

# Psychometric properties of the Brief Symptoms Inventory-18 (BSI-18) in a Spanish sample of outpatients with psychiatric disorders

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This study analyzes the psychometric and structural properties of the BSI-18 in a sample of Spanish outpatients with psychiatric disorders (N= 200), with three basic objectives: (a) to study the structural validity of the instrument; (b) to analyse reliability (internal consistency and test-retest stability) and validity (convergent and discriminant) of the instrument, and (c) to evaluate sensitivity to change in a therapeutic context. Using confirmatory factor analysis, two models were tested: the three-dimensional theoretical model proposed by its authors, and the empirical four-factor model obtained by the same authors through exploratory factor analysis. Our results showed that the best structure was a four-dimensional model, with the General Distress index and Somatization, Depression, General Anxiety and Panic scores. These four scales showed good internal consistency, test-retest reliability, validity and sensitivity to therapeutic change. The BSI-18 has been shown to be a reliable and useful tool for psychiatric assessment of patients, with the added advantage provided by its simplicity and ease of application.

*Propiedades psicométricas del Brief Symptoms Inventory 18 (BSI-18) en una muestra española de pacientes ambulatorios con trastornos psiquiátricos.* Este trabajo analiza las propiedades psicométricas y estructurales del BSI-18 en una muestra española de pacientes ambulatorios con trastornos psiquiátricos (N= 200) con tres objetivos: (i) estudiar la validez estructural del mismo; (ii) analizar su fiabilidad (consistencia interna y estabilidad test-retest) y validez (convergente y discriminante); y (iii) evaluar su sensibilidad al cambio en el contexto terapéutico. Utilizando análisis factorial confirmatorio, se pusieron a prueba dos modelos estructurales: el modelo trifactorial propuesto teóricamente por los autores del instrumento, y el modelo empírico obtenido por los mismos a través de un análisis factorial exploratorio que arrojó cuatro factores. Nuestros resultados mostraron que la estructura óptima era un modelo de cuatro dimensiones que diferencia entre Somatización, Depresión, Ansiedad general y Pánico. Estas cuatro escalas mostraron índices adecuados de consistencia interna, fiabilidad test-retest, validez convergente y discriminante, y sensibilidad al cambio terapéutico. El BSI-18 ha mostrado ser un instrumento fiable y válido para la evaluación de pacientes con trastornos psiquiátricos, con la ventaja adicional de su simplicidad y brevedad de aplicación.

One of the fundamental research objectives in clinical psychology is to gather empirical evidence on the psychometric properties of psychological assessment instruments. This evidence can be used for both patient assessment and evaluating the efficacy of intervention therapies. The present paper analyzes a recently developed instrument for the assessment of psychological distress: the BSI-18 (Brief Symptom Inventory, Derogatis, 2001).

The BSI-18 is the latest, most concise test in an integrated series of instruments designed by Derogatis to measure psychological distress. Widely used instruments in the series are the Brief Symptom Inventory (BSI, 53 items; Derogatis, 1993) and

the Symptom Checklist-90 Revised (SCL-90-R; 90 items; Derogatis, 1994). Both tests have demonstrated good psychometric properties, showing satisfactory indexes of internal consistency and test-retest reliability, and sensitivity to change (Derogatis, 1993; 1994). However, its weakness is found in the structural dimension, which has been the object of numerous criticisms. Although the author of the BSI proposes 9 dimensions, the structure has not been confirmed in the related bibliography: results indicate a unique factor and a number of authors defend the utility of the inventory exclusively as a general measure of distress (Aragón, Bragado, & Carrasco, 2000; Boulet & Boss, 1991; Piersma, Reaume, & Boes, 1994).

The utility of the SCL-90-R and the BSI has been consolidated as a general distress index in both clinical and research areas (Baider, Peretz, & De Nour, 1993; Geisser, Perna, Kirsch, & Bachman, 1998; Piersma, Reaume, & Boes, 1994; Strech, Knudson, & Durand, 1998), and these instruments have been adapted and validated in several languages and samples (Kreutzer,

Gervasio, & Camplair, 1994; Iwamasa & Kooreman, 1995; Pereda, Forns, & Peró, 2007). Recently, Derogatis (2001) has elaborated a new version of this series of instruments: the BSI-18. This instrument presents only three scales or dimensions (with six items each) of the previous instruments, using the same response scale: Somatization – distress caused by the perception of bodily dysfunction, focusing on symptoms arising from cardiovascular, gastrointestinal, and other physiological systems that have powerful autonomic mediation; Depression – symptoms of disaffection and dysphoric mood, such as those reflecting self-deprecation, anhedonia, loss of hope, and suicidal ideation; and Anxiety – symptoms of nervousness, tension, motor restlessness, apprehension and panic states. The selection of these three scales complies with two specific fundamental criteria by Derogatis (2001): (i) the verification that about 80% of psychological disorders belong to depressive and anxiety disorders, and (ii) the fact that the presence of elevated symptoms and somatic manifestations, which in many occasions provoke depressive and anxiety disorders that are not detected in primary care and are masked by other somatic symptoms.

The BSI-18 also offers a measure of general distress (total score), highly correlated with the one offered by the BSI ( $r > .90$ ), enabling the comparison of the results reached by both instruments. According to its authors, this new inventory presents satisfactory reliability indexes, both for the dimensions (ranging from .74 to .84) and the general distress index (.89) (Derogatis, 2001). The authors perform a factor analysis (a principal components analysis with a Kaiser varimax rotation) to examine the structural validity of the instrument. Factor analysis (in a non-clinical sample of 1134 subjects) yields a four-factor solution. Two of these factors (I and II) contain the exact items belonging to the Somatization and Depression scales. The other two factors are composed of the items belonging to the Anxiety scale originally proposed: a set of three items related to distress and generalized nervousness integrate Factor III, and three items that assessed panic symptoms comprise Factor IV. Nevertheless, the authors confirm the structural validity of the instrument because it can still be considered a single anxiety dimension (Derogatis, 2001). There are two reasons for this: the theoretical relationship between panic symptoms (Factor IV, Panic) and other common manifestations of anxiety (Factor III, General Anxiety), and the strong correlation obtained between these two factors.

The BSI-18 constitutes a new and promising tool for distress assessment in clinical samples and, therefore, requires studies of adaptation certifying the reliability and validity of the measure in different samples and cultures. Thus, we conducted a study of the psychometric and structural properties of the instrument in a sample of Spanish clinical outpatients maintaining three fundamental objectives: (i) a study of the structural validity of the BSI-18; (ii) reliability analysis (internal consistency and test-retest stability) and the validity (convergent and discriminant) of the instrument, and (iii) an evaluation of the sensitivity to change in a therapeutic context.

## Method

### Participants

The sample was made up of 200 outpatients who presented psychological symptomatology. Fifty-two percent of the outpatients

were recruited from a private psychology clinic, whereas 48% came from public services; specifically from the Psychiatric Unit of the Hospital Militar Central Gómez Ulla in Madrid, and from the Mental Health Unit of the Malvarrosa Hospital in Valencia. All of them have been diagnosed following the Structured Clinical Interview for DSM-IV (SCID) (First, Spitzer, Gibbon, & Williams, 1996).

The average patient age was 38.40, ranging from 16 to 70. Fifty-five percent were women and the remaining 45% were men. The majority of the sample (53.4%) presented anxiety disorders, 32% presented major depression disorders, and the rest of the sample had received a diagnosis which did not reach 15% of the sample; specifically: adjustment disorders (4.1%), personality disorders (3.7%), eating disorders (2.6%), psychotic disorders (2.6%), and somatoform disorders (1.6%).

### Procedure

In all of the cases, the patients were evaluated by a clinical psychologist after obtaining the informed consent to participate in this study. The BSI-18 was administered to 200 patients in the initial session, and again 15 days later in 103 cases (before the patients started any type of treatment) with the aim to evaluate test-retest reliability. In addition, and with the aim to assess the sensitivity to change, the BSI-18 was administered once again to 31 patients after they had finished psychological treatment and received therapeutic discharge by the attending clinical psychologist.

Furthermore, with the aim to analyze convergent and discriminant validity of the BSI-18, three other psychological assessment instruments were administered to 69 subjects in the initial session, as described below.

### Instruments

Three widely-used instruments that present documented satisfactory indexes of psychometric properties were chosen to assess clinical symptomatology.

*Beck Anxiety Inventory* (Beck, Epstein, Brown, & Steer, 1988). This is a 21-item self-report questionnaire (range 0-3) developed to evaluate anxiety in clinical populations. The Spanish adaptation (Vázquez, Sanz, Fortun, Espinosa, & García Vera, 2005) was used in this study. The factor analysis presented in the original publication of the instrument allowed for the isolation of two factors: «somatic symptoms of anxiety» and «subjective anxiety and panic symptoms». Although the factor analysis subsequently carried out for the publication of the instrument manual (Beck & Steer, 1990) yielded four factors, the majority of the studies regarding the factor structure of the questionnaire indicate two factors. These have been interpreted mostly as physiological symptoms (Physical Symptoms) and subjective anxiety and panic (Subjective Anxiety/Panic), which are more sensitive to the assessment of the physiological component (Ferguson, 2000). Thus, in our study we have considered both the total score and the two factors originally obtained by the authors.

*Beck Depression Inventory* (Beck, Ward, Mendelson, Mock, & Erbaugh, 1961). This is a 21-item questionnaire (range 0-3) designed to evaluate the severity (symptomatic intensity) of depression. Its content places more emphasis on the cognitive component of depression since 15 of the 21 items make a

reference to psychological/cognitive symptoms and the remaining 6 to somatic/vegetative symptoms. In this study the Spanish version of the scale (Vázquez et al., 2005) was used.

*Minnesota Multiphasic Personality Inventory-2* (Hathaway & McKinley, 2002). This instrument is a revised, updated and restandardized version of the original MMPI (Hathaway & McKinley, 1942). For this study, we used the Spanish adaptation (TEA Ediciones, 2001). It consists of a 567-item inventory assessing a wide spectrum of clinical symptomatology through different scales. For the purpose of this study only six MMPI-2 scales were considered: Anxiety, Depression, Fears, Health Concerns, Bizarre Mentation and Antisocial Practices. The first four scales were chosen according to their content and the variables assessed by the BSI-18. However, Bizarre Mentation and Antisocial Practices scales were selected with the aim to establish discriminant validity, since theoretically, their content is not related to any of the BSI-18 scales.

#### Data analysis

Confirmatory factor analyses (CFAs) were carried out using the EQS program in order to determine the factor structure of the questionnaire. Maximum likelihood was employed to estimate the model, as it has been reported (Hair, Anderson, Tathan, & Black, 1999) to perform reasonably well, even under several non-optimal conditions such as 'small size' and violation of the normality assumption. Moreover, the present study used a broad range of statistical tests and indexes designed to assess the goodness of fit of data to a proposed model because each type has potential strengths and weaknesses. The statistics considered (acceptable criteria level in parenthesis) were standardized root mean square residual (SRMR <.05), root mean square error of approximation (RMSEA <.08, confidence interval 90%), non-normed fit index (NNFI >.90) and robust comparative fit index (RCFI >.90). The criterion values used were in line with those proposed by Hu and Bentler (1999). In addition to these indexes, a comparative fit using chi-square was also considered because of its utility for future comparisons, despite recent criticism regarding its use in small sample sizes (Hu & Bentler, 1999). This index expresses the degree of fit which the model proposes to reproduce with the observed data. The higher the value, the higher the discrepancy between the data observed and those expected by the model; nevertheless, it is an index which is highly dependent on the number of subjects, thus we use Chi-square divided by the degrees of freedom which accounts for the degrees of freedom of the model. Finally, the Akaike Information Criterion (AIC) was employed; this index adjusts  $\chi^2$  for the number of estimated parameters and can be used to compare competing models that need not be nested. The higher is the value, the fit of the model is worse.

The aim of the study was to examine the latent factors of the first and second order levels defined according to the established items specified by Derogatis (2001) both within the theoretical and empirical model. In the event of an unsatisfactory fit with the confirmed models, three aspects were examined: the significance of the different saturations, the existence of covariances between errors, and unexpected saturations according to the models submitted to a confirmatory analysis (cross-loadings). These aspects were then considered and modified, leading to the calculation of a new model that reduces the effect of these alterations with respect to the original proposal.

Internal consistency of the scales was computed using Cronbach's alpha coefficient. The test-retest reliability of the questionnaire and its convergent and discriminant validity were obtained by computing Pearson correlations. Analysis of variance of repeated measures was used to analyze sensitivity to change.

#### Results

##### *BSI-18 Structural analysis: confirmatory factor analysis*

According to the structure established by Derogatis (2001), latent factors of the first and second order were defined both in the theoretical and empirical model. In table 1, the theoretical assignment of the items to the dimensions is presented, together with the standard deviations and averages. It should be remembered that the theoretical and empirical model coincide in their item distribution of the Depression and Somatization dimensions. Therefore, two models diverge in the Anxiety dimension theoretically proposed. In the empirical model, the items of this scale are separated into two factors: the General Anxiety factor (Factor III) and the Panic factor (Factor IV).

Confirmatory factor analysis were performed to both the four-factor structure and the three-factor structure (table 2) without obtaining satisfactory adjustment. Comparing both models, three factor model shows a  $\chi^2/df$  higher than 2.00, and its AIC value is superior that the four factor model (17.14 compared to -4.39), what indicate a worse adjustment of the model. In addition to this, the four factor model shows better RCFI and NNFI fit indexes (.92 and .91), and RMSEA (CI) values (.07; .06-.08) compared to three factor model fit indexes (.91 and .89) and RMSEA values (.08; .06-.09).

Table 1  
Mean and standard deviation. Items in BSI-18 dimensions (N= 200)

	Mean	S.D.
<b>Factor I. The Somatization dimesion</b>	<b>8.14</b>	<b>5.64</b>
1. Faintness or dizziness	.94	1.18
4. Pains in heart or chest	1.39	1.36
7. Nausea or upset stomach	1.30	1.34
10. Trouble getting your breath	1.46	1.44
13. Numbness or tigtling in parts of your body	1.57	1.43
16. Feeling weak in parts of your body	1.48	1.39
<b>Factor II. The depression dimension</b>	<b>11.17</b>	<b>6.46</b>
2. Feeling no interest in things	2.06	1.42
5. Feeling lonely	2.01	1.46
8. Feeling blue	2.51	1.25
11. Feeling of worthlessness	1.63	1.47
14. Feeling hopeless about the future	2.20	1.39
17. Thoughts of ending your life	.78	1.15
<b>Factor III. General anxiety</b>	<b>6.46</b>	<b>3.01</b>
3. Nervousness or shakiness inside	2.54	1.13
6. Feeling tense or keyed up	2.51	1.28
15. Feeling so restless you couldn't sit still	1.41	1.36
<b>Factor IV. Panic</b>	<b>4.45</b>	<b>3.60</b>
9. Suddenly scared for no reason	1.55	1.45
12. Spells of terror or panic	1.27	1.44
18. Feeling fearful	1.64	1.44
<b>General Distress</b>	<b>30.23</b>	<b>15.22</b>

Therefore, because no model was initially satisfactory, it was decided to improve the four and the three dimension models by checking cross-loadings or correlations between errors. Both models could be improved by including the correlations between some errors (1-7, 2-5, 13-16, 14-17). As can be seen in table 2, four factor improved model showed better RCFI and NNFI indexes than three factor improved model (.95 compared to .94, and .94 compared to .92, respectively). In addition to this, three factor improved model showed slightly higher values for SRMR (.07), RMSEA (CI) (.06; .05-.08), and  $\chi^2/df$  (1.77) compared to four factor improved model (.06, .05 (.04-.07), and 1.65, respectively). Finally, and because AIC value was certainly smaller in four factor improved model (-43.68 compared to -28.23 in three factor improved model), and the other fit indexes reached satisfactory values in this model, it can be considered that the four factor model better represented the structure of the instrument. This improved four factor model is presented in table 3, where the item saturation of each factor is reflected, as well as the factor saturation of the first order and the factor of the second order.

#### Scale Reliability: Internal consistency and test-retest reliability

The internal consistency (Cronbach's alpha) and the test-retest reliability (Pearson's r) of the obtained dimensions in the factor analysis are shown in table 4.

The values of the internal consistency are satisfactory, ranging from a reliability of .71 (General Anxiety factor) to .88 (Depression factor), reaching the Total BSI score a alpha of .89.

The test-retest reliability values (correlations between the initial assessment scores and after 15 days) are rather high; the lowest was the General Anxiety factor (.68).

INDEXES	Null	MODEL			
		3D	3D (I)	4D	4D (I)
SRMR	–	.07	.07	.07	.05
RMSEA (CI)	–	.08 (.06-.09)	.06 (.05-.08)	.07 (.06-.08)	.06 (.04-.07)
RCFI	–	.91	.94	.92	.95
NNFI	–	.89	.92	.91	.94
d.f	153	132	128	131	127
$\chi^2/d.f.$	–	2.13	1.77	1.97	1.65
AIC	1419.57	17.14	-28.23	-4.39	-43.68
Item errors correlated	–	–	1-7, 2-5, 14-17, 13-16	–	1-7, 2-5, 14-17, 13-16
Model: Null; 3D= Three Dimension Model; 3D(I)= Three Dimension Improved Model; 4D= Four Dimension Model; 4D (I)= Four Dimension Improved Model					
Indexes: SRMR= Standardized Root Mean Square Residual; RMSEA= Root Mean Square Error of Approximation (CI= confidence interval at 90%); RCFI= Robust Comparative Fit Index; NNFI= Robust Non-Normed Fit Index; AIC= Akaike Information Criterion					

#### Convergent and discriminant validity of the BSI

With the aim to establish convergent and discriminant validity of the BSI-18, a comparison was performed with previously described instruments. A total of 69 of the original 200 sample completed the BDI, the BAI and the MMPI-2 scales of Anxiety, Fears, Depression, Health Concerns, Bizarre Mentation and Antisocial Practices. Table 5 shows the obtained correlations between the BSI-18 factors and these instrument scales.

First of all, it is worth mentioning the high correlations obtained between the total score of the BSI-18 and the total scores of the BDI, BAI and the two BAI subscales ( $r > .74$ ,  $p < .001$ ). Significant correlations are maintained with some of the MMPI-2 scales but are much lower.

Items saturations	I	II	III	IV	V
11. Feeling of worthlessness	.42				
5. Feeling lonely	.92				
8. Feeling blue	.85				
2. Feeling no interest in things	.85				
14. Feeling hopeless about future	.66				
17. Thoughts of ending your life	.42				
1. Faintness or dizziness		.47			
4. Pains in heart or chest		.74			
7. Nausea or upset stomach		.47			
10. Trouble getting your breath		.71			
13. Numbness or tingling in parts of your body		.54			
16. Feeling weak in parts of your body		.58			
3. Nervousness of shakiness inside			.68		
6. Feeling tense or keyed up			.74		
15. Feeling so restless you couldn't sit still			.60		
9. Suddenly scared for no reason				.73	
18. Feeling fearful				.78	
12. Spells of terror or panic				.69	
<b>Factor saturations</b>					
Factor I					.62
Factor II					.93
Factor III					.90
Factor IV					.83

	Internal consistency (N=200) alpha Cronbach	Test-retest reliability (N= 103) Pearson correlation
Somatization	.78	.76
Depression	.88	.82
General anxiety	.71	.68
Panic	.78	.72
Total score	.89	.76



The BSI-18 Somatization scale highly correlates with both the total score of the BAI ( $r = .83$ ;  $p < .001$ ), and with the two subscales: Physical Symptoms ( $r = .81$ ;  $p < .001$ ) and Subjective Anxiety/Panic ( $r = .77$ ;  $p < .001$ ). Likewise, the high correlation with the MMPI-2 Health Concerns scale ( $r = .67$ ,  $p < .001$ ) should be pointed out. Moreover, the highest correlations of the BSI-18 Depression factor are established with the total BDI Depression scores ( $r = .83$ ;  $p < .001$ ) and with the MMPI-2 Depression score ( $r = .78$ ;  $p < .001$ ).

Two BSI-18 Anxiety factors show high correlations with both the total score of the BAI and with its two subscales. It must be pointed out that the highest is the one established between the BSI-18 Panic factor and the BAI Subjective Anxiety/Panic factor ( $r = .77$ ;  $p > .001$ ). Furthermore, the BSI-18 General Anxiety factor also maintains a high correlation ( $r = .66$ ;  $p < .001$ ) with the MMPI-2 Anxiety scale; whereas the correlation between this last scale and the BSI-18 Panic factor is lower ( $r = .47$ ,  $p < .001$ ).

With respect to the correlations with the included scales to analyze the convergent and discriminant validity of the BSI-18, the following was observed: the MMPI-2 Antisocial Practices scale (ASP) exclusively shows a significant correlation (with the BSI-18 Somatization factor), and it is the minimum ( $r = -.25$ ;  $p < .05$ ). However, the Bizarre Mentation scale maintains significant correlations, although low, with the total BSI-18 score ( $r = .35$ ;  $p < .01$ ) and three of its factors: Depression ( $r = .32$ ;  $p < .01$ ), General Anxiety ( $r = .37$ ;  $p < .01$ ), and Panic ( $r = .28$ ;  $p < .01$ ).

#### *Sensitivity to therapeutic change of the BSI-18*

In order to study the sensitivity to change of the BSI-18, analysis of variance of repeated measures was performed taking

into account the scores obtained before and after psychological treatment applied to 31 of the patients (Stratford & Riddle, 2005). This reduction of the sample was due to the fact that only these subjects finished psychological treatment during the course of this study. In table 6 the results are shown for the total BSI-18 score and its four factors. In all cases, statistically significant coefficient changes were obtained ( $p < .001$ ). Thus, the results indicate that all the instrument scales are sensitive to the therapeutic change in the patients with psychiatric disorders, finding significant differences between pretreatment and discharge scores.

#### Discussion

The BSI-18 is a new version of previously developed instruments by Derogatis to assess psychological distress in different populations. It has, according to its author, two advantages over them: (i) brevity, making it easy to administer and score, and (ii) the improvement of its structural validity since it is comprised of three unique conceptual and empirically more homogenous symptom scales than those in previous instruments. Its brevity (it can be completed in less than 5 minutes) offers a clear advantage in view of its objective: screening for psychological distress. The improvement of the internal structure of previous instruments, the other advantage of the BSI-18, is still an unresolved question. The results showed that neither model reached satisfactory fit indexes, but the four-factor model was better and could be improved by taking into account the covariances between error. The improved four-factor model presented very satisfactory values in all calculated fit indexes confirming itself as a four-factor structure (Somatization, Depression, General Anxiety and Panic) that clearly differentiate between generalized anxiety symptoms and panic disorder symptoms.

Our sample is made up of subjects belonging to a clinical population in which anxiety disorders are highly represented, such as depressive disorders in which anxiety as a symptom plays a relevant role. This fact is likely to provoke the appearance of a clear difference between two anxiety factors, revealing and calling, at least in this clinical population, for a separate analysis of these factors. This would require checking if these same results are given in non-clinical samples belonging to the general population, similar to the one used by Derogatis (2001) and in another type of sample, for instance, medical populations.

To date, the only two published studies that analyze the factor structure of the BSI-18 have been performed with medical population samples. Zabora et al. (2001) used a sample of cancer

*Table 5*  
Convergent and discriminant validity of BSI-18 (N= 69) (Pearson correlations)

	BSI Total	BSI SOM	BSI DEP	BSI ANX/GEN	BSI ANX/PAN
BSI Somatization	.83***				
BSI Depression	.82***	.44***			
BSI General anxiety	.78***	.65***	.51***		
BSI Panic	.80***	.62***	.54***	.53***	
BAI (Total) (.86) <sup>+</sup>	.82***	.83***	.57***	.64***	.71***
BAI (PHYS) (.87) <sup>+</sup>	.75***	.81***	.51***	.56***	.61***
BAI (SUBJ) (.85) <sup>+</sup>	.82***	.77***	.58***	.66***	.77***
BDI (.86) <sup>+</sup>	.75***	.51***	.83***	.53***	.49***
MMPI-ANX (.85) <sup>+</sup>	.62***	.52***	.48***	.66***	.47***
MMPI-FRS (.85) <sup>+</sup>	.32**	.41***	.10	.32**	.33**
MMPI-HEA (.85) <sup>+</sup>	.53***	.67***	.28**	.44***	.42*
MMPI-ASP (.64) <sup>+</sup>	-.19	-.25*	-.03	-.24	-.21
MMPI-DEP (.90) <sup>+</sup>	.61***	.30**	.78***	.47***	.36**
MMPI-BIZ (.66) <sup>+</sup>	.35**	.23	.32**	.37**	.28**

\*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$

<sup>+</sup> Internal consistency (alpha Cronbach) of scale

Footnote: BSI (Beck Symptoms Inventory); SOM (Somatization); DEP (Depression); ANX/GEN (General Anxiety); ANX/PAN (Panic); BAI (Beck Anxiety Inventory); PHYS (Physical Symptoms); SUBJ (Subjective anxiety / Panic); BDI (Beck Depression Inventory); ANX (Ansiedad); FRS (Fears); HEA (Health Concerns); ASP (Antisocial Practices); DEP (Depresión); BIZ (Bizarre Mentation)

*Table 6*  
Sensitivity to therapeutic change of BSI-18: analysis of variance of repeated measures (N= 31)

	Pre Mean (S.D.)	Post Mean (S.D.)	F	p
BSI Total	27.58 (12.75)	9.84 (7.13)	63.21	.000
BSI Som	8.06 (6.12)	2.29 (2.21)	30.84	.000
BSI Dep	10.16 (5.27)	4.19 (3.25)	48.50	.000
BSI Anx/general	5.90 (3.32)	2.13 (1.92)	40.71	.000
BSI Anx/panic	3.45 (3.30)	1.23 (2.23)	23.34	.000

Footnote: BSI (Beck Symptoms Inventory); Som (Somatization); Dep (Depression); Anx/general (General Anxiety); Anx/panic(Panic)

patients and performed a principal component factor analysis of the BSI-18 on it. From the results they identified four factors that were interpreted similarly to what Derogatis (2001) found empirically: Somatization, Depression, General Anxiety and Panic. However, we believe it is necessary to clarify this interpretation. The fourth factor obtained (Panic) by Zabora et al (2001) includes saturations above the cutoff ( $>.40$ ) in a single item (item 17: «Thoughts of ending your life»); however, the authors take into account the other two items that show mild correlations with this dimension (item 12: «Spells of terror or panic», and item 9: «Suddenly scared for no reason»), and interpret all of them as a Panic dimension. These two items show much higher saturations and are above the cutoff in the first factor, combining general anxiety and panic. Therefore, we believe that there is not enough empirical support in the factorial solution found by Zabora et al. (2001) to defend the separation of the two anxiety factors. In our opinion, the results indicate a three-factor structure for the BSI-18 integrating different anxiety symptoms into a single factor, similar to the one hypothesized by Derogatis (2001). A sample of cancer patients was also used in a work which is still unpublished and, using a confirmatory factor analysis, supports a three-factor structure for the BSI-18 (Galdón et al., in press). The other published study conducted with a medical population sample, specifically temporomandibular patients (a type of chronic pain syndrome with musculoskeletal problems affecting the temporomandibular joint and associated structures), also confirms the three-factor structure defended by Derogatis, using confirmatory factor analysis of the BSI-18 (Durá et al., 2006).

In summary, known studies that analyze the factor structure of the BSI-18 in medical population samples indicate that three dimensions, integrating different anxiety symptoms into a single factor is the best model structure. Perhaps, in this type of population, the threat caused by the medical condition homogenizes the situation that the patients are going through, and justifies the appearance of fewer factors than in patients with psychiatric disorders, where a separate analysis of the two anxiety factors might be advisable.

Regarding convergent and discriminant validity, the BSI-18 dimensions adequately correlate with other reliable and valid psychological assessment instruments widely utilized such as the BAI, the BDI, and the MMPI-2. The analyses have also confirmed the differential content of the two BSI-18 Anxiety factors by showing that the General Anxiety factor of this instrument has a higher correlation with the MMPI-2 Anxiety scale than the Panic factor. The latter also shows a higher correlation with the BAI Subjective Anxiety/Panic scale. In regard to theoretical correlations, unexpected results between the BSI-18 and some MMPI-2 scales make it necessary to emphasize that these, even though they are significant, are much lower than the rest of the cases. In fact, the only correlation found with the Antisocial Practices scale presents the lowest magnitude of all the obtained

correlations. Furthermore, the correlations found with the Bizarre Mentation scale could be due to the fact that a substantial proportion of scale items refer to delirious ideas and hallucinations, making it reasonable to think that individuals suffering from these symptoms present a higher anxiety component, explaining the significant correlations with the BSI-18 scores.

Moreover, we analyzed the BSI-18 psychometric properties, demonstrating adequate internal consistency of the instrument; and satisfactory test-retest reliability, which had not been an object of analysis by the author (Derogatis, 2001). The analysis of the sensitivity to change of the BSI-18 supports the fact that it can be used effectively as a treatment outcomes measure; a suggested application in Derogatis' Manual but not empirically considered to date (Derogatis, 2001).

Finally, some limitations of our study should be noted. Although 200 subjects participated, it is not an excessively wide sample. Likewise, the representation of some disorders is very low and, among them, personality disorders, eating disorders and psychotic disorders are significantly different to the other diagnosis, considering etiology, symptomatology, prognosis and therapeutic issues. The inclusion of these diagnosis in the sample could influence the discriminant validity results. However, in the first place, the sample recruited represents a real distribution of diagnosis in a sample of outpatients with psychiatric disorders assisted in public and private clinics. In the second place, we tested that, considering these patients in the sample or not, the structural validity and reliability of the scales did not differ. Finally, the BSI-18 is also included in the assessment of patients with personality disorders, eating disorders and psychotic disorders, making reasonable to include the patients with these disorders in the analysis.

Otherwise, this paper has important contributions. Firstly, confirmatory factor analysis (CFA) was used in this study of the BSI-18, in contrast to the principal component analysis (PCA) used in most of the published studies on the factor structure of the instrument. Secondly, it uses a sample of patients with psychiatric disorders, which has been not considered in previous studies about the factorial structure of BSI-18. Lastly, this study contributes to increase the set of questionnaires validated in Spanish language, with demonstrated satisfactory psychometric properties to be used in the psychological assessment of patients with psychiatric disorders (Bados, Solanas, & Andrés, 2005; Sandín, Valiente, Chorot, & Santed, 2005).

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