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Construct Validity of the Teate Depression Inventory with a Black African American Sample

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Eastern Illinois University

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Construct Validity of the Teate Depression Inventory

with a Black African American sample

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BY

Samantha Rushworth

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Running Head: CONSTRUCT VALIDITY OF THE TDI

**Construct Validity of the Teate Depression Inventory (TDI) with a Black/African
American Sample**

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Abstract

The purpose of this study was to assess the construct validity of a new measure of depression, the Teate Depression Inventory (TDI), with primary focus on the Black/African American participants. Research has demonstrated that Black/African Americans experience disparity in receiving mental health care for internalizing disorders, partially due to under-detection of symptoms. Detection of internalizing disorders is an important step in receiving appropriate treatment. This research is essential to benefit mental health practices, addressing the need for professionals to be culturally competent and aware of the appropriate assessment tools available. In order to best serve ethnic minorities, validity of measurements must be assessed. Research suggested that the TDI demonstrated strong psychometric qualities, although those properties have not been assessed for use with ethnically diverse populations in the United States.

The present study addressed the following research questions: 1) Is the TDI a valid measure of depression in Black/African Americans? 2) Does the TDI correlate with the General Behavior Inventory and State Trait Inventory for Cognitive and Somatic Anxiety as predicted, demonstrating convergent and discriminant validity? Convergent validity was predicted and identified in comparisons between the TDI and the depression scale of the GBI for both White/Caucasians and Black/African Americans. Although not specifically predicted, convergent validity was noted between the TDI and STICSA Cognitive scales for both groups. Discriminant validity was noted between the TDI and the hypomanic/biphasic scale of the GBI as well as between the TDI and STICSA Somatic scales. These findings suggested that the TDI measured depression symptoms in

Black/African Americans as well as, if not better than, it measured those symptoms in White/Caucasians. No significant difference was detected between Black/African American scores and White/Caucasian scores. The present study suggested additional strong support for the validity of the TDI with potential for assessment of Black/African American individuals. Sample size and socio-cultural factors may have impacted the significance of the findings.

Construct Validity of the Teate Depression Inventory (TDI)
with a Black/African American Sample

Introduction

The primary focus of the present study was assessing internalizing symptoms in Black/African Americans. There are several factors that impact the mental health of ethnic minority groups and lead negative outcomes. Cultural competence and knowledge of potential barriers can provide a foundation for providing the best treatment for ethnic minorities. However, to implement best practices for mental health treatment, valid assessments must be used. Considering ethnic minorities' experience with and perception of internalizing disorders benefits utility of valid measures of symptoms. The present study was grounded by appropriate mental health treatment and focused on valid measurement of depression in Black/African Americans.

Internalizing Disorders

Depression is one of the leading causes of disability in the United States and projected to become the number one leading cause of disability in higher income nations (Mathers & Loncar, 2006). Not only is depression debilitating for the individual experiencing symptoms, this mental health impairment incurs societal costs; severely depressed individuals may have limited productivity and require significant health care (Balsamo, Giampaglia, & Saggino, 2014). Specifically, Major Depressive Disorder (MDD) can be detrimental to an individual's ability to function, affecting mood, appetite, and sleep patterns. In 1996, the World Health Organization reported that depression was the 4th leading cause of disease-burden and was projected to be the second leading cause of disease-burden by 2020 (Murray & Lopez, 1996). Major Depressive Disorder is often

characterized by cognitive symptoms such as unreasonable guilt, feelings of worthlessness and self-deprecation, and irritability. This disorder can inhibit an individual's ability to participate in school or work, engage in enjoyable activities, or have successful relationships, thus drastically reducing quality of life (Fava & Kendler, 2000).

Dysthymia, or Persistent Depressive Disorder, can also be greatly debilitating. According to the Diagnostic and Statistical Manual of Mental Disorders, 5th edition (DSM-5; APA, 2013), dysthymia is characterized by having a depressed mood for most of the day, more often than not, and for at least 2 years. The symptoms of dysthymia do not meet criteria for a major depressive episode, but dysthymia is likely to last for years (Weissman, Leaf, Bruce, & Florio, 1988). Whether present in a major depressive episode or experienced steadily over several years, symptoms of depression reduce an individual's quality of life and increase their reliance on health care.

Depressive disorders have some overlapping symptoms with other disorders, such as Bipolar Disorder and anxiety disorders. Bipolar Disorder is characterized by both major depressive episodes and manic or hypomanic episodes. According to DSM-5 (APA, 2013) manic episodes are characterized by an elevated mood that is abnormal and distinct from typical mood, potentially featuring psychotic symptoms. A manic episode may feature irritability, distractibility, high-risk behaviors, and an increase in goal-directed activity. Hypomanic episodes are not as severe as manic episodes and do not feature psychotic symptoms. A hypomanic episode can be experienced in transition between depression and mania. In some individuals with bipolar disorder, a full manic episode is not reached and moods fluctuate between depression and hypomania. Anxiety

disorders feature both cognitive and somatic symptoms that can cause distress in mood, sometimes appearing similar to symptoms of depression. Maladaptive thinking, feelings of hopelessness, and negative attribution are symptoms that are typical to depression but can also be experienced in both bipolar and anxiety disorders (Balsamo et al., 2013).

These types of disorders are identified as internalizing due to the characterization of the symptoms. Conditions that are described as internalizing involve symptoms of emotion and mood that might not be observed by others. In comparison, externalizing disorders are primarily identified by dysregulated behavior such as aggression or hyperactivity (Kovacs & Devlin, 1998).

Anxiety disorders are considered to be the most common type of psychological ailment in the United States (Kessler, Chiu, Demler, & Walters, 2005). Anxiety is broadly characterized by a perception of threat that can induce thoughts and somatic sensations. Cognitive symptoms include intrusive thoughts, excessive worry, and difficulty concentrating. Somatic symptoms include muscle tension, trembling, sweating, heart palpitations, and hyperventilating. Anxiety can also be distinguished as state or trait anxiety. State anxiety is a temporary reaction characterized by feelings of worry, apprehension, tension, and arousal. Comparatively, trait anxiety is a more consistent quality of an individual, characterized by the frequent perception of threat (Ree, French, MacLeod, & Locke, 2008). Within the general domain of anxiety, it is beneficial for treatment outcomes to differentiate between state anxiety and trait anxiety, as well as cognitive symptoms and somatic symptoms (Lancaster, Melka, Klein, & Rodriguez, 2008).

Bipolar disorder presents complications in diagnosis, particularly in children and adolescents. Symptoms of mania can often be misinterpreted as externalizing symptoms (i.e. impulsivity, irritability, increased energy). Children and adolescents may present a number of symptoms that can be misunderstood, leading to inaccurate diagnosis. A child may display unreasonable aggression which may distract from the source of the behavior, potentially a dysregulation of mood (Findling et al., 2002). Additionally, Bipolar Disorder is characterized by some of the more dangerous consequences of internalizing disorders such as suicidality, self-harm, and substance abuse. Cyclothymic disorder features hypomanic episodes and depressive episodes and, similar to dysthymia, lasts for at least 2 years (APA, 2013). Bipolar disorder has not been as thoroughly researched as depression, although it is a challenging disorder to diagnose. Reducing the frequency of misdiagnosis is critical to providing the best treatment for individuals (Pendergast et al., 2014). Understanding, identifying, and differentiating depression, anxiety, bipolar disorder, and ADHD is essential to best practice in school and clinical psychology as well as in clinical practice.

An area of social concern that must be addressed is disparity in identification and treatment of ethnic minority groups, primarily Native Americans, Black/African Americans, and Hispanic/Latinos. Due to the prevalence and debilitating nature of internalizing disorders, particularly affecting ethnic minority groups, it is imperative for mental health professionals to be aware of the barriers to mental health and research regarding optimal practices. The following sections detail the common risk factors of developing internalizing disorders as well as the increased prevalence of symptoms in ethnic minority groups.

Risk Factors

There are a number of factors that increase the likelihood of developing depression. According to Fava and Kendler (2000), an individual is more likely to develop MDD if they have experienced stressful life events, adverse childhood experiences, or are a woman rather than a man. Additionally, particular personality traits tend to be associated with depression; individuals who are more easily upset under stress have higher rates of developing MDD. Specific environmental factors such as job loss, significant stress in marriage or other close relationships, or serious health problems are also considered risk factors. Improving measurement of internalizing disorders in general can benefit identifying problematic symptoms with early onset and recognizing the presence of risk factors or the absence of protective factors (Kovacs & Devlin, 1998).

Due to the prevalence and the incapacitating nature of internalizing disorders, it is essential to the public to receive appropriate diagnosis and treatment. However, internalizing disorders inherently present issues in measurement for professionals. Because diagnosis of internalizing disorders relies heavily on self-report measures, it is essential that these instruments be constructed with sound psychometric properties and utility for diverse groups. Without accurate assessment, one cannot receive the necessary or appropriate treatment, and ethnic minority groups experience disparity in both aspects in addressing mental illness. Thus, it is vital to expand the literature toward more progressive assessment and treatment of individuals who are minorities. Internalizing disorders present daily challenges for the general public, but ethnic minorities are at greater risk to face the negative consequences of these ailments.

Disparity in Treatment of Ethnic Minorities

Discrimination against ethnic minorities has been found to be a significant risk factor for longer duration and greater severity of mental illness. There is evidence that social circumstances affect the development of disorders, identification of symptoms, and access to treatment. In regard to circumstances as a risk for mental illness, the concept of "racial-battle fatigue" (Smith et al., 2007) has been studied as a potential factor that leaves Black/African Americans susceptible to developing Generalized Anxiety Disorder. Essentially, it can be emotionally, physically, and psychologically exhausting to feel invalidated, attacked, or disrespected based on race or ethnicity. This phenomenon may also be experienced by other ethnic minority groups, including Latino and Asian Americans (Gee, Spencer, Chen, Yip, & Takeuchi, 2007). Evidence demonstrates that sociocultural factors affect the onset of psychological disorders. Discrimination has been associated with both Major Depression and increased risk of prolonged symptoms of Generalized Anxiety Disorder in African Americans (Soto, Dawson-Andoh, & BeLue, 2010). Furthermore, the frustration-aggression hypothesis suggests that life stressors (i.e., poverty, crime, violence) lead to frustration that manifests as aggressive behaviors (Berkowitz, 1989). If ethnic minority individuals experience frustration-aggression, perhaps any underlying or maintaining internalized symptoms go undetected.

Help-Seeking and Stigma. Research by Alegria et al. (2009) demonstrated that distrust of mental health professionals and previous experience with discrimination has prevented many ethnic minorities from seeking professional help. Seeking treatment is a protective factor for positive outcomes, however, this behavior is impacted by perception of mental health professionals and awareness of the severity of mental illness symptoms

(Stockdale, Lagomasino, Siddique, McGuire, & Miranda, 2008). For example, Bipolar disorder often goes misdiagnosed in Black/African American individuals, potentially due to clinical bias and stigma that occurs without the use of structured instruments (Pendergast et al., 2014). Symptoms of mood disorders can be severe and treatment can improve overall functioning, thus it is imperative that professionals are able to appropriately identify symptoms. Additionally, stigma within the community and distrust of mental health professionals, may lead ethnic minorities to avoid treatment and locate other methods to ameliorate symptoms or suppress them. For example, discrimination and distrust were identified as barriers to mental health treatment in Native American Indian populations, specifically those residing on reservations (Beals et al., 2005).

Depression is named as one of the leading causes of disability in ethnic minority groups in the United States, yet data demonstrate that ethnic minority groups are typically underserved. In particular, Hispanic/Latino and Black/African Americans are less likely than White/Caucasians to receive appropriate and beneficial treatment for depression, thus reducing their opportunity for positive treatment outcomes. Due to inadequate identification and treatment, depressive symptoms are often chronic in ethnic minority populations (Gonzalez, Tarraf, Whitfield, & Vega, 2010). According to Stockdale et al. (2008), if Black/African American individuals seek mental health treatment, they are more likely to go to a primary care physician. Once they seek treatment from a physician, these individuals are less likely to be referred to counselors or psychiatrists and less likely to obtain an accurate differential diagnosis compared to White/Caucasian individuals. Distrust of mental health professionals, clinical judgment and bias, and misinterpretation of symptoms (often over-identification of psychotic symptoms) are all barriers for

Black/African Americans to gain access to adequate treatment. Improving representation of ethnic minorities in samples or specific examination with large samples of ethnic minorities will benefit development and evaluation of appropriate instruments and identification of symptoms across groups.

Research has not necessarily demonstrated that ethnic minorities experience clinical mood and anxiety disorders at a significantly higher rate than White/Caucasians. However research does suggest that ethnic minorities are at a greater risk for the negative outcomes that accompany the disorders (Burnett-Zeigler, Bohnert, & Ilgen, 2012). In general, culture affects human development and experience (Cauce et al., 2002). However, focus must be drawn to those individuals who face increased risk and are at a disadvantage based on their experiences.

There are various barriers to mental health treatment in ethnic minority groups that interfere with identifying mental illness, regardless of the validity of measurement. Research demonstrated that if ethnic minorities receive mental health treatment at all, they are less likely to receive good quality treatment compared to White/Caucasian individuals (Alegria et al., 2008). Additionally, the general stigma against those with mental illness is exacerbated in minority groups from disadvantaged areas, especially considering cultural perceptions of mental health (Knifton, 2012). In Hispanic/Latino communities, it is considered weak and disgraceful to suffer from a mental illness. Their cultural values prioritize hard work, therefore the inability to cope with stress is often considered weak and lazy. This negative stigma of mental illness is only increased if the individual seeks professional help or medication. The perception of depression and anxiety as weakness is also expressed in Black/African American communities. Research

has demonstrated that Black/African Americans fear that having a mental illness and seeking treatment will negatively impact their friendships and work experience, regardless of the type of treatment they receive (Givens et al., 2007). Additionally, the typical cultural dynamic prioritizes "family business," it is expected that personal matters, including difficulties from mental illness, stay private. Beaubouef-Lafontant (2007) discussed Black/African American women and their need to uphold an image of strong womanhood, particularly due to stereotypes and cultural expectations. Essentially, the cultural expectation is to rely on resilience and family support in order to maintain a reputation of strength and capability. Black/African Americans with strong religious affiliation are more likely to seek help from religious officials who are considered more trustworthy and familial.

For both Hispanic/Latino and Black/African American communities, there is a distrust of mental health professionals, particularly those who are White/Caucasian. This perception of threat is attributed to social and historical suppression of ethnic minorities (Yang, Thomicroft, Alvarado, Vega, & Link, 2014). An essential area of focus in mental health is identification of illness and access to treatment in the Black/African American community; is difficult to make effective conclusions about how diverse groups experience symptoms when those groups are often underrepresented or missing from research samples.

To help identify individuals who may face barriers to appropriate mental health services, it is essential to strengthen the validity of measurement for internalizing disorders. Quality screening tools can enhance treatment outcomes in general, and particularly for those in ethnic minority groups. There must be improved data samples

for ethnic minorities and a greater focus on epidemiological representation in the psychometric literature. According to research by Burnett-Zeigler et al. (2012), ethnic minority status does not have to be a risk factor for mental illness. In fact, strong attachment to one's ethnic identity has been found to be a protective factor that promotes positive adjustment. Asian-Americans tend to have a higher degree of ethnic identification as well as lower incidence of chronic challenges of depression or anxiety. The negative effects of bias, stigma, misdiagnosis, and poor treatment associated with ethnic minority status compounds additional risk factors. Addressing mental health disparity as a whole helps school psychologists and other mental health professionals to negotiate cultural differences, improve competence, and ultimately provide the best service to their clients.

Appropriate Measurement

The Teate Depression Inventory (TDI; Balsamo & Saggino, 2013) and the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, MacLeod, French, & Locke, 2000) are newer measures being investigated to ensure validity in identifying symptoms in diverse groups. The STICSA was designed to improve on the quality of the State-Trait Anxiety Inventory (STAI; Spielberger & Sydeman, 1994), incorporating both cognitive and somatic aspects of anxiety. The improvement was deemed necessary to better discriminate between symptoms of anxiety and depression (Gros, Simms, & McCabe 2007).

The Teate Depression Inventory (TDI; Balsamo & Saggino, 2013) contains only 21 items and has demonstrated psychometric support in measuring depression. However, further research is necessary to determine adequacy in diverse samples (Balsamo &

Saggino, 2014). Building a body of research for use of the TDI to identify depression may improve diagnosis and reduce misdiagnosis of other internalizing disorders.

Similarly, studies have provided psychometric evidence that the STICSA measures anxiety well, but additional research is needed with diverse populations (Lancaster et al., 2015). Another instrument used for identifying internalizing symptoms is the General Behavior Inventory (GBI; Depue, 1987). The GBI has demonstrated sound psychometric properties for distinguishing between depression and bipolar disorder, and may offer meaningful information for comparison with the scores produced by the newer instruments.

Previous research has supported the necessity of including cross cultural samples to improve the validity of the TDI with comparisons of the STICSA and the GBI. The representation of ethnic minorities in studies has positive implications for improving measurement and therefore improving quality of treatment. As newer instruments, the TDI and STICSA have room to develop, while the GBI is more established. It is socially and ethically important to ensure that mental health professionals are using the most appropriate instruments with empirical support. Internalizing disorders are debilitating on a national scale, but have particularly negative effects upon ethnic minority groups. Ultimately, adequate measurement is an important first step to reducing mental health disparity in ethnic minority groups.

Cultural competence and establishment of sound psychometric properties of the TDI and STICSA was the foundation of this researcher's goals. As discussed previously, there is a great need to address more diverse and representative sampling for psychological measurement. In the present study, the primary focus was determining the

construct validity comparisons of the TDI with Black/African Americans by examining convergent and discriminant validity with the STICSA and GBI. The literature has emphasized the need for mental health professionals to make progress in culturally competent problem-solving when working with diverse populations. Especially when working with Black/African Americans, racial bias and stigma must be addressed in order to positively impact the individual. Thus, improving Black/African American presence in sampling, can provide validity for appropriately identifying symptoms in that group.

Literature Review

Teate Depression Inventory

Development and Validity. The Teate Depression Inventory was developed in Italy to satisfy the need for a reliable and valid self-report measure of depression. Research by Balsamo, Giampaglia, and Saggino (2014) addressed the importance of psychometrically strict criteria for developing appropriate measures. Utilizing the Rasch measurement model (as opposed to classical test theory) appeared valuable for the development of self-report depression measures. Prior instruments developed based on classical test theory have had setbacks, including the assumption that scores for particular items would have the same meaning across samples and use of a total summed score for identification purposes. According to research, the Rasch measurement model provides more sufficient diagnostic utility based on logistic formulae. Based on Rasch theory, the results of a the TDI should be utilized to address the specific types of items the individual endorsed, thus informing the practitioner of that person's unique symptoms and needs (Rasch, 1960).

Balsamo et al. (2014) intended to select items that would be psychometrically sound to create a consistent scale. Initially, 152 items were chosen that represented the diagnostic criteria of depression. The items were rated by several experienced clinicians in order to eliminate inadequate items, retaining 54. Finally, non-clinical subjects assisted in determining if the items were easy to comprehend and 3 additional items were removed. A sample of 529 Italian participants consisting of 300 individuals without any mental illness and 229 individuals with a clinical diagnosis were used to assess item adequacy.

Rasch item trait test, utilizing chi square, assessed whether the items fit with one particular characteristic. Fit residual values between ± 2.0 and ± 2.5 indicate agreement with the model. Additionally, the Person Separation Index was used to determine if scores could distinguish individuals who had different severity of depression. An aspect of using the Rasch model is the person location distribution which was used to determine if each subject was identified correctly. The test of local independence was used to ensure that only one dimension, depression, was being measured. Ultimately, 21 items were selected to represent an objective measure of depression, with residuals of -2.20 and +1.92 and fitting the proposed model. All 21 items were scaled on a 5 point scale from 0 to 4. For more favorable test construction, 10 of the items were positively worded while the other 11 items were negatively worded. The TDI had a Chronbach's alpha of 0.95 and Person Separation Index of 0.96. The person location difference was significant between the nonclinical sample ($M = -1.44$, $SD = 1.22$) and the clinical sample ($M = 0.49$, $SD = 1.24$) ($F(1, 528) = 320.13$, $p < 0.0001$). Utilizing the Rasch model to assess the psychometric properties of the TDI revealed that it can be effective in categorizing

individuals based on results; nonclinical subjects endorsed less severe items and those with depression endorsed more symptom-related items. Replication of these findings with diverse samples would provide greater support for use of the TDI with consideration of cross-cultural differences (Balsamo et al., 2014).

Balsamo and Saggino (2014) conducted a study to determine a diagnostic cut-off for use of the TDI. Evidence demonstrated that the TDI may be able to identify depression better than other tools that are more frequently used. Determining accurate cut-off scores can benefit treatment decisions, depending on the severity of the depression symptoms, thus increasing the diagnostic utility of the TDI. The sample consisted of 125 adults diagnosed with a disorder according to DSM IV Axis I criteria. Of the 125 individuals, 91 were diagnosed with Major Depressive Disorder, (21 mild, 33 moderate, and 37 severe). The remaining 34 patients had disorders unrelated to depression. Each participant completed the TDI as well as the structured clinical interview for DSM-IV-TR Axis I. The Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-II; First & Gibbons, 2004) was used to group the participants into one of four classifications: mildly depressed, moderately depressed, severely depressed, and non-depressed. This clinical interview was standardized with a categorical rating system and algorithms for diagnostic criteria and has strong validity. Three Receiver Operator Characteristic (ROC) curves were used to identify optimal TDI cut-off scores: non-depressed compared to mildly depressed, non-depressed and mildly depressed compared to moderately depressed, and non depressed, mildly depressed, and moderately depressed collectively compared to severely depressed. Analysis of ROC curves demonstrated sensitivity and specificity, or how well the measure correctly identifies individuals with

the target condition and how well the measure correctly identifies those without the target condition. The area under the curve (AUC) represents overall accuracy. Values below 0.5 indicate that the measurement is operating only at chance. Values between 0.5 and 0.7 indicate low accuracy, values between 0.7 and 0.9 indicate moderate accuracy, and values between 0.9 and 1.0 indicate high accuracy (Metz, 1978).

Each of the ROC curves indicated diagnostic utility in discriminating individuals within the groups, the most distinct comparison being between severely depressed patients and the lesser and non-depressed patients. The AUC values were interpreted accounting for a 95% confidence interval. When comparing mildly depressed patients to non depressed patients the AUC was 0.85, $SE = 0.07$, 95% CI = 0.72, 0.98. When comparing mildly and moderately depressed to non depressed patient the AUC was 0.87, $SE = 0.05$, 95% CI = 0.79, 0.98. Finally, when comparing the three groups to severely depressed patients the AUC was 0.95, $SE = 0.07$, 95% CI = 0.91, 0.98.

The first cut-off point was 21, with sensitivity of 0.86 and specificity of 0.94. Classification accuracy was 0.90, with 85.7% true positives, 5.8% false positives, and 14.2% false negatives. For the second curve, comparing mild and moderate to non-depressed individuals, the cut-off was 35.5. This cut-off score had 0.82 sensitivity, 0.98 specificity, and 0.90 overall classification accuracy. This score was able to correctly identify 81.8% of the individuals with depression (true positives), 1.8% were incorrectly identified as having depression (false positives), and 14.2% were incorrectly identified as not having depression (false negatives). The final cut-off score was 49.5, with sensitivity of 0.81 and specificity of 0.94. Classification accuracy was 0.88 with 81.1% true positives, 5.7% false positives, and 18.9% false negatives. Each cut-off score was able to

correctly identify patients with symptoms of depression well above chance. These cut-scores indicated different groups: 0 to 21 indicated minimal depression, 22 to 36 indicated mild depression, 37 to 50 indicated moderate depression, and 51 to 84 indicated severe depression.

The TDI demonstrated strong diagnostic accuracy but the rate of false negatives and false positives that occur at the cut-off indicate potential for error in identification. However, depending on the specific use of the scale, an examiner can determine the most appropriate cut-off score to minimize cost. The TDI as a screening measure should be as sensitive as possible to minimize false negatives. This decision means choosing a lower cut-off score to ensure that no one with depression symptoms are falsely identified as not having those symptoms. However, this choice may also increase the number of false positives, identifying individuals who are not clinically depressed. As a screening measure, increasing false positives is not necessarily as risky as not identifying those that are potentially suffering from depression. Diagnosis should incorporate a variety of evaluation processes, but the TDI demonstrated strong psychometric properties to benefit a comprehensive diagnostic process. Balsamo & Saggino (2014) emphasized the need for more diverse samples in the psychometric literature regarding the TDI, in order to improve external validity to benefit individuals across diverse groups. Due to the complex nature of internalizing disorders, it is important to address the specific presentation of symptoms. Unipolar depression, bipolar disorder, and anxiety disorders feature behaviors that can appear similarly. For example, anger, agitation, and irritability can be present in both mood disorders and anxiety disorders. A study by Balsamo (2010) has addressed anger as a symptom of depression.

Aspects of Depression. Prior to the development of the TDI, research was conducted regarding the nature of depression symptoms. Both unipolar and bipolar depression can feature different aspects of negative mood, creating challenges for accurate diagnosis. Research by Balsamo (2010) addressed the prevalence of anger in younger depressed patients. Symptoms of anger may also be an aspect of bipolar disorder rather than unipolar depression. However, previous studies' findings identified a significant correlation between anger and depression (Brody, Haaga, Kirk, & Solomon, 1999; Fava & Rosenbaum, 1999; Koh, Kim, & Park, 2002). Another study suggested that approximately 30-40% of depressed patients experience anger attacks (Fava, 1998). It is difficult to determine if the relationship between depression and anger is causal; does depression become worse if an individual cannot regulate anger or does poor anger regulation cause the depression initially? Another possibility is that anger and depression develop from a common factor. Empirical evidence indicates a relationship between rumination and depression as well as between rumination and anger. Rumination is a maladaptive and persistent thinking pattern that occurs in response to negative moods; individuals dwell on the negatives of a situation or circumstance. The degree to which an individual ruminates often affects their prognosis. Rumination can also increase the intensity of an individual's anger or aggression. Essentially, rumination maintains depressive symptoms, anger-attacks in particular. Rather than causing the relationship between depression and anger, rumination affects the intensity of both and potentially strengthens that association.

To investigate rumination, anger, and depression Balsamo (2010) used the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996), State-Trait Anger

Expression Inventory (STAXI-2; Comunian, 2004), and the Padua Inventory (Sanovia, 1988) for intrusive thoughts with 353 Italian volunteer participants (Balsamo, 2010). Each of these measures had previously demonstrated high internal consistency, identifying the desired constructs. Correlations and multiple regression equations were estimated to address the potential relationship between the three test variables in question.

Results demonstrated that the Tendency to Doubt and Ruminare subscale of the Padua had significant correlations with both Trait Anger (0.48, $p < 0.001$) and Depression (0.41, $p < 0.001$) when the other variable was controlled for. Multiple regression was utilized to determine if tendency to doubt and ruminate mediated depression and anger. The association between tendency to doubt and ruminate and depression ($\beta = .54$; $t = 12.03$, $p < .001$) was statistically significant as was the association between tendency to doubt and ruminate and trait-anger ($\beta = .41$; $t = 8.32$, $p < .001$). The association between depression and trait-anger ($\beta = 0.12$; $t = 2.46$, $p < .001$) was decreased when the tendency to doubt and ruminate was controlled for. However, because the relationship between depression and trait-anger was still significant, the Sobel test (1982) was used to determine if there was partial mediation. The results of the Sobel test (7.8, $p < .001$) indicated that the tendency to doubt and ruminate was a partially mediating factor in the relationship between trait anger and depression. These findings indicated that rumination puts individuals at risk for depression, anger, or possibly anger as a symptom of their depression. Individuals with rumination and anger as significant aspects of their depression could benefit from treatment that targets those

challenges, thus reflecting the importance of using reliable and valid depression measures (Balsamo, 2010).

To further contribute to a comprehensive understanding of anger and depression, Balsamo (2013) investigated Cloninger's model of personality relative to symptoms of depression. Cloninger's model of four constructs that reflect dimensions of temperament: novelty seeking, harm avoidance, reward dependence, and persistence. Additionally, the model claims that there are three character dimensions: self-directedness, cooperativeness, and self-transcendence.

Harm avoidance is an aspect of temperament that addresses an individual's response to aversive stimuli and adapting by naturally avoiding dissatisfying conditions such as punishment or frustration. The self-directedness aspect of character refers to reliability, goal-setting, and the ability to regulate behaviors. Examination of depressed individuals has found high harm avoidance temperament and the reduced self-directedness character trait.

Theory suggested that there may be a correlation between the temperament of harm-avoidance and trait-anger. Additionally, studies suggested that the trait of anger in addition to the state of anger may influence the negative cognitions present in some depressed individuals. Balsamo (2013) examined the feeling of anger in relation to depression and personality.

The State-Trait Anger Expression Inventory-2 (STAXI-2), Beck Depression Inventory-II (BDI-II), and the Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999) were administered to 230 Italian undergraduate psychology students. Correlation coefficients were calculated to analyze the relationship between the scores.

Multiple regression was utilized to determine if anger was a mediating variable between depression and temperament/character.

Depression and trait-anger had a correlation of 0.48 ($p < .001$). Harm avoidance, persistence, cooperativeness, and self-transcendence had statistically significant negative correlations with depression. The personality dimensions of harm-avoidance, reward-dependence, self-directedness, and cooperativeness were significantly correlated with trait-anger. The cooperativeness subscale on the TCI-R did not have a significant correlation with depression, although the correlation with trait-anger was significant when depression was controlled ($.31, p < .001$). When controlling for cooperativeness depression and trait-anger were correlated 0.41 ($p < .001$). To complete the analysis of the three variables (cooperativeness, trait-anger, and depression), multiple regression equations were calculated. The target variable, cooperativeness was significantly associated with both the outcome variable, depression ($\beta = -0.30, t = -4.7, p < .001$) and the mediating variable, trait-anger ($\beta = -0.41, t = -6.7, p < .001$). Finally, when trait-anger was controlled, the relationship between cooperativeness and depression was no longer significant ($\beta = -0.12, t = -1.9$). Because each of the equations were in the predicted direction, trait-anger was identified as a mediating factor for cooperativeness and depression.

These results had implications for identifying specific symptoms of depression and providing the appropriate treatment for those challenges. Depression may manifest in individuals who experience trait-anger and have challenges understanding or tolerating other people, causing anger attacks. Treatment could target this emotional symptom of depression. However, these findings are not necessarily generalizable to other

populations, but represent the importance of a comprehensive measure such as the TDI for depressive symptoms. As mentioned previously, it is important to remember that the correlation between anger and depression may not indicate that one causes the other (Balsamo, 2013). Additionally, the distinction between anger attacks and mania symptoms may improve the appropriate diagnosis of either depression or bipolar disorder.

In a more recent study, Balsamo et al., (2015) utilized the TDI to explore construct validity in the Other as Shamer scale (OAS; Goss, Gilbert, & Allan, 1994). Shame is characterized by self-consciousness based on social rejection and feeling that social acceptance is threatened. Internalized shame has been related to negative self-perception, while external shame has been specifically related to being negatively evaluated by others. There is evidence that shame is associated with depressive symptoms such as self-focused rumination, withdrawal, and lack of social support and reinforcing environments. Correlations between the OAS and the TDI and BDI-II were assessed to compare appropriate items. Each of the three first-order OAS factors were significantly correlated with the TDI and BDI-II: inferiority scale ($r_{TDI} = .44$, $r_{BDI} = .41$, $p < 0.01$), emptiness scale ($r_{TDI} = .48$, $r_{BDI} = .41$, $p < .01$), and mistake scale ($r_{TDI} = .30$, $r_{BDI} = .32$, $p < .01$). These findings supported shame as a dimension of depression (Balsamo, et al., 2015).

Expanding sampling of the TDI to include diverse populations can benefit the validity and reliability of the measure. A recent study (Pendergast, 2016) reported on preliminary examination of the internal consistency and construct validity of the TDI with a sample of Black/African American college students. The TDI demonstrated

acceptable internal consistency with this sample for each of the factors: General Depression $\alpha = .943$, Depressive Mood $\alpha = .929$, Life Satisfaction $\alpha = .854$, and Daily Function $\alpha = .717$. Further exploration of the TDI may improve knowledge of its psychometric properties across diverse groups. There is need for replication and extension with a larger sample of Black/African Americans as well as other ethnic minorities.

A common problem in using self-report measures for internalizing disorders is adequately discriminating between anxiety and depression symptoms. Instruments intended to measure depression or anxiety often identify a general negative affect, rather than specific characteristics (Balsamo et al, 2013). Although they feature similar symptoms, depression and anxiety are distinct mental health disorders and it is important to utilize measures with sufficient validity in discriminating between symptoms. The following section addresses the appropriate measurement of the dimensions of anxiety.

State-Trait Inventory for Cognitive and Somatic Anxiety

Development and Validity. According to Elwood, Wolitzky-Taylor, and Olatunji (2012), trait anxiety is described as a characteristic that predisposes an individual to perceive threatening stimuli, which leaves that individual to be vulnerable to frequent and intense anxious responses. State anxiety is an emotion that is experienced based on a stressful situation, although trait anxiety may lead an individual to avoid stressful situations. The relationship between trait and state anxiety addresses the variety of aspects of anxiety as well as why the symptoms remain. Cognitive, behavioral, and physiological factors interact in anxious individuals that affect perceptions and responses. Distorted thoughts are developed that lead to the activation of the autonomic nervous system when perceived situations correlates with preconceived fears. The response to

threat is appropriate, however the perception of threat is not necessarily accurate and maladaptive (Elwood et al., 2012). Several studies have been conducted to assess use of the State-Trait Inventory of Cognitive and Somatic Anxiety to measure these aspects of anxiety.

In an effort to appropriately measure the multiple dimensions of anxiety, Ree, French, MacLeod, and Locke (2008) conducted a series of studies to properly develop the State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, French, MacLeod, and Locke, 2000) with sound psychometric properties. The STICSA is a self-report measure of multiple dimensions anxiety, initially developed in Australia. Somatic symptoms include hyperventilation, sweating, muscle tension, or trembling. Cognitive symptoms include negative thoughts characterized by excessive worry, intrusiveness, and obscured focus. Initially, 131 items were considered as distinguishing cognitive and somatic anxiety and 62 items were selected as most appropriate. The items were written in first person format on a scale of 1 to 4. Trait items were rated with frequency (ie. almost never, occasionally, often, almost always) while state items were rated with intensity of the feeling (i.e. not at all, somewhat, moderately so, very much). The state scale is administered first, followed by the trait scale.

Ultimately, 26 items were retained after eliminating items that were redundant or characterized by ceiling and floor effects. Confirmatory factor analyses determined that a correlated two factor model fit best for the trait anxiety scale. A one factor model and an orthogonal two factor model were also tested. Items that cross-loaded on both factors were eliminated. Chi-square indicated that the correlated two-factor model and the two-factor orthogonal model were both significant, although the correlated model was

preferred. The somatic and cognitive factors had 34% shared variance and internal consistency reliability coefficients of 0.87 and 0.84, respectively. For the state anxiety scale, confirmatory factor analysis also determined that a correlated two-factor model was best. There were no cross-loadings between cognitive and somatic dimensions and the factors had 53% shared variance. The cognitive scale had an internal consistency reliability coefficient of 0.90 and the somatic scale had a coefficient of 0.88.

The second study focused on replicating factor structure in order to determine if the STICSA was generalizable across multiple groups. For the trait anxiety scale, all items loaded on the appropriate factor with coefficients between 0.66 and 0.94, ($p < .01$). The somatic anxiety scale had an internal consistency reliability coefficient of 0.94 ($p < .01$) and the cognitive scale had a reliability coefficient of 0.95 ($p < .01$). Once again, the correlated two-factor model provided good fit to data. The state anxiety scales also had high internal consistency with coefficients of 0.94 ($p < .01$) for the cognitive dimension and 0.92 ($p < .01$) for the somatic dimension. Confirmatory factor analysis, once again, determined that the correlated two-factor model was an appropriate fit to data, thus improving the validity of the structure. Additionally, convergent and divergent validity of the STICSA was examined with measures of anxiety and depression. Fisher Z transformation of the coefficients and comparisons with t -tests (Meng, Rosenthal, & Rubin, 1992) indicated that STICSA scores converged with State-Trait Anxiety Inventory (STAI; Spielberger & Sydeman, 1994), an existing measure of anxiety, more than with measures of depression such as the Beck Depression Inventory.

Ree et al. (2008) assessed the STICSA's ability to identify increased anxiety in reliably stressful situations with the state anxiety scales and its ability to predict changes

in state anxiety with the trait anxiety scales. Students completed the STICSA at a low-stress time in the semester as a baseline and completed the STICSA again at exam time at the end of the semester to determine predictive validity. A three-way repeated measures analysis of variance (ANOVA) was conducted for main effects and interactions. There was a significant two-way interaction between the time of the assessment and the type of questionnaire: the mean state anxiety scores were higher at exam time than at baseline, $F(1,128) = 172.23, p < 0.01$. There was no significant difference in trait anxiety scores from baseline to high stress time. Essentially, as predicted, state anxiety scores fluctuated based on stressful situations and trait anxiety scores remained the same based on characteristics of the individual. Multiple regression was used to determine if there was different predictive value in the trait anxiety scales versus the state anxiety scales. The trait-cognitive anxiety scores on the baseline measure predicted approximately 5% additional variance for both state-cognitive anxiety scores ($F(2,126) = 9.18, p < 0.01$, total $R^2 = 0.29$) and state-somatic anxiety scores ($F(2,126) = 8.82, p < 0.01$, total $R^2 = 0.23$) at the exam stress measure. The baseline was assessed at a neutral time in the semester and the exam stress measure was assessed at the end of the semester during final examinations.

Finally, Ree et al., (2008) addressed the question suggested by the previous study; does trait-somatic anxiety predict state anxiety responses to somatic-based stressors? In this case, CO₂ enriched air was used as a somatic stressor. A two-way repeated ANOVA revealed a main effect for time of the exam, baseline versus stress, $F(1,31) = 7.28, p < 0.01$, as well as a main effect for anxiety dimension, $F(1,31) = 23.72, p < 0.01$. Ree et al., predicted that scores would be higher at exam time compared to baseline, however

they did not predict that cognitive scores would be higher than somatic scores.

Additionally, there was no interaction between the time of assessment and the type of anxiety. When addressing the somatic nature of the stress, multiple regression once again revealed that the trait-cognitive scores at the baseline assessment predicted a significant amount of additional variance in state-somatic scores, $F(1,29) = 12.02, p < 0.05$, total $R^2 = 0.31$; state cognitive scores, $F(1,29) = 14.23, p < 0.001$, total $R^2 = 0.37$ at the stressful exam time. These findings suggested that for both state-somatic anxiety and state-cognitive anxiety, trait-cognitive anxiety scores provided better predictive variance than trait-somatic anxiety.

Overall, research indicated that the structure of the STICSA was reliable and valid for measuring cognitive and somatic dimensions of state and trait anxiety. Using this type of measure to assess anxiety can provide more comprehensive understanding of an individual's symptoms and experiences of anxiety (Ree et al., 2008).

Lancaster, Melka, Klein, and Rodriguez (2015) assessed STICSA validity with both African Americans and European Americans. Several measures were compared to the STICSA and mean differences between groups were assessed with independent t -tests. Within group differences between cognitive and somatic anxiety were assessed with paired-sample t -tests. African American participants had higher scores on state-cognitive anxiety, $t(164) = 5.96, p < .001$, and trait cognitive, $t(164) = 7.63, p < .001$ compared to somatic anxiety. Both groups' scores on the STICSA were related to similar measures, such as the STAI. However, African American participants' ($n = 165$) trait-cognitive domain scores were not as related to measures of depression as the scores of European Americans ($n = 165$). This occurrence may suggest that the cognitive domain may be a

more accurate representation of anxiety for African Americans compared to European Americans, or perhaps indicate that African Americans are less likely to report cognitive symptoms of depression. Alternatively, somatic symptoms in African Americans may be more associated with depression compared to anxiety. The suggestions of these findings support the necessity of further research conducted with the STICSA and ethnic minorities, in order to obtain a clearer understanding of the STICSA dimensions. Ultimately, these findings are similar to previous research of the State Trait Anxiety Inventory (Williams, Peeters, & Zautra, 2004), demonstrating difficulty in discriminating between anxiety and depression among African Americans (Lancaster et al., 2015).

Generalizability. Balsamo, Innamorati, Van Dam, Carlucci, and Saggino (2015) conducted research on use of the STICSA with an elderly population, adding to the body of literature of using the STICSA with diverse groups. Anxiety presents differently in older adults and may be challenging to identify. The STICSA has evidence of sound psychometric properties, in contrast to other instruments specifically designed to assess for anxiety in older adults. Middle-aged and elderly adults, age 69 on average, completed the STICSA, TDI, the Geriatric Depression Scale (GDS; Yesavage et al., 1983), and the Health Survey (Ware, Kosinski, & Keller, 1996).

Confirmatory factor analysis was used to test four different oblique models. The non-normed fit index and comparative fit index were considered to indicate best fit. The four factor model (state-cognitive, state somatic, trait-cognitive, and trait somatic) was determined to fit best, supporting the distinction of items. Additionally, internal consistency was high for each factor, with Chronbach's alpha coefficients of 0.86 for state-cognitive, 0.90 for state-somatic, 0.86 for trait-cognitive, and 0.87 for trait-somatic.

The STICSA had higher correlations with the Geriatric Depression Scale ($r = 0.56$) than with other measures of depression. The correlation between the STICSA cognitive scales and the GDS may have resulted from the cognitive nature of items on the GDS. Scores on STICSA were negatively correlated with the Health Survey, indicating that greater levels of anxiety were related to poorer quality of life. A main benefit of using the STICSA with older individuals is differentiating between medical conditions and physical symptoms of anxiety (Balsamo et al., 2015).

Overall, the existing literature on the STICSA supports its use for identifying symptoms of anxiety across multiple dimensions. Diverse samples will add to the existing knowledge of the STICSA's measurement qualities. The primary purpose for the STICSA's development was to improve distinction between depression and anxiety symptoms in measurement. Bipolar disorder presents symptoms that may be difficult to distinguish from other internalizing disorders, thus creating a challenge for differential diagnosis. However, the General Behavior Inventory has demonstrated sound psychometric properties in identifying mood symptoms and distinguishing between unipolar and bipolar depression. The GBI is used in the present study to assist in assessing the construct validity of the TDI.

General Behavior Inventory

Development. An instrument that was developed to assist diagnosis of bipolar disorder is the General Behavior Inventory (GBI; Depue, 1987), which consists of 73 items on a likert scale and designed to address both symptoms of depression and mania. Higher scores indicate pathology. Most GBI research has utilized White samples. There

is evidence that GBI items and scales have high internal consistency as well as convergent and divergent validity (Pendergast et al., 2014).

An early study by Depue, Kleiman, Davis, Hutchinson, and Krauss (1985) addressed the use of the General Behavior Inventory for identifying cyclothymia as a risk for bipolar disorder. Cyclothymia is characterized by mild episodes of depression and hypomania. If left untreated, individuals with cyclothymia are at great risk for developing the full syndromic profile of bipolar disorder. Past research has suggested that cyclothymia and bipolar disorder share the same genetic influence (Turner & King, 1983; Wetzel, Cloninger, Hong, & Reich, 1980; Akiskal, 1981; Waters, 1979), thus identifying milder mood shifts can help prevent future severe episodes. In both individuals with unipolar depression and bipolar depression, cortisol levels are higher than in other individuals, supporting the relationship between stress, the hypothalamus, and mood disorders.

The GBI was used by Depue et al. (1985) to select individuals for their study and was administered to 850 university students with 126 of whom were blindly interviewed with the Schedule of Affective Disorders and Schizophrenia, Lifetime Version (SADS-L; Spitzer, 1979). Strict diagnosis for cyclothymia was used to select 59 subjects in contrast to 56 subjects with no diagnosable disorder. Ultimately, 15 participants were randomly selected from the cyclothymia group and 7 subjects were randomly selected as the control group. Some participants were excluded for a number of reasons, most notably if they were using medication that might affect cortisol levels or interfere with appropriate measurement. Before the start of the study, the Beck Depression Inventory (BDI) was administered in order to obtain a present level of depression. Additionally, the study took

place between 1:00 and 4:00 in the afternoon in order to control for circadian effects; cortisol secretion at this time of day is average for most individuals, regardless of the presence of a psychiatric disorder.

The participant's blood was tested followed by one hour of rest. Then, the participant experienced 30 minutes of a mild stressor followed by 90 minutes of recovery and a math task. The duration of the recovery period and the math task marks the half-life of cortisol release. Following the math task, the participant noted their degree of stress on a 5 point scale. Blood was taken at frequent intervals and extensive effort was made to accurately catalog the cortisol levels and generate statistical analyses.

The results indicated that the individuals in the cyclothymic group had slower reduction of their cortisol levels following the math task compared to those in the control group. Overall, the cortisol levels were not well regulated in the individuals with cyclothymia, potentially indicating dysregulation of stressful emotions. There was more variation between the participants in the cyclothymic group compared to the control group once the life events and math task measures were accounted for, although it was not clear why. Analyses revealed that number of depression symptoms endorsed on the GBI correlated with cortisol levels ($r = 0.42, p < 0.05$). This correlation was higher when the cortisol level was measured over the recovery period ($r = 0.78, p < 0.01$).

Discriminant function analysis determined that cortisol level was the most significant variable that differentiated 3 groups: control subjects, low subgroup of cyclothymic subjects that somewhat overlapped the control, and the high subgroup of cyclothymic subjects. The plot developed by the discriminant function analysis demonstrated the higher levels of cortisol secretion and the slower modulation during

recovery. Those with cyclothymia secreted twice as much cortisol as those who are considered to be in psychiatric health, indicating altered circadian cycles. It is not normal to have higher levels of cortisol in the afternoon and evening. The average cortisol secretion level for the cyclothymic group ($M = 6.34$, $SE = 1.26$) was twice as high as the control group ($M = 2.67$, $SE = 0.25$). Evidence suggested that the primary issue for cyclothymic individuals is the modulation aspect of cortisol secretion, not overproduction of cortisol. Essentially, the system that should modulate and control the secretion of cortisol is unstable and not operating properly. The results supported the hypotheses that the General Behavior Inventory can help identify individuals at risk for bipolar disorder based on biological evidence (Depue et al., 1985).

Utility. In order to determine if GBI could provide utility as a screening tool for affective disorders, Wold (1990) conducted research comparing the GBI to other measures. A brief self-report inventory can help identify those that may not realize that their emotional turmoil is evident of a mood disorder. Other measures have been used for this purpose but did not demonstrate the essential characteristic of discriminating between unipolar and bipolar depression.

Wold (1990) administered the Beck Depression Inventory and the General Behavior Inventory to 98 patients. The GBI correctly identified 91% of the individuals with bipolar disorder, while the BDI only identified 69% of those individuals. Additionally, the GBI correctly identified 75% of the depressed patients compared to the 89% identification by the BDI. These findings suggested that the GBI was sufficient for both bipolar and unipolar, exceeding the BDI in identifying bipolar disorder and falling short of BDI when identifying unipolar depression. Overall, 89% of individuals were

correctly identified by the GBI while the Beck Depression Inventory only correctly identified 55% of individuals. Based on this information, the GBI possessed the capability of screening for the symptoms of mood disorders and is particularly beneficial for identifying bipolar disorder (Wold, 1990).

Barr, Markowitz, and Kocsis (1992) examined the utility of the GBI for chronic depression, dysthymic disorder. Dysthymic disorder is characterized by pervasive depressive symptoms and lasts at least 2 years. Because of the debilitating nature of the disorder and morbidity, it is beneficial to have a tool that can screen for dysthymic disorder. Depressive disorder often goes untreated, but dysthymic disorder is particularly responsive to treatment if identified. Other self-report measures had not been successful in demonstrating utility for identifying dysthymia. Researchers determined the GBI was a psychometrically sound instrument that might be beneficial.

The GBI was administered to 138 patients, although only 59 completed the inventory. Of those, 43 individuals were blindly-interviewed with the Structured Clinical Interview for DSM-III Patient Version (SCID-P; Spitzer & Williams, 1989) for diagnosis. A majority of the diagnoses consisted of mood disorders other than dysthymia (48%) and those with dysthymia (42%). The GBI produced 61% sensitivity, 88% specificity, 76.9% positive predictive power, and 73% negative predictive power. Adjusting cut-off scores for identification did not benefit the sensitivity of correctly identifying dysthymic individual. The sensitivity of the GBI was not high enough for screening for dysthymia, leaving a number of patients unidentified. However, the positive predictive power and negative predictive power both indicate overall utility of the GBI in ruling in (PPP) and ruling out (NPP) dysthymia (Barr et al., 1992).

Youngstrom, Findling, Danielson, and Calabrese (2001) provided research regarding use of the GBI as a measure of parent report of their child's mood symptoms. It is important to utilize information from parents when addressing mental health concerns, including developmental history and observations of infrequent but important behaviors (i.e. suicidal or psychotic behavior). However, self-report from youth is beneficial to understanding subjective experience with emotions and anxiety. Parents often make inferences about their child's feelings based on behavior and subsequently, research shows that there is typically a disconnect between the child's report and the parent's report. However, because bipolar disorder is a particularly dangerous and serious disorder, it is beneficial to utilize a structured instrument for parent report to provide valid information to benefit diagnosis. Accurate identification of bipolar disorder in young people is particularly difficult and important, based on the similar appearance of symptoms of mania and ADHD. However, treatment of ADHD and bipolar disorder is very different, thus the importance of differential diagnosis.

Initially, the GBI was designed to be used by adults as a self-report measure. Youngstrom et al. (2001) adapted the measure so parents could report information regarding any hypomanic, depressive, and biphasic symptoms experienced by their child. The GBI has strong psychometric properties for its primary use, such as convergent and divergent validity of items for depressive and hypomanic symptoms. Internal consistency for both dimensions of the GBI greater than 0.85 (Depue, Krauss, Spont, & Arbisi, 1989). The GBI was revised for a parent report and Youngstrom et al., (2001) sought to determine if the GBI would retain its two-dimensional structure, if its items continued to

represent good internal consistency, if the scores could be utilized for differential diagnosis, and if the parent report correlated properly with child's self report.

In factor analysis, the items were grouped into 20 parcels of three or four similar items, based on the existing structure. Eight of the parcels were typically associated with hypomanic and biphasic symptoms while the other 12 were associated with depressive symptoms. Horn's parallel analysis was used to identify the correct number of factors. Principal-components analysis summarized the covariance between each of the 20 parcels, which was then compared to an artificial dataset where the random correlations would be zero. Through analyzing the covariance of the items and groups, 2 reliable factors were retained. The first factor had an eigenvalue of 12.68, the second factor had an eigenvalue of 1.76, and any additional factors were decreasing in value, deeming them insignificant. These results correlated with the initial factor model of the GBI as analyzed by Depue (1985). Youngstrom et al. determined that using an oblique rotation would be best to assess the data compared to the model. This analysis provided a simple structure that allowed the factors to be correlated; it is logical that the contents of the items would correlate and that individuals with bipolar disorder would score high on both factors. Biphasic symptoms loaded onto both factors, which was expected based on the nature of the items. Overall, 61.9% of the variance was due to the depressive factor while 7.5% of the variance was due to the hypomanic/biphasic factor ($r = 0.70$). The depression scale had a Chronbach's alpha of 0.97 with standard error of measurement of 4.7 on Likert items and alpha of 0.95 with standard error of measurement of 3.7 for case scoring (items scored 0 or 1). Utilizing standard error of the difference, changes of 13 points or more on

the depression scale and 11 points or more on the hypomanic/biphasic scale indicated a 95% chance of real change rather than measurement error.

Another important aspect of the study was addressing discriminant validity. Analysis of variance was used to compare children based on their diagnosis. Five groups were compared, demonstrating significant differences on both scales: Depression $F(4, 185) = 31.87, p < .0005$, hypomanic/biphasic $F(4, 185) = 37.11, p < .0005$. Logistic regression was used to create formulae for differential diagnosis. Of the five comparisons, the first two were intended to determine if the parent GBI ratings could be utilized as a screening measure (any mood disorder compared to no diagnosis, bipolar disorder compared to no diagnosis). However, the comparison group consisted of individuals that were referred for some psychiatric concern, which would inflate their level of pathology compared to the general public. Other beneficial comparisons included: mood disorder compared to no disorder (including disruptive disorders), unipolar compared to bipolar, and bipolar compared to disruptive disorders. Results indicated significant chi square values at $p < 0.00005$ with R^2 estimates between 0.45 and 0.81. In particular, both scales were beneficial in discriminating between unipolar and bipolar symptoms.

Finally, Receiver Operator Characteristic (ROC) analyses were used to determine diagnostic efficiency, identifying sensitivity and specificity. The accuracy of the ROC, the area under the curve (AUC), is the probability that randomly selected children from the population would be identified correctly. If the AUC is over 0.50, the measure is diagnosing better than chance. An AUC between 0.50 and 0.70 are considered to have low accuracy, AUCs between 0.70 and 0.90 indicate medium accuracy, and AUCs

between 0.90 and 1.00 indicate high accuracy (Metz, 1978). Each of the ROC curves for the five comparisons of both scales retained AUC values indicating medium to high accuracy. The one exception was the comparison between unipolar and bipolar depression: the depression scale was accurate only 40% of the time in distinguishing between the two disorders. The biphasic scale obtained medium accuracy with an AUC of 0.87 when differentiating between unipolar from bipolar depression. Notably, but unsurprisingly, comparing individuals with mood disorders to those without a diagnosis obtained AUC of 0.98 on the Depression scale and 0.94 on the hypomanic/biphasic scale. Additionally, when comparing individuals with bipolar disorder to those without, the AUC demonstrated that both scales accurately made this distinction 97% of the time. Overall, the analyses of the parent GBI ratings demonstrated sound psychometric properties and real-world applicability in identifying bipolar disorder and discriminating between disorders. The results indicated that the GBI could be utilized as a beneficial parent report for providing reliable information (Youngstrom et al., 2001).

A study by Findling et al. (2002) examined if the GBI had utility with younger populations. Participants were between the ages of 5 and 17. The Schedule for Affective Disorders and Schizophrenia for School Age Children -Present and Lifetime Version (K-SADS-PL; Kaufman et al., 1997) was used to interview both parents and children, with interrater reliability of 0.85. Participants were categorized into four groups, bipolar, unipolar, disruptive, and no diagnosis. Once the groups were established, parents and children of at least 10 years of age completed the GBI. Parents had the tendency to avoid sexual questions about their children. The two GBI scales did not differ in internal consistency between adolescent report and parent report. The depressive scale items had

an alpha of 0.97 for parents and 0.96 for self report while the hypomanic/biphasic scale items had an alpha of 0.96 for parent report and 0.94 for self-report.

In order to determine how well the GBI classified individuals with or without bipolar, Findling et al. (2002) assessed sensitivity (correctly identifying those with symptoms), specificity (correctly identifying individuals without symptoms), positive predictive power, and negative predictive power. Two cut scores were developed, one for 90% sensitivity and one for 90% specificity. ROC curves were assessed for accuracy of discriminating groups, using the area under the curve to identify the probability that GBI scores correctly rank subjects. The AUC was 0.88 for parent report and 0.82 for adolescent report when determining if the individual had bipolar disorder. Results suggested that a cut off of 17 on the hypomanic/biphasic scale would correctly classify 90% of youths with bipolar disorder. A cut off score of 36 would correctly classify 90% without bipolar. These findings supported potential use of the GBI as a parent report as well as a youth self report (Findling et al., 2002).

Predictive and Diagnostic Validity. A more recent study by Pendergast, Youngstrom, et al. (2014) expanded on use of the GBI to distinguish Bipolar Disorder from Unipolar depression and ADHD. The most common treatment for depression, use of antidepressants, has not demonstrated substantial utility for treating bipolar disorder. Specifically, antidepressants do not address hypomanic or manic symptoms and can possibly exacerbate symptoms (Pacchiarotti et al., 2011). In order to properly treat individuals, proper diagnosis is a necessary first step. As noted previously, ADHD and bipolar disorder can present similar symptoms in children and adolescents. If untreated, bipolar disorder can produce dangerous behaviors and symptoms, such as suicadality,

potential substance use, disruption in daily functions, and increased severity in overall symptoms. Additionally, if misdiagnosed with ADHD, a child with bipolar disorder may be treated with potentially harmful stimulant medications that have no evidence of benefiting their symptoms (Yatham et al, 2005; Correll, 2008).

The GBI is known to have 0.78 sensitivity in correctly identifying bipolar disorder and 0.98 specificity in determining an individual does not have the disorder (Depue, Krauss, Spont, & Arbisi, 1989). The hypomanic/biphasic scale is particularly helpful in distinguishing bipolar from unipolar depression. It is important to assess the use of the GBI with different populations. Pendergast et al. (2014) examined predictive and diagnostic validity of the GBI for adolescents and young adults ranging from 14 to 24.

Similar to other studies, The Schedule for Affective Disorders and Schizophrenia - Lifetime Version Expanded Edition (SADS-L; Spitzer, 1979) was administered to the participants to identify a wide variety of symptoms. Each of the interviewers had at least a bachelor's degree and were required to participate in 200 hours of training. The interrater reliability was high, exceeding 0.96 for mood disorders and 0.93 for ADHD. The young adult sample completed the GBI on their own while the adolescent sample completed the GBI while visiting the research lab.

There were no significant differences between samples in terms of race, sex, or socioeconomic status and the participants were grouped into 4 categories based on diagnosis with SADS-L, expanded edition: bipolar spectrum disorders, unipolar depression, ADHD, and those who did not meet criteria for any of the three disorders. Logistic regression was used for 6 comparisons followed by ROC analyses. Logistic

regression analyses revealed that GBI was able to differentiate between bipolar disorder and the other conditions, specifically utilizing the hypomanic/biphasic scores between bipolar and unipolar depression ($R^2 = .13, p < .001$) and between bipolar and the nonclinical subjects ($R^2 = .33, p < .001$). The ROC analyses provided concurrent evidence, demonstrating that the hypomanic/biphasic scale is particularly helpful for differentiating groups. Using diagnostic likelihood ratios (DLRs), Pendergast et al. categorized the groups as having low, moderate, or high scores on the hypomanic/biphasic scale. Results showed that when compared to individuals identified with ADHD, subjects identified as having bipolar disorder with the SADS-L were 5 times more likely to receive scores of 20 or higher on the hypomanic/biphasic scale and vice versa for low scores. Overall, the study provided a basis of support for use of the GBI for differential diagnosis in younger individuals. Although it is psychometrically sound, the GBI has 11th or 12th grade reading level that could be difficult for younger individuals or those with a lower reading level to interpret. As examined by Findling et al., (2002) the GBI can be utilized as a parent report for younger individuals (Pendergast et al., 2014).

O'Garro-Moore, Adams, Abramson, & Alloy (2015) utilized the GBI in assessing symptoms of bipolar disorder comorbid with symptoms of anxiety. The findings supported the distinction between the disorders while addressing the characteristics that may exacerbate the symptoms of both disorders. Maladaptive cognitions are characteristic of both anxiety and depression; depressed thoughts can create anxiety and anxious thoughts can worsen depression. This combination of challenges is further exacerbated by the mood instability of bipolar disorder. Thus, O'Garro-Moore et al.

(2015) demonstrated the complexity of symptoms of internalizing disorders and the value of differential diagnosis. Additionally, research by Pendergast et al. (2015) supported the use of the GBI for both Black/African American and White/Caucasian young adults. The GBI demonstrated consistency in identifying bipolar mood symptoms across diverse groups. Overall, the GBI has psychometric support for identifying bipolar disorder and distinguishing bipolar disorder from other internalizing disorder symptoms.

Conclusion

The TDI and STICSA have demonstrated evidence of sound psychometric properties in measurement of internalizing disorders. The literature suggests further need for examination of the TDI and STICSA with more diverse samples. Balsamo and Saggino, (2014) identified TDI cutoff scores that suggested utility of the TDI as a depression screening tool as well as a component of diagnosis. Using larger and more diverse samples to assess the psychometric properties of the TDI may benefit its potential utility. A majority of the research on the TDI has utilized Italian samples, although studies with more diversity have demonstrated promising results (Pendergast, 2016). Depression, anxiety, and bipolar disorder share a variety of similar qualities and have been identified as causing disability nationally and globally. Ensuring that assessments are able to distinguish between these disorders and identify the symptoms with validity is an important precursor to improving mental health outcomes. Including ethnic minority groups, who are often underserved, in data collection for social-emotional instruments can lead to improved understanding of symptomology and diagnosis, as well as better-quality treatment.

Depression can be debilitating, particularly in the ethnic minority community in the United States. To appropriately address mental health disparity, there must be adequate measures with substantial samples of these diverse groups of people. Both the TDI and the STICSA were developed based on substantial evidence of symptomology, containing items that demonstrate validity in discriminating between disorders. Of particular note, the TDI demonstrated evidence of distinguishing between depression and other disorders, utility as a screening or diagnostic tool, and reliability in measuring symptoms specific to depression (Balsamo, 2013; Balsamo & Saggino, 2014; Balsamo et al., 2015). Considering the potential utility of the STICSA and TDI, studies with culturally diverse samples are needed to determine the reliability and validity of scores in these diverse groups, particularly to ensure accurate and appropriate identification of symptoms. As noted, the GBI has evidence of utility and may provide a useful comparison for examining construct validity for use of these newer measures. For the purposes of this study, the construct validity of the TDI was the primary focus in order to generalize previous findings to Black/African Americans.

Research Questions

The purpose of this research was to answer the following questions: 1) Is the TDI a valid measure of depression in Black/African Americans? 2) Does the TDI correlate with the GBI and STICSA as predicted, demonstrating convergent and discriminant validity? It was predicted that convergent validity correlations between the TDI Total score and subscale scores and the GBI Depression scale would be high and discriminant validity correlations between the TDI Total score and subscale scores with the GBI Hypomanic/Biphasic scale would be significantly lower. The STICSA was developed to improve differentiation between anxiety and depression; thus, it was predicted that

discriminant validity would be observed between the TDI and STICSA. Answering questions about the psychometric properties of the TDI provided evidence of construct validity in addressing the mental health needs of racial ethnic minorities. Convergent and discriminant validity for the TDI provided information about how well it works for Black/African Americans.

Method

Participants

The target participants of the present study were ethnic minority individuals ages 18 to 30 in the general population. The study was open to all willing participants of any age. The sample included 578 individuals from various ethnic groups, including but not limited to, Asian Americans, Black/African Americans, Latino/Hispanic Americans, and White/Caucasian Americans.

Not all participants completed all three of the scales. Initially, 48 Black/African Americans began the study and 415 White/Caucasians began the study. For the purposes of this study, those who were outside of the target age range were removed from the sample. Of the total number of participants who began the study, 285 individuals completed the TDI and STICSA. Approximately 65% individuals noted the presence of one or more formal diagnosis, although there was no confirmation or accountability for honest reporting.

Individuals who were not members of the target ethnic groups or from the United States were removed from the sample prior to data analysis. Ultimately, the total sample utilized for data analysis included 24 Black African American participants and 218 White/Caucasian participants, a total of 242 individuals between the ages of 18 and 30.

A collection of all participants was stored as a master file for future analysis purposes.

Demographic information is provided in Table 1.

Table 1
Demographic Characteristics (N = 285)

Variable	<i>n</i>	%
<u>Gender</u>		
Male	35	12.3
Female	235	82.4
Nonbinary	9	3.2
Other	6	2.1
<u>Sexual Orientation</u>		
Homosexual	17	5.9
Heterosexual	176	61.8
Bisexual	60	21.1
Pansexual	14	4.9
Queer/Other	18	6.3
<u>Race/Ethnicity</u>		
White/Caucasian	218	76.5
Black/African American	24	8.4
Asian American	9	3.2
Hispanic/Latino	22	7.7
Native American Indian	1	0.3
Other	11	3.9
<u>Formal Diagnosis</u>		
Depression	26	9.1
Anxiety	31	10.9
Depression & Anxiety	75	26.3
Bipolar Disorder	5	1.8
Post-Traumatic Stress Disorder	1	.3
Eating Disorder	2	.7
Other/Multiple	43	15.1
None	102	35.8

Note: Total participants to complete the TDI and STICSA between the ages of 18 and 30.

Instruments

Teate Depression Inventory. The TDI (Balsamo & Saggino, 2013) is a self-report measure for depression symptoms, consisting of 21 items on a 5 point Likert scale (1 = never, 2 = rarely, 3 = sometimes, 4 = often, 5 = always). Previous studies of the TDI indicated reliability and validity with Italian participants. The following scores were calculated and utilized in data analysis: TDI Total (sum of all 21 items), Depressed Mood, Life Satisfaction, and Daily Function. These subscale scores were based on factor analysis and calculated for exploratory purposes (Ruan, Liao, Jones, & Pendergast, 2016). The English translated version of the TDI (Ruan et al., 2016) was used with publisher permission for the purposes of this study.

State-Trait Inventory for Cognitive and Somatic Anxiety. The STICSA (Ree, MacLeod, French, & Locke, 2000) is a self-report scale for symptoms of anxiety, designed to assess cognitive and somatic dimensions at a given time (state) as well as in general (trait). The Trait scale consists of 21 items (10 for cognitive symptoms and 11 for somatic symptoms) on a 4 point Likert scale (1 = almost never, 2 = occasionally, 3 = often, 4 = almost always) to rate frequency of anxiety symptoms. The State scale consists of the same 21 items (10 for cognitive and 11 for somatic) on a 4 point Likert scale to rate intensity of anxiety symptoms: 1 = not at all, 2 = a little, 3 = moderately, 4 = very much so. The following scores were utilized for data analysis: Trait-Cognitive, Trait-Somatic, State-Cognitive, and State-Somatic.

General Behavior Inventory. The GBI (Depue, 1987) is a self-report measure of mood disorder symptoms. It consists of 73 items rated on a 4 point Likert scale (0 = Never or Hardly Ever, 1 = Sometimes, 2 Often, 3 = Very Often Almost Constantly).

Responses indicate the frequency of depressive (46 items) and hypomanic/biphasic symptoms (28 items). One item is included for both symptom scales. The Depression score and the Hypomanic/Biphasic score were used in data analysis.

Procedure

Eastern Illinois University Institutional Review Board approved this research and supported that the study was of minimal risk to participants. The study was administered anonymously and electronically. A letter of invitation and a link to the research portal in Qualtrics were sent and shared with a variety of groups and individuals across the United States and were eventually forwarded to individuals in other nations. The link was shared with student organizations at Eastern Illinois University, as well as professors at other colleges and universities across the United States. The link was also shared amongst individuals not attending school. Participants forwarded the link to the study to contacts in other countries using Twitter, Facebook, and email. See Appendix for contents of the research materials.

All participants were administered the Teate Depression Inventory (TDI; Balsamo & Saggino, 2013), State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, MacLeod, French, & Locke, 2000), and the General Behavior Inventory (GBI; Depue, 1987). Demographic information was collected including age, gender/sex, race/ethnicity, religious affiliation, marital status, sexual orientation, report of formal diagnosis, zip code, and education level. Each participant was permitted to specify their race/ethnicity and gender/sex if the option was not listed. Following the collection of the demographic information, participants were asked if they provided informed consent to participate in the study by responding to scales measuring mood and worry. If the

individual selected yes, they proceeded to the first of the three self-report scales (TDI, STICSA, & GBI). Instruments were distributed electronically in random counterbalanced order via Qualtrics. Social media and email exchange were used to attract participants to the study.

Data Analysis

Pearson product-moment correlations were estimated using SPSS Version 21 in order to produce convergent and discriminant validity coefficients of TDI, STICSA, and GBI scores. The TDI and GBI Depression were expected to produce convergent validity (higher correlations), while the TDI and GBI Hypomanic/Biphasic were expected to produce discriminant validity (lower correlations). Additionally, the TDI and STICSA Cognitive scales were expected to produce convergent validity (higher correlations), while the TDI and STICSA Somatic scales were expected to produce discriminant validity (lower correlations). To compare convergent and discriminant validity coefficients, *t*-tests for dependent correlations were calculated for each group (B/AA and W/C) using the SimpleStats Test program (Watkins, 2007). To compare differences in coefficients between Black/African American and White/Caucasian groups, *z*-tests for independent correlations were calculated with the SimpleStats Test program (Watkins, 2007). These analyses were used to answer research questions to determine construct validity of the TDI.

Results

Demographics

The total sample that completed both TDI and STICSA included 285 participants. Individuals who Of that sample, 218 were White/Caucasian and 24 were Black/African American. The number of participants who completed the GBI in addition to the other two scales was slightly smaller (Black/African Americans, $n = 20$; White/Caucasians, $n = 202$), as 20 individuals did not complete the GBI. Demographic information for total sample ($N = 242$) are provided in Table 1.

Descriptive Statistics

Means, standard deviations, skewness, and kurtosis for the TDI, STICSA, and GBI for the total sample are presented in Table 2. The TDI scores include the Total score ($M = 41.03$, $SD = 15.37$), Depressed Mood ($M = 23.02$, $SD = 9.06$), Life Satisfaction ($M = 11.90$, $SD = 5.53$), and Daily Function ($M = 6.11$, $SD = 2.08$). The STICSA scores include Trait Cognitive ($M = 25.36$, $SD = 6.83$), Trait Somatic ($M = 20.14$, $SD = 5.63$), State Cognitive ($M = 22.08$, $SD = 8.17$), and State Somatic ($M = 16.75$, $SD = 5.75$). The GBI scores include Depression ($M = 57.33$, $SD = 29.62$) and Hypomanic/Biphasic ($M = 24.62$, $SD = 16.71$). Group mean differences were not reported due to the small sample size. Mean comparisons were considered for future studies.

Table 2
Descriptive Statistics for the Teate Depression Inventory, State-Trait Inventory for Cognitive and Somatic Anxiety, and General Behavior Inventory (N =242)

Variable	M	SD	Range		Skewness	Kurtosis
			Potential	Actual		
Teate Depression Inventory						
Total	41.03	15.37	0-84	6-79	-.12	-.58
Depressed Mood	23.02	9.06	0-44	3-43	-.23	-.51
Life Satisfaction	11.90	5.53	0-28	0-25	.20	-.69
Daily Function	6.11	2.08	0-12	1-12	-.21	-.44
State-Trait Inventory for Cognitive and Somatic Anxiety						
Trait-Cog	25.36	6.83	10-40	10-40	-.19	-.61
Trait-Som	20.14	5.63	11-41	11-41	.77	.42
State-Cog	22.08	8.17	10-40	10-40	.20	-1.05
State-Som	16.75	5.75	11-41	11-37	1.28	1.50
General Behavior Inventory						
Depression	57.33	29.62	0-138	2-112	.11	-.60
Hypomania/Biphasic	24.62	16.71	0-84	0-62	.88	.57

Note. Teate Depression Inventory (TDI) and State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA) samples $n = 242$, General Behavior Inventory (GBI) sample $n = 222$ as 20 participants failed to complete the GBI.

Convergent Validity

TDI and GBI. Table 3 presents convergent and discriminant validity coefficients for Black/African Americans below the diagonal and White/Caucasians above the diagonal. Convergent validity coefficients for the TDI Total score, Depressed Mood (DM), Life Satisfaction (LS), and Daily Function (DF) with the GBI-Depression score for Black/African Americans ranged from .69 to .84. Thus, the percent of shared variance ranged from 47.6% to 70.6%. Convergent validity coefficients were noted between TDI

Total, DM, LS, and GBI-D for White/Caucasians and ranged between .53 and .76. Thus, the percent of shared variance ranged from 28.1% to 57.8%.

TDI and STICSA. Additionally, correlations between TDI scores and STICSA scores are presented in Table 3. For Black/African American participants, convergent validity was noted between TDI total, DM, LS, and DF scores and STICSA-Trait Cognitive (correlations ranged from .69 and .85), as well as between all four TDI scores and STICSA-State Cognitive (correlations ranged from .64 and .81). The percent of shared variance ranged from 40% to 65.6%. Although smaller coefficients were observed, convergent validity was noted between White/Caucasian participants' TDI Total, DM, LS, and DF scores with STICSA- Trait Cognitive (.57 to .66), as well as between TDI Total, DM, LS, and DF with STICSA-State Cognitive (.55 to .64). The percent of shared variance ranged from 30.3% and 43.6%.

Table 3

Construct validity coefficients for the Teate Depression Inventory, State-Trait Inventory for Cognitive and Somatic Anxiety, and General Behavior Inventory for Black/African American Participants ($n = 24$) and White/Caucasian Participants ($n = 218$)

Variable	Total	TDI				STICSA				GBI	
		DM	LS	DF	TC	TS	SC	SS	D	H/B	
TDI-Total	-	.96	.89	.79	.66 ^C	.44 ^D	.56 ^C	.44 ^D	.76 ^C	.45 ^D	
TDI-Depressed Mood	.97	-	.76	.73	.65 ^C	.46 ^D	.64 ^C	.44 ^D	.76 ^C	.48 ^D	
TDI-Life Satisfaction	.92	.81	-	.62	.57 ^C	.34 ^D	.55 ^C	.36 ^D	.67 ^C	.35 ^D	
TDI-Daily Function	.90	.82	.84	-	.50 ^C	.38 ^D	.49 ^C	.41 ^D	.53 ^C	.35 ^D	
STICSA-Trait Cog	.84 ^C	.85 ^C	.69 ^C	.73 ^C	-	.54	.81	.44	.76	.60	
STICSA-Trait Som	.49 ^D	.53 ^D	.33 ^D	.48 ^D	.67	-	.49	.71	.61	.52	
STICSA-State Cog	.76 ^C	.81 ^C	.64 ^C	.69 ^C	.89	.69	-	.59	.65	.49	
STICSA-State Som	.51 ^D	.49 ^D	.35 ^D	.51 ^D	.68	.91	.73	-	.50	.49	
GBI-Depression	.82 ^C	.84 ^C	.69 ^C	.74 ^C	.96	.70	.87	.67	-	.75	
GBI-Hypomania/Biphasic	.67 ^D	.71 ^D	.52 ^D	.59 ^D	.91	.79	.89	.81	.89	-	

Note. Black/African American Participants ($n = 24$) coefficients below the diagonal and White/Caucasian Participants ($n = 218$) coefficients above the diagonal. Black/African Americans samples for Teate Depression Inventory (TDI) and State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA), $n = 24$ and General Behavior Inventory (GBI) sample $n = 20$, as 4 participants failed to complete the GBI. White/Caucasian samples for Teate Depression Inventory (TDI) and State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA) samples $n = 218$, General Behavior Inventory (GBI) sample $n = 202$, as 16 participants failed to complete the GBI. Convergent Validity Coefficient^C and Discriminant Validity Coefficient^D. Brackets indicate comparison of convergent and discriminant validity coefficients within groups and related scales.

Discriminant Validity

TDI and GBI. The TDI and GBI coefficients in Table 3 illustrate discriminant validity between the TDI Total, DM, LS, DF scores and the GBI-Hypomanic/Biphasic scores for Black/African Americans that ranged from .52 to .71. Thus, the shared variance ranged from 27.0% to 50.4%. For the White/Caucasian participants, discriminant validity was noted between TDI Total, DM, LS, DF scores and GBI-H/B with correlations that ranged from .35 to .48. The shared variance ranged from 12.3% to 23.0%.

TDI and STICSA: The discriminant validity coefficients between TDI scores and STICSA scores are presented in Table 3. For Black/African American participants, discriminant validity was noted between TDI Total, DM, LS, DF scores and STICSA-Trait Somatic scores (correlations ranged from .33 and .53), as well as between TDI Total, DM, LS, DF scores and STICSA-State Somatic scores (correlations ranged from .35 and .51). Shared variance ranged from 10.9% to 28.1%. For White/Caucasian participants, discriminant validity was noted between TDI Total, DM, LS, DF scores and STICSA-Trait Somatic (correlations ranged from .38 to .46), as well as between all four TDI scores and STICSA-State Somatic (.36 to .44). The shared variance ranged from 13.0% and 21.1%. Dependent t-tests for differences between correlations calculated to compare convergent coefficients to divergent validity coefficients. All discriminant validity coefficients were significantly lower than convergent validity coefficients, $p < .05$.

Between-Groups Comparisons

Comparisons between Black/African Americans' correlations and White/Caucasians' correlations were calculated, using z tests for independent correlations with SimpleStatsTest (Watkins, 2007). These comparisons are presented in Table 4. None of the comparisons were statistically significant, indicating that the convergent and discriminant validity coefficients for Black/African Americans did not differ from those of the White/Caucasian sample. See Table 4 for details.

Table 4
Between Group Comparison of Correlation Coefficients for Teate Depression Inventory, State-Trait Inventory for Cognitive and Somatic Anxiety, and General Behavior Inventory (N = 242)

Comparison	Race/Ethnicity		z	p
	B/AA	W/C		
<u>Convergent</u>				
TDI Total and GBI Depression	.82	.76	.621	.5347
TDI Total and STICSA Trait Cog	.84	.66	1.807	.0707
TDI Total and STICSA State Cog	.76	.56	.962	.3359
<u>Discriminant</u>				
TDI Total and GBI Hypomanic/Biphasic	.67	.45	1.258	.2083
TDI Total and STICSA Trait Som	.49	.44	.315	.7531
TDI Total and STICSA State Som	.51	.44	.345	.7304

Note. Teate Depression Inventory (TDI) and State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA) samples $n = 242$, General Behavior Inventory (GBI) sample $n = 222$ as 20 participants failed to complete the GBI.

B/AA = Black African Americans; W/C = White/Caucasians.

Discussion

The present study addressed the construct validity of the Teate Depression Inventory (TDI; Balsamo & Saggino, 2013) by examining convergent and discriminant validity with State-Trait Inventory for Cognitive and Somatic Anxiety (STICSA; Ree, MacLeod, French, & Locke, 2008) and General Behavior Inventory (GBI; Depue, 1987). The primary focus was to assess the validity of the TDI with Black/African Americans, in order to expand the use of reliable and valid assessment tools for identifying internalizing disorders in ethnic minority groups. Because ethnic minority groups are often under-represented in research samples, assessment and treatment may not adequately address their needs. Ultimately, the results provided additional support for the convergent and discriminant validity of the TDI.

It was predicted that correlations would be higher between TDI scores and the GBI-Depression score, compared to other correlations regardless of race/ethnicity. When comparing the correlation between the TDI Total and the GBI-D convergent, correlations were both statistically high and similar for Black/African Americans and White/Caucasians. The convergence of these scales provided strong support for the TDI's construct validity.

Additionally, convergent validity coefficients identified for TDI scores with both Trait and State Cognitive scales of the STICSA were higher, while discriminant validity correlations between TDI scores and both Trait and State Somatic scales of the STICSA were lower. These findings were theoretically logical, considering the symptomology of both anxiety and depression; depressive symptoms are more similar with the cognitive

component of anxiety compared to the somatic component of anxiety. Somatic symptoms of anxiety are less related to depression than cognitive symptoms, thus lower correlations.

The development of the STICSA was intended to increase ability to differentiate types of anxiety symptoms and these results may contribute to further understanding of the test (Ree et al., 2008). A study by Balsamo et al (2013) identified the high correlations between depression scales and anxiety scales, specifically the Beck Depression Inventory (BDI) and the State-Trait Anxiety Inventory (STAI). Exploratory factor analysis suggested a Depression and Anxiety factor of the STAI. Accounting for two factors, the data still indicated high correlations between the BDI and STAI (ranged between .46 and .96) for clinical samples. Comparing previous correlation coefficients of the BDI and STAI to the coefficients produced between the TDI and STICSA provides support for construct validity of the TDI. Convergent validity between the TDI and the Cognitive scales of the STICSA and discriminant validity between the TDI and the Somatic scales of STICSA demonstrated supported the TDI's use as an instrument that measures depression symptoms rather than anxiety symptoms.

The discriminant validity coefficients between the TDI and the GBI Hypomanic/Biphasic scale were predicted to be lower than convergent validity coefficients between the TDI and the GBI Depression scale. These findings were supported by the literature regarding the GBI's utility for differential diagnosis: the GBI D scale captures symptoms of depression while the GBI H/B captures symptoms of mania (Pendergast et al., 2014). When comparing individuals with bipolar disorder and depression, the GBI H/B scale was able to accurately distinguish between the groups according to logistic regression analysis ($R^2 = .56, p < .00005$) (Youngstrom et al., 2001).

Thus, the TDI's discriminant validity with the GBI Hypomanic/Biphasic for both Black/African American and White/Caucasian samples supported previous findings about measurement of mood disorders. However, these results must be interpreted with caution due to the limited sample size.

Although not statistically significant, correlations between TDI scores and STICSA Cognitive scores of Black/African Americans appeared somewhat larger than those of White/Caucasians. This relationship was not predicted, although it supported the need for further research of the TDI with Black/African Americans.

Limitations

Although obtaining participation from Black/African Americans was a priority, the number of B/AA individuals who participated by completing the scales was smaller than anticipated. A potential factor in the small sample of Black/African Americans was noted in previous literature: distrust of mental health professionals (Gary, 2005; Knifton, 2012; Yang et al, 2014). Research indicated that those in the Black/African American community are likely to distrust mental health professionals, interpret mental health challenges as personal and familial, and experience exacerbated stigma for mental illness (Knifton, 2012; Yang et al., 2014). Some individuals may have interpreted this research as threatening and invasive. Further, Black/African Americans who have a mental illness are more likely to feel internalized stigma in addition to the typical stigma of mental illness (Brown et al., 2011). This double stigma may have negatively impacted participation from that particular group of people.

The use of self-report measures had an inherent limitation, considering the reporting of formal diagnosis as well as the completing the questionnaires. The research

was entirely anonymous and there was no confirmation for the accuracy or honesty of participants' responses. Typically, self-report measures are subject to personal bias and rely on perception and self-reflection. Again, responses may have been influenced by cultural factors.

Another limitation of the small sample size was low power (between .10 and .45). The lack of power may have accounted for the failure to detect significant differences between Black/African American and White/Caucasian samples convergent and discriminant validity coefficients. However, it is noteworthy that despite the smaller sample size, the Black/African American correlations were *larger* than the White/Caucasian correlations.

Future Direction

Due to the smaller sample size of Black/African Americans, continued data collection may provide additional support for generalization of validity, as well as allow for additional analyses. A larger sample size will provide more power to adequately test the hypothesis: Black/African American scores on the TDI do not significantly differ from those of White/Caucasians.

Item-level analysis could potentially reveal specific differences between presentation of symptoms in Black/African Americans compared to White/Caucasians. This same approach can apply to different ethnic minority groups or other under-represented groups (e.g. Lesbian/Gay/Bisexual/Transgender/Queer+ community, low socioeconomic status, etc.). Black/African Americans may present symptoms of internalizing disorders differently than what is typically expected. Analyzing the type of items that Black/African Americans endorse may provide insight into symptom

presentation. Structural equation modeling is a large sample statistic, thus a large number of Black/African American participants would be needed to assess item content.

Conclusion

The results of the present study indicated that the TDI demonstrated strong convergent and discriminant validity for Black/African Americans and White/Caucasians. Although the sample size was not optimal, results were stronger than one might expect and supported the construct validity of the TDI. Future analysis and replications may provide similar evidence to the current findings. The small sample size of the Black/African Americans was a notable limitation for generalizing findings to the population at large. Caution is warranted in considering the results, although the findings were promising. In summation, identifying valid instruments for identifying depression and anxiety in Black/African Americans has important implications for improving the quality of detection, diagnosis, and treatment for the community.

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Appendix A

Invitation to Participate/Informed Consent

I am a School Psychology graduate student and conducting research to identify how three different questionnaires that measure symptoms or characteristics of mood and worry compare. In the mental health field, it is essential that valid and reliable tools are used to provide the best services to those in need and your responses to these questions based on your experiences is helpful.

My first task and first goal is to gather more information about how several newer questionnaires work in measuring individual's reports of fear, worry, and various moods.

Participation in the study is anonymous and will be extremely beneficial to building a better understanding of how well these newer questionnaires work. All information will be confidential, but some of the items or questions could make some individuals feel uncomfortable. In the event that participants feel concerned about mental health, contact information for national mental health organizations will be provided at the end of the survey. Although there are not direct benefits to the participants, individuals may gain insight about mental health through completing the survey and help contribute valuable information to the mental health field.

Completing the surveys may take between 20 and 45 minutes. Participation in the study is voluntary, however individuals who participate will have the opportunity to win a \$50 Amazon gift card upon completing the survey.

If you have any questions, please contact the primary investigator, Samantha Rushworth at sjrushworth@eiu.edu, or the faculty sponsor, Dr. Gary Canivez at gcanivez@eiu.edu.

If you have any questions or concerns about the treatment of human participants in this study, you may call or write: Institutional Review Board, Eastern Illinois University, 600 Lincoln Ave., Charleston, IL 61920, Telephone: (217) 581-8576, E-mail: eiuirb@www.eiu.edu

You will be given the opportunity to discuss any questions about your rights as a research subject with a member of the IRB. The IRB is an independent committee composed of members of the University community, as well as lay members of the community not connected with EIU. The IRB has reviewed and approved this study.

Demographic Information

Age:

Sex:

Race/Ethnicity: White/Caucasian, Black/African American, Asian American, Hispanic/Latino American, Native American Indian, Other

Highest Level of Education: Some High School, High School Diploma, GED, Some College, Bachelor's Degree or higher

Sexual Orientation: Homosexual, Heterosexual, Bisexual

Religious Affiliation: Christian, Jewish, Muslim, Hindu, Buddhist, Agnostic, Atheist, Other

Marital Status: Single, Married, Divorced

Formal Mental Health Diagnosis: Anxiety, Depression, Bipolar Disorder, Other

Zip Code

Teate Depression Inventory**State-Trait Inventory for Cognitive and Somatic Anxiety****General Behavior Inventory**

Final Page

If you are looking for more information regarding mental health, please contact a national organization .

National Institute of Mental Health

Website: <https://www.nimh.nih.gov/index.shtml>

Health and Information: <https://www.nimh.nih.gov/health/index.shtml>

Telephone: 1-866-615-6464 (toll-free)

Monday through Friday

8:30 a.m. to 5:00 p.m. ET

Email: nimhinfo@nih.gov

Anxiety and Depression Association of America

Understanding Anxiety: <https://www.adaa.org/understanding-anxiety>

Finding Help: <https://www.adaa.org/finding-help>

Contact Information: <https://www.adaa.org/contact-adaa>

Telephone: 240-485-1001

Email: information@adaa.org

National Alliance on Mental Health

Website: <http://www.nami.org/>

Finding Support: <http://www.nami.org/Find-Support>

Helpline: 800-950-6264

Depression and Bipolar Support Alliance

Website: <http://www.dbsalliance.org/site/PageServer?pagename=home>

Education: http://www.dbsalliance.org/site/PageServer?pagename=education_landing

Toll-free Phone: (800) 826-3632

National Suicide Prevention Line

1-800-273-8255

24 hours, 7 days a week

If you are looking for mental health services, please contact mental health counselors in your community or college campus.