Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Investigating the Factor Structure of the BSI-18 among African American Women

By

Juliet Kinyua
MBChB, MPH

Behavioral Sciences and Health Education

Nancy Thompson, PhD, MPH
Committee Chair

Gina Wingood, ScD, MPH
Committee Member

Michael Windle, PhD
Department Chair

Investigating the Factor Structure of the BSI-18 among African American Women

By

Juliet Kinyua

Bachelor of Medicine and Bachelor of Surgery (MBChB)
University of Nairobi
2006

Thesis Committee Chair: Nancy Thompson, PhD, MPH

An abstract of
A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Behavioral Sciences and Health Education
2013

Abstract

Investigating the Factor Structure of the BSI-18 among African American Women
By Juliet Kinyua

The factor structure of the BSI-18 has been examined in a number of minority populations. It has been validated as a measure of general psychological distress, but found unable to identify the specific clinical syndromes it was designed to assess: Depression, Somatization and Anxiety. However, it has not been validated in African Americans. This study therefore aimed to investigate its factor structure in African American women.

Data from 208 African American female employees of a hospital in the southeastern United States were subjected to factor analysis. Exploratory Factor Analysis (EFA) was carried out in order to extract the number of factors, and Confirmatory Factor Analysis (CFA) done to validate the factor structure. CFA was also performed to determine whether the data fit the model proposed and tested by Derogatis, the developer of the BSI-I8. Derogatis' model comprises of four factors: the first factor is Depression; the second is Somatization; the third factor is Anxiety and the fourth factor is Panic.

The EFA of the data supported the four factor structure model proposed by Derogatis. However, the third factor was Panic and the fourth factor Anxiety. When the EFA was repeated to yield three factors, in keeping with the design of the BSI-18, the first factor was Depression, the second Somatization and the third Panic. The BSI-18 was also assessed as a measure of overall psychological distress. The CFA failed to confirm the factor structure of the BS1-18 in this sample. It was also found to be invalid as a measure of overall psychological distress. The results also revealed an overlap between the symptoms of Depression and those of Anxiety in the women. Furthermore, they showed that somatization symptoms may not be an indicator of psychological distress in African American women.

The findings are consistent with previous research that shows that African Americans express symptoms of mental health disorders differently from white Americans. Further research into the validity of the BSI-18 in African Americans therefore needs to take place. In addition, research into the manifestations of psychological distress in African Americans is necessary for the development of more suitable measures.

Investigating the Factor Structure of the BSI-18 among African American Women

By

Juliet Kinyua

Bachelor of Medicine and Bachelor of Surgery (MBChB)
University of Nairobi
2006

Thesis Committee Chair: Nancy Thompson, PhD, MPH

A thesis submitted to the Faculty of the
Rollins School of Public Health of Emory University
in partial fulfillment of the requirements for the degree of
Master of Public Health
in Behavioral Sciences and Health Education
2013

TABLE OF CONTENTS

I: INTRODUCTION

Mental health has been defined by the World Health Organization (WHO, 2012) as ‘a broad array of activities directly or indirectly related to the mental well-being component included in its (the WHO’s) definition of health. It entails the promotion of well-being, prevention of mental disorders, and the treatment and rehabilitation of people affected by mental health disorders (“Mental Health”, WHO, 2012). The WHO defines health as a state of complete physical, mental, and social well-being, and not merely the absence of disease.

Mental health problems contribute greatly to the burden of disease worldwide, and their prevalence is increasing (“Mental Health as a Public Health Issue”, European Journal of Public Health, 2012). In the US, mental health problems are also quite prevalent. Over a quarter of adults (26.2%) are diagnosed with one or more mental health disorders annually. Of these, 22.3% (about 6% of the US population) are classified as having severe mental illness (Kessler, Chiu, Demler & Walters, 2005).

Despite the prevalence of mental health disorders in the US, only 36% of individuals affected are receiving treatment (Wang et al., 2005). Furthermore, only about a third of the individuals receiving treatment are receiving minimally adequate treatment. This situation is thought to be partly because individuals are not being diagnosed with mental health disorders (“Screening Tools”, Substance Abuse and Mental Health Services Administration (SAMHSA), n.d.).

A solution to this is regular screening of individuals in primary care and other settings, in order to enable earlier identification and management of mental health

problems ("Screening Tools", SAMHSA, n.d.). The ability to facilitate quick and accurate mental health assessments is, therefore, an important public health issue (Cano et al., 2001). Measures such as the Brief Symptom Inventory-18 (BSI-18), which can be completed in approximately four minutes, have been developed to meet this need.

The BSI-18 is designed to measure somatization, depression, anxiety and overall psychological distress (Derogatis, 2000). It has been validated among various populations, but not among African Americans. This thesis, therefore aims to determine the validity of the BSI-18 in a sample of African American women, through an analysis of its factor structure. The specific research question is: 'Is the factor structure of the BSI-18 valid in a sample of African American women?'

II: BACKGROUND AND REVIEW OF THE LITERATURE

A. The Brief Symptom Inventory

The Symptom Checklist-90-Revised (SCL-90-R) is a self-report measure designed to assess the current level of nine symptom dimensions of psychological distress (Derogatis, 1994). It is also designed to measure to overall psychological distress (Global Severity Index), intensity of symptoms (Positive Symptom Distress Index), and report number of self-reported symptoms (Positive Symptom Total). The nine symptom dimensions it assesses are somatization, obsession compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. After its initial development, the SCL-90-R was shortened to create the Brief Symptom

Inventory, a 53-item measure of the same nine dimensions and indices (BSI; Derogatis, 1993). More recently, an even briefer measure, the 18-item Brief Symptom Inventory-18 (BSI-18), was created for use as a screening tool for depression, anxiety, and somatization (Derogatis, 2000). It also measures the overall level of psychological distress (Global Severity Index).

The SCL-90-R and the BSI have been found to be internally consistent, and to have good concurrent validity of the 9 dimensions with other measures of distress. However, several authors have criticized the poor factor structure of the nine dimensions, with several studies in clinical populations finding only one factor of general discomfort (Benishek, Hayes, Bieschke, & Stoffelmayr, 1998; Bonynge, 1993; Boulet & Boss, 1991; Piersma, Boes, & Reaume, 1994). Factor analysis of the nine dimensions in a sample of college and university students who were undergoing counseling yielded six factors, while factor analysis in a sample of Greek-speaking adults only yielded a single factor that appeared to favor a mild form of depression (Hayes, 1997; Loutsiou-Ladd, Panayiotou & Kokkinos, 2008). Studies done in Jordan, Scotland and Germany found the BSI to be unidimensional, and valid only as a measure of general psychological distress. It was unable to identify specific clinical syndromes (Daoud & Abojedi, 2010; Endermann, 2005; Schwannauer & Chetwynd, 2007).

Prelow, Weaver, Spencer, and Bowman (2005) made similar claims regarding the BSI-18, based upon a study of Latinas in the general population. Using exploratory factor analysis with 1,115 low-income, Latina mothers, these researchers found and confirmed a one-factor solution for the BSI-18. Asner-Self, Schreiber, and Marotta

(2006), studying 100 Central American adult volunteers, also found results suggesting one underlying factor. Among a sample of Spanish breast cancer survivors, however, Galdon and colleagues (2008) found three factors representing depression, somatization, and anxiety. The three factor structure was also confirmed in a Spanish population of patients with temporomandibular disorder, and a sample of rural illicit drug users from Ohio, Arkansas, and Kentucky (Dura et al., 2006; Wang et al., 2010). These results were in contrast to the 4-factor solution comprised of depression (first), somatization (second), anxiety and panic (which separated into 2 factors) found in a general population by Derogatis (2000) and confirmed by Recklitis and colleagues (2006) in a study of almost 9,000 adult survivors of childhood cancer. Among 1,543 cancer patients, Zabora et al. (2001) found a similar 4-factor solution confirming the anxiety (first), depression (second) and somatization factors; however the fourth factor was comprised of suicide alone. The BSI-18 was also found to be valid in a population of homebound older adults. However, the somatization sub-scale was found to have lower internal consistency, and was not able to predict those with a DSM-IV diagnosis of somatization (Petkus et al., 2010). In a sample of patients with traumatic brain injury, the BSI was validated as a measure of overall psychological distress but the three sub-scales had limited validity due to their modest reliability (Meachen, Hanks, Scott & Rapport, 2007).

B. Psychological Distress and African Americans

Much of what we know about the rates of psychological distress in the United States comes from the Epidemiologic Catchment Area (ECA) study (Regier et al., 1984). The purpose of the ECA study was to collect data on the prevalence and incidence of mental disorders, the use of mental health services, and the need for services among the

mentally ill. According to the ECA data, rates of psychological distress appear to differ for African Americans when compared to other racial and ethnic groups. These findings have subsequently been corroborated by recent studies. Data from the Collaborative Psychiatric Epidemiology Studies showed that white Americans were more likely to be diagnosed with Social Anxiety Disorder, Generalized Anxiety Disorder and Panic Disorder than African Americans, Hispanic Americans and Asian Americans. In addition, African Americans more frequently met the criteria for Post-Traumatic Stress Disorder than the other three racial groups (Asnaani, Richey, Dimaite, Hinton & Hofmann, 2010). The differential rates of mental health disorders are true for other conditions, as well. For example, studies have shown that African Americans are more likely to be diagnosed with Schizophrenia, and less likely to be diagnosed with affective disorders such as Bipolar Disorder, compared to white Americans (Neighbors, Trierweiler, Ford & Muroff, 2003).

There are a number of possible reasons for this. First, studies have shown that there may be differences in the manifestation of psychiatric disorders among different racial and ethnic groups. For example, Robins and Regier (1991) reported that somatic symptoms are more common among African Americans (15%) than among white Americans (9%), and somatization is most prevalent among African-American women followed by African American men. These findings were confirmed in more recent studies that showed African Americans with the same severity of depression to be more significantly impaired by somatic symptoms than white patients. Specifically, these symptoms were insomnia, psychomotor retardation, loss of appetite, weight loss, and loss of libido (Brown, Schulberg & Madonia, 1996). African Americans with a diagnosis of

depression were also found to have less pessimism, dissatisfaction, self-blame, and suicidal ideation compared to white Americans with the same diagnosis. Self-dislike was found to be a stronger manifestation of depression in white Americans (Ayalon & Young, 2003).

Another possible reason for the differential rates of disease could be the under-diagnosis of psychiatric disorders in African Americans. According to the Epidemiologic Catchment Area (ECA) study, no difference was found in the rates of panic disorder among white, African American, or Hispanic populations in the United States. However, Paradis et al. (1994) noted methodological problems present among ECA data, suggesting that anxiety disorders are largely under-diagnosed in African Americans. Neal and Turner (1991) reported that anxiety disorders may have different manifestations among African Americans, possibly related to differences in their patterns of help-seeking behavior. These differences in patterns of help seeking behavior could explain why at the time of diagnosis with anxiety disorders, African Americans experience higher levels of overall mental illness severity and functional impairment when compared to white Americans (Himle, Baser, Taylor, Campbell & Jackson, 2009). Also, even upon diagnosis with other psychiatric disorders, their episodes are more severe and persist for longer periods of time (Earl, Williams & Anglade, 2011). This could point to the fact that there are delays in seeking treatment related to their help-seeking behavior.

Health care providers may also contribute to the varying rates of psychiatric disorders among different racial and ethnic groups. This is especially for conditions like Schizophrenia and Mood disorders like Depression; African Americans have higher rates

of Schizophrenia and lower rates of Depression. It is thought that, perhaps, clinicians are more likely to assign more impairing symptoms to reports from black patients (Earl, Williams & Anglade, 2011). Results from the Medical Outcomes Study also showed that patient race, ethnicity, and gender influenced recognition of mental health problems. Clinicians were less likely to diagnose mental health problems in African Americans, Hispanic Americans and male patients (Borowsky et al., 2000).

There are also factors than patient and provider factors that could be responsible for the differential rates of mental health problems among different racial and ethnic groups. These are issues inherent in the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR, 2000, is the latest revision) that provides the criteria for diagnosis of mental health disorders, and is the gold standard for diagnosis. It is believed that the criteria do not take into account sociocultural and language differences in relation to the conceptualization and presentation of various symptoms (Alegria et al., 2004; Earl, Williams & Anglade, 2011). As an example, the DSM-IV-TR anxiety criteria have some cultural limitations that may prevent their utility in the diagnosis of anxiety in some populations. Possible mismatches between the DSM-IV-TR criteria and the local phenomenology of the disorder were found for three anxiety disorders: Panic Disorder, Social Anxiety Disorder, and Generalized Anxiety Disorder (Lewis-Fernandez et al., 2010). This is also true for other psychiatric disorders. For example, even when a semi-structured instrument and DSM criteria were used (gold standard), white Americans were more likely than African Americans to receive a diagnosis of Bipolar Disorder (Neighbors, Trierweiler, Ford & Muroff, 2003). The issues inherent in the DSM-IV-TR

are of particular concern, since assessment measures like the BSI-I8 are usually based on DSM-IV-TR criteria, and use them as a gold standard when it comes to validation.

In light of these data, it is apparent that mental health outcomes, particularly somatization, anxiety, and depression, differ for African Americans compared with other cultural groups in the United States. Despite the variety of findings across other cultures and populations, however, no research to date has investigated the factor structure of the BSI-18 among African Americans. This study was designed to fill that gap. Specifically, the aim of this study is to determine the validity of the BSI-18 in a sample of African American women through an analysis of its factor structure.

C. Theoretical Basis: Factor Analytic Theory

Factor analysis enables researchers to account for and understand correlations among a number of measured variables. The fundamental premise of factor analysis is that there exist latent variables that influence the measured variables. A latent variable, or a factor in factor analysis, is a hypothetical construct that is not directly measured. According to factor analytic theory, latent variables influence measured variables; therefore an individual's response or measurement on the measured variable is indicative of the latent variable. In research, when correlations are observed among measured variables, factor analysis helps in determining the number and nature of the latent variables (factors), and their pattern of influence on the measured variables (MacCallum, 2009, p.123).

Factor analytic theory stipulates that in order to achieve this, a formal model has to be specified. Subsequently, procedures are carried out for fitting the model to the

observed data (measured variables). The formal model is known as the common factor model. It is based on the principle that there are two kinds of factors influencing measured variables: the common factor which influences more than one measured variable in the observed set, and the unique factor which influences only one measured variable. These unique factors also arise from two sources: specific factors which are systematic factors influencing only the given measured variable, and a random error of measurement. (MacCallum, 2009, p.124-126).

Exploratory Factor Analysis (EFA) and Confirmatory Factor Analyses (CFA) are methods of factor analysis that utilize the common factor model. EFA is a general approach used to determine the number and nature of the common factors that account for observed correlations among a set of measured variables. CFA, on the other hand, enables one to test a prior hypothesis about the factors (MacCallum, 2009, p. 135-136).

This study utilizes both types of factor analysis. EFA will be used to determine the number and nature of factors that arise from the data collected during an intervention to increase physical activity among employed, African American women, while the CFA will be used to determine whether the BSI-18 model fits the data collected from this sample of African American women. These statistical techniques will help answer the following research question: 'Is the factor structure of the BSI-18 valid in a sample of African American women?'

III. METHOD

A. Subjects

Subjects were 208 women who were recruited to participate in an intervention designed to increase physical activity among employed, African American women, and who completed the BSI-18. All of the women were employed in a large, inner-city hospital in the Southeastern United States and self-identified as African American. Participants ranged in age from 20 to 55 years, with a mean age of 37.73 years. The sample distribution by place of birth, marital status, and education is presented in Table 1 below.

Table 1. Sample Description

Variable	Category	Percent (n=208)
Place of Birth	US	88.8%
	Other	11.2%
Marital Status	Single and not living with a partner	36.5%
	Not married, living with a partner	7.2%
	Married	34.1%
	Separated	5.8%
	Divorced	13.9%
	Widowed	2.4%
Highest Degree	High school diploma or GED	19.2%
	Associate's Degree/Certificate	22.6%
	Bachelor's Degree (BA or BS)	32.7%
	Master's Degree	14.9%
	Doctoral Degree	5.8%
	Other	4.8%

B. Sampling and Recruitment

Participants were selected through stratified random sampling. Departments of the hospital were stratified into three tertiles based on median income, and further stratified into three based on median age. Random sampling was subsequently carried out within the nine strata. Participants had to have an increased risk for heart disease by virtue of being physically inactive. However, those for whom an adverse event was most likely were excluded. A sample of 208 participants was obtained. This sample size was adequate (more than 200) for the statistical techniques performed and allowed for missing data (Suhr, 2012).

C. Measures

As mentioned above, the BSI-18 is a shortened, 18-item version of the Brief Symptom Inventory. The BSI-18 is designed to screen for depression, somatization, and anxiety. The instrument consists of a list of problems, and measures how much people were bothered by each problem during the past 7 days on the following scale: 1=not at all, 2=a little bit, 3=moderately, 4=quite a bit, and 5=extremely. The BSI-18 items were presented with the standard instructions asking participants to report the extent to which they had been "distressed or bothered" in the previous 7 days by each symptom. Participants responded by endorsing one of five Likert responses from 1 to 5. A sample depression item is, "How much were you distressed or bothered by feeling lonely?" A sample anxiety item is, "How much were you distressed or bothered by feeling tense or keyed up?" A sample somatization item is, "How much were you distressed or bothered by faintness or dizziness?"

At intake into the physical activity intervention, women were given the BSI-18 to complete among a series of 11 instruments. The BSI-18 was seventh in order.

D. Human Subjects Protection

Random sampling was carried out to ensure the principle of justice was upheld by spreading the risk of participation. Individuals interested in taking part in the study scheduled an appointment with the study recruiter. At this session, the written informed consent form was read and signed by the participant. Data obtained during the intervention were de-identified by the original study team before being sent for analysis.

E. Analysis

Data were analyzed using SAS 9.3. The PROC FACTOR procedure was used for Exploratory Factor Analysis, and the PROC CALIS procedure was used for Confirmatory Factor Analysis. Internal consistency of the BSI-18 and its three subscales was evaluated using Cronbach's coefficient alpha (Reynaldo &Santos, 1999). Exploratory Factor Analysis (EFA) was conducted using both orthogonal varimax rotation and oblique promax rotation. Oblique rotation reduces small and moderate loadings towards zero resulting in more extreme loadings that increase interpretability of factors (Recklitis, Parsons, Shih, Robison & Zelter, 2006). Factors for retention were determined by examining the scree plot, eigenvalues, and proportion of variance accounted for by the factor (Suhr, 2012). Factors that had eigenvalues greater than one (Kaiser's criterion), and whose proportion of variance accounted for at least 5% were retained. The EFA was

also repeated to produce a three factor model and a one factor model in keeping with the design of the BSI-18.

Loadings exceeding 0.40 were considered significant and reported. The original models, the three factor model and one factor model structures derived in the EFA were then tested for model fit using Confirmatory Factor Analysis (CFA). Item loadings greater than 0.40 were retained for the CFA. Repeat CFA was also carried out to determine whether the model proposed by Derogatis (2000) would fit the data.

Model fit was assessed using the following fit indices: chi square, Root Mean Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), Non-normed Index (NNI) and Normed Formative Index (NFI). Chi square tests the null hypothesis of perfect model fit, with p values greater than 0.05 indicating acceptable model fit (Suhr, n.d.). RMSEA examines the probability of close model fit, and is an indicator of the amount of unexplained variance or residual. RMSEA values less than or equal to 0.06 are an indicators of acceptable model fit (Suhr, n.d.). CFI and NNFI values indicate the amount of covariance explained by the model. Values ranging from 0.90 indicate acceptable model fit (Suhr, n.d.).

IV. RESULTS

The BSI-18 was found to have good reliability in this sample with a Cronbach's alpha of 0.86. The lowest item-total correlation was for 'thoughts of ending life' (r=0.17), and the highest was for 'hopeless about the future' (r=0.66). The Depression subscale had a Cronbach's alpha of 0.84 (good reliability), the Somatization subscale had a Cronbach's

alpha of 0.67 (questionable reliability) and the Anxiety subscale had a Cronbach's alpha of 0.79 (acceptable reliability). The criteria for reliability used were those provided by George and Mallery (as cited in J. Gliem & R.Gliem, 2003). Exploratory Factor Analysis yielded a four-factor solution using both types of rotation (orthogonal and oblique). All the four factors had eigenvalues greater than 1. Each factor accounted for at least 5% of variance. These results were similar to the four-factor solution found by Derogatis (2000). Factor I corresponded with the Depression scale, Factor II the Somatization scale, Factor III represented Panic, and Factor IV Anxiety. A comparison of the EFA findings with those of Derogatis is shown in Table 2.

When the orthogonal rotation was applied, the original depression items 'loneliness' and 'feeling blue' loaded on both the depression and anxiety factors, with higher loadings on the anxiety factor. The item 'having no interest in things' loaded on the anxiety factor, and the rest of the original depression items, 'feelings of worthlessness', 'hopelessness about the future', and 'thoughts of ending life', loaded on the depression factor.

The original somatization items 'faintness/dizziness', 'trouble getting breath', 'numbness/tingling' and 'feeling weak in parts of body', loaded on the Somatization factor. The other somatization items, 'nausea/upset stomach' and 'pains in heart/chest', did not load on any of the factors. The original anxiety item 'feeling fearful', loaded on both the Panic factor and the Depression factor, with a higher loading on the panic factor. The anxiety items 'feeling scared for no reason' and 'terror or panic' also loaded on the Panic factor. Finally, two original anxiety items 'nervousness/shakiness' and 'feeling tense/keyed up', loaded on the anxiety factor together with the two depression items

Table 2. 4-factor solutions: Derogatis (2000) and the present Oblique and Orthogonal Rotations

	Derogatis (2000)				**Oblique Rotation**				**Orthogonal Rotation**			
	I	II	III	IV	I	II	III	IV	I	II	III	IV
How much were you bothered by:	D[1]	S[2]	A[3]	P[4]	D[1]	S[2]	P[4]	A[3]	D[1]	S[2]	P[4]	A[3]
Faintness/dizziness		.64								.43		
No interest in things	.76											.41
Nervousness/shakiness			.60	.42				.41				.41
Pains in heart/chest		.73										
Lonely	.71			.42				.54	.49			.56
Feeling Tense/keyed up	.41		.67					.62				.59
Nausea/upset stomach		.67										
Feeling Blue	.81							.70	.56			.69
Feeling scared for no reason				.85			.74				.71	
Trouble getting breath		.73				.42				.46		
Worthlessness	.77				.74				.74			
Terror or panic		.43		.78			.74				.70	
Numbness/tingling		.65				.50				.51		
Hopelessness about future	.74				.68				.71			
Restless/Couldn't sit still			.63			.59				.61		
Feeling weak in parts of body	.49	.67				.75				.72		
Thoughts of ending life	.53			.43	.63				.55			
Feeling Fearful			.53	.80			.61		.45		.60	

[1]Anxiety [2]Somatization [3]Anxiety [4]Panic

mentioned above. However, the item ‘restlessness/couldn’t sit still’ loaded on the somatization factor.

When the oblique promax rotation was applied, the original depression items, ‘feelings of worthlessness’, ‘hopelessness about the future’, and ‘thoughts of ending life’, loaded on the Depression factor. The original somatization items, ‘numbness/tingling’, ‘trouble getting breath’ and ‘feeling weak in parts of body’, and the anxiety item ‘restlessness/couldn’t sit still’ loaded on the Somatization factor. The other three original somatization items, ‘faintness/dizziness’, ‘nausea/upset stomach’ and ‘pains in heart/chest’ did not load on any of the factors. The anxiety items, ‘feeling fearful’, ‘feeling scared for no reason’ and ‘terror or panic’ loaded on the Panic factor. The original anxiety items ‘feeling tense/keyed up’ and ‘nervousness/shakiness’, and two original depression items, ‘loneliness’ and ‘feeling blue’, loaded on the Anxiety factor. The item ‘having no interest in things’ did not load on any of the factors.

The EFA was repeated to yield a three-factor solution, in keeping with the design of the BSI-18. When the factor loadings were examined, Factor I corresponded to Depression, Factor II to Somatization, and Factor III to Panic. The findings are shown in Table 3.

When the orthogonal varimax rotation was applied to the three-factor solution, all the original depression items loaded on the depression factor. In addition, the original anxiety items, ‘feeling tense/keyed up’ and ‘feeling fearful’, also loaded on the depression factor. The item ‘feeling fearful’ also loaded on the factor Panic, with a higher loading on this factor. Four original somatization items, ‘numbness/tingling’, ‘feeling

Table 3. Findings from the 3-Factor Solution (Oblique and Orthogonal Rotations)

How much were you bothered by:	**Oblique Rotation**			**Orthogonal Rotation**		
	I	II	III	I	II	III
	Dep	Som	Panic	Dep	Som	Panic
Faintness/dizziness					.44	
No interest in things	.50			.55		
Nervousness/shakiness						
Pains in heart/chest						
Lonely	.69			.69		
Feeling Tense/keyed up				.40		
Nausea/upset stomach						
Feeling Blue	.80			.79		
Feeling scared for no reason			.77			.73
Trouble getting breath		.45			.48	
Worthlessness	.75			.73		
Terror or panic			.77			.72
Numbness/tingling		.52			.53	
Hopelessness about future	.72			.74		
Restless/Couldn't sit still		.60			.62	
Feeling weak in parts of body		.74			.72	
Thoughts of ending life	.55			.46		
Feeling Fearful			.48	.43		.52

weak in parts of body', 'faintness/dizziness' and 'trouble getting breath', loaded on the Somatization factor. The anxiety item, 'restlessness/couldn't sit still', also loaded on the Somatization factor. Two original anxiety items, 'feeling scared for no reason' and 'terror or panic', loaded on the Panic factor. The items 'nausea/upset stomach', 'pains in heart/chest' and ''nervousness/shakiness', did not load on any of the four factors.

When the oblique promax rotation was applied to the three-factor solution, all the original depression items loaded on the Depression factor. Three original somatization items, 'numbness/tingling', 'feeling weak in parts of body' and ''trouble getting breath' loaded on the Somatization factor. The original anxiety item ''restlessness/couldn't sit still' also loaded on the Somatization factor. Three original anxiety items, 'feeling scared for no reason', 'feeling fearful', and 'terror or panic', loaded on the Panic factor. The items 'nausea/upset stomach', 'pains in heart/chest' and ''nervousness/shakiness', did not load on any of the four factors.

When the EFA was repeated to yield a one factor solution, that is assessing overall psychological distress, six items did not load on the single factor. These items included five items from the Somatization subscale and one item from the Depression subscale. The items from the Somatization subscale were 'feeling weak in parts of the body', 'numbness/tingling', 'trouble getting breath', 'pains in heart/chest' and 'nausea/upset stomach'. The item from the Depression subscale was 'thoughts of ending life'. Rotation was not possible as the operation involved only a single factor. These findings are shown in Table 4.

The CFA did not confirm the factor structure of any of the models. All the models tested did not satisfy the requirements for acceptable model fit. These include the 4-factor

Table 4. Findings from the 1-Factor Solution

How much were you bothered by:	**Overall Psychological Distress**
Faintness/dizziness	.41
No interest in things	.62
Nervousness/shakiness	.49
Pains in heart/chest	
Lonely	.68
Feeling Tense/keyed up	.59
Nausea/upset stomach	
Feeling Blue	.70
Feeling scared for no reason	.63
Trouble getting breath	
Worthlessness	.69
Terror or panic	.53
Numbness/tingling	
Hopelessness about future	.77
Restless/Couldn't sit still	.49
Feeling weak in parts of body	
Thoughts of ending life	
Feeling Fearful	.69

solutions, the 3-factor solutions and the single factor solutions. This was irrespective of the type of rotation applied to the data. In addition, the CFA did not confirm the factor structure of the models proposed by Derogatis (2000). Results of the CFA are shown in Table 5.

V. DISCUSSION

A. Findings of the Factor Analysis

The BSI-18 was internally consistent in this population of African American women. The four factor solution obtained after factor analysis was also similar to that found by Derogatis (2000) and Recklitis et al. (2006). Similar to the findings in those studies, the current study yielded a Depression factor, a Somatization Factor and two Anxiety factors, one of which represented Panic. This was true regardless of the rotation applied, orthogonal or oblique. However, unlike the solution found by Derogatis (2000) where the Anxiety factor was third and the Panic factor fourth, in this current study, Panic was the third factor and Anxiety the fourth factor. When EFA was repeated to produce a three-factor solution, the third factor was Panic.

Apart from the different distribution of the factors, there were other significant differences between the findings of the different studies. First, the original anxiety item 'feeling restless/couldn't sit still', loaded consistently on the Somatization factor in all the models examined. Second, when the four factor model was utilized, two original depression items, 'loneliness' and 'feeling blue' loaded on the Anxiety factor. Third,

Table 5: Fit Statistics from Confirmatory Analysis

Model	Chi Square	df	p-value	RMSEA[1] (90%CI)	CFI[2]	NNI[3]	NFI[4]
4-factor (Orthogonal; Factor Extraction)	176.74	59	<0.0001	0.0989 (0.0823-0.1158)	0.8505	0.8023	0.7958
4-factor (Orthogonal; Derogatis)	383.4337	129	<0.0001	0.0986 (0.0873-0.1100)	0.8076	0.7718	0.7401
4-factor (Oblique; Factor Extraction)	162.2962	48	<0.0001	0.1075 (0.0896-0.1259)	0.8814	0.8370	0.8424
4-factor (Oblique; Derogatis)	383.4337	129	<0.0001	0.0986 (0.0873-0.1100)	0.8076	0.7718	0.7401
3-factor (Orthogonal; Factor Extraction)	254.1165	74	<0.0001	0.1095 (0.0949-0.1244)	0.8259	0.7860	0.7743
3-factor (Orthogonal; Derogatis)	417.1877	132	<0.0001	0.1032 (0.0921-0.1144)	0.7844	0.7500	0.7173
3-factor (Oblique; Factor Extraction)	254.1165	74	<0.0001	0.1095 (0.0949-0.1244)	0.8259	0.7860	0.7743
3-factor (Oblique; Derogatis)	417.1877	132	<0.0001	0.1032 (0.0921-0.1144)	0.7844	0.7500	0.7173
1-factor (Factor Extraction)	313.6055	54	<0.0001	0.1535 (0.1373-0.1702)	0.7477	0.6917	0.7136
1-factor (Derogatis)	622.4389	135	<0.0001	0.1334 (0.1229-0.1441)	0.6314	0.5823	0.5781

[1]Root Mean Square Error of Approximation (RMSEA)
[2]Comparative Fit Index (CFI)
[3]Non-normed Index (NNI)
[4]Normed Fit Index (NFI)

two original anxiety items, ‘feeling fearful’ and ‘feeling tense or keyed up’, loaded on the Depression factor in two of the models (four-factor orthogonal rotation and three-factor orthogonal rotation). Fourth, when the three factor solution was applied, the third factor was Panic. Additionally, when the EFA was repeated to yield a single factor solution, six items failed to load on the single factor. Finally, the factor structure of the BSI-18 was not confirmed in this population of African American women.

The original anxiety item, ‘feeling restless/couldn’t sit still’ consistently loaded with somatization in all the models. This is in keeping with the study on the expression of anxiety in African Americans conducted by Heurtin-Roberts and colleagues (1997), where this item was not mentioned as an expression of anxiety. This points to the different manifestations of anxiety disorders among African Americans, as has been found by researchers such as Neal and Turner (1991).

With regard to the Depression subscale, two items, ‘loneliness’ and ‘feeling blue’, loaded on the anxiety subscale when the four factor model was utilized. This may mean that these two symptoms are indicators of anxiety in African Americans. This is supported by ethnographic studies which showed that sadness and depression were manifestations of anxiety in African Americans (Heurtin-Roberts, Snowden & Miller, 1997). Ayalon and Young (2003) also found that African Americans with a diagnosis of depression were found to have less pessimism, dissatisfaction, self-blame and suicidal ideation compared to white Americans. Perhaps these characteristics, as well as loneliness and feeling blue, are more associated with anxiety among African Americans

than with depression. This could contribute to the misdiagnosis of African Americans because existing measures may not capture their different manifestation of anxiety.

The Anxiety Subscale raised similar concerns. Two original anxiety items, 'feeling fearful' and 'feeling tense or keyed up' loaded on the Depression factor when the orthogonal varimax rotation was applied. This could mean that African Americans with Depression are being diagnosed as having Anxiety, which may partially explain their lower rates of diagnosis with affective disorders (Neighbors, Trierweiler, Ford & Muroff, 2003).

When the EFA was repeated to produce a three-factor solution, the third factor was Panic. The other anxiety items either loaded on the Depression factor, or did not load on any of the three factors. The Anxiety factor was also fourth when the four-factor solution was applied, occupying the lowest hierarchical position. The apparent overlap between the symptoms of Depression and Anxiety was also noted by Carr and Vitaliano when they examined research pertaining to patients who either had a diagnosis of Anxiety or Depression (as cited in Heurtin-Roberts, Snowden & Miller, 1997). This may, in part, be due to the fact that there are shared symptoms between Chronic Anxiety and Depression in the DSM-IV-TR (Mynatt & Cunningham, 2007). It is also thought that this shows that psychiatric disorders do not fall into discrete categories (Heurtin-Roberts, Snowden & Miller, 1997).

Issues inherent in the DSM-IV-TR, such as its failure to capture sociocultural and language differences in relation to the presentation of various symptoms (Alegria et al., 2004; Earl, Williams & Anglade, 2011), may also account for the differences between the findings of this study and those of Derogatis (2000). As noted, there appear to be

different manifestations of anxiety and depression, in particular, for African Americans, as described above. Failure of the DSM-IV-TR to capture these differences is of concern because the DSM-IV-TR is the gold standard for diagnosis of mental health disorders, and also forms the basis for the development of measures of psychological distress.

When the EFA was repeated to yield a single factor solution, six items did not load on the factor. Of these, five items belonged to the Somatization subscale and one item, "thoughts of ending life", belonged to the Depression subscale. There are two possible explanations for this. First, is that the Somatization subscale may not be valid in African American women. This is supported by the questionable reliability of the subscale in this sample (Cronbach's alpha 0.67). Second, is that somatization may not be an indicator of psychological distress in African Americans, thus the failure of the items to load on the single factor of overall psychological distress.

The CFA was most likely unable to confirm the factor structure of the BSI-18 in this population because of the issues described above. In addition, the CFA may have failed to confirm the EFA findings specifically because of the Somatization subscale; that is, due to its possible lack of validity in this sample, and the fact that Somatization may not be an indicator of psychological distress in African American women as mentioned above.

B. Conclusions

The results of the EFA and CFA indicate that the BSI-18 may not be valid for use among African American women. The Depression subscale aligned with the original results of Derogatis (2000), only in the three-factor model where the oblique promax

rotation was utilized. All the other subscales and models showed differences with the model proposed by Derogatis, as well.

C. Strengths and Limitations

The study has a number of strengths. To begin, random sampling was used in the selection of participants for the study. This is important because it is a prerequisite for the utilization of Exploratory Factor Analysis. It also serves to improve the generalizability of the study. The sample size was also adequate for factor analysis (n=208), and allowed for missing data (Suhr, 2012).

In addition, robust statistical techniques were used in the analysis of the data. EFA and CFA are powerful statistical techniques that enable one to determine the underlying constructs for a set of measured variables (Suhr, 2012). Furthermore, the cut-offs applied during the process of factor extraction ensured a rigorous level of analysis.

Similarly, in order to rigorously test the factor structure of the BSI-18, different operations were applied to the data. This included use of both orthogonal and oblique rotations, and examination of both three-factor and four-factor models. The model proposed by Derogatis (2000) was also utilized in an attempt to assess the validity of the BSI-18 in this population.

The good reliability of the BSI-18 in the study population was also an asset in the utilization of the factor analysis procedures (Suhr, 2012). Finally, the fact that the measure was self-administered prevented the risk of social desirability bias.

The study also had some limitations. The fact that study participants were employees of a hospital in the southeastern United States and physically inactive, limits

the generalizability of the study findings to African American women in different work environments, who are unemployed, who are physically active, and in other regions of the country. In addition, there is the probability of selection bias, as the women who agreed to participate in the study may have been different from those who declined.

Finally, presence of a replication sample from the same population would have enabled testing of the results of the analysis in a different sample. This would have served to further increase the rigor of the analysis (Recklitis et al., 2006).

D. Implications

The findings of this study are important for a number of reasons. First, it is possible that due to the inability of measures such as the BSI-I8 to screen for mental health disorders, African American individuals may be going undiagnosed (Paradis et al., 1994). Not only might this account for the different rates of psychological distress compared to other racial and ethnic groups, but it also means that individuals may not be receiving the treatment they require.

Secondly, the loading of the original depression items on the Anxiety factor, and conversely the loading of the anxiety items on the Depression factor, indicates that there is a potential for misdiagnosis of Depression and Anxiety among African Americans. This is problematic because it prevents these individuals from receiving the proper treatment and management. Failure to receive the right treatment can lead to an unnecessary length of morbidity and debilitation for the individual. It is also a barrier to addressing mental health, which is a significant public health problem (“Mental Health as a Public Health Issue”, European Journal of Public Health, 2012).

Finally, failure to properly identify mental health disorders and provide the right treatment can lead to a reduction in the gains made in tackling the stigma associated with mental health. It is, therefore, important that accurate diagnosis is made and appropriate treatment initiated, so that individuals and communities realize that mental health disorders can be managed, and that those affected can live whole and productive lives. A reduction in stigma can also lead to more individuals seeking mental health services, and therefore receiving the help they need to live healthier lives.

E. Recommendations

Given the implications of having unsuitable measures to assess psychological distress in African Americans, it is important that further research is carried out in an attempt to solve this problem. Similar studies can be carried out at the population level and within different regions of the United States. This will serve to increase the knowledge about the suitability of the BSI-18 for measuring psychological distress in African Americans, and also ensure generalizability of findings for this population.

In addition, further research must be done on the manifestation of Anxiety, Depression, and other mental health disorders among African Americans. This will enable the development of better measures of psychological distress in this population. The research can be in the form of focus groups, whose findings can then be used to inform the development of new measures. Similarly, the overlap of symptoms of Depression and Anxiety among African Americans needs to be examined. Knowledge in this area has the potential to reduce the risk of misdiagnosis of the two conditions, and ensure that individuals obtain the right treatment.

Finally, a review of the DSM-IV-TR criteria for mental health disorders needs to be carried out. The DSM-IV-TR needs to take into account cultural and language differences in its criteria. This is especially important because it is the gold standard for diagnosis of these disorders, and is used in the development and validation of measures of psychological distress.

REFERENCES

Alegría, M., Vila, D., Woo, M., Canino, G., Takeuchi, D., Vera, M., Febo, V., Guarnaccia, P., Aguilar-Gaxiola, S. & Shrout, P. (2004).). Cultural Relevance and Equivalence in the NLAAS Instrument: Integrating Etic and Emic in the Development of Cross-Cultural Measures for a Psychiatric Epidemiology and Services Study of Latinos. *International Journal of Methods in Psychiatric Research*, 13(4), 270-288.

Asnaani, A., Richey, J.A., Dimaite, R., Hinton, D.E. &Hofmann, S.G. (2010). A cross-ethnic comparison of lifetime prevalence rates of anxiety disorders. *The Journal of Nervous and Mental Disease*,198(8), 551-5.

Asner-Self, K. K., Schreiber, J. B., & Marotta, S. A. (2006). A cross-cultural analysis of the Brief Symptom Inventory-18. *Cultural Diversity and Ethnic Minority Psychology, 12*(2), 367-375.

Ayalon, L. & Young, M.A. (2003). A Comparison Of Depressive Symptons In African Americans And Caucasian Americans. *Journal of Cross-Cultural Psychology*, 34(1), 111-124.

Benishek, L.A., Hayes, C.M., Bieschke, K.J., & Stoffelmayr, B.E. (1998). Exploratory and confirmatory analyses of the Brief Symptom Inventory among substance abusers. *Journal of Substance Abuse*, 10, 103–114.

Bonynge, E.R. (1993). Unidimensionality of SCL-90-R scales in adult and adolescent crisis samples. *Journal of Clinical Psychology*, 49, 212–215.

Boulet, J., & Boss, M.W. (1991). Reliability and validity of the Brief Symptom Inventory Psychological Assessment, 3, 433–437.

'Brief Symptom Inventory 18'. (2012). Retrieved from http://psychcorp.pearsonassessments.com/HAIWEB/Cultures/en-us/Productdetail.htm?Pid=PAg110

Borowsky, S.J., Rubenstein, L.V., Meredith, L.S., Camp, P., Jackson-Triche, M. & Wells, K. B. (2000). Who Is at Risk of Nondetection of Mental Health Problems in Primary Care? *Journal of General Internal Medicine*, 15(6), 381–388.

Brown, C., Schulberg, H.C. &Madonia, M.J. (1996). Clinical presentations of major depression by African Americans and whites in primary medical care practice. *Journal of Affective Disorders*, 41(3), 181-91.

Cano, A., Sprafkin, R.P., Scaturo, D.J., Lantinga, L.J., Fiese, B.H. & Brand, F. (2001). Mental Health Screening in Primary Care: A Comparison of 3 Brief Measures of Psychological Distress. *Primary Care Companion to the Journal of Clinical Psychiatry*, 3(5), 206–210.

Daoud, F.S. & Abojedi, A.A. (2010). Equivalent factorial structure of the Brief Symptom Inventory (BSI) in clinical and nonclinical Jordanian populations. *European Journal of Psychological Assessment*, 26(2),116-121.

Derogatis, L. R. (1993). Brief Symptom Inventory (BSI) administration, scoring, and procedures manual (3rd ed.). Minneapolis: NCS Pearson.

Derogatis, L. R. (1994). Symptom Checklist-90-R (SCL-90-R) administration, scoring, and procedures manual (3rd ed.). Minneapolis: NCS Pearson.

Derogatis, L. R. (2000). *The Brief Symptom Inventory–18 (BSI-18): Administration, Scoring and Procedures Manual.* Minneapolis, MN: National Computer Systems.

Durá, E., Andreu, Y., Galdón, M.J., Ferrando, M., Murgui, S., Poveda, R. & Jimenez, Y. (2006). Psychological assessment of patients with temporomandibular disorders: confirmatory analysis of the dimensional structure of the Brief Symptoms Inventory 18. *Journal of Psychosomatic Research*, 60(4), 365-70.

Earl, T., Williams, D., & Anglade, S. (2011). An Update on the Mental Health of Black Americans : Puzzling Dilemmas and Needed Research. *Journal of Black Psychology*, 37 (4), 485-498.

Endermann, M. (2005). The Brief Symptom Inventory (BSI) as a screening tool for psychological disorders in patients with epilepsy and mild intellectual disabilities in residential care. *Epilepsy & Behavior*. 7(1), 85-94.

European Journal of Public Health. (2013).Mental Health as a Public Health Issue. Retrieved from http://eurpub.oxfordjournals.org/content/15/2/111.full#ref-1

Galdon, M. J., Dura, E., Andreu, Y., Ferrando, M. Murgui, S., Perez, S., & Ibanez, E. (2008). Psychometric properties of the Brief Symptom Inventory-18 in a Spanish breast cancer sample.
Journal of Psychosomatic Research, 65(6), 533-539.

Gliem, J.A. & Gliem, R.R. (2003). Calculating, Interpreting, and Reporting Cronbach's Alpha Reliability Coefficient for Likert-Type Scales. *2003 Midwest Research to Practice Conference in Adult, Continuing, and Community Education*. Retrieved from https://scholarworks.iupui.edu/bitstream/handle/1805/344/Gliem+&+Gliem.pdf?sequence=1

Hayes, J.A. (1997). What Does the Brief Symptom Inventory Measure in College and University Counseling Center Clients? *Journal of Counseling Psychology*, 44(4), 360-67.

Heurtin-Roberts, S., Snowden, L, & Miller, L. (1997). Expressions of anxiety in African Americans: Ethnography and the Epidemiological Catchment Area studies. *Culture, Medicine and Psychiatry, 21*, 337-363.

Himle, J.A., Baser, R.E., Taylor, R.J., Campbell, R.D., & Jackson, J.S. (2009). Anxiety Disorders among African Americans, Blacks of Caribbean Descent, and Non-Hispanic Whites in the United States. *Journal of Anxiety Disorders*, 23(5), 578-590.

Kaiser, H. F. (1960). The application of electronic computers to factor analysis. *Educational and Psychological Measurement, 20*, 141-151.

Kessler, R.C., Chiu, W.T., Demler, O. & Walters, E. E. (2005). Prevalence, severity, and comorbidity of twelve-month DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*, 62(6), 617-627.

Lewis-Ferna´ndez, R., Hinton, D.E., Laria, A.J., Patterson, E.H., Hofmann, S.G., Craske, M.G., Stein, D.J., Asnaani, A. & Liao, B. (2010). Culture and The Anxiety Disorders: Recommendations for DSM-V. *Depression and Anxiety*, 27, 212–229.

Loutsiou-Ladd, A., Panayiotou, G. & Kokkinos, C.M. (2008). A Review of the Factorial Structure of the Brief Symptom Inventory (BSI): Greek Evidence. *International Journal of Testing*, 8(1), 90-110.

MacCallum, R.C. (2009). Factor Analysis. In Millsap, R.E. & Maydeu-Olivares, A. The Sage Handbook of Quantitative Methods in Psychology (pp.123-136). Thousand Oaks, CA: SAGE Publications Inc.

Meachen, S., Hanks, R.A., Millis, S.R. & Rapport, L.J. (2008). The Reliability and Validity of the Brief Symptom Inventory−18 in Persons With Traumatic Brain Injury. *Archives of Physical Medicine and Rehabilitation*, 89(5), 958–965.

Mynatt, S. & Cunningham, P. (2007). Unraveling Anxiety and Depression. *The Nurse Practitioner: The American Journal of Primary Health Care*, 32 (8), 28-36.Neal, A. M. & Turner, S. M. (1991). Anxiety disorders research with African Americans: Current status. *Psychological Bulletin, 109*(3), 400-410.

Neighbors, H.W., Trierweiler, S.J., Ford, B.C. & Muroff, J.R. Racial differences in DSM diagnosis using a semi-structured instrument: the importance of clinical judgment in the diagnosis of African Americans. *Journal of Health and Social Behavior*, 44(3), 237-56.

Paradis, C. M., Hatch, J., & Friedman, S. (1994). Anxiety disorders in African Americans: An update. *Journal of the National Medical Association, 86*(8), 609-612.

Petkus, A.J., Gum, A.M., Small, B., Malcarne, V.L., Stein, M.B. &Wetherell, J.L. (2010). Evaluation of the factor structure and psychometric properties of the Brief Symptom Inventory-18 with homebound older adults. *International Journal of Geriatric Psychiatry*, 25(6), 578-87.

Piersma, H.L., Boes, J.L., & Reaume, W.M. (1994). Unidimensionality of the Brief Symptom Inventory (BSI) in adult and adolescent inpatients. *Journal of Personality Assessment, 63,* 338–344.

Prelow, H. M., Weaver, S. R., Swenson, R. R., & Bowman, M. A. (2005). A preliminary investigation of the validity and reliability of the Brief-Symptom Inventory-18 in economically disadvantaged Latina American mothers. *Journal of Community Psychology, 33*(2), 139-155.

Recklitis, C. J., Parsons, S. K., Shih, M-C., Mertens, A., Robison, L. L., &; Zeltzer, L. (2006). Factor Structure of the Brief Symptom Inventory-18 in Adult Survivors of Childhood Cancer: Results From the Childhood Cancer Survivor Study. *Psychological Assessment,18*(1), 22-32.

Regier, D. A., Myers, J. K., Kramer, M., Robins, L. N., Blazer, D. G., Hough, R. L., Eaton, W. W., & Locke, B. Z. (1984). The NIMH Epidemiologic Catchment Area program. Historical context, major objectives, and study population characteristics. *Archives of General Psychiatry, 41*(10), 934-941.

Robins, L., & Regier, D. A. (1991). *Psychiatric disorders in America: The Epidemiologic Catchment Area Study*. New York: The Free Press.

Reynaldo, J. & Santos, A. (1999). Cronbach's Alpha: A Tool for Assessing the Reliability of Scales. *Journal of Extension*, 37(2). Retrieved from http://www.joe.org/joe/1999april/tt3.php

Schwannauer, M. & Chetwynd, P. (2007). The Brief Symptom Inventory: A validity study in two independent Scottish samples. *Clinical Psychology & Psychotherapy*, 14(3),221–228.

Substance Abuse and Mental Health Services Administration. (n.d.). Screening Tools. Retrieved from http://www.integration.samhsa.gov/clinical-practice/screening-tools

Suhr, D. (2012). Exploratory Factor Analysis with the World Values Survey. *Statistics and Data Analysis*, Paper 331-2012. Retrieved from http://support.sas.com/resources/papers/proceedings12/331-2012.pdf

Suhr, D.D. (n.d.). Exploratory or Confirmatory Factor Analysis? *Statistics and Data Analysis,* Paper 200-31. Retrieved from http://www2.sas.com/proceedings/sugi31/200-31.pdf

Wang, J., Kelly, B.C., Booth, B.M., Falck, R.S., Leukefeld, C. & Carlson, R.G. (2010). Examining factorial structure and measurement invariance of the Brief Symptom Inventory (BSI)-18 among drug users. *Addictive Behaviors*, 35(1), 23-9.

Wang, P.S., Lane, M., Olfson, M., Pincus, H.A., Wells, K.B. & Kessler, R.C. (2005). Twelve month use of mental health services in the United States. *Archives of General Psychiatry*, 62(6), 629-640.

World Health Organization. (2012). Mental Health. Retrieved from http://www.who.int/topics/mental_health/en/

Zabora, J., BrintzenhofeSzoc, K., Jacobsen, P., Curbow, B., Piantadosi, S., Hooker, C., et al. (2001). A new psychosocial screening instrument for use with cancer patients. *Psychosomatics, 42*, 241–246.