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Lars Olsson

Department of Psychology



LUND UNIVERSITY

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Discriminating Depressive Patients and Patients with Somatoform Disorders by Means of the Beck Depression Inventory (BDI)

Lars Olsson

Department of Psychology, Lund University, Sweden

Ninety-eight patients, 56 suffering according to DSM-IV of unipolar depression and 42 of somatoform disorders, were compared on the Beck Depression Inventory (BDI) total scale, the subscale of Somatic complaints and the Cognitive-affective subscale. A factor analysis performed on the total group revealed five factors used to determine new subscales: Depressed mood, Somatic manifestations, Loss of weight and appetite, Negative self-image and Negative social feelings. The scores of the Cognitive-affective subscale and of the subscales of Depressed mood, Loss of weight and appetite and Negative self-image were more pronounced in the group with unipolar depression than in the somatoform disorders group. Since the BDI is multidimensional, using only the total score increases the risk of overestimating depression when somatic complaints are prominent.

Keywords: BDI, depression, somatoform disorders

The Beck Depression Inventory (BDI), originally developed to examine changes due to treatment (Beck et al., 1961), is a widely used instrument for the assessment of depression (Tennen et al., 1995). Depressed patients obtain higher scores on the BDI than normal subjects (Richter et al., 1998), a finding that holds true in different cultural settings (Bonicatto et al., 1998; Shek, 1991; Wang et al., 2005). Since the inventory contains items referring to mood, self-image and somatization, it has been questioned whether it is specific in terms of its measurement of depression or if it could be said to measure distress more generally (Sloan et al., 2002). The possibility of using BDI for discriminating depressive from other clinical

groups has also been under some question. However, a difference in total scores has been reported for patients with a major depression and those with dysthymic disorder (Steer et al., 1987), and on two of the 21 items (Sadness and Loss of libido) patients with depressive disorder have been found to differ from those with generalized anxiety disorder (Steer et al., 1986).

How the items of BDI relate to each other is an important question (Plumb & Holland, 1977; Cavanaugh et al., 1983), and has recently been investigated in several studies using factor analysis (Bennett et al., 1997; Bonilla et al., 2004; Novy et al., 1995). The number of factors extracted range from one to nine, depending on the objective of the study, the characteristics of the sample used, the extraction method, the criterion for the estimation of factor numbers, etc. (Richter et al., 1998). Among other things these studies show that it is useful to separate psychiatric, somatic and normal samples by means of two subscales, a Cognitive-affective and one of Somatic complaints. It is suggested that these scales should be used when the somatic complaints the patients have might lead to an overestimation of their depressive symptoms (Beck & Steer, 2001).

The research cited seems to show that the overall total score of the BDI has an acceptable discriminative validity when the groups examined have little overlapping symptomatology, but less so when patients combine depressive symptoms with other symptoms such as anxiety and somatization. The primary aim of the present study was, therefore, in a combined group of depressed patients and patients with somatoform disorders to make an attempt to establish useful subscales by means of factor analysis, and then examine the extent to which the extracted subscales can be used for differentiating between the two patient groups. The extent to which the BDI total scale, the Cognitive-affective subscale and the subscale of Somatic complaints differentiate between the two groups will also be examined.

METHOD

Participants

The participants were 98 patients in the ages 18 – 70 years (M 43.3 years, S.D. 12.4), 59 women and 39 men, in psychiatric or community health care in a health district in the south of Sweden. Fifty-six patients, 37 women and 19 men (age range 18 – 70 years; M 43.8 years, S.D. 13.4), had a diagnosis of unipolar depression, denoted according to DSM-IV (1994) as a major depressive disorder either with a single or recurrent episode. All of the remaining 42 patients, 22 women and 20 men (age range 20 – 68 years; M 42.6 years, S.D. 11.1), had one of the following somatoform DSM-IV disorders: hypochondriasis (4), somatization disorder

(2), somatoform pain disorder (5) and undifferentiated somatoform disorder (31). The DSM-IV diagnoses were made by a psychiatrist or a specialist in general medicine. All patients volunteered after being asked by their treating physician to participate in psychological testing including among other tests the BDI, performed by the present author (a certified clinical psychologist).

Beck Depression Inventory

The Swedish version of the BDI (the revised version of BDI, referred to as BDI-II, was not available at the time the data was collected) was administered to the participants (Beck & Steer, 2001). For each of the 21 items that this self-report inventory includes, the subject can select one of four alternatives (scores 0 – 3) reflecting the severity of depressive symptomatology (Beck, 1967; Beck et al., 1974). Total scores range from 0 to 63, and are used as a measures of less to more signs of reported depression. There are also the two subscales referred to as Cognitive-affective (items 1 - 13 in Table 1) and Somatic complaints (items 14 - 21) mentioned in the Introduction.

RESULTS

The factor analysis in the form of Principal Component Analysis with varimax rotation and Kaiser normalisation to achieve simple structure gave 5 factors with Eigenvalues over 1.0 that accounted for 62.4 % of the variance (Table 1). Bartlett's test of sphericity was significant, indicating sufficient overlap among BDI items (variables). The overall Kaiser-Meyer-Olkin measure of sampling adequacy was .83, demonstrating sufficient sample size in relation to the number of variables used.

A factor loading above .50 was used to assign a BDI item to a factor. Four items did not reach a loading above .50 in any of the factors (Table 2). To test significant differences among the factors in relation to the diagnostic groups the raw material was recalculated with the sum of those items belonging to a factor serving as component factor scores. This was done in part to increase the practical utility of any positive results, and in part to prevent the factors from being influenced by those items that did not have a strong loading in any factor, as would be the case if regression factor scores were used as variables.

The factors were, in order, referred to as Depressed mood, Somatic manifestations, Loss of weight and appetite, Negative self-image and Negative social feelings (Table 2). The internal consistency of these new component variables was evaluated using Cronbach's alpha. An internal reliability coefficient of .72 was obtained and regarded as acceptable (Nunnally,

1978). The alpha values for the separate subscales were mostly lower (.61, .68, .70, .64 and .73) due to lesser number of items.

Table 1. *Principal components of the factor analysis of the BDI.*

Variable and item	Item number	Communality	Factor	Eigen-value	% of variance	Cumulative % of variance
Sadness	1	.652	1	7.169	34.139	34.139
Pessimism	2	.673	2	2.167	10.320	44.459
Sense of failure	3	.685	3	1.514	7.209	51.667
Dissatisfaction	4	.535	4	1.184	5.640	57.307
Guilt	5	.527	5	1.062	5.057	62.364
Expectation of punishment	6	.497				
Self dislike	7	.825				
Self accusations	8	.665				
Suicidal ideas	9	.540				
Crying	10	.609				
Irritability	11	.715				
Social withdrawal	12	.613				
Indecisiveness	13	.581				
Body image change	14	.728				
Work retardation	15	.619				
Insomnia	16	.585				
Fatiguability	17	.657				
Loss of appetite	18	.615				
Loss of weight	19	.671				
Somatic preoccupation	20	.597				
Loss of libido	21	.505				

The t-test was used to find out if there were any differences between the two groups on the BDI scales. All scales met the assumption according to Levenes's test of equal variances in the groups. There were no statistically significant differences between the groups on the BDI total scale or on the subscale of Somatic complaints (Table 3). The scores of the subscales of Depressed mood, Loss of weight and appetite and Negative self-image were more pronounced in the depressed than in the somatization group, and so were the scores of the Cognitive-affective subscale. As can be seen from Table 4, the Cognitive-affective subscale and the subscales of Depressed mood and Negative self image were highly correlated. All the six Depressed mood items and two of the three items of Negative self image were part of the Cognitive-affective subscale.

DISCUSSION

No statistically significant difference on the BDI total scores was found between the present patients in the depressive group and those with somatoform disorders. Primarily, the two groups seem to have much in common in regard to somatic symptoms. No difference between them was obtained, not only on the subscale of somatic complaints, but also on the subscale derived from the factor analysis and referred to as somatic manifestations.

Table 2. *Factorial weights of the BDI items distributed on factors (rotated solution).*

Scale and item	Factor 1	Factor 2	Factor 3	Factor 4	Factor 5
Depressed mood					
Guilt	.70	.02	.10	.17	.07
Crying	.69	.30	-.10	.18	-.07
Indecisiveness	.67	-.06	.13	.02	.33
Sense of failure	.65	.13	.12	.48	-.01
Suicidal ideas	.54	.20	.36	.27	.09
Sadness	.52	.22	.50	.12	.27
Somatic manifestations					
Fatiguability	.23	.76	-.00	-.00	.15
Work retardation	.16	.75	.09	.04	.12
Somatic preoccupation	-.29	.69	.10	.06	.17
Insomnia	.18	.57	.41	.20	.14
Loss of weight and appetite					
Loss of weight	-.05	.07	.80	.15	-.06
Loss of appetite	.35	.28	.64	.09	.06
Negative self-image					
Self dislike	.16	-.06	.33	.80	.22
Body image change	.31	.39	-.24	.63	.15
Self accusations	.45	-.09	.39	.55	.08
Negative social feelings					
Irritability	-.08	.13	-.19	.09	.80
Social withdrawal	.21	.17	.25	.17	.67
Pessimism	.47	.47	.30	.09	.36
Loss of libido	.11	.47	.22	.47	-.07
Dissatisfaction	.34	.43	.24	.06	.42
Expectation of punishment	.39	.34	.02	-.04	.48

Table 3. *Distribution of scores (M and S.D.) of the BDI scales in the two groups and characteristics of the t-test (two-tailed).*

Scale	Depression		Somatoform disorders		t	p
BDI total score	26.82	10.14	23.64	11.39	-1.46	.15
Cognitive-affective	16.34	6.18	13.23	7.75	-2.21	.03
Somatic complaints	9.57	4.44	9.56	4.20	-0.01	.99
Depressed mood	7.55	3.23	5.87	4.30	-2.22	.03
Somatic manifestations	5.22	2.24	5.86	2.44	1.33	.19
Loss of weight and appetite	1.84	1.50	1.15	1.42	-2.28	.03
Negative self-image	4.10	2.17	3.19	2.28	-2.01	.05
Negative social feelings	1.98	1.34	1.81	1.47	-0.60	.55

Furthermore, no difference between the groups was found on the subscale of Negative social feelings also derived from the factor analysis. The two items of this subscale (irritability and social withdrawal) are included among the 13 items defining the Cognitive-affective subscale on which the depressive patients scored higher than those with somatoform disorders. The majority of items in the Cognitive-affective subscale are the same as those in the subscales here referred to as Depressed mood and Negative self-image, also found together with Loss of weight and appetite to differentiate between the two groups.

Table 4. *Intercorrelations (Pearson coefficients) of the BDI scales.*

Scale	BDI total score	Cognitive-affective	Somatic complaints	Depressed mood	Somatic manifestations	Loss of weight and appetite	Negative self-image
Cognitive-affective	.94***						
Somatic complaints	.84***	.66***					
Depressed mood	.84***	.91***	.56***				
Somatic manifestations	.64***	.48***	.87***	.36***			
Loss of weight and appetite	.60***	.47***	.64***	.44***	.34***		
Negative self-image	.74***	.74***	.58***	.64***	.32***	.35***	
Negative social feelings	.51***	.56***	.34***	.29**	.34***	.12	.27**

** $p \leq 0.01$ level, *** $p \leq 0.001$ (two-tailed test)

In conclusion, and in line with the opinion of Beck & Steer (2001), the BDI Cognitive-affective subscale seems to be useful for distinguishing between clinical groups who differ in regard to depressive symptomatology. The findings from the present analyses appear, however, to imply that the three subscales referred to as Depressed mood, Loss of weight and appetite and Negative self-image are more informative in describing the uniqueness of depressive patients than the Cognitive-affective subscale taken separately.

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E-mail: Lars.Olsson@malmo.se

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