Published in final edited form as:

J Pers Assess. 2008 September ; 90(5): 521–523. doi:10.1080/00223890802248919.

Psychometric Properties of the Beck Depression Inventory-II in Low-Income, African American Suicide Attempters

Sean Joe¹, Michael E. Woolley², Gregory K. Brown³, Marjan Ghahramanlou-Holloway⁴, and Aaron T. Beck³

¹ School of Social Work and Department of Psychiatry, University of Michigan

² School of Social Service Administration, University of Chicago

³ Department of Psychiatry, University of Pennsylvania

⁴ Department of Medical and Clinical Psychology, Uniformed Services University of the Health Sciences

Abstract

Cross-cultural examinations of the validity and reliability of the Beck Depression Inventory–II (Beck, Steer, Ball, & Ranieri, 1996) is essential for its use in assessment and monitoring of the effectiveness of suicide interventions across racial groups. We tested the fit of a second-order, two-factor model and the internal reliability of the BDI–II in a sample of 133 African Americans with a recent history of suicide attempts. Additionally, we examined the convergent validity with the Hamilton Rating Scale for Depression (Reynolds & Koback, 1995). The results indicate that the BDI–II is a reliable and valid measure of depressive symptoms for African American suicide attempters.

The Beck Depression Inventory–II (BDI–II; Beck, Steer, Ball, & Ranieri, 1996) is one of the most commonly used instruments in research and practice to measure the presence and severity of depression and has been widely used in suicide prevention research (Brown, 2001). Suicide has increased among ethnic minorities, and 60% of suicides suffer from depression (Goldsmith, Pellmar, Kleinman, & Bunney, 2002). Therefore, accurate assessment of depression among ethnic minorities, especially in individuals with a history of suicide behavior, will be an important task. Comparative studies have raised questions about the validity of measures used to assess depression (Bryne, Stewart, & Lee, 2004). Concurrently, in the past decade, research has spawned interest in ethnic, racial, and cultural differences in depression, as several studies have pointed to the possibility that the characteristics of depression as measured by the BDI–II may differ across cultural groups (Dutton et al., 2004; Paniagua, 2000).

Most participants in previous BDI–II studies have been White and middle-class (Grothe et al., 2005). Only one study examined the BDI–II factor structure in an African American sample. Among low-income, African American medical outpatients ($N = 220$), Grothe et al. (2005) confirmed fit of a second-order, two-factor structure. However, the generalizability of these results is limited to medical patients. Prior research has suggested that the experiences of depression among medically ill patients are qualitatively different from psychiatric patients (Morley, Williams, & Black, 2002). For instance, medically ill patients are more likely to endorse somatic items and less likely to endorse affective items, and their depression is not characterized by a depreciating view of self, key symptoms among psychiatric patients (Morley et al., 2002). Therefore, in this study, we sought to replicate and extend the work begun by

Grothe et al. by examining the psychometric properties of the BDI–II in a psychiatric sample of African American participants who recently attempted suicide. In addition, we assessed the internal reliability and convergent validity of the BDI–II.

Method

Sample

The sample was collected as a part of a randomized clinical trial examining the effectiveness of cognitive therapy for suicide prevention (Brown et al., 2005). Participants were evaluated no more than 48 hr after presenting at the emergency department for a suicide attempt. Participants were aged 16 or older and able to speak English, complete a baseline assessment, provide at least one verifiable contact, and understand and provide written informed consent. This study included the 133 African American participants in the total sample of 216, of whom 83 (62%) were female and 50 (37%) were male. Mean age was 35.23 ($SD = 9.85$, range 18–66), and 71% reported an income less than \$12,000. Of the sample, 81 (60%) were never married; 13% were married; 22% were widowed, separated, or divorced; and 5% did not indicate marital status.

Measures

The BDI–II is a 21-item, self-report instrument that measures severity of depression in adults and adolescents (Beck, Steer, & Brown, 1996). Items assess symptoms corresponding to criteria for diagnosing depressive disorders listed in the *Diagnostic and Statistical Manual of Mental Disorders* (4th ed.; American Psychiatric Association, 1994). Answer options include four increasing levels of severity. Scores for each item range from 0 to 3; the total score is the sum of all responses.

The Revised Hamilton Rating Scale for Depression (HRSD; Reynolds & Koback, 1995) is a 24-item, clinician-administered rating scale that assesses depression (Riskind, Beck, Berchick, Brown, & Steer, 1987). The HRSD was clinician administered as a fully structured interview. Item scores range from 0 to 4, with the total score being the sum of all responses. Reliability in community and psychiatric samples has ranged from .72 to .96 (Moberg et al., 2001; Reynolds & Koback, 1995), and it has demonstrated convergent validity with the BDI (e.g., $r = .89$; Moberg et al., 2001).

Results

Consistent with a sample of suicide attempters, the severity of psychiatric distress in this sample can be seen in both high HRSD scores ($M = 27.99$, $SD = 10.65$) and very low global assessment of functioning (GAF) scores ($M = 19.62$, $SD = 13.34$); even the mean highest GAF over the past year was in the psychiatrically impaired range ($M = 48.06$, $SD = 14.66$). Further reinforcing their high level of psychiatric distress, more than 25% of the sample reported severe life problems in their partnerships, parent–child interactions, occupations, and economics.

Descriptive statistics for BDI–II item responses and scales are detailed in Table 1. Item means ranged from 1.08 to 1.95, and corrected item-total correlations within each first-order factor ranged from .47 to .70. Mean scores were elevated on the sub-scales and total scores, and Cronbach's alphas were good. The correlation between total scores on the BDI–II and the HRSD was moderate ($r = .66$, $p < .001$), which supported convergent validity.

Because the two-factor structure of the BDI has been well established, we chose a confirmatory factor analytic approach (Byrne, 2005), and we tested all models using AMOS Version 5.0 (Arbuckle, 2003). The Kaiser–Meyer–Olkin index of sampling adequacy, which is a concern with this smaller sample with an item-to-subject ratio of 1:6.3, was .93 and indicated that factor

analysis was appropriate. We used the comparative fit index (CFI), the incremental fit index (IFI)—both developed to estimate fit with smaller samples (Byrne, 2001)—and the root mean square error of approximation (RMSEA) to evaluate model fit. Values of the CFI and IFI greater than .93 indicate good fit; values of the RMSEA less than .05 indicate a well-fitting model (Byrne, 2005).

The chi-square statistic for the second-order, two-factor model indicated it did not explain all of the variance in the data, $\chi^2(188, N = 133) = 276.86, p < .05$. However, other indexes suggest acceptable fit; the CFI = .92 and IFI = .93 were near or at the benchmark for a well-fitting model, whereas the RMSEA = .06 (90% confidence interval = .04–.07) indicated a marginally acceptable fit. As can be seen in Table 1, the lowest loadings were .622 on the somatic factor and .645 on the cognitive-affective factor; the loadings of these factors on the second-order depression factor were similar at .785 and .774.

Discussion

Consistent with Grothe et al. (2005), in this study, we found evidence to support the dimensionality, internal reliability, and convergent validity of the BDI–II in a sample of African American participants who recently attempted suicide. Our reliability for the full BDI–II ($\alpha = .94$) was comparable to estimates obtained for psychiatric samples ($\alpha = .91$; Beck et al., 1996) and primary care African American patients ($\alpha = .90$; Dutton et al., 2004). Unlike previous studies (Beck et al., 1996), we found a moderately high correlation between the BDI–II and the HRSD. Although this finding supports concurrent validity of the BDI–II in African American suicide attempters, the lower than expected correlation and the low item means seen in this study could reflect true variability in psychological recovery—namely, the typical symptom reduction in suicidal and depressive behavior that often occurs following a suicide attempt. Future research should seek to identify subtle differences in the depressive symptom profile of African American suicide attempters. Isolating these features may help guide future research into their social, psychological, or biological correlates and provide symptom targets for treatment trials designed to reduce suicide risk.

Several limitations of this study must be noted. The participants were patients who recently attempted suicide; were recruited from a large, urban hospital; and agreed to participate in a clinical trial. The extent to which these findings are replicable in other clinical samples is not known. Additional limitations are the small sample size and the fact that potential age differences were not addressed. Despite these limitations, our findings indicate the BDI–II is a reliable and valid instrument for the assessment of depression in African American suicide attempters. Establishing validity and reliability of such assessment tools in diverse racial and ethnic groups minimizes the likelihood of poor treatment decisions or erroneous research conclusions.

Acknowledgments

This research was supported in part by funds from the National Institute of Mental Health, U.S. Department of Health and Human Resources awarded (K01–MH65499) to Dr. Joe. Additional support was provided by a grant from the National Institute of Mental Health (P20–MH-071905-02) to Dr. Beck. This article benefits greatly from the perceptive comments of Robert Steers.

References

- American Psychiatric Association. Diagnostic and statistical manual of mental disorders. Vol. 4. Washington, DC: Author; 1994.
- Arbuckle, J.L. AMOS (Version 5.0) [Computer software]. Chicago, IL: SmallWaters Corporation; 2003.

- Beck, AT.; Steer, RA.; Brown, GK. Manual for the Beck Depression Inventory–II. San Antonio, TX: Psychological Corporation; 1996.
- Beck AT, Steer RA, Ball R, Ranieri W. Comparison of Beck Depression Inventories–IA and –II in psychiatric outpatients. *Journal of Personality Assessment* 1996;67:588–597. [PubMed: 8991972]
- Brown, G. A review of suicide assessment measures for intervention research with adults and older adults [Electronic version]. 2001 [Retrieved September 12, 2005]. from <http://www.nimh.nih.gov/suicideresearch/adultsuicide.pdf>
- Brown GK, ten-Have T, Henriques GR, Xie SX, Hollander JE, Beck AT. Cognitive therapy for the prevention of suicide attempts: A randomized controlled trial. *Journal of the American Medical Association* 2005;294:563–570. [PubMed: 16077050]
- Byrne, BM. Structural equation modeling with AMOS: Basic concepts, applications and programming. Mahwah, NJ: Lawrence Erlbaum Associates; 2001.
- Byrne BM. Factor analytic models: Viewing the structure of an assessment instrument from three perspectives. *Journal of Personality Assessment* 2005;85:17–32. [PubMed: 16083381]
- Bryne BM, Stewart SM, Lee PWH. Validating the Beck Depression Inventory–II for Hong Kong community adolescents. *International Journal of Testing* 2004;4:199–216.
- Dutton GR, Grothe KB, Jones GN, Whitehead D, Kendra K, Brantley PJ. Use of the Beck Depression Inventory–II with African American primary care patients. *General Hospital Psychiatry* 2004;26:437–442. [PubMed: 15567209]
- Goldsmith, SK.; Pellmar, TC.; Kleinman, AM.; Bunney, WE. Reducing suicide: A national imperative. Washington, DC: Institute of Medicine, National Academies Press; 2002.
- Grothe KB, Dutton GR, Jones GN, Bodenlos J, Ancona M, Brantley PJ. Validation of the Beck Depression Inventory–II in a low-income African American sample of medical outpatients. *Psychological Assessment* 2005;17:110–114. [PubMed: 15769232]
- Moberg PJ, Lazarus LW, Mesholam RI, Bikler W, Chuy IL, Neyman I, et al. Comparison of the standard and structured interview guide for the Hamilton Depression Rating Scale in depressed geriatric inpatients. *American Journal of Geriatric Psychiatry* 2001;9:35–40. [PubMed: 11156750]
- Morley S, Williams AC, Black S. A confirmatory factor analysis of the Beck Depression Inventory in chronic pain. *Pain* 2002;99:289–298. [PubMed: 12237207]
- Paniagua, FA. Culture-bound syndromes, cultural variations, and psychopathology. In: Cuellar, I.; Paniagua, FA., editors. *Handbook of multicultural mental health: Assessment and treatment of diverse populations*. San Diego, CA: Academic; 2000. p. 139-169.
- Reynolds WM, Koback KA. Reliability and validity of the Hamilton Depression Inventory: A paper-and-pencil version of the Hamilton Depression Rating Scale Clinical Interview. *Psychological Assessment* 1995;7:472–483.
- Riskind JH, Beck AT, Berchick RJ, Brown G, Steer RA. Reliability of *DSM–III* diagnoses for major depression and generalized anxiety disorder using the Structured Clinical Interview for DSM–III. *Archives of General Psychiatry* 1987;44:817–820. [PubMed: 3632255]

Table 1
BDI-II item descriptives and two-factor model coefficients.

First-Order Factor	Item	Item <i>M</i>	Item <i>SD</i>	Corrected Item-Total Correlation ^a	Two Factor Model Coefficient	<i>SE</i>
Somatic	4. Loss of pleasure	1.40	0.94	.63	.808	.105
	10. Crying	1.46	1.09	.47	.622	.122
	11. Agitation	1.33	1.06	.58	.789	.118
	12. Loss of interest	1.56	1.12	.66	1.0 ^b	
	13. Indecisiveness	1.34	1.06	.59	.820	.117
	15. Loss of energy	1.57	0.89	.64	.734	.099
	16. Changes in sleeping pattern	1.95	1.13	.54	.789	.126
	17. Irritability	1.39	1.05	.70	.982	.116
	18. Change in appetite	1.57	1.10	.55	.782	.122
	19. Concentration difficulty	1.41	0.88	.70	.770	.097
	20. Tiredness or fatigue	1.42	1.03	.69	.934	.114
	21. Loss of interest in sex	1.08	1.05	.51	.702	.117
Cognitive-Affective	1. Sadness	1.43	1.07	.59	.876	.142
	2. Pessimism	1.38	1.08	.61	.934	.146
	3. Past failure	1.52	1.02	.69	.886	.138
	5. Guilty feelings	1.25	.089	.53	.645	.115
	6. Punishment feelings	1.69	1.33	.56	1.0 ^b	
	7. Self-dislike	1.60	1.07	.62	.845	.140
	8. Self-criticism	1.77	1.11	.52	.800	.143
	9. Suicidal thoughts or wishes	1.30	1.06	.65	.983	.146
	14. Worthlessness	1.43	1.03	.65	.926	.140
Second-Order Factor	First-Order Factor	Mean	<i>SD</i>	Cronbach's α	Coefficient	<i>SE</i>
Depression		30.55	14.35	.94		
	Somatic	17.37	8.36	.89	.785	.109
	Cognitive-Affective	13.24	6.74	.87	.774	.087

First-Order Factor	Item	Item <i>M</i>	Item <i>SD</i>	Corrected Item-Total Correlation ^a	Two Factor Model Coefficient	<i>SE</i>
--------------------	------	---------------	----------------	---	------------------------------	-----------

Note. BDI-II = Beck Depression Inventory–II. Factor loadings reported are unstandardized path coefficients; *n* = 133 African American suicide attempters; all coefficients (factor loadings) significant at *p* < .01. Responses to all items revealed the full response range of 0 to 3.

^aCorrected item-total correlations are estimated among the items in each first-order factor.

^bRegression path constrained at 1.000; therefore, no standard error reported.