychology (2014) **14**, 128–136

ELSEVIER DOYMA

International Journal of Clinical and Health Psychology

www.elsevier.es/ijchp



ORIGINAL ARTICLE

Comparing neurocognitive impairment in schizophrenia and bipolar I disorder using the Screen for Cognitive Impairment in Psychiatry Scale☆

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Received May 22, 2013; accepted December 9, 2013

KEYWORDS
Cognitive impairment;
Screen for Cognitive Impairment in Psychiatry;
Schizophrenia;
Bipolar disorder;
Instrumental study

Abstract The purpose of this study was to compare the psychometric properties of the Screen for Cognitive Impairment in Psychiatry (SCIP) when applied to patients diagnosed with schizophrenia (n = 126) or bipolar I disorder (n = 76), and also to compare the cognitive impairment in both samples of patients and a control group (n = 83) using the SCIP and a complete neuropsychological battery. The SCIP is a scale intended to quickly and easily assess cognitive impairment in patients with severe psychiatric disorders. The results showed firstly that, in terms of internal consistency, temporal stability, dimensional structure, and criterion-referenced validity, the SCIP provides reliable and valid scores at an equivalent level in both schizophrenia and bipolar I disorder samples. Secondly, it showed that differential cognitive impairment between the two patient groups occurs only in verbal memory, although the effect

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size of the difference is small. Finally, compared with the control group, cognitive impairment was present at all levels in both groups of patients using both the SCIP and the neuropsychological battery, which indicates that the SCIP is a good screening tool for cognitive deficits in schizophrenia and bipolar and useful in clinical practice for healthcare professionals.

PALABRAS CLAVE
Deterioro cognitivo;
Screen for Cognitive Impairment in Psychiatry;
Esquizofrenia;
Trastorno bipolar;
Estudio instrumental

Resumen El objetivo del estudio fue comparar las propiedades psicométricas del test *Screen for Cognitive Impairment in Psychiatry* (SCIP) en pacientes diagnosticados de esquizofrenia (*n* = 126) o trastorno bipolar I (*n* = 76). Además, el deterioro cognitivo se comparó con un grupo control (*n* = 83) empleando el SCIP y una batería neuropsicológica completa. El test SCIP es una escala que evalúa rápida y fácilmente el deterioro cognitivo en trastornos psiquiátricos graves. En términos de consistencia interna, estabilidad temporal, estructura dimensional y validez de criterio, el SCIP proporciona resultados al mismo nivel de fiabilidad y validez en pacientes con esquizofrenia o trastorno bipolar I. Además, demostró que el deterioro cognitivo diferencial entre los dos grupos de pacientes se produce solo en la memoria verbal, aunque el tamaño del efecto de esta diferencia es pequeño. Por último, y frente al grupo control, se confirma el deterioro cognitivo a todos los niveles en ambos grupos de pacientes utilizando tanto el SCIP como la batería neuropsicológica, lo que indica que el SCIP es una buena herramienta de detección para los déficits cognitivos en esquizofrenia y trastorno bipolar, y útil en la práctica clínica habitual para profesionales de la salud.

Several studies have shown that cognitive functions are impaired both in patients with schizophrenia and those with bipolar I disorder, and these impairments have a real impact on the daily functioning of patients with these disorders (Bowie et al., 2010; Tabarés-Seisdedos et al., 2008). The early detection of neurocognitive impairment is a challenge, particularly with respect to orientation of treatment (Balanzá-Martínez et al., 2010).

The Screen for Cognitive Impairment in Psychiatry (SCIP) (Pino et al., 2006; Purdon, 2005) was designed for detecting cognitive deficits in several psychotic and affective disorders. It may be administered without the need for additional equipment (only pencil and paper) and requires less than 15 minutes, which allows it to be easily administered in daily medical practice in different settings without an extra burden of administration. There are three alternative forms of the scale available to minimize learning effects in prospective evaluations. The SCIP consists of five brief peformance subtests including a Working Memory Test (WMT), a Verbal Learning Test-Immediate Recall (VLT-I), a Verbal Fluency Test (VFT), a Verbal Learning Test-Delayed Recall (VLT-D), and a Processing Speed Test (PST). The original SCIP version is in English. The origin and nature of the scale have previously been explained in detail both for the original instrument (Purdon, 2005) and for the process of translation and adaptation of the Spanish version (Pino et al., 2006). Recently, its psychometric properties have been validated in a sample of psychiatric patients with schizophrenia (Pino et al., 2008) or bipolar I disorder (Guilera et al., 2009). In addition, useful cut-off points have been established to facilitate the use of the SCIP in both clinical and research settings (Rojo et al., 2010), and a recent report has provided evidence that the SCIP may have better predictive value than other screening tools for detecting a global cognitive deficit (Cuesta et al., 2011).

The previous investigations of the psychometric properties of the Spanish version of the SCIP (SCIP-S) have provided empirical support for the validity and reliability of the test in schizophrenia (Pino et al., 2006) and bipolar I disorder (Guilera et al., 2009) patients, despite small differences in the values obtained with regard to internal consistency, temporal stability, dimensional structure and relationships with other variables. The study described below will discuss further the statistical equivalency of the psychometric properties of the SCIP-S with more direct comparisons between the values obtained from patients with schizophrenia or bipolar I disorder. The main aim is to determine whether the SCIP is equally reliable and valid for both psychiatric samples. The secondary aims would be to assess the value of the SCIP for detection of cognitive impairment in each psychiatric samples relative to a healthy control group, and to directly compare the psychiatric samples to assess any differences in the severity or the profile of cognitive deficits detected by the SCIP in each group in relation to the deficits detected by a more detailed neuropsychological examination.

Method

Participants

A total of 202 psychiatric patients participated in this study. The sample included 126 patients diagnosed with schizophrenia (73% men; mean age 36.66; *SD* = 8.38) and 76 with bipolar I disorder (45% men; mean age 40.30; *SD* = 8.98). The clinical sample was recruited through 40 outpatient psychiatric clinics across Spain. All patients were evaluated by experienced psychiatrists and met DSM IV-TR criteria (American Psychiatric Association, 2000) for

the corresponding diagnosis. The inclusion criteria for patients were 18-55 years of age, and no changes in drug regimen or dose during the study. For patients with schizophrenia was required a stable phase of the illness defined by no hospitalization in the past 3 months, a total score under 70 on the Positive and Negative Syndrome Scale (PANSS, Kay, Flszbein, & Opfer, 1986; Peralta & Cuesta, 2004), and a score under 3 on all seven positive symptom items of the PANSS. For patients with bipolar I disorder was required a stable phase of the illness defined by at least 6 months in remission, a Hamilton Depression Scale (HAMD) (Hamilton, 1960) score less than 8, a Young Mania Rating Scale (YMRS) (Young, Biggs, Ziegler, & Meyer, 1978) score less than 6. In both cases, patients were not included if they were suffering from a severe medical or neurological condition, or another psychiatric disorder that required treatment, if they were participating in a clinical trial, or exhibiting difficulties with reading or writing. Relative to the schizophrenia sample, the bipolar I disorder sample was older ($t_{(200)}$ = 2,91, p < .05), and had a larger proportion of women (*chi square* = 16,15, p < .05). The schizophrenia sample tended to be single (87%), living with their birth families (73%), unemployed on disability benefits (41%), and educated to at least a secondary level (60%). The bipolar I disorder group tended also to be single (46%) and living with their family (46%), with many working (38%) and having achieved at least a secondary education (61%). Further description of the demographic characteristics of the groups is available in our prior reports (Guilera et al., 2009; Pino et al., 2008).

A control group composed of 83 healthy individuals (59% men; mean age 38.07; SD=8.48) also participated in the study. The control sample was statistically matched with both clinical samples combined on sex, age, and educational level, and they were free of significant symptoms of psychiatric illness assessed with the interview Comprehensive Assessment of Symptoms and History (CASH) (Andreasen, Flaum, & Arndt, 1992). Controls were excluded if they had severe medical or neurological problems, met criteria for a psychiatric disorder, were participating in a clinical trial, were illiterate, or having any first degree relative with mental illness. There were no significant differences in terms of age, sex or educational level compared with the patient samples (all p values > .05). This group was statistically matched with both samples combined, so there were no significant differences in terms of age or sex compared with the patient samples (all p values > .05). The control group tended to be married (61%), with many working (86%) and having achieved at least a secondary education (68%). All participants were asked for their written consent to participate in the study, and the protocol and procedures were reviewed and approved by the University of Barcelona Research Committee.

Instruments

The SCIP was designed to detect cognitive deficits in several psychotic and affective disorders. It can be administered without the need for additional equipment (only pencil and paper) and requires around 15 minutes to complete. Three alternative forms of the scale are available to facilitate repeated testing while minimizing learning effects. 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). The original version of the SCIP is in English (Purdon, 2005), while the rationale, and development of the Spanish version (SCIP-S) was described in a previous publication (Pino et al., 2006). The SCIP-S has shown adequate psychometric properties for detection of cognitive impairment in patients with schizophrenia (Pino et al., 2008) and type I bipolar disorder (Guilera et al., 2009). Psychometric properties tested included feasibility, reliability, construct and criteria validities. Feasibility was supported by a brief administration time (approximately 15 minutes) in patients with either schizophrenia or bipolar type I, and minimal scoring errors. The reliability of the SCIP was confirmed by good equivalence of forms, acceptable stability (ICC range .74 to .90 in schizophrenia subjects and .59 to .87 in bipolar type I patients) and adequate internal consistency (Cronbach's alpha of .73 and .74, respectively). Construct validity was granted by extraction of a single factor (accounting 50% and 52% of the variance, respectively in patients with schizophrenia or bipolar type I disorder). The SCIP scale was correlated, in both type of patients, with corresponding neuropsychological instruments, with Pearson's r between .38 and .60 and the scale effectively discriminated between patients with any of such psychiatric conditions and controls.

Procedure

The SCIP was administered to the control group on one occasion only, and to patients on three occasions separated by an interval of one week (± 2 days). The order of administration of the three parallel forms of the SCIP was balanced in the first two visits, followed by a re-test with last version administered (e.g. 1-2-2, 1-3-3, 2-1-1, 2-3-3, 3-1-1, 3-2-2). Furthermore, to assess the merits of the SCIP relative to a more extensive battery of neuropsychological instruments, at the baseline visit all subjects were administered twelve additional standardized cognitive instruments including tests of immediate and delayed word recall (WMS-III Word List I and II), processing speed (WAIS-III Digit Symbol Coding, Trail Making A and B, WAIS-III Digit Symbol Coding, WAIS-III Symbol Search), working memory (WAIS-III Arithmetic, Digit Span, and Letter-Number Sequencing), language (Semantic Fluency, and WAIS-III Vocabulary), and problem solving (Wisconsin Card Sorting Test, WCST). The selection of this battery was in accordance with the criteria included in Carretero-Dios and Pérez (2007), and Jurado and Pueyo (2012). Additional details of the instruments, recruitment procedures, and the design for data collection design are available in our prior reports (Guilera et al., 2009; Pino et al., 2008).

Data analysis

The two studies mentioned above showed that there were no differences between the parallel forms of the SCIP in either of the patient groups, so the analysis of this study was performed with the three forms combined. The analysis of the psychometric properties of the scale followed the

Table 1 Intraclass correlation coefficients of the SCIP in patients with schizophrenia and bipolar I disorder, and Feldt's *W*.

	Schizophrenia		Bipolar I Disorder		
Sub-test	*n*	*ICC*	*n*	*ICC*	*Feldt's W*
VLT-I	122	.76	74	.75	.960
WMT	122	.80	74	.77	.870
VFT	122	.81	74	.67	.576*
VLT-D	121	.74	74	.59	.634*
PST	122	.75	74	.82	1.389
Total SCIP	121	.90	74	.87	.769

Note. VLT-I = Verbal Learning Test-Immediate; WMT=Working Memory Test; VFT = Verbal Fluency Test; VLT-D= Verbal Learning Test-Delayed; PST = Processing Speed Test; Total SCIP= SCIP total score.
* $p < .05$.

recommendations from Carretero-Dios and Pérez (2007). In assessing the internal consistency of the SCIP, Cronbach's alpha coefficient was computed with the scores from the first visit, and in assessing temporal stability, intraclass correlation coefficients (ICC) were calculated for each sub-test of the SCIP with the scores from the second and third visit. Feldt's *W* statistic was used to compare the internal consistency coefficients obtained in both samples (Feldt, 1969) and the corresponding intraclass correlation coefficients (Kraemer, 1981). The null hypothesis of this statistic suggests that the coefficients of sample 1 and sample 2 are equal and the statistic is defined as $W = (1-\alpha_1)/ =1-\alpha_2)$ in the case of temporal stability, the coefficients of internal consistency should be replaced by the corresponding ICCs – which follows an F distribution with N_1-1 and N_2-1 degrees of freedom. The dimensional structure of the SCIP was assessed with a principal component analysis and the comparison between the two structures by computing Tucker's congruency index (Tucker, 1951) and the identity coefficient (Zegers & ten Berge, 1985). Finally, the convergence of the SCIP sub-test scores with the neuropsychological battery scores was assessed using Pearson correlation coefficients, which in turn were compared between patients with schizophrenia and bipolar disorder using Fisher's *Z*.

The capability of the SCIP to discriminate among the schizophrenia, bipolar, and matched healthy control samples was assessed by multivariate (with Bonferroni adjustment) and univariate comparisons of the baseline SCIP subscale scores and total score, respectively. Because of the differences found in the demographic variables between the patient samples, the analysis also included sex as a factor and age as a covariate. The magnitude of those differences in each subscale score and the total score was calculated with Cohen's *d*, representing the difference between the scores of the two compared groups divided by the pooled standard deviation. Additionally, this multivariate approach was used for between group comparisons of performance on the neuropsychological battery by entry of test scores corresponding to total items correct on Word List I, Word List II, Digit Symbol Coding, Symbol Search, Arithmetic, Letter-Number Sequencing, Semantic Fluency, and Vocabulary, as well as time to complete TMT-A and TMT-B, and total errors and total perseverative errors on the WCST.

Results

Equivalency between psychometric properties

Internal consistency and temporal stability. Cronbach's alpha coefficient was very similar for both diagnoses; in the sample of patients with schizophrenia it was .73, while for patients with bipolar I disorder it reached a value of .74. Feldt's *W* statistic of comparison between the two coefficients reached a value of 1.03 ($p = .56$), leading to acceptance of the null hypothesis of equality between the internal consistency indexes. Regarding test-retest reliability, Table 1 shows the ICC values in both groups for all subtests and the SCIP total score, as well as their Feldt's *W* statistic of comparison. The ICC values, ranging between .74 and 0.90 in patients with schizophrenia, and between .59 and 0.87 in patients with bipolar I disorder, as well as their comparison in both samples confirm the statistical similarity between the corresponding coefficients with the exception of VFT and VLT-D.

Dimensional structure and relationship with other variables. The dimensional structures, both for the sample of patients with schizophrenia and those with bipolar I disorder, are defined by a single factor that explains approximately 50% of the observed variance (see Table 2).

Table 2 Dimensional structure of the SCIP in patients with schizophrenia and bipolar I disorder, and Tucker's C coefficient.

Sub-tests	Schizophrenia	Bipolar I Disorder
VLT-I	.78	.77
WMT	.75	.71
VFT	.70	.75
VLT-D	.64	.80
PST	.64	.53
Eigenvalue	2.49	2.61
% variance	49.79	52.21
Tucker's *C*	.99	
C. of identity	.99	

Note. VLT-I = Verbal Learning Test-Immediate; WMT=Working Memory Test; VFT = Verbal Fluency Test; VLT-D= Verbal Learning Test-Delayed; PST = Processing Speed Test.

Table 3 Correlations between the SCIP and the neuropsychological battery in patients with schizophrenia and bipolar I disorder, and Fisher's Z

		Schizophrenia		Bipolar I Disorder		
Subtests	**Neuropsychological battery test(s)**	*n*	*r*	*n*	*r*	*Fisher's Z*
VLT-I	WMS-III Wordlist I	123	.55*	76	.67*	–1.296
WMT	WAIS-III Arithmetic	123	.45*	76	.39*	.491
	WMS-III Digit Span	123	.40*	76	.39*	.080
	WAIS-III Letter Number – Sequencing	122	.38*	76	.32*	.460
VFT	Semantic fluency	123	.44*	76	.25*	1.461
	Trail Making A (time)	123	–.38*	76	–.45*	.570
	WAIS-III Digit Symbol - Coding	123	.39*	76	.49*	–.837
	WAIS-III Symbol search	122	.47*	76	.52*	–.446
VLT-D	WMS-III Wordlist II	123	.48*	76	.52*	–.359
PST	WAIS-III Digit Symbol - Coding	122	.57*	76	.61*	–.413
	WAIS-III Symbol search	121	.60*	76	.58*	.206

Note. VLT-I = Verbal Learning Test-Immediate; WMT = Working Memory Test; VFT = Verbal Fluency Test; VLT-D = Verbal Learning Test-Delayed; PST=Processing Speed Test.
* $p < .05$.

The saturations of the various subtests for this factor range between .64 and .78 in patients with schizophrenia and between .53 and .80 in patients with bipolar I disorder, so they are all highly significant.

Although it is accepted that two factor structures are equivalent if the index of congruence and identity values are close to 1, there is no test of statistical significance for these indexes; however, van de Vijver (2003) proposes an approach to interpretation, which postulates that values greater than .95 indicate factor similarity. Thus, this study confirms the equivalency of the dimensional structures in the sample of patients with schizophrenia versus patients with bipolar I disorder.

As seen in Table 3, all correlations of each subtest of the SCIP with the corresponding tests of the neuropsychological battery were statistically significant and moderate to high in both schizophrenia and bipolar patient samples; Fisher's *Z*, calculated to compare these coefficients of correlation between the two samples, was not statistically significant in any of the cases, which indicates similarity of the correlations obtained in the two patient samples.

Comparison between samples

Table 4 shows the mean SCIP scores at the baseline visit for patients with schizophrenia and those with bipolar I disorder, and the control group. As can be seen, in the comparison between the two patient samples, those with schizophrenia obtained lower scores on all subtests than those diagnosed with bipolar disorder who also had lower mean scores than the control group.

The multivariate analyses showed a group membership effect ($F_{(10,546)} = 12{,}111$, $p < .05$). Pairwise comparisons with respect to patient samples only reached statistical significance in the case of subtests VLT-I and VLT-D (both *p* values < .05), with small effect sizes ($d = -0.23$ and $d = 0.30$, respectively). However, in the case of the control

Table 4 SCIP mean scores in patients with schizophrenia and bipolar I disorder, and Cohen's *d*.

	Schizophrenia			Bipolar I Disorder			Control			Cohen's *d*		
Sub-test	*n*	*Mean*	*SD*	*n*	*Mean*	*SD*	*n*	*Mean*	*SD*	*B vs S*	*C vs B*	*C vs S*
VLT-I	124	18.46	3.81	76	19.39	4.36	83	21.87	3.45	0.23	0.63	0.93
WMT	124	17.04	4.33	76	17.29	3.88	83	19.59	3.20	0.06	0.65	0.65
VFT	124	14.34	5.40	76	14.42	5.32	83	19.48	5.59	0.01	0.93	0.94
VLT-D	124	4.56	2.25	76	5.26	2.42	83	6.59	1.89	0.30	0.62	0.96
PST	124	9.10	2.89	76	9.11	2.73	83	12.54	2.83	0.01	1.23	1.20
Total SCIP	124	63.51	13.45	76	65.47	13.65	83	80.07	10.58	0.14	1.20	1.41

Note. VLT-I = Verbal Learning Test-Immediate; WMT = Working Memory Test; VFT = Verbal Fluency Test; VLT-D = Verbal Learning Test-Delayed; PST=Processing Speed Test; Total SCIP = SCIP total score; SD = Standard Deviation; S = Schizophrenia; B = Type I bipolar disorder; C=Control group.

Table 5 Subtest mean scores, standard deviations, and Cohen's d in schizophrenia, bipolar I disorder and control group.

	Schizophrenia			Bipolar I			Control			Cohen's d		
Subtest	*n*	*Mean*	*SD*	*n*	*Mean*	*SD*	*n*	*Mean*	*SD*	*B vs S*	*C vs B*	*C vs S*
Word list I	90	29.09	6.29	57	29.14	6.26	75	34.33	6.68	0.01	0.83	0.84
Word list II	90	5.73	2.82	57	5.65	3.00	75	7.80	2.75	−0.03	0.75	0.74
Digit symbol-coding	90	52.46	18.38	57	54.96	20.09	75	82.76	19.04	0.13	1.42	1.62
Symbol search	90	23.98	9.80	57	24.37	.26	75	37.08	8.89	0.04	1.40	1.39
Arithmetic	90	10.37	3.45	57	10.47	2.86	75	12.73	3.38	0.03	0.71	0.69
Digits	90	13.86	3.80	57	13.98	3.93	75	17.41	4.05	0.03	.86	0.91
Letters and numbers	90	8.01	2.56	57	8.25	3.01	75	11.21	2.46	0.08	1.10	1.27
TMT-A[a]	90	49.88	20.79	55	47.22	13.85	75	28.13	11.06	0.14	1.55	1.27
TMT-B*[b]	90	123.52	59.83	55	126.98	51.44	75	68.28	24.84	−0.06	1.53	1.17
Semantic fluency	90	18.80	5.63	57	19.63	6.00	75	25.60	7.97	0.14	0.83	1.00
Vocabulary	90	39.32	11.49	57	39.14	12.20	75	46.53	7.24	−0.01	0.76	0.74
WCST-E	90	40.07	24.00	57	39.60	21.90	75	20.83	15.21	0.02	1.02	0.94
WCST-PE	90	25.49	19.70	57	27.53	22.31	75	11.20	8.75	−0.10	1.02	0.91

Note. WCST-E = Number of total errors; WCST-PE = Number of perseverative errors.
[a] Excluding patients with time to complete > 150 seconds.
[b] Excluding participants with time to complete > 400 seconds.

group, scores on all subtests were significantly higher than scores obtained from either patient sample (all *p* values < .05), with very similar effect sizes in both diagnostic groups ranging from 0.62 for VLT-D and 1.23 for PST in those with bipolar I disorder, and 0.65 WMT and 1.20 for PST in individuals with schizophrenia.

As for the SCIP total score, type of sample showed a statistically significant effect ($F_{(2,276)}$ = 51,390, p < .05). Subsequent analyses showed that these differences came from the comparison of the control group with both the sample of patients with bipolar disorder (p < .05; d = 1.20) and those diagnosed with schizophrenia (p < .05; d = 1.41), while they disappeared when the two patients samples were compared (p = .09; d = 0.14).

Regarding the neuropsychological battery, schizophrenia patients performed slightly worse than bipolar I patients in nine of the thirteen subtests, and both groups performed worse than controls on all subtests (Table 5).

A significant difference was found in the multivariate analysis of variance comparing the subtest scores from the three samples ($F_{(26,408)}$ = 5.981, p < .05). The univariate comparisons between patient groups were not significant for any of the subtests (all *p* values > .05). However, when comparing each group of patients with the control group, these differences were statistically significant for all the subtests (all *p* values < .05) and their magnitudes were substantial, with Cohen's *d* scores ranging from 0.74 (word list I and vocabulary) to 1.62 (digit symbol-coding) in schizophrenia patients and from 0.71 (arithmetic) to 1.55 (TMT-A time to complete) in bipolar patients. In general, both patient groups showed a poorer performance than controls on measures of processing speed/attention (Digit symbol-coding, Symbol search and TMT-A), verbal learning, semantic fluency and executive functions (WCST, TMT-B), with large effect sizes. Similarly, both groups were cognitively more impaired than controls on working memory (medium-large ES) and on verbal memory subtests (medium ES).

Discussion

The purpose of this study was to compare cognitive impairment in one sample of patients with schizophrenia and another with bipolar I disorder using a screening test, the SCIP, which may be helpful in routine clinical practice because it can be easily administered and corrected by healthcare professionals. This study is original in its design, as there are few comparisons in the scientific literature of screening methods for detection of neurocognitive impairment in severe mental illnesses such as schizophrenia and bipolar disorder. In the scientific review performed on the psychometric properties of screening tools for cognitive impairment, we were able to find similar studies only in the area of cognitive disorders associated with dementia or stroke (Donald & Van Til, 2001; Pohjasvaara et al., 2001; Tuijl, Scholte, de Craen, & van der Mast, 2012), but not in patients with severe psychiatric disorders. The early detection of cognitive impairment in these disorders is important because cognitive skills are intimately linked with successful daily functioning, and the severity of the cognitive impairment in schizophrenia and bipolar disorders has been directly linked to greater functional disability (Bonnín et al., 2012; Bowie et al., 2010; Martínez-Arán et al., 2007; Tabarés-Seisdedos et al., 2008). Early detection of cognitive deficits using screening instruments such as the SCIP will contribute to the selection of optimal treatments in our clinical practices (Balanzá-Martínez et al., 2010), and may provide more objective criteria on which to weight the relative merits of seeking additional consultation from neuropsychology, neurology, and radiology.

The results reported here offer psychometric evidence to support the use of the SCIP for screening cognitive impairment in schizophrenia and bipolar I disorder. The characteristics of the SCIP were examined and compared in terms of internal consistency, temporal stability, dimensional structure and criterion validity in one sample of patients with schizophrenia and one with bipolar I

disorder. As for the reliability of the scale, acceptable values are obtained both with Cronbach's alpha and ICCs, suggesting that, when applied to these samples of patients, the SCIP measures cognitive functions accurately and also has temporal stability in such measurements when administered on several occasions. In regard to the validity of the SCIP, the results suggest the existence of a single general cognitive factor that supports the concurrent validity of the test. Regarding the comparison of psychometric properties between the two patient samples, the results lead us to conclude that the SCIP has statistically similar psychometric properties in both samples. Therefore, it is an instrument that provides equally reliable and valid scores for assessing cognitive impairment in patients diagnosed with schizophrenia and those with bipolar I disorder (Guilera et al., 2009; Pino et al., 2008). The usefulness of these findings is that the SCIP user can be certain that the instrument is appropriately measuring the cognitive impairment of the patient diagnosed with either schizophrenia or bipolar I disorder.

The comparison of cognitive impairment quantified by the SCIP total score in the patient groups suggests that both groups show significant impairment but show little difference from each other, with similar results apparent in the deficits observed on all tests from the more extended neuropsychological battery. The extended battery offered no compelling evidence of cognitive differences between the schizophrenia and bipolar disorder groups, aside from small effect sizes suggesting slightly more impairment in the schizophrenia group on the test of semantic fluency and one test of processing speed (Digit Symbol Coding). The SCIP also offered little compelling evidence of a difference between the schizophrenia group and the bipolar I disorder group aside from a small effect size difference for total score and a small to medium effect difference for immediate and delayed verbal recall, with all differences suggesting more impairment in the schizophrenia group. The learning and memory discrepancy was also suggested in the relatively greater impairment in the schizophrenia sample vs. controls, showing a large effect size, compared to the medium effect sizes in the bipolar disorder sample vs. controls. The profile was not observed in the verbal learning and memory measures from the extended neuropsychological battery (e.g., WMS-III Word List I and II), both of which showed similar impairment in both patient samples relative to the healthy control groups. Compared to the Verbal Learning Tests from the SCIP (e.g., 10 words tested 3 times immediate, and again after a 5 to 10 minute delay), the Word List Tests (12 words tested 4 times, and again after a 25 to 35 minute delay) would be expected to have a higher ceiling than the SCIP that might explain some of the apparent discrepancy if the bipolar patients were more likely to achieve the maximum score. Regardless, the results from both the SCIP and the extended battery are consistent with previous comparative studies that have demonstrated few qualitative differences with respect to the cognitive performance profile of patients with schizophrenia and patients with bipolar disorders, despite several suggestions of quantitative differences implicating less impairment in bipolar disorders (Balanzá-Martínez et al., 2005; Daban et al., 2006; Martínez-Arán et al., 2002; Tabarés-Seisdedos et al., 2008). More similarities between the two disorders with respect to neurocognitive performance were found in patients with greater chronicity or disease progression (Lewandowski, Cohen, & Ongur, 2011). Neurocognitive assessment in the early stages of the disorder enables early detection of abnormalities and more effective intervention in these patients (Fuentes-Durá et al., 2012; Martínez-Arán et al., 2011; Vieta et al., 2012) as well as prevention of poorer illness course and greater disability (Guilera et al., 2012).

In conclusion, the results observed in this study indicate that SCIP is a good screening tool for cognitive deficits in schizophrenia and bipolar disorder, providing a comparable assessment of cognitive function in these severe mental disorders. The brevity and ease of administration of the SCIP as a screening tool for detection of cognitive impairment are important advantages that would make this tool a cost-effective and addition of a variety of research applications, particularly in clinical trials for objective quantification of potential benefits or adverse effects of medications. With relatively minimal training, the SCIP can be administered and scored by a variety of healthcare professionals, rendering it suitable for a wide spectrum of clinical applications in schizophrenic and bipolar patients, but with particular value to the necessity of referring patients with significant impairments for more extensive neuropsychological examinations. It should be emphasized that the SCIP was not developed to supplant referral for evaluation and treatment recommendations from a neuropsychologist where such facilities exist (Rosa et al., 2011; Vieta, 2011), but it was developed to assist early screening and to provide objective criteria on which to base treatment decisions in the many clinical settings that lack the time and resources for more thorough examinations, and to offer objective evidence to support referrals for additional consultation.

Funding and conflict of interest disclosure

The statistical analysis of this work was funded by Pfizer, S.L.U. Data collection in the original study source for the analysis included here was funded by Pfizer, SLU, and also received grants from *Ministerio de Economía y Competitividad* (PSI2012-32275), *Instituto de Salud Carlos III*, CIBERSAM and the *Ministerio de Sanidad y Consumo: Plan Nacional de Drogas* (2008/I/30) and *Gobierno de Navarra* (GON 55/200). Editorial support was funded by project 2009SGR0822 (J. Gómez-Benito y G. Guilera) and 2009SGR1022 (E. Vieta y A. Martínez-Arán) from *Departament d'Universitats, Recerca i Societat de la Informació de la Generalitat de Catalunya*. Grammatical review was carried out by Sharon Grevet and was funded by Pfizer, SLU. Javier Rejas is employ of Pfizer, SLU. All other authors declare that they have no conflict of interest as a consequence of this work.

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