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Factorial Structure of Depressive Symptoms in Anglophone Caribbean University Students: Psychometric Properties of the Beck Depression Inventory-II

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Abstract

This study sought to establish psychometric properties of the Beck Depression Inventory-Second Edition (BDI-II) with Caribbean university students (*n*=400, 76% women, mean age=25.2). Additionally, we administered the Ego Resiliency Scale-89, Perceived Stress Scale-Ten Item Version, State-Trait Anxiety Inventory-Trait Version, and Zung Self-Rating Depression Scale. Confirmatory factor analysis compared the observed structure with the oblique structures proposed in two-factor models. Factorial estimates and goodness-of-fit indices suggested adequate fit for two-factor models. Internal consistency (α=.86) and test-retest reliabilities (*n*=57, *r*=.78) were strong. Correlations assessing validity were significant in the theoretically expected directions. Results support use of the BDI-II with Caribbean students.
Keywords: Depression; University students; Caribbean, instrumental study.

La Estructura Factorial de los Síntomas de Depresión en Estudiantes Universitarios del Caribe Angloparlante: Rasgos Psicometricospsicométricos del Inventario de Depresión de Beck-II

Compendio

Este estudio buscó establecer propiedades psicométricas del Inventario de Depresión de Beck-Segunda Edición (BDI-II) con estudiantes de una universidad del Caribe (*n*=400, 76% mujeres, edad media=25.2). Además, administramos la Escala de Elasticidad de Ego-89, La Escala de Tensión Percibida, La Escala de Ansiedad Estado-Rasgo (Versión de Rasgo) y La Escala de Depresión de Zung. El análisis factorial confirmativo comparó la estructura observada con las estructuras oblicuas propuestas en los modelos de dos factores. Las estimaciones factoriales y los índices de calidad de ajuste sugirieron adecuado ajuste para modelos de dos factores. La consistencia interna (α=.86) y la fiabilidad test-retest (*n*=57, *r*=.78) eran fuertes. Las correlaciones de validez eran significativas en las direcciones teóricamente esperadas. Los resultados apoyan el uso del BDI-II con estudiantes del Caribe.
Palabras clave: Depresión; Universitarios; El Caribe, estudio instrumental.

Valid measures of depression have the potential to improve both diagnosis and treatment for a variety of public health problems in the region. Effective evaluation and treatment of depression in university students offers opportunity for early intervention. Importantly, depression is a major aspect of Caribbean mental health services and found to be associated with a variety of negative outcomes in the region, including burnout and absenteeism (Baba, Galperin, & Lituchy, 1999), decreased maternal willingness to breastfeed (Galler, Harrison, Ramsay, Chawla, & Talyor, 2006), and obesity (Tull et al., 1999). Additionally, depressive symptoms appear to be psychological sequalae of major public health problems, especially chronic diseases (Hutchinson et al., 2004). Evaluating psychometric properties of a well-validated measure is an important step in reducing the negative effects of depressive symptomatology.

The Beck Depression Inventory-Second Edition (BDI-II) is a 21-item self-report instrument widely used

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to assess the presence and severity of depressive symptoms in adolescents and adults (Beck, Steer, & Brown, 1996). The items on this revised version of the original Beck Depression Inventory ([BDI]; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961) have been adjusted to measure depressive symptoms corresponding with the diagnostic criteria for depressive disorders outlined in the *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* ([DSM-IV]; American Psychiatric Association, 1994). The factor structure of the BDI has been extensively documented, with the majority of findings supporting a three-factor structure: *Negative Attitudes Toward Self* (cognitive symptoms), *Performance Impairment* (behavioral symptoms), and *Somatic Complaints* (affective symptoms). Indeed, a recent meta-analysis (Shafer, 2006) supports a three-factor structure.

The BDI-II is a paper-and-pencil test that requires approximately 5 minutes to administer and is validated for ages 13 to 80. The brevity and simplicity of the instrument provide efficient and robust assessment of depressive symptoms in heterogeneous inpatient, outpatient, hospital and primary care samples (Ball & Steer, 2003; Cole, Grossman, Prilliman, & Hunsaker, 2003; Steer, Cavalieri, Leonard, & Beck, 1999). Although the BDI-II is frequently used with culturally and geographically diverse populations, limited empirical support for its factor solution exists outside of North America.

Psychometric findings of the original version of the BDI with samples in Puerto Rico (Bonilla, Bernal, Santos, & Santos, 2004) and Jamaica (Lipps & Lowe, 2006; Lowe, Lipps, Abel, Brown, & Hickling, 2004) broadened its clinical utility. However, psychometric validation of the BDI-II in other Caribbean samples is minimal. This reflects more broadly the scarcity of published research on the prevalence of depression in the Caribbean (Hickling, 2005), in spite of increasing public awareness of mental illness in the region and strong advocacy for rigorous research and improved practice (Lowe & Gibson, 2005; Periago, 2005). Indeed, a recent editorial in the *West Indian Medical Journal* called specifically for validation of the BDI-II to facilitate epidemiological studies of depression in the Anglophone Caribbean (Abel, Gibson, & Hickling, 2005).

Typically, psychometric appraisal of instruments in novel contexts assesses criterion-related validity. In the present study we have chosen the following instruments: the Ego Resiliency Scale – 89 (Block, 1989), Perceived Stress Scale-Ten Item Version (Cohen, Kamarck, & Mermelstein, 1983), State-Trait Anxiety Inventory-Trait Version (Spielberger, 1983), and Zung Self-Rating Depression Scale (Zung, 1965), to establish criterion-related validity.

Extant research suggests that depression is a significant, and neglected, public health problem in the Anglophone Caribbean. Hickling's (1975) analysis of new psychiatric patients at the University Hospital of the West Indies, Jamaica (JM), in 1971 indicated that 23% suffered from depression. Recently, a lifestyle survey conducted in Jamaica found that 49% of respondents reported "feeling down or depressed" and 28.7% of men and 36.6% of women described themselves as "having little interest or pleasure in activities." (Wilks et al., 2002). Maharaj (2007) reported depression prevalence of 12.8% among primary care patients in Trinidad (TT). Additionally, Williams et al. (2007) reported lifetime prevalence of Major Depressive Disorder of 12.9% among Caribbean blacks living in the United States (US); the rate was lower than that for white Americans (17.9%) but higher than that for African Americans (10.4%). Moreover, a number of studies (e.g., Maharajh & Abdool, 2005; Mahy, 1993) have reported increasing suicide rates in the Anglophone Caribbean.

Finally, the association of chronic diseases (e.g., diabetes and hypertension), with depression is well documented. A recent metaanalysis (Anderson, Freedland, Clouse, & Lustman, 2001) of 20 controlled studies demonstrated that the presence of diabetes doubles the odds that a patient will develop comorbid depression. Moreover, several studies suggest that the presence of depression in persons with diabetes increases overall health burden (Black, 1999). Additionally, one prospective North American study suggests that Major Depressive Disorder is a predictor of type-2 diabetes independent of its correlation with other risk factors (Eaton, Armenian, Gallo, Pratt, & Ford, 1996). This further attests to the importance of validly and reliably assessing depression, since type-2 diabetes is one of the major – and growing – public health challenges in the Caribbean (Hennis & Fraser, 2004).

The developers of the BDI-II utilised an outpatient sample (n=500) and an undergraduate sample (n=120). Exploratory factor analysis (EFA) revealed a two-factor structure: Somatic-Affective (SA) and Cognitive (C) for the outpatient sample and Cognitive-Affective (CA) and Somatic (S) factors for the college student sample. Revision of the 21-item inventory revealed 19 of the 21 items loaded on a two-factor solution (Beck et al., 1996) (SA items "pessimism" and "loss of interest in sex" had loadings less than .35). In contrast, Whisman, Perez, and Ramel (2000) applied confirmatory factor analysis (CFA) to test the CA-S model derived from the Beck et al. (1996) study. They found that 20 of the items loaded (<.35) on either a Cognitive-Affective (CA) or Somatic (S) factor solution in a sample of 576

college students. However, the "loss of interest in sex" item had a loading of .31 on S.

The present study examines the factorial structure of depressive symptoms in a non-clinical University student population. While this valid assessment of depressive symptoms certainly has important implications for the aforementioned public health challenges it is important to acknowledge that university students as a population have unique characteristics with regards to depressive symptoms, and in particular that clinically severe symptoms do not always translate to a clinical diagnosis in a straightforward manner (Coyne, 1994). University students are susceptible to transitory distress that may result in elevated scores on self-report measures but not warrant a diagnosis of depression; hence, their self-report measures of depressive symptoms do not necessarily generalize well to other groups (Coyne, 1994). In fact depressive symptoms have immediate and long term importance in young adult populations however researchers should be cautious of generalizing findings from university students to other populations and settings. Extant international literature in this area is limited. Using a sample of 414 North American university students, Storch, Roberti, and Roth (2004) reported a two-factor solution (CA and S) that included all items, with items assessing "pessimism" and "loss of interest in sex" loading on the Cognitive-Affective factor, derived from CFA. Carmody's (2005) CFA provided comparative data with an ethnically diverse university sample (n=502) demonstrating a robust fit for the three-factor model (negative attitude, performance difficulty, and somatic symptoms).

A small-sample study of the BDI-II with Caribbean university students demonstrated strong internal consistency, test-retest reliability, and concurrent validity (Campbell & Maynard, 2006). The current study sought to examine the factorial structure of the BDI-II with a larger sample in order to evaluate the proposed theoretical models of the BDI-II in a Caribbean student sample. Specifically, we evaluated SA-C and CA-S models for goodness of fit to the Barbadian data. In addition, descriptive characteristics, test-retest reliability, internal consistency, and concurrent validity were assessed to elucidate the clinical and research application of the BDI-II in the Caribbean.

Method

Participants

Undergraduate student volunteers enrolled at a Caribbean public university (n=400, 76% women, mean age=25.2) participated after completing written informed consent. Volunteers received no compensation for participation nor penalty for withdrawal. The majority of students were from Barbados or countries in the Eastern Caribbean. Two – thirds of the sample were women; this number is representative of the overall student enrolment of the university. There were no gender differences on any of the dependent measures. We did not code racial identity, because discreet categories frequently fail to capture the complex layering of identities in the Caribbean (Oostindie, 2005).

Materials

Beck Depression Inventory-Second Edition. The BDI-II (Beck et al., 1996) is a 21-item self-report measure of depressive symptoms experienced during the past week. Extensive reliability and validity data have been reported (Beck et al., 1996; Whisman et al., 2000).

Ego Resiliency Scale-89. The ER-89 (Block, 1989) is a 14-item self-report measure developed for research purposes. This scale has been used as a predictor of coping and has generally good reliability, e.g., coefficient alpha values approaching .80 (Block & Kremen, 1996; Fredrickson, Tugade, Waugh, & Larkin, 2003). In the present sample, Cronbach's alpha for the ER-89 was .76.

Perceived Stress Scale-Ten Item Version. The PSS-10 (Cohen et al., 1983) is a self-report instrument designed to assess the degree to which situations and circumstances in one's life are appraised as stressful. The PSS requires participants to respond to a series of questions using a 5-point likert scale (never, almost never, sometimes, fairly often, very often). Higher scores reflect greater stress levels. The PSS has strong psychometrics with high coefficient alpha reliabilities, generally .75 and above (Baldwin, Harris, & Chambliss, 1997). In the present sample, Cronbach's alpha for the PSS-10 was .79.

State-Trait Anxiety Inventory-Trait Version. The STAI-T (Spielberger, 1983) is a widely used 20-item measure of trait anxiety rated on a 4-point likert scale (almost never, sometimes, often, or almost always). The STAI-T has good reliability in North American populations. Internal consistency has ranged from .86 to .92; test-retest reliability has ranged from .65 to .75 (Spielberger, 1983). In the present sample, Cronbach's alpha for the STAI-T was .88.

Zung Self-Rating Depression Scale. The SDS (Zung, 1965) is a 20-item likert-style (4-point) rating scale for depression. The instrument has most often been used to monitor progress in treatment but has also been validated as a screening device (Zung, 1990). Efforts have been made to validate the instrument in Jamaica (Ward, Matthies, Wright, Crossman, & Hickling, 2001), and a modified version of the SDS

has been used to assess depression in Trinidad (Maharaj, 2001, 2007; Maharaj, Reid, & Misir, 2005). The SDS has the advantage of being available in the public domain. In the present sample, Cronbach's alpha for the SDS was .83.

Procedure

Students completed the questionnaires during scheduled class time. The questionnaires were counterbalanced. A research assistant present at each administration provided instructions and obtained informed consent from the students. Participants were allowed as much time as they needed to complete the instruments, and no identifying information other than demographics was collected. No attending student declined to participate.

Data Analysis

Initial Data Screening. Prior to conducting multivariate analyses, the data were screened for univariate and multivariate outliers. Assessing the critical value of the Mahalanobis distance, 32 multivariate outliers were identified ($\chi^2_{(21)}$=49.06, p<0.001). A close examination of these cases revealed that several of the item scores deviated severely (z=±3.00) from the remainder of the sample. Thus, the remaining sample of 368 was used for subsequent analyses and met recommendations for sample size (n > 200) for analyzing ordinal data (Jöreskog, 2004).

West, Finch, and Curran (1995) have noted that skewness of ±3 and a kurtosis of ±7 indicate an extreme deviation from normality. The univariate skewness of the 21 items ranged from .18 to 2.8 (M=1.53) and univariate kurtosis ranged from -.06 to 6.90 (M=2.54) with the exception of Item 14, "Worthlessness," which deviated from a univariate normal distribution, skew=11.89 and kurtosis=3.51. More than 91% of the participants did not endorse this symptom; however, it was included in further analyses. Mardia's (1970) normalized estimate of multivariate kurtosis was 159.31, the critical ratio of which was 49.17, representing departure from a multivariate normal distribution.

Model Comparison Strategy. It was hypothesized that the structure of the BDI-II would be consistent with two 2-factor structures previously published. Both exploratory and confirmatory factor analyses have revealed a Somatic-Affective and Cognitive (SA-C) model and a Cognitive-Affective and Somatic (CA-S) model with oblique factors. The SA-C model was constructed with item specifications suggested by Beck et al. (1996) and Whisman et al. (2000). Items on the C factor consisted of the following: "sadness," "pessimism," "past failure," "guilty feelings," "punishment feelings," "self-dislike," "self-criticalness," "suicidal thoughts," and "worthlessness," with the remaining items comprising the SA factor. Item loadings with correlated errors (indicated by substantial modification indices) for three pairs of items: "loss of energy" with "tiredness or fatigue", "self-dislike" with "self-criticalness", and "loss of pleasure" with "loss of interest" are indicated in Table 1.

The CA-S model was constructed with item specifications proposed by Whisman et al. (2000) and Storch et al. (2004). Items comprising the S factor were "loss of energy," "changes in sleeping," "changes in appetite," "concentration difficulty," and "tiredness or fatigue," and the other 16 items comprised the CA factor. Similarly, modification indices suggested substantial fit improvement with correlated errors for three pairs of items: "sadness" with "crying", "self-dislike" with "self-criticalness", and "loss of pleasure" with "loss of interest".

Confirmatory Factor Analysis of the BDI-II. To compare the observed structure with the oblique structures proposed in the theoretical models, a confirmatory factor analysis (CFA) was conducted using AMOS 5.0 (Arbuckle, 2003) structural equation modeling software. Because the BDI-II does not rely on continuous data (ordinal data) and multivariate non-normal data were present, a non-parametric bootstrap procedure (Efron & Tibshirani, 1993) was utilised. The bootstrap uses the empirical distribution to approximate the population-sample relationship and it is equivalent to resampling with replacement from the original sample. The bootstrap technique allows for examination of parameter distributions yielded from multiple subsamples drawn from the original sample.

Results

The first step in the bootstrap procedure was to create 1,000 random samples with replacement from the original dataset. Each randomly generated sample with replacement yields path coefficient estimations, standard error estimates, and approximate confidence intervals for the two proposed BDI-II models. BDI-II items were fixed to 1.00 rather than fixing the corresponding factor's variance values to 1.00, thus reducing inflated bootstrapped standard errors (Hancock & Nevitt, 1999).

Adequate fit of the measurement and structural models was determined with a number of commonly used methods. First, the proposed models were evaluated with the tests of significances (p-values) for bootstrap Maximum Likelihood (ML) parameter estimates, standard errors, and 95% bias-correction confident intervals for the bootstrapped regression estimates (Table 1). The regular ML parameter estima-

tes were also inspected for a baseline comparison. Secondly, the Bollen-Stine X^2goodness-of-fit statistic (Bollen & Stine, 1993) was computed to evaluate the appropriateness of the hypothesized model. A modified X^2goodness-of-fit statistic, the Bollen-Stine X^2goodness-of-fit is a method of testing the null hypothesis that the specified model is correct (Byrne, 2001).

Lastly, we evaluated several commonly used goodness of fit indices: goodness of fit index (GFI), the Akaike information criterion (AIC), standardized root mean square residual (SRMR), and the root mean square error of approximation (RMSEA), and the expected cross-validation index (ECVI). The GFI parameter ranges from 0 to 1, with values of .90 or higher indicating an adequate fit between the observed model and the theoretical model. For the RMSEA and SRMR, values below .05 indicate a good fit and values as high as .08 represent an adequate fit (Byrne, 2001). The AIC and ECVI were calculated to assess comparison of models within the same population with smaller values suggesting better fit in cross-validation within the same population.

The bootstrap procedure produced 1000 usage samples with no evidence of unusable solutions. Table 1 revealed that regular ML standardized regression parameters ranged from .23 to .70 (p-values < .0001) for the CA-S model and ranged from .27 to .67 (p-values < .0001) for the SA-C model. For the CA-S model, the discrepancy between the regular ML and bootstrapped standard error estimates for the regression weights revealed a wider distribution than would be expected under normal theory assumptions. For the SA-C model, the discrepancies were smaller, suggesting a closer approximation to the normal distribution.

Table 1
Standardized Non-Parametric Bootstrap Estimates from CFAs of the Proposed Models

	ML Standardized Regression Weights		$SE^1 - SE^2$		95% bias-corrected CI for Bootstrapped Standardized Regression Weights	
BDI - II Item	SA – C	CA – S	SA – C	CA – S	SA – C	CA – S
Sadness	.50	.47	.00	.37	.40 - .58	.38 - .57
Pessimism	.56	.53	.03	.28	.48 - .65	.44 - .60
Past failure	.44	.40	.06	.26	.35 - .53	.31 - .49
Loss of pleasure	.49	.48	.01	.27	.40 - .56	.41 - .58
Guilty feelings	.38	.38	.05	.16	.29 - .48	.29 - .48
Punishment feelings	.52	.48	.07	.57	.40 - .61	.37 - .58
Self - dislike	.62	.55	.05	.55	.53 - .70	.47 - .63
Self - criticalness	.59	.58	.05	.38	.51 - .67	.50 - .65
Suicidal thoughts	.42	.42	.01	.21	.30 - .54	.30 - .54
Crying	.51	.52	.06	.37	.41 - .61	.42 - .62
Agitation	.44	.44	.01	.24	.34 - .52	.34 - .52
Loss of interest	.58	.55	.01	.21	.49 - .65	.47 - .63
Indecisiveness	.58	.56	.04	.28	.50 - ..65	.47 - .64
Worthlessness	.59	.55	.07	.27	.47 - .69	.42 - .64
Loss of energy	.51	.56	.01	.00	.45 - .59	.48 - .63
Changes in sleeping	.37	.41	.01	.02	.27 - .46	.31 - .50
Irritability	.60	.57	.01	.25	.52 - .66	.49 - .64
Changes in appetite	.50	.53	.01	.02	.42 - .58	.44 - .61
Concentration difficulty	.67	.70	.01	.03	.60 - .73	.63 - .77
Tiredness or fatigue	.56	.64	.00	.01	.47 - .63	.54 - .71
Loss of interest in sex	.27	.23	.01	.00	.17 - .36	.14 - .32

Note: $SE^1 - SE^2$ = the discrepancy between the regular ML standard error estimates for the regression weight and the bootstrap standard error estimates for the regression weight. Discrepancies are reported as positive integers. Factors are abbreviated as follows: SA = Somatic – Affective; C = Cognitive; CA = Cognitive-Affective; S = Somatic.

Furthermore, bootstrapped standardized regression weights were assessed by constructing 95% bias-corrected CI significance (Efron & Tibshirani, 1993). Bootstrapped standardized regression weights for both models had *p*-values < .001, thus rejecting the hypothesis that the regression weights are equal to zero in the population. The Bollen-Stine X^2goodness-of-fit *p*-value < .001, thus indicating the specified model is incorrect and should be rejected. Because the Bollen-Stine X^2goodness-of-fit is sensitive to minor deviations between the estimated covariance matrix and the actual covariance matrix, the other fit indices were assessed. Inspection of the goodness-of-fit indices suggested a good fit for both models and a slightly better fit for the SA-C model (Table 2).

Table 2
Comparison of Standardized Loadings for Model SA-C and Model CA-S

Model	Factor *r*	X^2 *p*-value	GFI	AIC	SRMR	RMSEA	90% CI	ECVI	90% CI
SA-C	.78	.001	.91	485.2	.02	.05	.05-.06	1.32	1.18-1.49
CA-S	.79	.001	.90	519.7	.02	.06	.05-.07	1.42	1.26-1.59

Note. GFI=goodness of fit index; AIC=Akaike information criterion; SRMR=standardized root mean square residual; RMSEA=root mean square error of approximation; CI=confidence interval; ECVI=expected cross-validation index; SA-C=Somatic-Affective and Cognitive; CA-S=Cognitive-Affective and Somatic.

Reliability and Validity of the BDI-II. The mean total score on the BDI-II was 8.9 (*SD*=6.6; range=0-33). Table 3 presents the scale means, scale variance, corrected item-total correlations and alpha coefficients. Corrected item-total correlations were greater than .32 with the exception of "loss of interest in sex" (*r*=.22). Coefficient alpha for the total scale was .86, suggesting high internal consistency of the BDI-II. Test-retest reliability, computed using scores from 57 students who retook the BDI-II at a one-week interval, was .78 ($r < .01$). Concurrent validities were strong and in the theoretically expected directions. The BDI-II correlated with the ER-89 (r=-.35, $p < .01$), PSS-10 (r=.61, $p < .01$), the STAI-T (r=.64, $p < .01$), and SDS (r=.67, $p < .01$).

Table 3
Scale Means, Scale Variance, Corrected Item-Total Correlations, and Alpha Coefficients for the BDI-II

Item	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Alpha if Item Deleted
Sadness	8.34	38.40	.42	.85
Pessimism	8.42	38.69	.47	.85
Past Failure	8.24	38.27	.35	.86
Loss of Pleasure	8.28	38.06	.47	.85
Guilty Feelings	8.25	38.85	.37	.85
Punishment Feelings	8.26	36.64	.44	.85
Self-Dislike	8.32	37.46	.47	.85
Self-Criticalness	8.17	36.80	.53	.85
Suicidal Thoughts	8.53	39.91	.35	.86
Crying	8.33	36.61	.49	.85
Agitation	8.26	38.47	.38	.85
Loss of Interest	8.24	37.71	.52	.85
Indecisiveness	8.19	36.60	.51	.85
Worthlessness	8.52	38.89	.47	.85
Loss of Energy	7.92	37.89	.46	.85
Changes in Sleeping	7.78	37.76	.32	.86
Irritability	8.26	37.47	.53	.85
Changes in Appetite	8.04	37.09	.46	.85
Concentration Difficulty	7.99	36.01	.58	.85
Tiredness or Fatigue	8.01	37.31	.49	.85
Loss of Interest in Sex	8.37	39.48	.22	.86

Discussion

The current study represents psychometric qualities and comparative factorial data for the BDI-II in a Caribbean sample. The mean scale score, factor scores, individual items, and internal consistency were consistent with previous findings (Beck et al., 1996; Storch et al., 2004; Whisman et al., 2000). Test-retest reliabilities demonstrate reasonable temporal stability of the BDI-II in the Caribbean sample. In general, item-total correlations were moderate. The weak association between "loss of interest in sex" and total score is notable, particularly given other evidence of problems with the item. Indeed, 8 % of the sample omitted the item altogether. Anecdotally, a number of participants indicated in the margin that the question did not apply to them. We speculate that the item may have been problematic to the extent that students, of which unmarried women constituted the majority, perceived the item as a direct query of their sexual *behaviour* rather than attraction or interest. Low response rates to questions regarding sex have been documented in health surveys in the region, particularly Jamaica (Wilks et al., 2007), and in other cultures with conservative sexual mores (Alansari, 2006; Al-Musawi, 2001; Kojima, 2002). The present results are possibly a specific instance of a broader phenomenon in cultures with conservative attitudes toward sex. Revision of the item wording may improve the performance of the BDI-II with Caribbean students.

An important goal was discerning differential scoring patterns of individuals residing in the Caribbean when compared to those obtained in North American samples. The previously published oblique structures (Storch et al., 2004; Whisman et al., 2000) provided adequate fit for the sample data. Both the CA-S and SA-C models provided replication with some slight modification (i.e., permitting correlated errors), however, neither was superior in fit.

This study is constrained by three limitations; first, the study employed a convenient non-clinical sample. The demographics of this sample consisted of undergraduate students, and different factorial structures may emerge in various clinical settings. As Coyne (1994) aptly demonstrates, self-report measures of depressive symptoms in university students do not necessarily generalise well to other groups. Additionally, university students are prone to transient distress that may elevate scores on self-report measures but not warrant a diagnosis of depression. However, these symptoms are of clinical relevance and should be adequately assessed. Generalisations from the present sample may be limited by the large proportion of females, even though multivariate analyses revealed no differences between males and females on the BDI-II factor scores. This is consistent with previous findings that university students do not manifest gender differences in depression as consistently as does the general population (Coyne, 1994). Second, self-report measures, including the BDI-II, may be susceptible to shared method variance and response bias. Future studies that employ multi-method assessments would address this issue. Third, although various criteria suggest the presence of a two-factor structure, there is the possibility that the wording of certain items may warrant revision for use with a Caribbean population. We hope that our efforts contribute to improvements in mental health services for university students of Caribbean origin, both in the region and beyond.

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