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A Decision Tree Approach To The Assessment Of Posttraumatic Stress Disorder

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A DECISION TREE APPROACH TO THE ASSESSMENT OF POSTTRAUMATIC STRESS DISORDER

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ABSTRACT

Structured diagnostic interviews are widely considered to be the optimal method of assessing symptoms of posttraumatic stress; however few clinicians report using structured assessments to guide clinical practice. One key impediment to the use of structured assessments in clinical practice is the amount of time required for test administration and interpretation. Thus, the present research conducted an initial feasibility study using a normative sample of college-aged adults (N = 88) to develop an assessment protocol based on the Clinician Administered PTSD Scale (CAPS). Decision tree analysis was utilized to identify a subset of predictor variables within the 17 CAPS symptom criteria variables that were most predictive of a diagnosis of posttraumatic stress disorder (PTSD). The algorithm-driven sequence of questions reduced the number of items administered by more than 75% and classified the validation sample at 100.0% accuracy for those without a diagnosis of PTSD and 85.7% accuracy for those with a diagnosis of PTSD. The present study also demonstrated the feasibility of computer administration of the algorithm-based sequence in a normative sample of college-aged adults (N = 197). The algorithm-based, computer-administered sequence had high sensitivity and specificity and excellent diagnostic agreement with the computer-administered full CAPS sequence. These results demonstrated the feasibility of developing a protocol to assess PTSD in a way that imposes little assessment burden while still providing a reliable diagnosis.

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I. INTRODUCTION

Posttraumatic Stress Disorder (PTSD) is a complex and debilitating condition that may develop following exposure to extreme stressors, including such things as childhood physical or sexual abuse, domestic violence, sexual assault, combat, life-threatening illness, and natural disasters. PTSD has been defined as a mental health disorder characterized by the direct or indirect experience of a potentially traumatic event, resulting in reexperiencing of the trauma, avoidance of stimuli associated with the trauma, emotional numbing, and symptoms of hyperarousal (American Psychiatric Association, 2000). PTSD is a complex disorder that can be associated with significant disability and functional impairments (Foa, Keane, Friedman, & Cohen, 2009).

PTSD represents a significant public health concern that affects between 6 – 8% of the American adult population (Breslau, Peterson, Poisson, Schultz, & Lucia, 2004; Breslau et al., 1998; Kessler et al., 2005). The disorder is associated with psychosocial difficulties including depression (Breslau, Davis, Andreski, & Peterson, 1991), substance use disorders (Cottler, Compton, Mager, Spitznagel, & Janca, 1992), and suicidality (Kramer, Lindy, Green, & Grace, 1994). Research also suggests that traumatized individuals are at an increased risk for developing medical illnesses (Weisberg, et al., 2002) and have a higher mortality rate (Boscarino, 2008). The negative sequelae of traumatic stress underscore the serious nature of the phenomenon and the importance of appropriate and timely identification of individuals who suffer from these

reactions. Research suggests that PTSD is often under-diagnosed or misdiagnosed and that the disorder is frequently overlooked in clinical practice when symptoms of PTSD are not the presenting complaint (Davidson & Smith, 1990; Mkize, 2008; Sheeran & Zimmerman, 2002; Zimmerman & Mattia, 1999). In light of this, there is a critical need to obtain reliable and valid information concerning PTSD symptoms among individuals presenting for psychiatric treatment.

Structured diagnostic interviews are widely considered to be the optimal method of PTSD assessment (American Academy of Child and Adolescent Psychiatry (AACAP), 2010; Cohen, Mannarino, & Deblinger, 2006; Weathers, Keane, & Foa, 2009) and hold a number of advantages over unstructured interviews. Research suggests that structured interviews, as compared with unstructured interviews, tend to provide a more comprehensive coverage of the domain of interest (Garb, 2005) and that when using unstructured interviews, clinicians often fail to probe important events (Cascardi, Mueser, DeGiralomo, & Murrin, 1996; Garb, 2005). Interrater reliability has also been shown to be higher for structured interviews than for unstructured interviews (Anthony, & Barlow, 2002; Wood, Garb, Lilienfeld, & Neziorski, 2002). Further, Zimmerman and Mattia (1999) found that the prevalence of PTSD was two times higher among psychiatric outpatients assessed using a structured diagnostic interview than among those diagnosed using an unstructured interview.

Despite the known benefits of using structured diagnostic interviews, only a small percentage of clinicians report using structured assessments to guide clinical practice (Hatfield, & Ogles, 2004). Reasons for this lack of implementation are not entirely clear, but one key impediment identified in the literature is the amount of time required for test administration and interpretation (Garland, Kruse, & Aarons, 2003). In clinical settings, particularly those that rely

on billable hours for revenue to support operations, the time spent to conduct structured, comprehensive assessment procedures is expensive (Ebesutani, Bernstein, Chorpita, & Weisz, 2012). Thus, these procedures are not always readily feasible in clinical practice settings. In light of this, a need exists to employ procedures that balance structure and objectivity of assessments against personnel time and cost (Chorpita & Nakamura, 2008).

One potential method for doing so involves the use of screening instruments to guide subsequent interview administration. Structured interviews are resource intensive, often requiring clinicians with advanced training to administer a lengthy assessment individually with each client (Guy, Poythress, Douglas, Skeem, & Edens, 2008). In contrast to structured interviews, self-report measures are relatively concise, involve minimal clinician time, and generally entail a shorter burden of administration. However, self-report instruments present certain drawbacks, such as the possibility of respondents not understanding the questions and the inability to clarify and assess the validity of the criteria upon which respondents endorsed particular items (Smith, Klein, & Benjamin, 2003). Guy and colleagues (2008) suggest that the best clinical practice utilizes the advantages of both assessment modalities through the use of a reliable and valid self-report instrument to inform the use of a structured interview. For example, individuals with high scores on a self-report measure of PTSD would have a greater likelihood of receiving a PTSD diagnosis via a structured interview. Thus, when these individuals are encountered in clinical practice, their scores on the self-report would indicate the need for further assessment using a structured interview. Conversely, individuals with lower scores on the same self-report would not necessarily be referred for more intensive assessment. This procedure is particularly useful in instances in which there may be a shortage of clinicians or significant demands on clinician time, such as community mental health centers. Efficient identification of

individuals with the greatest risk for psychopathology would allow available resources to be focused on those who are most likely to be in need of services (Foa, Johnson, Feeny, & Treadwell, 2001).

Another potential method for balancing structure and objectivity of assessments against personnel time and cost involves the use of decision tree analysis. Decision tree analysis is a statistical classification procedure that involves the application of specific algorithms for extracting patterns from data. The analysis uses a set of algorithms to determine the variables that optimally predict a dependent measure by partitioning a sample into progressively smaller subsets that are increasingly homogeneous on the outcome measure (Witten, & Frank, 2000). Each subset is represented by a node in the tree structure. The tree structure includes a root node, which includes all data, subsequent internal nodes, and a set of terminal nodes, also known as leaves. Decision tree analysis determines the most important predictor variables and how they interact with one another to differentiate groups along the outcome variable of interest (Liu, Yang, Ramsay, Li, & Coid, 2011). When the outcome variable is categorical in nature, the process functions via binary recursive partitioning, in which each group is split into two subgroups (Lewis, 2000). Recursive refers to the fact that the binary splitting process is carried out repeatedly. Thus within the tree structure, the root node and each internal node (i.e. parent nodes) are split into two subsequent nodes (i.e. child nodes), which are then split, forming additional child nodes (Lewis, 2000).

All individuals begin as a single group and the algorithm then systematically divides the cases into two subgroups, examining one variable at a time and splitting the cases on the basis of a dividing line for that variable (e.g. age > 45 or age < 45). The splitting is repeated until no further significant divisions can be found. To choose the best splitter variable at each node, the

algorithm examines all possible predictor variables and selects the one that results in binary groups that are the most homogeneous with regard to the outcome variable (Lemon, Roy, Clark, Friedman, & Rakowski, 2003).

When applied to assessment, a decision tree approach represents an adaptive and contingent model in which the specific questions to be asked depend on the answers given to preceding questions (Steadman et al., 2000). An initial question is asked of each respondent, and depending on each person's response to that question, one of several second questions is asked. This process is repeated with subsequent questions until each respondent is classified into one of two categories. When assessing for psychopathology the categories would be "clinically significant symptoms present" or "clinically significant symptoms absent".

Decision tree analysis represents a potential method of engendering length reduction of structured diagnostic interviews. The decision tree algorithm incorporates items that are most predictive of classification and omits those that do not significantly differentiate between diagnostic groups, thereby reducing the total number of items administered. The use of a predictive model, based on efficiently gathered input data, could reduce the administration and scoring time required for an interview, making it more easily implemented and thus more regularly used to inform treatment planning. In this context, efficiency is defined in terms of clinician time required to perform a task (e.g. administer structured interviews, provide therapy services, etc.). A process that is efficient reduces clinician time while maintaining the quality and accuracy of services. Due in part to the proliferation of managed health care, clinicians and agencies have been under increasing pressure to increase the efficiency and cost-effectiveness of their time spent with clients (Chorpita, & Nakamura, 2008; Richardson, & Austad, 1991).

One potential method for increasing efficiency and cost-effectiveness is through the use of computerized assessments. As noted previously, the administration of structured interviews can be time-consuming, and thus computer administration can lead to a significant savings in clinician time (Garb, 2007). Consequently, computer-administered interviews have the potential to reduce assessment burden for clinicians and agencies, making them more likely to be utilized in clinical practice (Ebesutani et al., 2012). A number of studies have demonstrated good reliability and validity for computer-administered interviews (Lewis, 1994; Jewell, Handwerk, Almquist, & Lucas, 2004; Reilly-Harrington, et al., 2010) and a large body of literature indicates that computer interviews are well accepted by most clients (Bachman, 2003; Dignon, 1996; Hoyer, Ruhl, Scholz, & Wittchen, 2006; Petrie, & Abell, 1994; Rosenman, Levings, & Kosten, 1997; Shakeshaft, Bowman, & Sanson-Fisher, 1998). An additional advantage of computer interviews is the elimination of data entry and scoring errors because the computer automatically enters responses and performs needed calculations.

Only a single study has investigated computerized administration for any version of the CAPS. Neal, Busuttil, Herapath, and Strike (1994) developed and investigated a computerized version of the Clinician-Administered PTSD Scale-1 (CAPS-1; Blake et al., 1990), which was an earlier version of the current CAPS designed to assess DSM-III PTSD symptom criteria. Neal and colleagues (1994) found that the computerized CAPS-1 demonstrated strong psychometric properties, including high internal consistency for the total scale (α = .96) and excellent test-retest reliability (α = .99) with 24 hours between administrations. The computer administered CAPS-1 also demonstrated high interrater reliability with the in-person administration of the

CAPS-1, (κ = .90) and good convergent validity between the two types of administration (r = .95; Neal, Busuttil, Herepak, & Strike, 1994).

Among methods of reducing assessment burden, the use of self-report instruments and computer administration are well documented in the literature (e.g. Chorpita & Nakamura, 2008; Lucas et al., 2000; Neal et al., 1994; Sarrazin et al., 2002); the use of decision tree analysis, however, is much less common. The literature on decision tree analysis that is germane to clinical psychological assessment typically focuses on actuarial models of predicting the risk of violent behavior (Liu et al., 2011; Stalans, Yarnold, Seng, Olson, & Repp, 2004; Steadman et al., 2000; Thomas et al., 2005) or suicide risk (Mann et al., 2008; Batterham, & Christensen, 2012; Tiet, Ilgen, Byrnes, & Moos, 2006; Buri, Von Bonin, Strik, & Moggi, 2009; Ilgen et al., 2009). An exception to this is a study that was recently published by Ebesutani and colleagues (2012). The authors developed an assessment protocol based on 2 child and 2 parent self-report measures. Using decision tree analysis they were able to integrate information from multiple informants (i.e. parent and child) and identify a set of predictors and cutoff scores that could be used to inform treatment need related to anxiety, depression, attention-deficit/hyperactivity disorder (ADHD), and disruptive behavior problems.

Three decision trees were generated in order to address the following questions: (1) Is any form of treatment needed? (2) Should an internalizing or externalizing treatment protocol be utilized?; and (3) Which disorder-specific protocol should be utilized? The decision-tree approach was compared with the commonly used "best estimate" approach, in which trained assessors and supervisors integrate information gathered from child and parent structured interviews and self-reports to determine treatment need. With treatment determinations based on

the best estimate procedure used as the criterion measure, the decision tree rules demonstrated excellent accuracy in classifying children as either in need of some form of treatment or not in need of any treatment, with a 94% accuracy rate. The algorithm-based approach demonstrated good accuracy in determining whether individuals needed an internalizing or externalizing treatment protocol, with a classification accuracy rate of 83%. The third decision tree entailed the highest level of specificity regarding treatment and was generated to determine whether anxiety, depression, ADHD, disruptive behavior, or no treatment was needed. This algorithm demonstrated fair accuracy, with an accuracy rate of 79%, relative to the best estimate assessment procedure. The results of this study demonstrate the feasibility of using decision tree analysis to reduce assessment burden while still maintaining scientific methods for treatment planning.

The points presented thus far converge to demonstrate a need for efficient evidence-based assessments of PTSD and demonstrate the feasibility of procedures such as the use of self-report measures, computer administration, and decision tree analysis. When one considers the number of people affected by PTSD, in combination with the serious negative sequelae of the disorder, the importance of reliable and thorough PTSD assessment measures that are viable in clinical practice is difficult to overstate (Ruggiero, Del Ben, Scotti, & Rabalais, 2003). The most supported method of PTSD assessment is the structured diagnostic interview; however, the length and administration time associated with this procedure have likely been key impediments to its use in clinical practice.

As noted previously, the use of self-report measures, computer administration, and decision tree analysis are all methods of potentially reducing assessment burden, which will in turn make the use of empirically supported structured interviews more viable for “real world”

settings. The study conducted by Ebesutani et al. (2012) is a tangible example of some of these processes at work and demonstrates their feasibility; therefore the present study applies these methods to a new area, the assessment of PTSD, in an effort to develop a PTSD assessment protocol that is automated, short, and not error-prone.

IV. . PRESENT STUDY

The objective of the present study was to investigate the utility of a PTSD assessment protocol that reduces administration burden through the use of (a) a relatively brief self-report measure, (b) decision tree algorithms to guide the interview sequence, and (c) computer administration and thus could possibly promote greater use of evidence-based assessment in practice. This was accomplished through the use of a 2-phase study.

Phase 1. Specifically, data collected via a widely disseminated self-report instrument (the PTSD Check List – Civilian Version; PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993) were used to predict diagnoses based on a structured interview for PTSD (the Clinician-Administered PTSD Scale; CAPS, Blake et al., 1995). Using a screening measure could reduce assessment burden by identifying individuals who are likely experiencing significant PTSD symptomatology, while those who report few to no symptoms of PTSD would not be referred for further assessment. Additionally, decision tree analysis was utilized to generate predictive algorithms for diagnoses based on the CAPS. In this way, the number of questions to be asked was reduced, thereby reducing assessment time.

Phase 2. This phase of the study included computer administration of the algorithm-based CAPS sequence, which was compared with computer administration of the full CAPS sequence.

Clinician Administered PTSD Scale. The CAPS was chosen as the focus of this study for a number of reasons. The CAPS is widely considered to be the "gold standard" in PTSD assessment (Foa & Tolin, 2000; International Society for Traumatic Stress Studies (ISTSS), 2013) and is one of the most widely used structured interviews used for the assessment of PTSD (Weathers, Keane, & Davidson, 2001). The instrument is well-validated and has demonstrated strong psychometric properties across many different trauma populations, including combat veterans (Asmundson et al., 2000, Blake et al., 1995; Hyer, Summers, Boyd, Litaker, & Boudewyns, 1996; Simms, Watson, & Doebbeling, 2002), victims of community violence (Griffin, Uhlmansiek, Resick, & Mechanic, 2004), sexual assault victims (Zlotnick, Davidson, Shea, & Pearlstein, 1996), burn victims (Fleming, & Difede, 1999), victims of motor vehicle accidents (Shalev, Freedman, Peri, Brandes, & Sahar, 1997), disaster workers exposed to the World Trade Center ground zero (Palmieri, Weathers, Difede, & King, 2007), and refugees exposed to genocide (Hinton et al., 2006). Questions map directly onto all PTSD symptoms in the three clusters of the DSM-IV TR (reexperiencing, avoidance/numbing, and hyperarousal) and the measure provides a PTSD symptom severity score as well as an assessment of functional impairment, improvement since baseline, and the validity of responses. The instrument is available without cost and has a great deal of utility for research as well as clinical applications. Its clinical utility, however, has been hindered by the length and cumbersomeness of the instrument (Bovin, & Weathers, 2012; Foa, & Tolin, 2000; ISTSS, 2013; Weathers, Keane, & Foa, 2009). Therefore, the present study sought to address the need for a more concise structured interview for PTSD assessment through the examination of a protocol that incorporated the use of decision tree analysis and computer administration. (A detailed description of the

psychometric properties of the CAPS is included in the instrument description listed in the procedures section below.)

Hypotheses. Based on the literature regarding (a) convergence between the CAPS and PCL-C (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996; Palmiere et al., 2007), (b) decision tree analysis (Ebesutani et al., 2012), and (c) computer-administration of diagnostic interviews (Garb, 2007; Neal et al. , 1994), it was hypothesized that (a) the PCL-C total score would significantly predict PTSD diagnosis according to the CAPS, (b) diagnoses derived from the decision tree approach would closely correspond to those from the full CAPS interview, and (c) the reliability and validity of the computerized CAPS would be supported via adequate internal consistency, convergent validity, and divergent validity.

V. METHODS STUDY PHASE 1

Participants

Participants were 88 undergraduate students at the University of Mississippi. The mean age of the sample was 18.93 years (SD = 1.19, range = 18– 24) and the group consisted of 79.8% females. The ethnic makeup of the sample was 78.3% Caucasian, 15.7% African American, 6% Multiethnic, and 1.2% other ethnicities. Approximately 50% of the participants for this study were recruited according to their score on the PCL-C, a screening measure that was included as a component of the assessment protocol used in Introduction to Psychology (PSY 201) courses (IRB protocol 12-031). If a participant scored in the clinically significant range on the PCL-C, the primary investigator contacted him/her via email to request participation in the study. This procedure was implemented in order to increase the likelihood of encountering participants who meet criteria for a diagnosis of PTSD, given the low base rate of PTSD in the general population. The remaining 50% of participants were recruited online through the Sona program sponsored by the Department of Psychology, regardless of their score on the PCL-C. All participants were rewarded for participation with extra-credit and/or research participation fulfillment in their respective courses.

Measures

Clinician-Administered PTSD Scale (CAPS; Blake et al., 1995). The CAPS is a 30-item structured diagnostic interview designed to assess the frequency and intensity of PTSD symptoms. The instrument includes 17 items that assess DSM-IV symptom criteria for PTSD; 5 items that assess onset, duration, subjective distress, and functional impairment; 1 item that assesses overall response validity, 2 items that assess symptom severity and symptom improvement, and 5 items that assess associated features. The CAPS assesses exposure to potentially traumatic events through the Life Events Checklist (LEC; Blake et al., 1995) and a trauma inquiry section that assesses both Criterion A.1 (experiencing or witnessing an event that involved actual or threatened death or injury, or a threat to physical integrity; APA, 2000) and A.2 (the person's response involved intense fear, helplessness, or horror; APA, 2000).

The instrument assesses the frequency and intensity of the 17 DSM-IV symptoms of PTSD using a 5-point Likert-type scale ranging from 0 to 4. Frequency and intensity scores for each item can be summed to determine an individual symptom severity score, ranging from 0 to 8, with higher scores indicating greater symptom severity. Frequency and intensity scores can be summed for all 17 core items to yield a total PTSD severity score, ranging from 0 to 136. According to the authors (Blake et al., 1995) PTSD classification should be assigned as follows: 0-19: asymptomatic/few symptoms, 20-39: mild PTSD/subthreshold, 40-59: moderate PTSD/threshold; 60-79: severe PTSD symptoms, >79: extreme PTSD symptoms.

The CAPS has demonstrated strong psychometric properties, including high internal consistency for the 3 symptom clusters (α = .85 to α = .87) and for the total score (α = .94), and high interrater reliabilities, ranging from .92 to 1.0 for "frequency" ratings and .93 to .98 for

"intensity ratings" (Blake et al., 1995). Other studies have also found good internal consistency for the symptom clusters (α = .87 to α = .97) and the total score (α = .94 to α = .97; Hyer et al., 1996; Shalev et al., 1997; Weathers, Russio, & Keane, 1999). The instrument has shown good convergent validity with other measures of PTSD, including the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Gibbon, & Williams, 1995) PTSD Module (*r* = .83), the PTSD Symptom Scale–Interview Version (PSS-I; Foa, Riggs, Dancu, &Rothbaum, 1993; *r* = .87), and the Mississippi Scale for Combat-Related PTSD (Foa, & Tolin, 2000; Keane, Caddell, & Taylor, 1988; *r* = .91). Weathers, Ruscio, & Keane (1997) found that a CAPS scoring rule of 1 and 2 (i.e. frequency rating of 1 and intensity rating of 2 required to count the item as a symptom) and continuous scoring with a cutoff of 65 both yielded kappa coefficients of .72 with the SCID PTSD diagnosis as the criterion.

Confirmatory factor analysis (CFA) has suggested that the factor structure of the CAPS is best represented by a four-factor model, with factors corresponding to re-experiencing, avoidance, emotional numbing, and hyperarousal (King, Leskin, King, & Weathers; 1998; Palmiere et al., 2007). Although this 4-factor model includes an additional factor as compared with the DSM-IV conceptualization of the structure of PTSD (separation of the avoidance and emotional numbing cluster into 2 separate clusters), the model is consistent with a large body of literature suggesting that PTSD is best represented by a 4-factor structure (e.g. King et al., 1998; Simms et al., 2002; Yufik, & Simms, 2010).

Posttraumatic Stress Disorder Checklist – Civilian Version (PCL-C; Weathers, Litz, Herman, Huska, & Keane, 1993). The PCL-C is a self-report measure designed to assess PTSD symptom severity and diagnosis in adults who have experienced a potentially traumatic event.

Similar to the interview-based CAPS, the measure includes 17 items that map onto DSM-IV criteria. The questions ask respondents to indicate the degree to which they have been bothered by the 17 PTSD symptoms during the past month, using a 5-point Likert-type scale ranging from 1 (*not at all*) to 5 (*extremely*). Individual item scores can be summed to provide a continuous measure of symptom severity for each of the 3 symptom clusters (reexperiencing, avoidance/numbing, and hyperarousal) and for total symptom severity. The PCL can also be scored dichotomously to provide a diagnostic status, with any item rated 3 (*moderately)* or above included as a symptom endorsement. PTSD diagnosis is determined by following the DSM-IV diagnostic criteria of at least one re-experiencing symptom (PCL items 1-5), at least three avoidance and numbing symptoms (PCL items 6-12), and at least 2 hyperarousal symptoms (PCL items 13-17).

There are currently 3 versions of the PCL, which differ only in the description of the traumatic experience for the first 8 items. The civilian version (PCL-C) refers to "a stressful experience from the past", the military version (PCL-M) refers to "a stressful military experience", and the specific version (PCL-S) refers to "the stressful experience", which is identified by the respondent at the beginning of the measure (Weathers et al., 1993).

The PCL is one of the most widely used self-report measures of PTSD (Elhai, Gray, Kashdan, & Franklin, 2005). The instrument is well validated and has demonstrated strong psychometric properties. Although the first psychometric investigation was carried out with combat veterans (Weathers et al., 1993), the strong psychometric properties of the PCL have been replicated in a variety of other trauma populations (e.g. Andrykowski, Cordova, Studts, & Miller, 1998; Bollinger, Cuevas, Vielhauer, Morgan, & Keane, 2008; Grubaugh, Elhai, Cusack, wells, & Frueh, 2007; Harrington, & Newman, 2007; McDonald & Calhoun, 2010; Ruggiero et

al., 2003; Walker, Newman, Dobie, Ciechanowski, & Katon., 2002). In the original psychometric investigation of the PCL, Weathers et al. (1993) reported high internal consistency for the total symptom severity score (α = .96) and excellent test-retest reliability (r = .96). Additionally, the PCL has demonstrated strong correlation with other measures of PTSD, including the CAPS (r =.93), the MMPI-2 Keane PTSD Scale (PK Scale; Keane, Malloy, & Fairbank, 1984; r = .77), and the Impact of Events Scale (IES; Horowitz, Wilner, & Alvarez, 1979; r = .90) (Blanchard, Jones-Alexander, Buckley, & Forneris, 1996).

When utilizing continuous scoring, a cutoff score of 50 has conventionally been recommended to indicate likely PTSD among veterans (Weathers et al., 1993), whereas a cutoff score of 44 is recommended for non-military populations (Blanchard et al., 1996). Although the aforementioned cutoff scores have conventionally been used, a number of studies have suggested that other cutoff scores may be more appropriate. Studies have supported cutoff scores ranging from 30 (Walker et al., 2002) to 60 (Keane, Kutter, Niles, & Krinsley, 2008), resulting in estimates of PTSD prevalence rates that vary widely. Using a cutoff score of 60, Keene et al. (2008) found a PTSD prevalence rate of 22% among a sample of community–dwelling veterans. Alternatively, using a cutoff score of 30, Walker et al. (2002) found a prevalence rate of 11% among health maintenance organization (HMO) patients. Using a cutoff score of 38, Dobie et al. (2002) encountered a PTSD prevalence rate of 36% among a sample of Veterans Administration (VA) primary care patients, whereas Grubaugh et al. (2007) reported that a cutoff score of 54 provided a PTSD prevalence rate of 59% among patients with psychotic disorders. Research indicates that the optimal cutoff score for the PCL varies depending on trauma type, setting, and

population being assessed; however, the choice of cutoff scores in specific populations still needs further investigation (Bovin & Weathers, 2012).

Terhakopian and colleagues (2008) suggest that given the inconsistency across studies, the best approach in selecting a cutoff score for the PCL is to consider the prevalence rate of PTSD in the population that will be assessed. The authors state that in populations with a PTSD base rate of 15% or lower, cutoff scores below 44 are likely to substantially overestimate the prevalence of the disorder (Terhakopian et al., 2008). Other researchers have pointed out that when utilizing the PCL as a screening instrument, choosing a cutoff score with high sensitivity is preferred in order to maximize detection of possible cases (McDonald & Calhoun, 2010; National Center for PTSD, 2012; Ruggiero et al., 2003). Considering the rate of PTSD in the general adult population is estimated to be well below 15% (Breslau et al., 1998; Breslau et al., 2004; Kessler et al., 2005), in combination with the need for high sensitivity of screening measures, a cutoff score of 44 was selected for the present study.

Research suggests that the PCL is best represented by a 4-factor model. Although this is somewhat at odds with scoring suggested by the instrument's authors, the original subscales were based on DSM-IV symptom clusters and were constructed in the absence of psychometric data regarding the instrument's factor structure. Studies suggest that a 4-factor model with individual factors of re-experiencing, avoidance, emotional numbing, and hyperarousal is the best fitting model for the instrument (Asmundson et al., 2000; Asmundson, Wright, McCreary, & Pedlar, 2003; Marshall, 2004; Palmieri et al., 2007). The PCL was chosen for use in the present study due to the ubiquity of the instrument in combination with its factor structure, which parallels that of the CAPS.

Life Events Checklist (LEC; Blake et al., 1995). The LEC is a 17-item self-report measure designed to assess lifetime exposure to potentially traumatic events. The measure utilizes a 5-point nominal scale with the following response options: *happened to me, witnessed it, learned about it, not sure*, and *does not apply*. The LEC was developed concurrently with the CAPS and is administered prior to the CAPS in order to screen for potential Criterion A events. Although the instrument is typically utilized as a checklist to inform subsequent CAPS questions, a total score can be calculated by scoring items dichotomously, with items in which the respondent endorsed that the event happened to them personally receiving a score of 1 and all other responses receiving a score of 0. The LEC has demonstrated adequate psychometric properties (Gray, Litz, Hsu, & Lombardo, 2004).

Center for Epidemiologic Studies-Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-item self-report measure of depression. The questions assess the frequency and severity of current depressive symptoms, using a 4-point Likert-type scale ranging from 0 (*seldom*) to 3 (*most of the time*). Four items are reverse coded in an attempt to control for response bias. A total score is calculated by reverse coding scores for items 4, 8, 12, and 16 and then summing all item scores. Total scores range from 0 to 60 with higher scores indicating greater depressive symptoms. A cutoff score of 16 is used to identify individuals with a higher probability of clinically significant depressive symptoms (Andersen, Carter, Malmgren, & Patrick, 1994). Scores in the range of 16 to 26 are classified as mild depression and scores of 27 or greater are classified as major depressive disorder (Zich, Attkisson, & Greenfield, 1990).

The CES-D is one of the most widely used screening tools for depression in both epidemiological and clinical research (Van Dam, & Earleywine, 2011; Edwards, Cheavens, Cukriwicz, & Heiy, 2010). The instrument has demonstrated strong psychometric properties,

including high internal consistency for the total score (α = .85 to α =.90), and fair test-retest reliability, ranging from .51 to .67 with a time between administration ranging from 2 to 8 weeks (Radloff, 1977). The instrument correlates well with other measures of depression, including the Symptom Checklist-90 (Derogatis, Lipman, & Covi, 1973) depression subscale (r = .73 to r = .79) and the Hamilton Rating Scale (Hamilton, 1960; r = .50 to r = .80; Radloff, 1977). Confirmatory factor analyses have suggested that a four-factor model provides the best fit for the CES-D, with individual factors representing depressed affect, lack of positive affect, somatic symptoms, and interpersonal difficulties (Clark, Aneshensel, Frerichs, & Morgan, 1981; Devins et al., 1988; Roberts, Vernon, & Rhoades, 1989). A study by Hertzog and colleagues (1990), however, found that a single-factor structure fit equally well.

Depression Anxiety Stress Scales 21 (DASS-21; Lovibond, & Lovibond, 1995). The DASS-21 is a 21-item self-report measure of depression, anxiety, and stress. The DASS-21 is a short form of the DASS (Lovibond, & Lovibond, 1995), a 42-item self-report measure of the same constructs. Items inquire about symptoms experienced over the previous week and are rated on a 4-point Likert-type scale ranging from 0 (*did not apply to me at all over the last week*) to 3 (*applied to me very much or most of the time over the past week*). The DASS-21 provides a total scale score as well as subscale scores for depression, anxiety, and stress. To compute subscale scores, individual item scores that correspond with each subscale are summed. The final score of each subscale is then multiplied by 2, which enables the use of the original DASS (42 items) scoring criteria. In order to compute a total score, each total subscale score (which has already been multiplied by 2) is summed. The instrument has demonstrated strong psychometric properties, including excellent reliability for the total score (α = .93) and good to excellent

reliability for the subscale scores (depression α = .88; anxiety α = .82; stress α = .90; Osman et al., 2012). The concurrent validity of the DASS-21 has been supported by moderate to high correlation (r = .40 to r = .65) with related measures of depression and anxiety (Antony, Bieling, Cox, Enns, & Swinson, 1998; Brown, Chorpita, Korotitsch, & Barlow, 1997; Crawford, & Henry, 2003). There is disagreement in the literature regarding the factor structure of the instrument. Exploratory and confirmatory factor analyses have found support for single-factor, 2-factor, and 4-factor models (Henry, & Crawford, 2005; Osman et al., 2012).

Procedures

Administration of the Instruments. Upon arriving at the lab, each participant was given a more detailed explanation of the procedures and asked to provide written informed consent. Next, the participant was given a questionnaire packet to complete. Next the participant was assessed for the presence of PTSD symptomatology using the CAPS. Participants were given the option of receiving feedback regarding their data. If a participant indicated that he or she wanted to receive feedback, it was provided by a Ph.D. level supervisor, Dr. John Young. If feedback was requested, a time was scheduled with the participant for Dr. Young to deliver the feedback. Four participants requested and were provided with feedback. All participants were given a list of community psychological resources, including services in both on-campus and off-campus locations (see Appendix D).

Data Analysis

Means and standard deviations for all instruments utilized in study phase 1 can be found in Table 1.

Logistic Regression. Logistic regression was carried out using SPSS 20.0 to determine the extent to which the PCL-C total score predicted a CAPS diagnosis of PTSD. As recommended by Hair et al. (1998), classification was considered accurate if it provided a 25% improvement over the accuracy rate achievable by chance alone. It was expected that the PCL-C total score would provide accurate classification of PTSD diagnoses and would significantly predict diagnosis according to the CAPS at the 0.05 level.

Decision Tree Analysis. Decision tree analysis was conducted using the Classification Tree module of SPSS 20.0 to identify an optimal algorithm for CAPS administration. To develop the decision tree model, the chi-squared automatic interaction detector (CHAID) growth method was utilized. This technique uses a systematic algorithm to detect the strongest relationships between predictors and the outcome variable at each level of the tree. CHAID is similar to regression analysis, in that it selects the best predictors that account for the most explained variance; however, CHAID analysis goes one step further, and identifies those variables that most differentiate each category of the outcome variable (Horner, Fireman, & Wang, 2010). CHAID analysis uses chi-squared tests at each subdivision to determine which input variable best predicts the outcome variable for each split (Chan, Cheing, Chung Chan, Rosenthal, & Chronister, 2006). Correction for multiple comparisons carried out in the procedure is accomplished through the use of Bonferroni adjusted *p* values with an overall error rate of .05 (Chan et al., 2006).

Internal Consistency. To evaluate internal consistency, Cronbach's alpha coefficients were calculated for each measure used in this phase of the study.

Severity of PTSD Symptoms. In order to examine the convergent validity of CAPS total PTSD severity score, means and standard deviations for the total score were calculated

separately for each of 2 subgroups: (a) for those with a PTSD diagnosis as determined by scores on the PCL-C, and (b) for those without a PTSD diagnosis according to the PCL-C. It was expected that the mean CAPS score of individuals with a PTSD diagnosis according to the PCL-C would be significantly higher than the mean score from individuals without a PTSD diagnosis according to the PCL-C. A *t*-test was performed in order to compare these scores.

Convergent Validity. Scores on the PCL-C were used as the external criterion for convergent validity of the CAPS total PTSD severity score. Pearson product-moment correlation coefficients were calculated between the CAPS total score and the PCL-C total score. Based on correlations reported in other psychometric studies of the CAPS (Blanchard et al., 1996; Bollinger et al., 2008; Grubaugh et al., 2007; Harrington, & Newman, 2007), it was predicted that correlation coefficients would be high (i.e., in the range of .70 – .80).

Divergent Validity. To examine divergent validity, Pearson product-moment correlation coefficients were calculated between the CAPS total PTSD severity score and depression scores from the CES-D and anxiety scores from the DASS-21. It was predicted that the correlations with anxiety and depression would be lower than the correlation with the PCL-C. Fisher's z-test for correlated correlations (Meng, Rosenthal, & Rubin, 1992) was utilized to statistically compare the magnitude of these correlations. It was hypothesized that the CAPS total PTSD severity score would be significantly less correlated with the CES-D and DASS-21 (less related constructs) than with the PCL-C (a more related construct to PTSD symptoms).

VI. . RESULTS STUDY PHASE 1

Logistic Regression. Results of the logistic analysis indicated that the PCL-C total score was an overall significant predictor of the CAPS PTSD diagnosis, χ^2 (1, 78) = 8.67, p = .003. The model provided a correct prediction rate of 98.5% for individuals without PTSD according to the CAPS, thus indicating a high degree of specificity. The instrument's accurate categorization of individuals with PTSD, however, was much lower at 20.0%. Thus, these results indicated a relatively limited sensitivity in terms of diagnostic prediction.

Decision Tree Analysis. The results of the more detailed administration of the CAPS yielded more robust results. For the decision tree analysis with all 17 CAPS symptom criteria as potential predictor variables and PTSD diagnosis as the criterion variable, a solution was found with a classification accuracy rate of 100% for individuals with PTSD and 100% for individuals without PTSD. Put another way, these results elucidated an administration algorithm that contained no decrement in either specificity or sensitivity in comparison to using all 17 questions. Figure 1 shows the branching patterns predicting CAPS PTSD diagnosis. The best overall predictor variable is item number 11 (restricted range of affect). For individuals endorsing this initial symptom the next variable contributing to optimized prediction of a PTSD diagnosis was item 7 (efforts to avoid activities, places, or people that arouse recollections of the

trauma). For individuals without a restricted range of affect (i.e., a negative response to item 11) the next most optimal variable in the tree was item number 5 (physiological reactivity on exposure to trauma cues). As seen in Figure 1, the tree continues to branch downward with subsequent splitter variables determined by answers to previous questions. Other splitter variables included in the model were item 1 (recurrent and intrusive distressing memories of the event), item 2 (recurrent distressing dreams of the event), item 13 (difficulty falling or staying asleep), and item 16 (hypervigilance). According to the model, individuals are best administered one of 6 series of questions (depending upon their answers at each point): (a) items 11, 7, and 1; (b) items 11, 7, 1, and 5; (c) items 11, 7, and 2; (d) items 11, 7, 2, and 13; (e) items 11 and 5; or (f) items 11, 5, and 16. Thus the lowest number of items required for fully accurate PTSD classification in comparison to the overall CAPS is 2, whereas the highest is only 4.

Internal Consistency. The CAPS total PTSD severity score as well as the PCL-C total score demonstrated high internal consistency, with alpha coefficients of 0.94 and 0.90 respectively. The CES-D total score exhibited good internal consistency, with an alpha coefficient of .88, while the DASS-21 anxiety scale score exhibited fair internal consistency, with an alpha coefficient of .76. Thus, despite a range of reliability noted in the instruments implemented, all measures produced results sufficient to support their usage in this study.

Severity of PTSD Symptoms. Due to poor sensitivity exhibited by the PCL-C, correspondence between the CAPS and PCL-C was also examined by utilizing CAPS symptom severity scores to compare PCL-C categorization (PTSD vs. no PTSD). The mean CAPS total PTSD severity score of individuals with a PTSD diagnosis as determined by scores on the PCL-C was 39.20 (SD= 25.60), which was significantly higher than the mean score of 15.52 (SD =

15.02) from individuals without a PTSD diagnosis as determined by scores on the PCL-C (t (76) = 5.01, $p < .001$).

Convergent Validity. Convergent validity of the CAPS was supported, as evidenced by the CAPS total PTSD severity score correlating positively and significantly with the PCL-C total scale score ($r = .57$, $p < .001$).

Discriminant Validity. In terms of discriminant validity, as predicted, the CAPS was significantly less correlated with the CES-D ($r = .21$, $p = .07$) than with the PCL-C ($r = .57$, $p < .001$) as determined by the results of a Fisher's z-test (Meng et al., 1992; z (88) = 2.6, $p = 0.003$). Conversely, no significant difference was observed between correlations of the CAPS with the DASS-21 anxiety scale ($r = .49$, $p < .001$) and the PCL-C (z (88) = .68, $p = 0.25$).

VII. ETHODS STUDY PHASE 2

Participants

Participants were 197 undergraduate students at the University of Mississippi. The mean age of the sample was 18.97 years (SD = 1.32, range = 18 – 26) and the group consisted of 62.8% females. The ethnic makeup of the sample was 70.4% Caucasian, 21.6% African American, 3% Asian, 3% Multiethnic, and 2% other ethnicities. Approximately 25% of the participants for this study were recruited according to their score on the PCL-C, a screening measure that was included as a component of the assessment protocol used in Introduction to Psychology (PSY 201) courses (IRB protocol 12-031). If a participant scored in the clinically significant range on the PCL-C, the primary investigator contacted him/her via email to request participation in the study. This procedure was implemented in order to increase the likelihood of encountering participants who meet criteria for a diagnosis of PTSD, given the low base rate of PTSD in the general population. The remaining 75% of participants were recruited online through the Sona program sponsored by the Department of Psychology, regardless of their score on the PCL-C. All participants were rewarded for participation with extra-credit and/or research participation fulfillment in their respective courses.

Measures

The measures utilized for phase two were identical to measures used in phase 1 of the study; however, some participants received only a subset of CAPS diagnostic questions (see below).

Procedures

Randomization. All participants were randomly assigned to receive the full administration of the CAPS or the algorithm-based version of the CAPS. The computer-administered algorithm-based CAPS sequence will be referred to as the Quick CAPS (Q-CAPS) from here forward. The randomization procedure included setting up 50% of the computers in the lab to administer the full version of the CAPS and 50% of the computers to administer the Q-CAPS. Each computer in the lab was numbered. The number that corresponded to each computer was written on individual slips of paper, which were folded and placed inside a jar. Upon arriving in the lab, each participant selected a slip of paper and was assigned to the corresponding computer. Ninety-eight participants were administered the full sequence CAPS and 99 participants were administered the Q-CAPS.

Administration of the Instruments. Participants completed computerized versions of the instruments via Qualtrics in a group format. Upon arriving in the lab participants were given a more detailed explanation of the procedures and asked to provide written informed consent. Next, participants completed self-report measures via a Qualtrics questionnaire. Following this, participants were assessed for the presence of PTSD symptoms using the CAPS via Qualtrics. In the case of randomization to the Q-CAPS form this included skip logic to optimize the administration algorithm as outlined in phase 1 above. Upon completion of the computer-administered instruments, each participant was given the option of receiving feedback regarding their data. If a participant indicated that he or she wanted to receive feedback, it was provided by

a Ph.D. level supervisor, Dr. John Young. If feedback was requested, a time was scheduled with the participant for Dr. Young to deliver the feedback. Five participants requested and were provided with feedback. All participants were given a list of community resources, including resources for psychological services in on-campus and off-campus locations.

Data Analysis

Means and standard deviations for all instruments utilized in study phase 2 can be found in Table 1.

PTSD Diagnosis. A chi-squared test was conducted in order to compare the incidence of PTSD diagnosis across the two types of administration (i.e., algorithm-based and full administration). This was performed as a proxy check on the categorization of PTSD via these different methods in a sample unique from phase 1. It was reasoned that if the tests indicated widely different base rates of PTSD this would be an indicator that one or the other forms of the CAPS was not functioning as desired. To the extent these results were notable it would yield the need for caution and perhaps more careful scrutiny regarding the performance of the Q-CAPS.

Diagnostic Agreement. In order to investigate the diagnostic utility of the Q-CAPS, the Q-CAPS algorithm was imposed on data from the computer-administered, full version of the CAPS. Subsequently, diagnoses based on the imposed algorithm and the original full administration were compared for concordance using the Kappa statistic and interpreted via the seminal guidelines outlined in Landis and Koch (1977). This widely cited publication posited that kappa values exceeding 0.8 indicate excellent agreement, those between 0.6 and 0.8 indicate

substantial agreement, those between 0.4 and 0.6 indicate moderate agreement, and those below 0.4 indicate poor agreement.

Convergent Validity. Scores on the PCL-C were used as the external criterion for convergent validity of the Q-CAPS. Point-biserial correlation coefficients were calculated between PCL-C total scores and PTSD diagnoses according to the Q-CAPS.

Divergent Validity. To examine divergent validity, point-biserial correlation coefficients were calculated between the Q- CAPS PTSD diagnoses and depression scores from the CES-D. Similar correlations were performed in relation to anxiety scores from the DASS-21. It was hypothesized that the Q-CAPS PTSD diagnoses would be significantly less correlated with the CES-D and DASS-21 than with the PCL-C, and that the magnitude of similar correlations using the elongated version of the computer-administered CAPS would not differ significantly from these observed relationships. Fisher's z-test for correlated correlations (Meng et al., 1992) was utilized to statistically compare the magnitude of these correlations.

VIII. ESULTS STUDY PHASE 2

PTSD Diagnosis. A chi-square test revealed no significant difference in the frequency of PTSD diagnosis between the Q-CAPS and full sequence CAPS ($\chi^2 = .003$, df = 1, $p = .95$). Thus, this proxy measure of potential caution did not yield results deleterious to straightforward interpretation of the remainder of analyses outlined below.

Diagnostic Agreement. PTSD diagnoses derived from the Q-CAPS exhibited excellent agreement with PTSD diagnoses derived from the computer-administered full sequence CAPS ($\kappa = .90$, $p < .001$). Of the 7 individuals who would have been assigned a diagnosis of PTSD via the full-length instrument, 6 received the same categorization as a function of the Q-CAPS.

Convergent Validity. Convergent validity of the Q- CAPS was supported, as evidenced by the Q-CAPS PTSD diagnoses correlating positively and significantly with the PCL-C total score ($r = .34$, $p < .001$). Additionally, the correlation between the PCL-C and the full administration version of the computer-administered CAPS ($r = .38$, $p < .001$) did not differ significantly from the correlation observed between the PCL-C and the Q-CAPS, as determined by the results of a Fisher's z-test (Meng et al., 1992; z (193) = -.31, $p = 0.76$).

Divergent Validity. With regards to divergent validity, contrary to what was predicted, no significant difference was observed between correlations of the Q-CAPS with the CES-D ($r = .23$, $p = .02$) or the DASS-21 anxiety scale ($r = .19$, $p = .05$) and the PCL-C ($r = .34$, $p < .001$) as determined by the results of Fisher's z-tests (Meng et al., 1992; CES-D: z (200) = -.83, $p = 0.41$; DASS-21: z (98) = 1.11, $p = 0.27$). However, the magnitude of similar correlations using the

elongated version of the computer-administered CAPS did not differ significantly from these observed relationships (CES-D: z (193) = -.45, p = 0.65; DASS-21: z (193) = -1.65, p = 0.10; PCL-C: z (193) = -.31, p = 0.76).

IX. DISCUSSION

The objective of the present study was to investigate the utility of a PTSD assessment protocol associated with low administration burden, as compared with a traditional structured interview for PTSD, through the use of decision tree algorithms and computer administration. The results from phase 1 of the study demonstrated the feasibility of identifying a subset of predictor variables within the 17 CAPS symptom criteria variables that were most predictive of PTSD diagnosis and efficiently met the goals for reducing administration burden. The algorithm-driven sequence of questions reduced the number of items administered by 76 – 88% and classified the validation sample (study phase 2) at 87.5% accuracy for those with a diagnosis of PTSD and 100% accuracy for those without a diagnosis of PTSD. Although the accuracy rate for those with PTSD is considerably lower than for those without PTSD, it is important to note that there was only one misclassification for the PTSD group. Although only one case was misclassified, the number of individuals with PTSD was quite small (n = 7), resulting in a significant decrease in classification accuracy rate.

Phase 2 of the present study also demonstrated the feasibility of computer administration of the algorithm-based sequence. There was no significant difference in the frequency of PTSD diagnosis between the Q-CAPS and full sequence computer administration of the CAPS in a large sample of individuals, half of whom were selected on the basis of elevated likelihood of PTSD diagnosis. Further, the diagnostic utility of the Q-CAPS was supported by excellent concordance between PTSD diagnoses derived from the Q-CAPS sequence and PTSD diagnoses

derived from the computer-administered full sequence CAPS. Although the Q-CAPS PTSD diagnoses were not significantly more correlated with the PCL-C total score than with the CES-D or DASS-21 anxiety subscale, this is not entirely unexpected given the strong association of PTSD with depression and anxiety. Additionally, the magnitude of more general convergent and discriminant correlations did not reflect differences between the full version of the CAPS and the Q-CAPS, further supporting the performance of the algorithm form in relation to the full-length version. There were also unexpected results in this study that could warrant future attention. In this study the PCL-C, a widely used instrument, was a poor predictor of PTSD diagnosis according to the CAPS, specifically for individuals without a PTSD diagnosis. Given that the CAPS is a well-validated instrument and has demonstrated strong psychometric properties across many different populations, future studies may benefit from the examination of the predictive power of the PCL-C, particularly for individuals with low or sub-threshold PTSD symptomatology.

Although the results of the present study support the psychometric properties of the Q-CAPS and the utility of this measure as a useful protocol to identify PTSD, several limitations merit attention. First, when assessing the discriminant validity of the Q-CAPS, the CES-D and DASS-21 anxiety subscale were utilized. Given that the constructs of depression and anxiety are both associated with PTSD, future studies would benefit from utilizing more widely theoretically divergent measures in order to more clearly assess discriminant validity. Finding an appropriate set of measures may be challenging, however, due to the global nature of traumatic stress reactions. That is to say, when an individual experiences lasting difficulty on the basis of exposure to traumatic stress this is likely to impact a broad range of psychosocial functioning. Nonetheless, future studies could work to integrate examinations of divergent constructs, with

attention to the difficulty of this task as perhaps exemplifying the broad importance of studies on the pervasive effects of traumatic stress.

It is also important to note that the samples included in this study were recruited from the general population rather than from clinically referred or treatment seeking individuals. Although specific strategies were implemented in an effort to recruit individuals with a higher likelihood of PTSD diagnosis, only 6.5% (n = 14) of the computer administration sample met full criteria. Future studies would benefit from inclusion of more individuals who meet PTSD symptom criteria and are seeking services for these difficulties. While the base rate of PTSD in the computer administration sample was low, it was analogous with what would be expected in the population at large. Thus, the positive results demonstrated in the study (even considering the base rate) point to the promising nature of the Q-CAPS and the potential utility of the instrument in applied practice.

Despite the noted limitations, the present study demonstrated the feasibility of utilizing decision tree analysis and computer administration to significantly reduce assessment burden associated with a structured interview for PTSD assessment. For the vast majority of the validation sample examined, the Q-CAPS was able to match the full administration CAPS PTSD diagnosis. Although the Q-CAPS did not have perfect correspondence (i.e., 100% accuracy) relative to the full sequence administration, this initial feasibility study demonstrated considerable potential with respect to developing an efficient assessment protocol that provides a reliable diagnosis. When developing assessment procedures that are viable for “real world” settings, a need exists to employ procedures that balance the structure and objectivity of assessments against burden and likelihood of utilization. Thus, the evaluation of the utility of an assessment protocol should include not only its classification accuracy, but also its

transportability properties, such as low assessment burden (Ebesutani et al., 2012). Assessment protocols, such as the Q-CAPS, which are associated with low burden, could greatly promote the use of evidence-based assessments in clinical practice. The decision tree approach utilized in the present study could serve as a useful technique to build similar assessment strategies in other areas. Decision tree analysis could be applied to the assessment of any number of individual psychological disorders or for the purposes of building a fully comprehensive instrument. Future directions in this area could also include studies to investigate clinicians' willingness to utilize algorithm based assessments, time savings between full length and algorithm based assessments, accuracy, and connection to treatment planning.

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LIST OF APPENDICIES

APPENDIX: A

Figure 1. Decision Tree Predicting CAPS PTSD Diagnosis

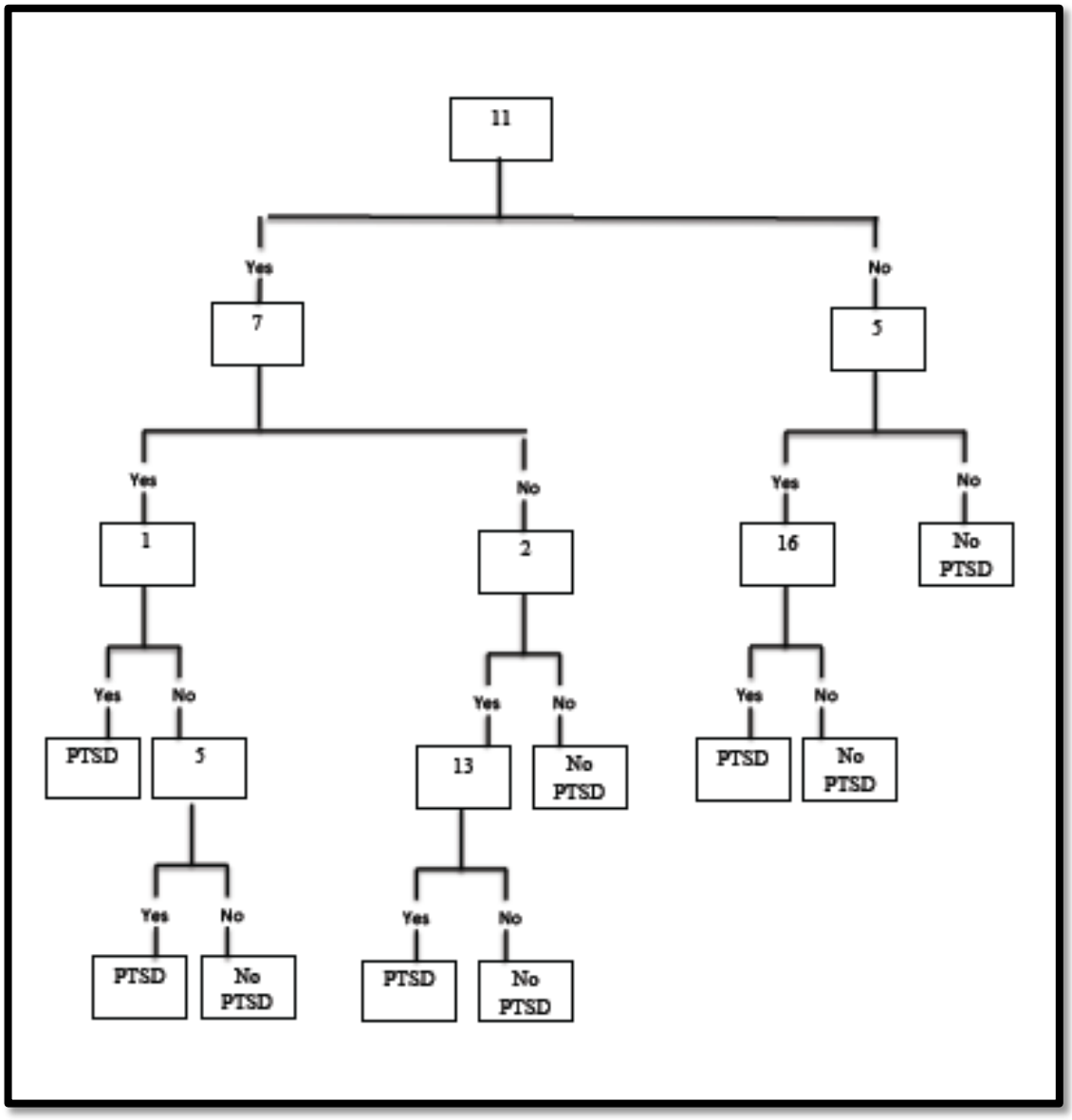

Figure 1. Decision tree model for the 17 core symptom items of the CAPS. Numbers denote the CAPS item number. *Yes* and *no* denote whether symptom criteria are met (i.e., frequency score of 1 and intensity score of 2) for each item. CAPS = Clinician Administered PTSD Scale; PTSD = Posttraumatic Stress Disorder

APPENDIX: B

Table 1

Mean and Standard Deviation for All Instruments Utilized

	Instrument	Mean	Standard Deviation
Study Phase 1			
	CAPS	21.25	20.51
	PCL-C	36.0	12.51
	LEC*	3.87	2.80
	DASS 21-Anx	3.65	3.71
	CES-D	19.75	20.91
Study Phase 2			
	CAPS	**	**
	Question 1	.28	1.17
	Question 2	.08	.48
	Question 5	.38	1.06
	Question 7	.27	.99
	Question 11	1.24	1.83
	Question 13	.00	.00
	Question 16	.15	.84
	PCL-C	29.75	10.79
	LEC*	3.87	2.80
	DASS-21-Anx	5.78	6.01
	CES-D	17.02	6.31

Note. CAPS = Clinician Administered PTSD Scale; PCL-C = PTSD Checklist-Civilian Version; DASS-21-Anx = Depression Anxiety Stress Scales-21 Anxiety Subscale; CES-D = Center for Epidemiologic Studies-Depression Scale; LEC = Life Events Checklist.

*LEC mean scores indicate the mean number of potentially traumatic experiences reported. ** *Mean and standard deviation for the CAPS Total Score were unable to be calculated for study phase 2 because decision tree analysis resulted in a variable number of questions administered for each participant. Thus, individual item mean and standard deviation are reported for study phase 2. CAPS individual item means for study phase 2 were comparable with individual item means from study phase 1.*

APPENDIX: C

Table 2

*Study Phase 2 Comparisons and Statistical Analyses**

Comparison	Statistical Analysis	Question Being Answered
1. Algorithm-based CAPS 2. Full administration CAPS	Chi-squared	Incidence of PTSD diagnosis across the 2 types of administration
1. Full administration CAPS 2. Algorithm-imposed on full administration CAPS*	Kappa	Concordance of diagnoses derived from the full and algorithm-based protocols (intra-individual)
1. PCL-C total scores 2. Algorithm-based CAPS PTSD diagnoses	Point-biserial correlation	Convergent validity – Correlation of the PCL-C total scores and PTSD diagnoses according to the algorithm-based CAPS
1. Algorithm-based CAPS 2. (a) CES-D depression score (b) DASS-21 anxiety score	Point-biserial correlation; Fisher's z test	Divergent validity – Does the CAPS correlate more highly with the PCL-C than with CES-D and DASS-21?

Note. All comparisons involve only computerized administration of the instruments as collected in phase 2 of the study (i.e. no paper-and-pencil data are included).
*For this analysis the decision tree algorithm was imposed on data from the full sequence computer administration. Diagnoses derived from the original full administration were then compared with the algorithm-imposed diagnoses.

APPENDIX: D

Survey packet instructions and demographic questions

1. What is your biological sex? 0 = Male
   1 = Female

2. How old are you? _____

3. What is your marital status?
   0 = Never married
   1 = Married
   2 = Divorced/Annulled
   3 = Separated
   4 = Widowed
   5 = Not married, but living with partner

4. Who do you currently live with? Check all that apply.
   □ = Alone
   □ = Spouse or romantic partner
   □ = Children (under age 18)
   □ = Other relative
   □ = Friend or roommate

5. What is your *highest* education level completed?
   0 = Elementary (8th grade or less)
   1 = Some High School
   2 = High School Diploma
   3 = Some College
   4 = Bachelor's Degree
   5 = Master's Degree
   6 = Doctoral or professional degree (PhD, MD, etc.)

6. What best describes your current employment status?
   0 = Unemployed
   1 = Home Maker
   2 = Part-Time
   3 = Full-time (40 hours per week or more)

7. What best describes your total household income (before taxes)?
   0 = Less than 10,000
   1 = $10,000 to $20,000
   2 = $21,000 to $30,000
   3 = $31,000 to $50,000
   4 = $51,000 to $100,000
   5 = Greater than $100,000

8. Do you describe yourself as a Hispanic or Latino? 0 = No
   1 = Yes

9. What is your race?
   0 = White
   1 = Black/African American
   2 = Asian
   3 = Native American, Alaskan Native
   4 = Asian or Pacific Islander
   5 = Native Hawaiian or Other Pacific Islander
   6 = Multiracial (list numbers_____&_____& ____)

10. What is your religious affiliation?
    1. Protestant Christian
    2. Roman Catholic
    3. Evangelical Christian
    4. Jewish Muslim
    5. Muslim
    6. Hindu
    7. Buddist
    8. Other:_____
    9. I am not religious.

APPENDIX: E

PCL-C

Instructions: Below is a list of problems and complaints that people sometimes have in response to stressful life experiences. Please read each one carefully, then circle one of the numbers to the right to indicate how much you have been bothered by that problem in the past month.

	Not at all	*A little bit*	*Moderately*	*Quite a bit*	*Extremely*
1. Repeated, disturbing *memories, thoughts, or images* of a stressful	**1**	**2**	**3**	**4**	**5**
2. Repeated, disturbing *dreams* of a stressful experience from the	**1**	**2**	**3**	**4**	**5**
3. Suddenly *acting or feeling* as if a stressful experience from the past *were happening again* (as if you were reliving it)?	**1**	**2**	**3**	**4**	**5**
4. Feeling *very upset* when *something reminded you* of a stressful experience from the	**1**	**2**	**3**	**4**	**5**
5. Having *physical reactions* (e.g., heart pounding, trouble breathing, sweating) when *something reminded you* of a stressful experience from the	**1**	**2**	**3**	**4**	**5**
6. Avoiding *thinking about or talking about* a stressful experience from the past or avoiding *having feelings* related	**1**	**2**	**3**	**4**	**5**
7. Avoiding *activities or situations* because *they reminded you* of a stressful experience from the	**1**	**2**	**3**	**4**	**5**
8. Trouble *remembering important parts* of a stressful experience from the past?	**1**	**2**	**3**	**4**	**5**
9. *Loss of interest* in activities that you used to enjoy?	**1**	**2**	**3**	**4**	**5**

10. Feeling *distant or cut off* from other people?	**1**	**2**	**3**	**4**	**5**
11. Feeling *emotionally numb* or being unable to have loving feelings for those close to you?	**1**	**2**	**3**	**4**	**5**
12. Feeling as if your *future* somehow will be *cut short*?	**1**	**2**	**3**	**4**	**5**
13. Trouble *falling or staying asleep*?	**1**	**2**	**3**	**4**	**5**
14. Feeling *irritable* or having *angry outbursts*?	**1**	**2**	**3**	**4**	**5**
15. Having *difficulty concentrating*?	**1**	**2**	**3**	**4**	**5**
16. Being "*super alert*" or watchful or on guard?	**1**	**2**	**3**	**4**	**5**
17. Feeling *jumpy* or easily startled?	**1**	**2**	**3**	**4**	**5**

Appendix: F

LIFE EVENTS CHECKLIST

Listed below are a number of difficult or stressful things that sometimes happen to people. For each event indicate if (a) it *happened to you* personally, and if so, (b) how old you were when it happened. If it has happened more than once, please list each age at which it happened. Be sure to consider your *entire life* (growing up as well as adulthood) as you go through the list of events.

Event	*Happened to me*	*Witnessed it*	*Learned about it*	*Age(s)*
1. Natural disaster (for example, flood, hurricane, tornado, earthquake)				
2. Fire or explosion				
3. Transportation accident (for example, car accident, boat accident, train wreck, plane crash)				
4. Serious accident at work, home, or during recreational activity				
5. Exposure to toxic substance (for example, dangerous chemicals, radiation)				
6. Physical assault (for example, being attacked, hit, slapped, kicked, beaten up)				
7. Assault with a weapon (for example, being shot, stabbed, threatened with a knife, gun, bomb)				
8. Rape (forced oral, anal or vaginal penetration)				
9. Other unwanted or uncomfortable sexual experience				
10. Combat or exposure to a war-zone (in the military or as a civilian)				
11. Captivity (for example, being kidnapped, abducted, held hostage, prisoner of war)				
12. Life-threatening illness or injury				
13. Severe human suffering				

14. Sudden, violent death (for example, homicide, suicide)				
15. Sudden, unexpected death of someone close to you				
16. Serious injury, harm, or death you caused to someone else				
17. Any other very stressful even or experience (please identify): **_____**				

Appendix: G

Center for Epidemiologic Studies Depression Scale (CES-D), NIMH

Below is a list of the ways you might have felt or behaved. Please tell me how often you have felt this way during the past week.

	During the Past Week			
	Rarely or none of the time (less than 1 day)	Some or a little of the time (1-2 days)	Occasionally or a moderate amount of time (3-4 days)	Most or all of the time (5-7 days)
1. I was bothered by things that usually don't bother me.	☐	☐	☐	☐
2. I did not feel like eating; my appetite was poor.	☐	☐	☐	☐
3. I felt that I could not shake off the blues even with help from my family or friends.	☐	☐	☐	☐
4. I felt I was just as good as other people.	☐	☐	☐	☐
5. I had trouble keeping my mind on what I was doing.	☐	☐	☐	☐
6. I felt depressed.	☐	☐	☐	☐
7. I felt that everything I did was an effort.	☐	☐	☐	☐
8. I felt hopeful about the future.	☐	☐	☐	☐
9. I thought my life had been a failure.	☐	☐	☐	☐
10. I felt fearful.	☐	☐	☐	☐
11. My sleep was restless.	☐	☐	☐	☐
12. I was happy.	☐	☐	☐	☐
13. I talked less than usual.	☐	☐	☐	☐
14. I felt lonely.	☐	☐	☐	☐
15. People were unfriendly.	☐	☐	☐	☐
16. I enjoyed life.	☐	☐	☐	☐
17. I had crying spells.	☐	☐	☐	☐
18. I felt sad.	☐	☐	☐	☐
19. I felt that people dislike me.	☐	☐	☐	☐
20. I could not get "going."	☐	☐	☐	☐

Appendix: H

DASS-21

Choose the number which indicates how much the statement applied to you over the past week.

0 = Did not apply to me at all
1 = Applied to me to some degree, or some of the time
2 = Applied to me to a considerable degree, or a good part of the time
3 = Applied to me very much, or most of the time

1. I found it hard to wind down.	0	1	2	3
2. I was aware of dryness in my mouth.	0	1	2	3
3. I couldn't seem to experience any positive feeling at all.	0	1	2	3
4. I experienced breathing difficulty (e.g., excessively rapid Breathing, breathlessness in the absence of physical exertion).	0	1	2	3
5. I found it difficult to work up the initiative to do things.	0	1	2	3
6. I tended to over-react to situations.	0	1	2	3
7. I experienced trembling (e.g., in the hands).	0	1	2	3
8. I felt that I was using a lot of nervous energy.	0	1	2	3
9. I was worried about situations in which I might panic and make a fool of myself.	0	1	2	3
10. I felt that I had nothing to look forward to.	0	1	2	3
11. I found myself getting agitated.	0	1	2	3
12. I found it difficult to relax.	0	1	2	3
13. I felt down-hearted and blue.	0	1	2	3
14. I was intolerant of anything that kept me from getting on with what I was doing.	0	1	2	3
15. I felt I was close to panic.	0	1	2	3
16. I was unable to become enthusiastic about anything.	0	1	2	3
17. I felt I wasn't worth much as a person.	0	1	2	3
18. I felt that I was rather touchy.	0	1	2	3
19. I was aware of the action of my heart in the absence of physical exertion (e.g., sense of heart rate increase, heart missing a beat).	0	1	2	3
20. I felt scared without any good reason.	0	1	2	3
21. I felt that life was meaningless.	0	1	2	3

Appendix: I

Consent to Participate in an Experimental Study

Title: What self-reports can tell us: Using a decision tree approach to reduce assessment burden

Investigator
Regan W. Stewart, M.A.
Department of Psychology
205 Peabody Hall
The University of Mississippi
(662) 915-5398

Sponsor
John Young, Ph.D.
Department of Psychology
205 Peabody Hall
The University of Mississippi
(662) 915-5398

Description

You are being invited to participate in a study because you are a student who has expressed interest in being part of a lab-based study focused on identifying ways to improve the assessment of anxiety. Please ask us about anything in this document or that we tell you that you do not understand. We are doing this study to learn more about predictive factors that may be able to help reduce the amount of time it takes to assess anxiety. We are investigating a particular kind of anxiety called post-traumatic stress disorder (PTSD). We are testing two groups of students – one group where many students may likely have PTSD, and another where this is much less likely. We will interview you to determine your mood, any symptoms of anxiety, and whether or not you have symptoms related to PTSD. We will compare that information to your questionnaires in order to determine which items in the questionnaires are most likely to predict answers in the interview. The information gathered from the questionnaires is for research purposes only; however, the results can be shared with you if you wish. If you would like to receive feedback regarding your questionnaires and interview, please let the research assistant know. The interview and questionnaires will take approximately one hour to complete. You will be offered the chance to take breaks, if needed.

Risks and Benefits

It's not unusual to experience strong negative emotional responses when answering questions about a potentially traumatic event. You may choose not to answer any question if it makes you uncomfortable. You will not receive a direct benefit from participating in this study. We hope to learn information that may help others with anxiety in the future. Should you wish to seek help for discomfort from symptoms you are experiencing, please see the attached list of psychological providers in the community.

Cost and Payments

The interview and questionnaires will take about 1 hour to finish, and we will talk to you for about five more minutes. There are no other costs for helping us with this study. You will receive 1.5 hours of experimental course credit for being part of this project.

Confidentiality

We will not put your name on any of your assessments. Therefore, we do not believe that you can be identified from any of your assessments.

Right to Withdraw
You do not have to take part in this study. If you start the study and decide that you do not want to finish, all you have to do is to tell the research assistant who is administering the tests. Whether or not you choose to participate or to withdraw will not affect your standing with the Department of Psychology, or with the University, and it will not cause you to lose any benefits to which you are entitled. Inducements, if any, will be prorated based on the amount of time you spent in the study.

The researchers may terminate your participation in the study without regard to your consent and for any reason, such as protecting your safety and protecting the integrity of the research data. If the researcher terminates your participation, any inducements to participate will be prorated based on the amount of time you spent in the study.

IRB Approval
This study has been reviewed by The University of Mississippi's Institutional Review Board (IRB). The IRB has determined that this study fulfills the human research subject protections obligations required by state and federal law and University policies. If you have any questions, concerns, or reports regarding your rights as a participant of research, please contact the IRB at (662) 915-7482.

Statement of Consent
I have read the above information. I have been given a copy of this form. I have had an opportunity to ask questions, and I have received answers. I consent to participate in the study.

Signature of Participant	Date
Signature of Investigator	Date

NOTE TO PARTICIPANTS: DO <u>NOT</u> SIGN THIS FORM
IF THE IRB APPROVAL STAMP ON THE FIRST PAGE HAS EXPIRED.

Appendix: J

Recruitment Scripts

Recruitment email:

Dear Student,

This email is an invitation for you to participate in a research study investigating stressful life events. You are receiving this email because you indicated, in a screening measure that you filled out at the beginning of the semester, that you have experienced at least one very stressful life event and that the memory of this event may still cause difficulty for you. We are conducting a research study to learn more about predictive factors that may be able to help reduce the amount of time it takes to assess anxiety, particularly a kind of anxiety called post-traumatic stress disorder (PTSD). If you decide to participate in this study, you will complete an interview to determine your mood, any symptoms of anxiety, and whether or not you have symptoms related to PTSD. We will compare that information to your questionnaires in order to determine which items in the questionnaires are most likely to predict answers in the interview.

The interview and questionnaires will take about 1 hour to complete. You will receive 1.5 hours of experimental course credit for being part of this project. If you are interested in participating in this project please reply to this email. Also, if you have any questions you can reply to this email and I will respond quickly.

Thank

you,

Regan

Stewart

Principal Investigator

Online recruitment description for Sona:

You are being invited to participate in a study to learn more about predictive factors that may be able to help reduce the amount of time it takes to assess anxiety. We are investigating a particular kind of anxiety called post-traumatic stress disorder (PTSD). We are testing two groups of students – one group where many students may likely have symptoms of PTSD, and another where this is much less likely.

We will interview you to determine your mood, any symptoms of anxiety, and whether or not you have symptoms related to PTSD. We will compare that information to your questionnaires in order to determine which items in the questionnaires are most likely to predict answers in the interview. If you decide to participate in this study, you will complete an interview and questionnaires about your mood, any symptoms of anxiety you may experience, stressful life events, as well as a series of questionnaires that ask about personality, thoughts, emotions, and the ways in which you respond to your thoughts and emotions. The interview and questionnaires will take approximately one hour to complete. You will receive 1.5 hours of experimental course credit for being part of this project.

Appendix: K

Campus and Community Resources

Counseling/Psychotherapy:

Psychological Services Center, University of Mississippi……(662) 915-7385 University

Counseling Center, University of Mississippi……..(662) 915-3784

Delta Autumn Consulting, Oxford, MS…….(662) 259-0868

Mitchell Counseling Services of Oxford…….(662) 236-9333

VITA

NAME: Regan W. Stewart

EDUCATION:

Ph.D. (Currently pursuing)	Clinical Psychology University of Mississippi	Currently Enrolled
M.A.	Clinical Psychology University of Mississippi	May, 2012
M.A.	Early Childhood Education College of Charleston	December, 2006
B.A.	Spanish (highly distinguished) Business (minor) College of Charleston	May, 2003

SUPERVISED CLINICAL EXPERIENCE:

University of Mississippi Psychological Services Center, University, MS (June, 2011 – May 2014) Supervisors: Alan Gross, Ph.D., John Young, Ph.D., and Laura Johnson, Ph.D.

- Completed psychosocial assessments of new patients. Assessment included structured diagnostic interviews (e.g. ADIS, MINI) and intake interviews
- Provided individual therapy services to university students and adult and child community members, including treatment for social anxiety, panic, generalized anxiety, depression, PTSD, adjustment disorder, conduct disorder, emotion dysregulation, and provision of parent training

Baptist Children's Village, Water Valley, Mississippi (August, 2012 – June, 2013) Supervisor: Randy Cotton, Ph.D.

- Provided assessment and treatment of children in a group home setting. Assessment included structured diagnostic interviews (ChIPS) and intake interviews, intelligence and achievement tests, and self-report measures. Therapy services included weekly individual therapy and group therapy.
- Contributed to weekly staff meetings and case consultations
- Presented training for childcare staff regarding childhood posttraumatic stress disorder and related emotional and behavioral sequelae

University of Mississippi Office of International Programs, University, Mississippi (January 2012 – May 2012) Supervisor: Laura Johnson, Ph.D.

- Facilitated a social support group for female international students

RESEARCH EXPERIENCE

Dissertation Research (August, 2012 – May 2014)

- Designed and recruited participants for study investigating the utility of a PTSD assessment protocol that reduces administration burden through the use of (a) decision tree algorithms to guide the interview sequence and (b) computer administration.
- Trained graduate research assistants to run participants through study
- Finished data collection and analysis September, 2013
- Completed dissertation defense June, 2014

Research Assistant, University of Mississippi (August, 2011 – July 2014), Supervisor: John Young, Ph.D.

- Participated in meetings with school district leaders to request collaboration on research projects
- Assisted with school-based data collection
- Helped provide feedback session for school administrators regarding results of mental health screenings
- Supervised undergraduate research assistants

Thesis Research (August, 2011 - January, 2012)

- Designed and implemented a multi-site (7 public schools in northern Mississippi) study assessing the psychometric validity of the CPSS in an ethnically diverse youth sample

Research Assistant, University of Mississippi (August, 2010 – July, 2011), Supervisor: Laura Johnson, Ph.D.

- Helped design and facilitate a yearlong intercultural competence training seminar for Army ROTC students
- Assisted with intercultural training workshops for U.S. study abroad students
- Co-authored an immigration report for the APA Committee on International Relations in Psychology

Research Assistant, The Citadel (June, 2009 – July, 2010), Supervisor: William G. Johnson, Ph.D.

- Assisted with research and preparation of IRB protocols
- Helped with data collection and analysis
- Served as a Spanish interpreter for data collection

UNIVERSITY TEACHING EXPERIENCE:

Instructor, University of Mississippi (January, 2012 – May, 2012) "PSYC 100: Introduction to the Major". Semester-long undergraduate course providing an introduction to the Department of Psychology, its faculty and courses, with an emphasis on career planning and student development.

OTHER EXPERIENCE:

Coordinator, Undergraduate Resource Center, University of Mississippi (August, 2011 - May, 2012) Supervisor: Karen Sabol, Ph.D.

- Advised undergraduate psychology students regarding coursework, applying to graduate school, and careers in psychology

Teacher of English for Speakers of Other Languages (August, 2003 – June 2010), Berkeley County School District, Moncks Corner, South Carolina, Supervisor: Denise Ling, Ph.D.

- Worked with recently immigrated students to foster their English language acquisition
- Held parenting nights for parents of students with limited English proficiency
- Developed and directed an after-school tutoring program and summer camp for students with limited English proficiency
- Interpreted for parent-teacher conferences and all other communication needs for Spanish-speaking parents

PUBLICATIONS:

Stewart, R.W., Drescher, C.F., Maack, D., Ebesutani, C., & Young, J. (in press). The development and psychometric investigation of the Cyberbullying Scale. *Journal of Interpersonal Violence*.

Stewart, R.W., & Darden, M. (2013). Sojourner. In K. Keith (Ed.) *Encyclopedia of Cross-Cultural Psychology* (pp. 1214-1218). Oxford: Wiley-Blackwell.

Johnson, W.G., **Stewart, R.W**, & Pussera, A. (2012). The perceptual threshold for overweight eating behaviors. *Eating Behaviors, 13*, 188-193.

PRESENTATIONS:

Stewart, R.W. & Young, J. (2014, June). *The association between experiences of maltreatment and psychopathology among adolescent psychiatric inpatients*. Poster presented at the annual meeting of the American Professional Society on the Abuse of Children, New Orleans, LA.

Stewart, R.W., Drescher, C.F., Maack, D., & Young, J. (2012, November). *The development and preliminary psychometric investigation of the Cyberbullying Questionnaire*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, National Harbor, MD.

Stewart, R.W., Drescher, C.F., Young, J., & Hamblin, R.J. (2012, November). *Minority status and the experience of peer victimization: The importance of the racial/ethnic context of schools*. Poster presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, National Harbor, MD.

Hamblin, R. J., Drescher, C.F., **Stewart, R.W**, & Young, J.N. (2012, November). Peer victimization in elementary school children: associations with internalizing symptoms. Paper presented at the annual meeting of the Association for Behavioral and Cognitive Therapies, National Harbor, MD.

Johnson, W.G., **Stewart, R.W.**, Johnson-Pynn, J.S., Pynn, T.M. (2010, August). *Student attitudes toward war and peace*. Poster presented at the annual meeting of the American Psychological Association, San Diego, CA.

DIVERSITY TRAINING/COLLOQUIA:

Johnson, L.R., & **Stewart, R.W.** (October 2010 – May 2011) *Developing Intercultural Competence for ROTC: Success at Home and Around the World*, year-long intercultural training course for Army ROTC students, Department of Military Science, University of Mississippi

Johnson, L.R., Drescher, C., Bastein, G., Hankton, U., & **Stewart, R.W** (March, 2011) *Cross Cultural Communication and the Therapeutic Relationship*, Diversity Colloquia Series, Department of Psychology, University of Mississippi.

REPORTS TO AGENCIES:

Bastein, G., **Stewart, R.W.**, Hankton, U., & Johnson, L. (2011). *Immigration Facts and Resources for Psychologists in the United States*, Report prepared for the American Psychological Association, Committee on International Relations in Psychology.

GRANT SUBMISSIONS

U.S. Fulbright Fellowship for Research Abroad

School Mental Health Screening: Providing the Tools for a Total Educational Environment

Regan Stewart, M.A. – Principal Investigator

(Alternate)

Ruth L. Kirschstein National Research Service Award for Individual Predoctoral Fellows
Evaluating a Self Report Measure of PTSD in a Child Latino Sample
Regan Stewart, M.A. – Principal Investigator
(Unfunded)

MEMBERSHIP IN PROFESSIONAL ORGANIZATIONS:

American Psychological Association (student affiliate)
Association for Behavioral and Cognitive Therapies (student affiliate)
International Society for Traumatic Stress Studies (student affiliate)
American Professional Society on the Abuse of Children (student affiliate)