



## Study 8

### Beck's Depression Inventory (BDI) Revisited.

#### Source:

Louks, J., Hayne, C., & Smith, J. (1989). Replicated factor structure of the Beck Depression Inventory. *Journal of Nervous and Mental Disease*, 177(8), 473-479.

#### Aim of Louks et al.'s study:

To estimate the factor structure of the Beck's Depression Inventory (BDI)

#### Method:

470 patients from a residential institution with impaired vocational and social functioning were used in a first study whose data are reanalyzed here. Patients with major depression, bipolar disorder, schizoaffective disorder, and delusional disorder were included. The 21 item standard BDI (Beck et al., 1961) was used.

#### Procedure of data analysis

Principal components analysis and Varimax rotation were applied by Louks et al. and for my reanalysis.

Table 1

Input for factor analysis

1
.54 1
.55 .59 1
.55 .52 .60 1
.51 .48 .60 .55 1
.45 .41 .50 .43 .48 1
.52 .48 .69 .59 .67 .49 1
.39 .38 .58 .46 .52 .41 .63 1
.46 .49 .46 .47 .46 .43 .46 .36 1
.42 .41 .40 .35 .36 .35 .33 .26 .37 1
.33 .33 .36 .38 .34 .27 .35 .36 .30 .29 1
.41 .49 .45 .48 .40 .32 .45 .37 .41 .33 .35 1
.42 .50 .55 .54 .50 .33 .55 .52 .43 .33 .34 .46 1
.31 .33 .43 .39 .35 .43 .42 .36 .40 .25 .34 .34 .41 1
.34 .34 .33 .42 .25 .23 .33 .25 .26 .25 .30 .38 .38 .31 1
.38 .31 .41 .42 .35 .28 .37 .30 .29 .27 .30 .35 .29 .34 .45 1
.30 .25 .29 .34 .25 .24 .32 .25 .20 .19 .22 .26 .31 .22 .56 .35 1
.23 .23 .16 .28 .17 .14 .15 .16 .13 .14 .12 .20 .21 .18 .33 .32 .32 1
.17 .10 .06 .13 .07 .04 .08 .12 .09 .10 .10 .11 .11 .03 .15 .18 .24 .27 1
.29 .19 .27 .30 .24 .22 .26 .29 .21 .18 .25 .24 .33 .28 .36 .33 .42 .28 .29 1
.22 .32 .26 .29 .26 .18 .25 .26 .27 .27 .21 .35 .33 .24 .30 .21 .39 .29 .18 .33 1

For names of the 21 variables, see Tables 2 and 3

Eigenvalues:

7.96 1.83 0.98 0.94 0.89 ...
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## Varimax results

The following Varimax results have been obtained by recalculation. They do not differ appreciably from Louks et al's results.

Table 2

Varimax-rotated loadings of PCA factors

	F1 "Cognitive" Items	F2 "Somatic" Items	Variables
01	<b>0.757</b>	-0.188	Mood
02	<b>0.662</b>	0.224	Pessimism
03	<b>0.774</b>	0.039	Sense of failure
04	<b>0.663</b>	0.317	Lack of satisfaction
05	<b>0.800</b>	0.066	Guilty feeling
06	<b>0.700</b>	0.158	Sense of punishment
07	<b>0.762</b>	0.111	Self hate
08	<b>0.729</b>	0.118	Self accusation
09	<b>0.598</b>	0.213	Self-punitive wishes
10	<b>0.561</b>	0.180	Crying spells
11	<b>0.482</b>	0.305	Irritability
12	<b>0.600</b>	0.225	Social withdrawal
13	<b>0.696</b>	0.303	Indecisiveness
14	<b>0.494</b>	0.318	Body image
15	0.222	<b>0.633</b>	Work inhibition
16	0.336	<b>0.532</b>	Sleep disturbance
17	0.223	<b>0.666</b>	Fatigability
18	0.170	<b>0.644</b>	Loss of appetite
19	-0.092	<b>0.518</b>	Weight loss
20	0.194	<b>0.571</b>	Somatic preoccupation
21	0.177	<b>0.461</b>	Loss of libido
%	31.4	14.3	Sum = 45.8

#### Varimax factor interpretation:

F1 has been generally regarded as indicating, above all, clinical depression. An overall measure of depression is generally obtained either (1) by summing the first 13 BDI ratings that are highly loaded on Varimax F1, (2) by summing all 21 ratings ignoring eight 'somatic' F2 items as less important, or (3) by using factor scores of a second order factor based on primary factors. The questionable role of factors beyond F1 for depression has been the main problem of BDI assessments of depression.

F2 has often been regarded as more or less superfluous for non-clinical samples. Medical experts are well aware of the difference between mental and physiological or somatic symptoms of clinically depressive patients. However, the BDI is often also applied in non-clinical samples where somatic symptoms are not the primary issue (Richter et al., 1994).

#### Criticism:

An assessment of depression by BDI has not been satisfactory since this test was first introduced. *"The measurement of 'depression' is as confused as the basic construct of the state itself"* (Snaith, 1993, p. 296). My stance is that methodological reasons are mainly responsible for this state of affairs. By rotating the initial factors to simple structure, the result of Varimax or similar simple structure procedures, a first approximation by initial F1 to general depression is hampered and even destroyed, leaving open many questions and uncertainties.

Varimin results

Table 3

Varimin loadings:

	F1 General Depression	F2 Mental vs. Physio- logical Compo- nents	Variables
01	0.668	0.403	Mood
02	0.627	0.310	Pessimism
03	0.575	0.520	Sense of failure
04	0.693	0.245	Lack of satisfaction
05	0.612	0.518	Guilty feeling
06	0.607	0.384	Sense of punishment
07	0.617	0.460	Self hate
08	0.599	0.432	Self accusation
09	0.574	0.272	Self-punitive wishes
10	0.523	0.269	Crying spells
11	0.557	0.125	Irritability
12	0.583	0.265	Social withdrawal
13	0.707	0.278	Indecisiveness
14	0.574	0.124	Body image
15	0.605	-0.291	Work inhibition
16	0.613	-0.139	Sleep disturbance
17	0.629	-0.313	Fatigability
18	0.575	-0.335	Loss of appetite
19	0.301	-0.432	Weight loss
20	0.541	-0.267	Somatic preoccupation
21	0.451	-0.201	Loss of libido
%	34.6	11.1	Sum = 45.8

### Interpretation of Varimin factors

F1 items represent mental or physical-physiological symptoms of depression. Apparently, the most pronounced or typical symptom of depression is 'indecisiveness' (F1-loading= 0.707) and the least pronounced is 'weight loss' (F1=0.301) and 'loss of libido' (0.451).

Rating responses add factorial weight to F1 factors due to response sets (above all social desirability, Schmitt & Maes, 2000). Unfortunately, the amount of response set contribution to F1 can only be presumed, not directly and objectively measured.

F2 is a bipolar factor. Its negative loadings indicate somatic symptoms of depression, and positive loadings indicate non-physical dysfunctional features.

### Evaluation:

The results of a Varimin analysis of the data confirm previous researchers' decision to regard the 21 summed BDI responses of test takers as measures of degrees of depression. However, the results also suggest to use the relative preponderance of positive or negative responses to F2 items as indicating the patients' position on a continuum between the extremes of purely mental vs. purely somatic malfunctioning. A BDI revision would have to include more somatic items and to adapt the analysis for applying subcategories of depression in such a manner.

### References:

Richter, P., Werner, J., & Bastine, R. (1994). Psychometrische Eigenschaften des Beck-Depressionsinventars (BDI): Ein Überblick. *Zeitschrift für Klinische Psychologie*, 23(1), 3-10.

Schmitt, M. & Maes, J. (2000). Vorschlag zur Vereinfachung des Beck-Depressionsinventars (BDI). *Diagnostica*, 46(1), 38-46.

Depressionsinventars (BDI): Ein Überblick. *Zeitschrift für Klinische Psychologie*, 23(1), 3-10.

Schmitt, M. & Maes, J. (2000). Vorschlag zur Vereinfachung des Beck-Depressionsinventars (BDI). *Diagnostica*, 46(1), 38-46.

Snaith, P. (1993). What do depression rating scales measure?-*British Journal of Psychiatry*, 163, 293-298.

Table 4

Minimal pairs :

Var. no.	F1 General depression	F2 Mental vs. Physiological Components	Variables
19	0.301	-0.432	Weight loss
03	0.575	0.520	Sense of failure
17	0.629	-0.313	Fatigability
05	0.612	0.518	Guilty feelings

Comment:

Another procedure for taking account of F2 ratings is to use F2 factor scores as sub-qualifiers of general F1 measures of depression.