

Validation of the Beck Depression Inventory – II in a Jamaican University Student Cohort

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ABSTRACT

Objective: This project explores the internal consistency reliability and the concurrent and discriminant validity of the Beck Depression Inventory – II (BDI – II) using a wide cross-section of the student population attending the University of the West Indies, Kingston, Jamaica.

Subjects and Methods: Students enrolled in UWI Foundation courses during the first and second semesters of the 2005/2006 academic year ($n = 690$; 77% females, 23% males; mean age = 23.4 ± 7.4 years) were administered the BDI – II along with the Brief Screen for Depression (BSD), the Centre for Epidemiological Studies – Depression Scale (CES-D) and the UCLA Loneliness Scale – Revised.

Results: Overall, the BDI – II was found to have an acceptable degree of reliability ($\alpha = 0.90$). The scale also had reasonably good concurrent validity as evidenced by high correlations with scores on the BSD ($r = 0.74$) and the CES-D ($r = 0.71$) and acceptable discriminant validity as demonstrated through moderate correlations with the UCLA Loneliness Scale ($r = 0.50$). This pattern of scores suggests that the majority of the variance underlying the BDI – II assesses depression (50% to 55%) while a smaller degree of the variability (25%) measures a conceptually similar but distinct concept.

Conclusion: The BDI – II is a reliable and valid measure for assessing depression within the Jamaican population.

Validación del Inventario de Depresión de Beck II en una Cohorte de Estudiantes Universitarios Jamaicanos

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RESUMEN

Objetivo: Este proyecto explora la fiabilidad de la consistencia interna y la validez discriminante y concurrente del inventario de depresión de Beck II (IDB – II) usando una amplia sección transversal de la población estudiantil que asiste a la Universidad de West Indies, Kingston, Jamaica.

Sujetos y Métodos: A los estudiantes matriculados en los cursos de Fundación de UWI durante el primer y segundo semestres del año académico 2005/2006 ($n = 690$; 77% hembras 23% varones; edad promedio = 23.4 años ± 7.4) se les aplicó el IDB – II junto con la Prueba Breve para la Detección de la Depresión (BSD), la Escala de Depresión del Centro de Estudios Epidemiológicos (CES-D), y la Escala Revisada de Soledad de la Universidad de los Ángeles de California.

Resultados: En general, se halló que el IDB – II tenía un grado aceptable de fiabilidad ($\alpha = 0.90$). La escala también tenía una validez concurrente razonablemente tal como lo evidencian las altas correlaciones con las puntuaciones del BSD ($r = 0.74$) y el CES-D ($r = 0.71$), y una validez discriminante aceptable como quedó demostrado mediante las correlaciones moderadas con la Escala de Soledad de UCLA ($r = 0.50$). Este patrón de puntuaciones sugiere que la mayor parte de la varianza que subyace en el IDB – II evalúa la depresión (50% a 55%) mientras que un grado menor de variabilidad (25%) mide un concepto conceptualmente similar pero distinto.

Conclusión: El IDB – II constituye un instrumento de medición fiable y válido para evaluar la depresión en la población jamaicana.

West Indian Med J 2007; 56 (5): 404

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INTRODUCTION

Extensive research has focussed on depression among North American university students (1–4) for several reasons. Firstly, depression is the most commonly reported psychiatric disorder in that group (5). Secondly, university students with depression are more at risk than others for attempted and completed suicide (5) and thirdly, in the last two decades, depression research has used college students as study subjects because of their convenience and ease of access (6). While the research done in North America is informative and worthwhile, minimal investigations have been performed on Caribbean university students and even fewer on Jamaican college students.

The Jamaican society

While Jamaican society shares many similarities with North American and European societies, there are several factors which may place Jamaican university students at an increased risk for depression. Jamaican society is strongly stratified by social class (8). This social stratification has many impacts on the social environment especially the educational system (9). Repeated critical competency examinations within the educational system, high levels of poverty, high levels of unemployment and limited opportunities for social mobility may also elevate the risk of depression for students (10). Given this enhanced risk, it is important to determine the characteristics and prevalence of depression among Jamaican university students. To elucidate these issues, a scale such as the Beck Depression Inventory–II (BDI – II) which has been standardized and validated for depression elsewhere and which has cultural versatility (11) would first need to be validated in a Jamaican university student cohort.

It is hypothesized that the BDI – II will achieve concurrent and discriminant validity in a sample of Jamaican college students. In accordance with past research using non-Caribbean samples (12–14) it is hypothesized that female students will report more intense symptoms of depression than their male counterparts.

SUBJECTS AND METHOD

Participants

Students attending the University of the West Indies (UWI) Kingston, Jamaica, were used to obtain preliminary evidence for the validity of the Beck Depression Inventory – II. In all, 690 participants (252 from semester one, 438 from semester two; 77% females, 23% males; age 16–62 years, median = 20 years, mean = 23.4 ± 7.4 years) took part in this brief study. Students were enrolled in the Foundation courses during the first and second semesters of the 2005/2006 academic year. Nearly 43% of the cohort was enrolled in the Faculty of Humanities and Education, with 40% from the Faculty of Social Sciences and the remaining students from Pure and Applied Sciences (6%), Medical Sciences (4%) and Law (1%). Ethical approval for the study was obtained from the Head, Department of Sociology, Psychology and Social Work who

is responsible for the ethical review and approval of all research in the Department. The study was conducted following the guidelines established for research by the American Psychological Association. In particular, all respondents were asked to provide their written informed consent prior to collection of data.

Measures

Beck Depression Inventory – II (BDI – II). The Beck Depression Inventory (BDI – II) is a 21-item measure designed to assess the cognitive, behavioural, affective and somatic symptoms of depression. Participants were asked to record their responses to each item using a series of Guttman rank ordered statements. Statements were assigned a score of 0 to 3 depending on the severity of the symptom they described. Students were asked to circle the number associated with the statement that most accurately described their feelings. Depression scores were calculated by summing the numbers associated with the circled statements. Previous research suggests that the BDI is reliable in North American samples of adults (11). Within this sample of adults, the BDI appears to have a reasonable degree of internal consistency reliability ($\alpha = 0.86$).

To test the dimensional structure of the BDI – II, a confirmatory Principal Components Analysis (PCA) was conducted. Past studies have strongly identified a two-component structure for the instrument (26–30). However, while two clear components do fall from the BDI – II, the affective items either load on a cognitive component (29) or a somatic component (27) depending on the sample which was used. Studies with university students have found that the affective items loaded on the cognitive component (29). To confirm the structure of the BDI – II in our sample, we conducted a two-component PCA using oblique rotation.

Centre for Epidemiologic Studies of Depression Scale (CES-D). The Centre for Epidemiological Studies – Depression scale (CES-D)(15) is a 20-item measure of depressed mood. It was designed for use in general population surveys of depression but has also found extensive use in clinical settings. While the CES-D assesses current depression, it places particular emphasis on the affective component of depression. The scale was created by combining items from other validated measures of depression. Past research suggests that the CES-D has a reasonable degree of reliability ($\alpha = 0.85$ for general populations and $\alpha = 0.90$ for psychiatric groups) (16). The CES-D will be used to establish the concurrent validity of the BDI – II.

Brief Screen for Depression (BSD). The Brief Screen for Depression (BSD) (17) was included in the current project to assess the concurrent validity of the BDI – II. It consists of four simple-to-complete items, each of which assesses one set of depressive symptoms. Scores above 21 on the BSD indicate clinical levels of depression while those above 24 are used to distinguish patients with clinical levels of depression from those experiencing other psychiatric dis-

orders. The BSD has been shown to correlate strongly with other measures of depression (16) and to have acceptable degrees of reliability ($\alpha = 0.63$ to $\alpha = 0.65$) (16).

University of Los Angeles Loneliness Scale – Revised (UCLA-R). The University of Los Angeles Loneliness Scale – Revised (18) is the most widely accepted and commonly used measure of loneliness. It was included in the battery of measures to provide evidence for the discriminant validity of the BDI – II as loneliness is a similar but conceptually distinct phenomenon from depression. While all people who report strong feelings of loneliness may report many symptoms of depression, not all those who score highly on measures of depression report that they are socially isolated or are lonely. Indeed, past research (18) has used measures of depression to gather evidence for the validity of measures of loneliness. Thus, the UCLA Loneliness Scale – Revised is expected to have a moderate but not strong correlation with scores on the BDI – II.

The UCLA-R consists of 20 statements regarding perceptions of social relationships and feelings of belonging. Half of the items are phrased to express positive perceptions of social belonging while the other half are phrased to express perceptions of a lack of social and emotional intimacy with others. The UCLA-R has been administered in several different cultural contexts and countries including Iran, Zimbabwe, Puerto Rico, Cape Verde, Portugal, Taiwan and Greece (19–24). The measure has been found to have high levels of concurrent and discriminant validity and high levels of internal consistency reliability ($\alpha = 0.94$) (16).

Procedure

Research assistants provided a brief introduction to the project at the start of participants' regular lecture. The project was described as an investigation into the psychosocial factors associated with mood and social relationships. Participants were informed that their participation was completely voluntary and they could withdraw from the project at any time. Questionnaires were then distributed for completion. Completed questionnaires were returned to one of the investigators at the end of the lecture. The data obtained from the questionnaires was entered into a SPSS version 11.5 and analyzed using *t*-tests, ANOVA and multiple regression.

RESULTS

A two-stage approach was used to establish the reliability and validity of the BDI – II. First, the internal consistency reliability of the BDI – II was examined using Cronbach's Coefficient Alpha (25). Following this, the concurrent and discriminant validity of the BDI – II was examined using Pearson's product moment correlations. Prior to conducting all analyses, the mean score rounded to the nearest whole number was substituted for missing values on individual BDI items and CES-D, BSD and UCLA-R items.

The BDI – II was found to have a high degree of internal consistency reliability ($\alpha = 0.90$). The UCLA-R, CES-D

and the BSD were also found to have high levels of internal consistency ($\alpha = 0.88, 0.89$ and 0.77 respectively). Overall, results of the validity analyses suggest that the BDI – II has an acceptable degree of concurrent and discriminant validity (Table 1). Scores on the BDI – II strongly correlated ($r =$

Table 1: Concurrent and discriminant validity coefficients for the Beck Depression Inventory – II

Scale	BDI – II	BSD	CES-D	UCLA-R
BDI – II	1.00			
BSD	0.74	1.00		
CES-D	0.71	0.70	1.00	
UCLA-R	0.50	0.43	0.58	1.00

0.74) with the BSD and with the CES-D ($r = 0.71$) suggesting that the BDI – II has a moderate degree of concurrent validity. In contrast, scores on the BDI – II correlated less strongly with scores on the UCLA-R Loneliness scale ($r = 0.50$) suggesting the BDI – II has an acceptable degree of discriminant validity. This pattern of scores suggests that the majority of the stable variance underlying the BDI – II assesses depression (50% to 55%) while a smaller degree of the variability (25%) measures a conceptually similar but distinct construct.

The BDI – II also appears to correctly classify participants into clinically depressed and normal groups. Using the cut-off scores for clinical depression on the BSD and those for moderate to severe depression on the BDI – II, the BDI – II correctly classified 75% of all participants (Table 2). The

Table 2: Comparison of depression groupings generated by the Beck Depression Inventory – II and the Brief Screen for Depression

		BSD category		
		Non-depressed	Depressed	Total
BDI – II category	Non-depressed	407 (59.0%)	160 (23.2%)	567 (82.2%)
	Depressed	13 (1.9%)	110 (15.9%)	123 (17.8%)
Total		420 (60.9%)	270 (39.1%)	690 100.0%

BDI – II also generated a low rate of false positive scores. Only 13 or 1.9% of all participants classed by the BDI – II as clinically depressed were classified by the BSD as normal. However, 160 or 23.2% of all participants classified by the BDI – II as normal were classed as depressed by the BSD. This relatively high level of false negative scores may be due to the nature of the BSD. The BSD was designed as a screening instrument for use in general health clinics. As such, the measure is designed to identify a relatively high number of people as depressed so as to ensure that persons who are truly depressed are not missed.

As expected, there was a significant gender ($t(651) = 2.24, p < 0.05$) difference in depression on the BDI – II such

that females reported significantly higher levels of depression ($\bar{x} = 11.71 \pm 9.34$) than their male counterparts ($\bar{x} = 9.81 \pm 8.55$).

Consistent with past research (26–30), we found two clear components which underlie the BDI – II. The first component consisted of a combination of cognitive and affective items while the second component contained somatic items (Tables 3 & 4). These two components were moderately

Table 3: Pattern matrix from the Confirmatory Principal Components Analysis of the BDI – II

BDI – II Item	Component	
	1	2
Worthlessness	0.813	
Feelings of dislike	0.757	
Past failure	0.738	
Self criticalness	0.669	
Pessimism	0.667	
Suicide	0.624	
Sadness	0.487	
Feelings of guilt	0.444	
Crying	0.436	
Feelings of punishment		
Indecision		
Tiredness or Fatigue		0.797
Change in appetite		0.707
Change in sleeping pattern		0.633
Lack of energy		0.615
Irritability		0.569
Loss of pleasure		0.561
Concentration difficulty		0.547
Agitation		0.482
Loss in interest		0.461
Loss of interest in sex		

Table 4: Structure matrix from the Confirmatory Principal Components Analysis of the BDI-II

BDI – II Item	Component	
	1	2
Worthlessness	0.762	
Feelings of dislike	0.752	0.425
Self criticalness	0.712	0.460
Past failure	0.671	
Pessimism	0.662	
Sadness	0.640	0.547
Suicide	0.638	
Crying	0.586	0.512
Feelings of guilt	0.550	0.439
Indecision	0.548	0.538
Feelings of punishment	0.525	0.485
Tiredness or fatigue		0.742
Irritability	0.457	0.644
Concentration difficulty	0.481	0.643
Lack of energy		0.636
Agitation	0.541	0.633
Loss of pleasure	0.434	0.625
Change in appetite		0.616
Change in sleeping pattern		0.595
Loss in interest	0.481	0.585
Loss of interest in sex		

correlated with one another ($r = 0.57$) suggesting a single general depression factor may underlie the BDI – II. The items loading on the cognitive-affective and the somatic components strongly resembled those of previous analyses with the exception of the items assessing a loss of interest in sex and indecision which did not load on any component.

DISCUSSION

The BDI – II was found to have an acceptable level of concurrent and discriminant validity in this population of respondents. It also had an acceptable level of internal consistency reliability. In keeping with past research (26–30), the Principal Components Analysis of the BDI – II in this sample was found to consist of two moderately correlated components, one of which assessed the cognitive affective dimension of depression and the other the somatic. Finally, the BDI – II has a high degree of selectivity but less sensitivity as indicated in Table 2. It tends to identify the more severely depressed while the BSD identifies more moderate cases of depression. This pattern is expected as the BSD is designed to capture many potential cases of depression for further assessment by clinicians.

Depression has both affective and cognitive manifestations, with the affective symptoms appearing in the earlier stages of the illness while the cognitive symptoms appear later (31). Thus, cognitive symptoms are indicative of more severe levels of depression. As a measure of depression, the BDI – II contains a larger number of items assessing the cognitive symptoms of depression than the affective symptoms. For this reason, the BDI – II may play a particularly important role in monitoring the progress of clinically depressed patients from the population sampled in this paper. However, its under-inclusion of affective symptoms may make it less appropriate in the assessment of the early presentation of depression. Thus, the BDI – II may not function as an efficient and effective screening tool for depression. Instead, the BSD may perform as better screening measures as it includes a larger number of items assessing the affective symptoms of depression.

As anticipated, we found a gender difference in BDI – II depression scores. Mean differences between male and female participants were statistically significant, ($p < 0.05$). Based on this sample, we can conclude that gender differences seem to hold true on the BDI – II scores such that women report higher scores than men. Future research will examine the role that employment status, faculty of origin, family socio-economic status may play in levels of BDI – II depression.

One limitation of the current project is the use of university students as a sample. While students at the UWI represent a wider range of ages and a different gender distribution than North American universities, this population is still not representative of the Jamaican populace. In fact, previous research suggests that there is a higher self-reported prevalence of depression among university students than that

seen in the general population (5). Future studies will be conducted using a broader and more representative sample of the Jamaican population. However, the current study provides some preliminary evidence for the concurrent and discriminant validity of the BDI – II.

ACKNOWLEDGEMENT

We would like to thank those participants who consented to take part in this research project. We would also like to thank John Earle Spence for his assistance in obtaining the sample and Andrea Reynolds for her assistance with data processing.

REFERENCES

- Hamilton S, Fagot BI. Chronic stress and coping styles: a comparison of male and female undergraduates. *J Pers Soc Psychol* 1988; **55**: 819–23.
- Hammen CL, Cochran SD. Cognitive correlates of life stress and depression in college students. *J Abnorm Psychol* 1981; **90**:23–7.
- Hammen CL, Padesky CA. Sex differences in the expression of depressive responses on the Beck Depression Inventory. *J Abnorm Psychol* 1977; **86**: 609–14.
- Vredenburg K, O'Brien E, Krames L. Depression in college students: personality and experimental factors. *J Counse Psychol* 1988; **35**: 419–25.
- Daughtry D, Kunkel M. Experience of depression in college students: a concept map. *J Counse Psychol* 1993; **40**: 316–23.
- Gotlib IH. Depression and general psychopathology in university students. *J Abnorm Psychol* 1984;1084; **93**: 19–30.
- Sherlock, P. Bennett H. *The Story of the Jamaican People*. Kingston, Jamaica: Ian Randle Publishers; 2001.
- Miller E. Body image, physical beauty and colour among Jamaican adolescents. *Soc Econo Stud* 1969; **18**: 72–89.
- Evans, H. Streaming and its effects on students. In: H. Evans (Ed.), *Inside Jamaican Schools*. Kingston, Jamaica: University of the West Indies Press; 2001: 90–104.
- Harriott, A. The crisis of public safety in Jamaica and the prospects for change. *Souls: a critical journal of Black politics, culture, and society* 2001; **3**: 56–65.
- Beck A, Steer R, Brown G. Beck Depression Inventory – (second edition) Manual, the Psychological Corporation, Harcourt Brace & Company, San Antonio; 1996.
- Fleming J, Offord D, Boyle, M. Prevalence of childhood and adolescent depression in the community; Ontario Child Health Study. *Br J Psychiatry* 1989; **155**: 647–54.
- McCracken J. The epidemiology of child and adolescent mood disorders. *Child Adolesc Psychiatr Clin N Am* 1992; **1**: 53–72.
- Jenkins S, Goodness K, Buhrmester, D. Gender differences in early adolescents' relationship qualities, self-efficacy, and depression symptoms. *J Early Adolesc* 2002; **22**: 277–309.
- Radloff L. The CES-D scale: A self-report depression scale for research in the general population. *Appl Psychol Measure* 1977; **1**: 385–401.
- Fischer, J, Corcoran K. *Measures for Clinical Practice: A Sourcebook*, 2nd Ed. (2 vols). New York: Free Press; 1994.
- Hakstian AR, McLean, P. D. Brief screen for depression [BSD]. *Psychol Assess* 1989; **1**: 139–41.
- Russell D, Peplau LA, Cutrona CE. The revised UCLA Loneliness Scale: concurrent and discriminant validity evidence. *J Pers Soc Psychol* 1980; **39**: 472–80.
- Anderson LR, Malikiosi-Loizos M. Reliability data for a Greek translation of the Revised UCLA Loneliness Scale: comparisons with data from the USA. *Psychol Rep* 1992; **71**: 665–66.
- Hojat M. Psychometric characteristics of the UCLA Loneliness Scale: a study with Iranian college students. *Educ Psychol Meas* 1982; **42**: 917–25.
- Hsu LR, Hailey BJ, Range LM. Cultural and emotional components of loneliness and depression. *J Psychol* 1987; **121**: 61–70.
- Neto F, Barros J. Psychosocial concomitants of loneliness among students of Cape Verde and Portugal. *J Psychol* 2000; **134**: 503–14.
- Pretorius TB. The metric equivalence of the UCLA Loneliness Scale for a sample of South African students. *Educ Psychol Meas* 1993; **53**: 233–39.
- Wilson D, Cutts J, Lees I, Mapungwana S, Maunganidze L. Psychometric properties of the revised UCLA Loneliness Scale and two short-form measures of loneliness in Zimbabwe. *J Pers Assess* 1992; **59**: 72–81.
- Cronbach L J. Coefficient alpha and the internal structure of tests. *Psychometrika* 1951; **16**: 297–334.
- Beck AT, Steer RA, Brown, GK. Beck Depression Inventory, 2d ed, San Antonio, TX: The Psychological Corporation; 1996.
- Steer RA, Ball R, Ranieri WF, Beck AT. Dimensions of the Beck Depression Inventory–II in clinically depressed outpatients. *J Clin Psych* 1999; **55**: 117–28.
- Bedi RP, Koopman RF, Thompson JM. The dimensionality of the Beck Depression Inventory – II and its relevance for tailoring the psychological treatment of women with depression. *Psychotherapy* 20001; **38**: 306–18.
- Steer RA, Clarke DA. Psychometric characteristics of the Beck Depression Inventory–II with college students. *Measurement and Evaluation in Counseling and Development* 1997; **30**: 128–36.
- Storch EA, Roberti JW, Roth DA. Factor structure, concurrent validity and internal consistency of the Beck Depression Inventory – Second Edition in a sample of college students. *Depression and Anxiety* 2004; **19**: 187–89.
- Kumar G, Steer RA, Teitelman KB, Villacis L. Effectiveness of Beck Depression Inventory II Subscales in screening for major depressive disorders in adolescent psychiatric inpatients. *Assessment* 2002; **9**: 164–70.