

ABSTRACT

Screening for Psychological Distress in the General Population: Acceptability and Validation of a Brief Measure of Psychological Distress

Aimee K. Johnson, Ph.D.

Mentor: Gary R. Elkins, Ph.D.

With the increasing costs and utilization of health care services, and evidence for under-diagnosis of psychological distress, a brief multidimensional screening measure that includes the most salient constructs of psychological distress (depression, anxiety, hopelessness, and anger) is needed. Such a scale could potentially detect psychological distress and provide clinicians with a practical instrument that identifies patients who may require additional psychological evaluation.

Although initial data for the Elkins Distress Scale (EDS), has indicated good reliability and validity in psychiatric and collegiate samples, it has not been determined if the instrument is equally suitable for members of the general population. To attempt to meet the need for a brief screening instrument, it is necessary to collect normative data to ensure that the EDS can discriminate between distressed individuals and non-distressed individuals.

Thus, the purpose of this dissertation is to evaluate the validity, acceptability and model fit of the EDS in a sample of the adult general population, and to determine the

EDS's utility as a multidimensional state measure. The goal of Study 1 was to collect normative data to determine the reliability, validity, model fit, and acceptability in a sample of the general population. Study 2 and 3 determined if the EDS is suitable to be utilized as a state screening measure of psychological distress by analyzing longitudinal data obtained from a psychiatric and a general population sample.

The study was conducted via Amazon's Mechanical Turk (MTurk), and participants were asked to complete the EDS in addition to well-validated scales assessing each domain of distress. Item analyses, convergent and divergent validity, incremental validity, and confirmatory analyses suggest that this scale has potential as a reliable and valid clinical tool in the general population to implement as a brief screening measure of psychological distress.

Screening for Psychological Distress In the General Population:
Acceptability and Validation of a Brief Measure of Psychological Distress

by

Aimee K. Johnson, B.A., M.A.

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Jamie L. Diaz-Granados, Ph.D., Chairperson

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Approved by the Dissertation Committee

Gary R. Elkins, Ph.D., Chairperson

Thomas A. Fergus, Ph.D.

Matthew S. Stanford, Ph.D.

Wade C. Rowatt, Ph.D.

James W. Ellor, Ph.D.

Accepted by the Graduate School

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J. Larry Lyon, Ph.D., Dean

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DEDICATION

To my mom and dad, Candace and Joe Johnson, whose constant love and support make my accomplishments possible

CHAPTER ONE

Introduction

The Impact of Psychological Distress

Psychological distress has received increased attention in recent years as empirical investigation has shed light on the broad domain of its effects, which include decreased health-related quality of life in persons with conditions such as obesity (Kern, Schrempf, Schneider, Schultheib, Reichmann, & Ziemssen, 2009; Mannucci, Petroni, Villanova, Rotella, Apolone, & Marchesini, 2010); decreased levels of functioning and increased disease activity (Duvdevany, Cohen, Minsker-Valtzer, & Lorber, 2011); increased symptom severity (Hasler, Parkman, Wilson, Pasricha, Koch, Abell *et al.*, 2010); cardiac pathologies (e.g., Song, Son, & Lennie, 2009); and decreased rehabilitation and functional outcomes in stroke patients (Hilari, Northcott, Roy, Marshall, Wiggins, Chataway, *et al.*, 2010). Research has accounted for numerous secondary effects of psychological distress, such as abnormal fetus development (Henrichs, Schenk, Roza, van den Berg, Schmidt, Steegers, *et al.*, 2009) and greater occurrence of falls and fractures in Alzheimer's patients looked after by distressed care givers (Maggio, Ercolani, Andreani, Ruggiero, Mariani, Mangialasche, *et al.*, 2010). In the workforce, distress has been linked to reduced employee productivity (Hilton, Scuffham, Vecchio, & Whiteford, 2010). Among college students distress has been linked to a greater risk of infidelity (Hall & Fincham, 2009), and impaired academic performance (Rosenthal & Wilson, 2003). Furthermore, empirical investigation has related distress to a number of health risks including: increased nicotine usage (Hamera,

Schneider, & Deviney, 1995); greater internal pressure to self-injure (Bohus, Limberger, Ebner, Glocker, Schwarz, et al., 2000); and increased motivation to attempt suicide (Holm & Severinsson, 2008; Leiner, Compton, Houry, & Kaslow, 2008). Given the growing evidence of the deleterious effects of psychological distress, it is necessary to implement effective and efficient assessment.

Healthcare Costs Associated with Psychological Distress

Psychological distress is associated with increased costs and labor demands for healthcare facilities (Gill, Sharpe, 1999; Hansen, Fink, Frydenberg, Oxhoj, 2002). Data from the Agency for Healthcare Research and Quality's (AHRQ's) Medical Expenditure Panel Survey estimates that total expenditures in mental health care cost for Americans in 2006 was approximately \$57.5 billion (Soni, 2009). In 2006, the average expenditure per person on mental health was \$1,591 (Soni, 2009). Data collected in 1996 and 2006, demonstrated that, of the five most costly medical conditions, the cost of mental health care increased by the largest margin. In addition to the growing cost of mental health care, the number of people accruing mental health cost has increased. For example, in 1996, 19.3 million people accumulated expenses for mental health, but by 2006, the number of persons seeking mental health care increased to 36.2 million.

In response to this growing need, research has sought to identify specific constructs that would allow for greater prediction of psychological distress. Results of a longitudinal study indicate that depression scores alone predicted an increase of inpatient (24.1%) and outpatient costs (8.9%) (Grabe, Baumeister, John, Freyberger, & Volzke, 2009). The same study demonstrated that comorbidity of somatization, depression and anxiety predicted a 50% increase in overall health costs (Grabe et al., 2009).

Furthermore, in twenty-eight European countries, the economic cost associated with anxiety disorders alone was estimated at \$58 billion (Iyer, Rothmann, Vogler, & Spaulding, 2005). With increasing worldwide cost attributed to the effects associated with psychological distress, there is a growing demand for accountability of economic resources and effectiveness in treatment interventions (Iyer et al., 2005). Grabe and colleagues (2009) recommend the use of simple and time-efficient screening procedures to assist in identifying patients at risk for future health care utilizations. In light of the growing demands for mental health treatment, simple and time-efficient screening procedures may ameliorate the growing costs by identifying patients that would benefit from further evaluation.

Prevalence of Psychological Distress

The growing influx of patient-reported psychological distress may be attributable to a breakdown in capturing symptoms among the general population which are not encompassed by current diagnostic criteria. There are a multitude of conceptualizations of, and assessments for distress. This gives rise to difficulty in ascertaining the prevalence of psychological distress in the general population, as diagnosis is largely dependent upon on how researchers operationalize the term “*psychological distress*”. Furthermore, prevalence estimates are difficult given the lack of standardizations used to assess distress, the time window used in documentation of symptoms, and cutoff points applied to dichotomize the score (Drapeau, Marchand, Beaulieu-Prevost, 2010).

Prevalence estimates of psychological distress in the general population range between 5% and 27% at any given point (Benzeval & Judge, 2001, Chittleborough, et al, 2001, Gispert et al, 2003; Kuriyama et al, 2009). However, other research suggests that

the prevalence of patient distress may be as high as 70% (Cummings, VandenBos, 1981; VonKorff, Shapiro, Burke, et al., 1987). Nevertheless, a larger number of these distressed patients do not meet the formal diagnostic criteria for depression or anxiety. For example, Nagel, Lynch, and Tamburrino (1998) noted that, of 457 patients surveyed, 71% screened as positive for having major depression; however they would not have been classified as having major depression based on the *Diagnostic and Statistical Manual, Fourth Edition* (DSM-IV) criteria. These patients may still need relief, and because presentation of psychological distress in the general population may differ from its presentation in psychiatric patients, screening instruments should be multidimensional to reflect these differences (Coyne, Schwenk, & Fechner-Bates, 1995).

Defining Distress

Psychological distress serves as an outcome measure in clinical trials and is a widely utilized, but generally loosely operationalized, indicator of mental health (Drapeau, et al., 2012). Generally, psychological distress is defined as “a state of emotional suffering characterized by symptoms of depression (e.g. loss of interest, sadness, hopelessness and anxiety)” (Mirowsky & Ross, 2002). Furthermore, psychological distress may also include somatic symptoms (e.g. insomnia, headaches, and fatigue) (Wheaton, 2007). Other conceptualizations of psychological distress characterize an emotional disturbance in which the social functioning of the individual and quality of life is significantly reduced (Wheaton, 2007).

Definitions and models of distress show considerable variation within the literature (e.g. Karasz, Sacajiu, Garcia, 2003; Masse, Poulin, Dassa, Lambert, Battaglini, 1998; Tanaka & Huba, 1984; Veit & Ware, 1983). Although some conceptualizations of

distress potentially confound the domain by including stress, it is important to distinguish between the two, particularly when attempting to evaluate symptoms of distress. In an attempt to add clarity, Ridner (2004) proposed a concept analysis providing contextual distinctions between the terms *stress*, *distress*, *biological distress*, and *psychological distress*. According to Ridner (2004), the term *stress* is defined as a “non-specific biological response to a demand or stressor that is not necessarily harmful to the individual” (p. 2).

In contrast, she defines *distress* as a “non-specific biological response to a demand/stressor that is harmful to the individual” (Ridner, 2004, p. 2). According to the proposed model, the concept of distress is further differentiated into biological distress and psychological distress. *Biological distress* refers to “potentially harmful physiological changes that occur in the body in response to a stressor” (Ridner 2004, p. 3), whereas *psychological distress* refers to the “unique discomforting, emotional state experienced by an individual in response to a specific stressor that results in temporary or potentially permanent harm to the individual” (Ridner, 2004, p. 3). Ridner (2004) proposes that psychological distress contains five defining components: perceived inability to cope effectively, change in emotional status, discomfort, communication of discomfort, and harm. According to the model, for psychological distress to occur antecedents must be present. Initially, a stressor must be present that incites stress or distress. The stressor must then induce the perception of a personal threat, which activates the fight or flight response resulting in psychological distress (Selye, 1976; Masse, 2000). Although the model may be criticized for oversimplifying complicated processes, it provides a primary, overall attempt to understand the complexities of

distress. This model aids in the development of constructs specific to psychological distress, thus enabling a more precise clinical measure.

Assessment of Psychological Distress

Assessment of psychological distress has been studied in numerous settings each using an array of psychological distress measures for multiple functions (e.g. clinical treatment evaluation, screening in primary care). Brief self-report measures of psychological distress have advantages over structured interviews, which are intensive and costly. Self-report measures can be easily administered by non-clinicians such as nurses or office administrative staff in a waiting room setting. As psychological distress may increase health care costs, prolong medical treatment, and lead to unnecessary hospitalization, early identification and intervention may produce a significant financial benefit to both health care providers and patients alike.

Developing a Screening Measure for Psychological Distress

There have been several published mental health measures developed to assess multiple unitary dimensions of psychological distress. Examples of frequently employed, well-validated, unitary domain measures of psychological distress include: the Beck Depression Inventory–II (BDI–II; Beck, Steer, & Brown, 1996), the Beck Anxiety Inventory (BAI; Beck & Steer, 1988), the Beck Hopelessness Scale (BHS; Beck & Steer, 1988), and the State-Trait Anger Expression Inventory (STAXI–2; Spielberger, 1999). Although these measures have been well-validated in multiple samples (e.g. clinical, adolescent, and general populations), it is not practical to administer such measures in a time-pressed setting, and the full battery of these tests would require up to 30 minutes to screen for depression, anxiety, anger, and hopelessness.

Multidimensional Measures of Psychological Distress

Several measures exist which assess and screen for psychological distress (Figure 1).

Scale	Number of Items	Time for Administration	Depression	Anxiety	Hopelessness	Anger
Brief Symptom Inventory (BSI; Derogatis, 1992)	53	8-12 minutes	X	X		
Derogatis Stress Profile (Derogatis, 1977)	77	12-13 minutes	X	X		
Distress Thermometer (DT; National Comprehensive Cancer Network; 2005)	1	Not Provided				
Duke Health Profile (DUKE; Parkerson, Braodhead, Tse, 1990)	17	Not Provided	X	X		
Five Item Screening Tool for Psychological Distress (STOP-D; Young et al, 2007)	5	1-2 minutes	X	X		X
Four-Dimensional Symptom Questionnaire (4DSQ; Terluin, 1996)	50	Not Provided	X	X		
General Health Questionnaire (GHQ; Goldberg & Blackwell, 1970)	12,28,30 & 60	3- 8 minutes	X	X		
Kessler Psychological Distress Scale (K-10 and K-6; Kessler et al., 2002)	6 or 10	Not Provided	X	X		
Medical Outcomes Study 36-item Short-form Health Survey (SF-36; Stewart, Hays, Ware, 1988)	36	10-15 minutes				
Primary Care Evaluation of Mental Disorders (PRIME-MD; Spitzer, Williams, Kronke et al., 1994)	26	7-10 minutes	X	X		
Psychological Screening Inventory (PSI; Lanyon, 1970)	130	10- 20 minutes				
Rand Mental Health Inventory (MHI; Berwick, Murphy, Goldman et al., 1991)	5	Not Provided				
Symptom Checklist-90-R (SCL-90-R; Derogatis, 1977)	90	12-15 minutes	X	X		
Talbieh Brief Distress Inventory (TBI; Ritsner et al., 1995)	24	Not Provided	X	X		

Figure 1. *Common Measures of Psychological Distress*

These measures vary by construct and validating samples, and none of these instruments screen for all four constructs theorized as critical in assessing psychological

distress in a clinical sample (BDI-II: Beck, Steer, & Brown, 1996; BAI: Beck & Steer, 1993; BHS: Beck & Steer, 1988; Spielberger, 1999). The administration time for existing multidimensional measures ranges from 2 minutes to 15 minutes. Assessing multiple constructs that serve as important indicators of psychological distress with separate instruments poses a significant time burden on patients and busy health care professionals.

Given the increasing cost of mental healthcare services, a brief screening measure that incorporates the commonly utilized constructs of distress is critically needed to identify psychological distress without increasing the burden on patients or professionals. Furthermore, administering multiple, commercially available validated measures may be prohibitive for clinical practice with patients with limited financial means, or in research where funding is limited or nonexistent. Presently, there are no brief validated screening tools that assess all four of the most prominent constructs of psychological distress in a single measure. Testing would require up to 25 minutes (and possibly more) to complete a full battery of even the briefest of the current validated measures to screen for depression, anxiety, anger, and hopelessness. Additionally, 5 -10 minutes of staff time would be required per patient to score and interpret the results of the screening tools. Most of the existing measures also have a user fee associated with them, creating a cost of approximately \$5 USD per measure, per patient (Young, Ignaszewski, Fofonoff, Kaan, 2007). So, to collect the same data that the EDS may provide, there would be cost of approximately US\$ 15 per patient. Most importantly, there is no single, brief screening measurement that assesses anger, a potential confound to clinical care, or hopelessness, the most consistent predictor of suicide.

The Need for a Multidimensional Screener of Psychological Distress

Based on these considerations, a brief scale is in development to capture all four constructs believed to be of critical importance when assessing psychological distress. A brief description on the selected constructs of psychological distress along with the rationale for their inclusion in this scale follows:

Depression

According to the World Health Organization, depressive disorders are one of the leading causes of disease worldwide with reported prevalence of depressive episodes being 16 per 100,000 people per year for males, and 25 per 100,000 people per year for females (Ustun et al., 2004). Estimates suggest that 6.7 % of the U.S. adult population suffers from major depressive disorder, and 30.4 % of these cases are classified as severe (Kessler, Berglund, Demler, Jin, & Walters, 2005). Prevalence of depression among younger age groups, and the high likelihood of recurrence during adulthood are consistent findings across various research trials (Gotlib & Hammen, 2002). Based on the aforementioned epidemiologic studies, (Kessler et al, 2003) it is apparent that within the U.S. general population depression is a widespread concern and given the early onset, lifetime prevalence will be higher in the future for younger cohorts (Craighead, Sheets, Brosse, & Ilardi, 2007). Depression is a necessary and vital construct to include in a brief screening assessment of psychological distress.

Anxiety

As with depression, anxiety is another frequent construct from the domain of psychological distress. Anxiety disorders are commonly comorbid with other mood

disorders, especially major depressive disorder. Estimates suggest that 18.1% of the U.S. adult population suffers from an anxiety disorder, with 22.8% of these cases classified as severe (Kessler, Berglund, Demler, Jin, & Walters, 2005). Anxiety disorders such as specific phobias, social anxiety disorder, post-traumatic stress disorder, and generalized anxiety disorder have a high prevalence in society and are commonly found to be comorbid with depression (Kasper, 2006). Despite this high prevalence, anxiety disorders continue to be under-diagnosed, misdiagnosed, and inappropriately treated. Less than one in five patients receives appropriate medication when presenting with an anxiety disorder alone; this ratio improves to one in three when the patient also suffers from depression (Kasper, 2006). Anxiety disorders have many negative consequences for both the individual and society, including disability, reduced ability to work leading to loss of productivity, and a high risk of suicide. These consequences make anxiety a critical component of a measure of psychological distress.

Anger

Anger, as a construct, is rarely employed in psychometric instruments of psychological distress; however, as anger can seriously affect clinical outcomes, this is an oversight. It has been reported that anger from any cause can block effective interaction between the patient and caregiver (Fava, Rosenbaum, Pava, McCarthy, Steingard, & Bouffides, 1993). Therefore, the inclusion of the construct of anger to a measure of psychological distress is of critical clinical importance (Faulkner, Maguire & Regnard, 1994). Many scales of distress may have overlooked anger because estimating the precise prevalence of anger-related problems is very difficult. However, estimates may be developed based on the results of a large epidemiologic study of 21,443 adults aged 25 to

59 years, in which fifteen percent reported extremely high hostility scores (Romanov, Hatakka, Keskinen, Laaksonen, Kaprio et al., 1994).

Further, anger is associated with increased health concerns. Early investigations of health consequences associated with high trait anger focused on the adverse effects on the cardiovascular system (Young et al., 2007). Now, recent research shows adverse consequences on almost every organ system (Song, Sun & Lennie, 2009). Furthermore, recent studies have indicated a strong correlation between anger and risk for stroke (Young, Ignaszewski, Fofonoff, & Kaan, 2007). Individuals suffering from anxiety and depression have an increased risk for anger attacks, (Gould, Ball, Kaspi, Otto, Pollack, Shekhar & Fava, 1996) which are defined as “episodes of anger accompanied by physiological features, similar to panic attacks, in context of depressive or related psychopathology” (Young et al., 2007). It is hypothesized that anger attacks may exist as a distinct syndrome, and if left untreated, may lead to secondary anxiety and depression cyclically exacerbating the problem (Fava, Rosenbaum, Pava, McCarthy, Steingard, & Bouffides, 1993). Given the impact of anger on patient health and patient provider interaction, the construct of anger was included in the development of the EDS.

Hopelessness

Hopelessness, a construct closely linked to depression, has been found to be one of the strongest and most consistent predictors of suicide ideation, suicidal intent, and completed suicide (Beck et al., 1993; Malone, 2000; Beck, Brown, Berchick, Stewardt & Steer, 1990). Consistent with the body of literature linking hopelessness to suicide (e.g., Pompili et al., 2008). Beck, Steer, Kovacs, and Garrison (1985) found that hopelessness

at the time of hospitalization predicted 91% of eventual suicides in a 10-year prospective study of 207 psychiatric inpatients admitted with suicidal ideation.

However, research regarding the prevalence of hopelessness in the general population is limited (Greene, 1981). A 2-year follow-up study that examined hopelessness in a sample of 1,389 adults in the general population found that more than half of those who were considered to be hopeless (7% of the sample) at baseline remained hopeless at follow-up (Haatainen, Tanskanen, Kylma, Honkalampi, Antikainen & Vinamaki, 2003). This suggests that hopelessness as opposed to other psychopathology such as depression may not be alleviated by the passage of time alone. The stability of hopelessness offers opportunities in preventive and mental health care (Haatainen et al., 2003), and as a unique construct, hopelessness should be included in any comprehensive measure of psychological distress.

Hopelessness: Positive vs. Negative Thinking. The Beck Hopelessness Scale (BHS; Beck, Weissman, Lester, & Trexler, 1974) which assesses global outlook for the future is considered to be a unidimensional construct (Aish & Wasserman, 2001). However, recent evidence suggests that hopelessness may be multifaceted. Another assessment of hopelessness is a task-based measure which separates future-directed thinking into two components (MacLeod, Pankhania, Lee, & Mitchell, 1997; MacLeod, Rose, & Williams, 1993). In the future thinking task, individuals are asked to think of future positive events (things they are looking forward to) and negative events (things they are not looking forward to), for a range of future time periods. Results have consistently shown that parasuicide patients are less able to provide events they are looking forward to but do not differ from controls in the number of events they are not

looking forward to (Conaghan & Davidson, 2002). The future thinking of parasuicidal individuals is characterized mainly by a lack of positive anticipation in the absence of any increase in negative anticipation (MacLeod et al., 1997; MacLeod et al., 1993). A recent study utilizing the future-thinking task, showed hopelessness is more strongly correlated with positive future thinking than it did with negative future thinking (McLeod, Tyrer, Schmidt, Davidson, Thompson, 2005). In both cases, the relationship was independent of anxiety and depression. Consistent with previous findings (MacLeod & Byrne, 1996), depression was related to positive future thinking and anxiety was related to negative future thinking.

Initial Development of the Elkins Distress Scale

The initial development of the Elkins Distress Scale began with three phases. The first phase, item generation, involved the generation of 100 items by three doctoral level psychologists who each selected items to measure “high negative affect,” to create the most theoretically relevant questions per construct. These items were then reduced to 40 by eliminating overlapping items. Forty items were selected, and administered using an 5-point Likert rating scale for each item, with anchors of 1: Strongly disagree, 3: Neutral, and 5: Strongly agree.

The first initial validation study was conducted on participants recruited during inpatient admissions to a psychiatric unit in a major medical center in the southwestern United States over an 18-month period (Elkins, Fisher & Johnson, 2012). Item analysis of the four constructs yielded a Cronbach’s alpha of .91, suggesting that the constructs in this sample are shown to be reliable in a psychiatric outpatient sample. A principal components analysis was performed on the sample of psychiatric outpatients using an

oblique (Direct Oblimin) rotation utilizing the Kaiser criterion by extracting eigenvalues greater than one (Kaiser, 1960). Four factors were selected for the final analyses on the basis of the scree test and best theoretical fit (Cattell, 1966). For the construct of hopelessness, both positive and negative items were included. However, the positive items yielded the higher factor loadings, and did not cross-load onto other factors. The negative items were not included in the final set of items, due to weak factor loadings, and cross-loadings on other factors. It was decided that after removing redundant or very poorly loading items, a second sample would be employed to test a revised scale in a confirmatory factor analysis. On the basis of best theoretical fit and factor loadings, the initial scale was redacted to 19 items (Depression = 4 items, Hopelessness=4 items, Anxiety=5 items, Anger =6 items)

A secondary validation study was conducted on a collegiate sample and a psychiatric sample. The participants in this study included 204 undergraduate English-speaking college students and 62 inpatient participants in psychiatric unit in a major medical center in the southwestern United States admitted over an 18-month period. Statistical evaluations of the items suggest that the scale used in this study is generally reliable. Internal consistency reliability ranges from $\alpha = .813$ to $.875$ for the total scale and from $\alpha = .767$ to $.898$ for the subscales. Convergent and divergent validity analyses of the four constructs of psychological distress scale indicated strong correlations with corresponding measures from other well-validated instruments. A confirmatory factor analysis was performed utilizing LISREL 8.80 (Jöreskog & Sörbom, 2005). Results indicated a good model fit based on for the collegiate and psychiatric samples. The

Comparative Fit Index and Standardized Root-Mean Residual both met the recommended cutoff of .95 and .09 for good fit (Hu & Bentler, 1999).

Purpose of the Proposed Study

The purpose of the proposed study is to evaluate the Elkins Distress Scale in order to determine its acceptability as a potential screening instrument. Although, initial data for the EDS, has indicated good reliability and validity in psychiatric and collegiate sample, it has yet to be determined if it is equally suitable for members of the general population. In order to attempt to meet the need for a brief multidimensional screening instrument, it is necessary to collect normative data to ensure that the EDS can discriminate between distressed individuals and non-distressed individuals based upon current screening measures. Study I, will focus on collecting normative data to determine the reliability, validity, model fit, and acceptability in a sample of the general population. Additionally, Study 2 and 3 will determine if the EDS is suitable to be utilized as a state screening measure of psychological distress by analyzing longitudinal data obtained from a psychiatric and general population sample.

CHAPTER TWO

Materials and Methods

Study 1

Objectives

The objective of study 1 of this dissertation is to evaluate the Elkins Distress Scale in order to establish mean and standard deviation scores to determine if it will discriminate between distressed and non-distressed participants. Additionally, study 1 will determine reliability, validity, and model fit in a sample of the adult general population, as well as participant ratings of acceptability of the Elkins Distress Scale.

Specific Aims

Aim 1: Establish mean and standard deviation scores to determine if the EDS will discriminate between distressed and non-distressed participants as identified by the distress thermometer.

H 1.1 There will be a significant difference in mean depression scores as measured by the EDS between distressed and non-distressed participants.

H 1.2 There will be a significant difference in mean anxiety scores on the EDS between distressed and non-distressed participants.

H 1.3 There will be a significant difference in mean hopelessness EDS scores between distressed and non-distressed participants.

H 1.4 There will be a significant difference in mean EDS anger scores between distressed and non-distressed participants.

Aim 2: Determine the reliability and validity of the EDS in a sample of the general population.

H 2.1 The total score of the EDS will demonstrate a Cronbach's alpha above .80

H 2.2 The depression construct of the EDS will demonstrate a Cronbach's alpha above 0.80.

H 2.3 The anxiety construct of the EDS will demonstrate a Cronbach's alpha above 0.80.

H 2.4 The anger construct of the EDS will demonstrate a Cronbach's alpha above 0.80.

H 2.5 The hopelessness construct of the EDS will demonstrate a Cronbach's alpha above 0.80.

H 2.6 The depression construct of the EDS and the Beck Depression Inventory-II (BDI-II) will demonstrate significant positive correlations.

H 2.7 The anxiety construct of the EDS and the Beck Anxiety Inventory (BAI) will demonstrate significant positive correlations.

H 2.8 The anger construct of the EDS and the State- Trait Anger Expression Inventory-II (STAXI) will demonstrate significant positive correlations.

H 2.9 The hopelessness construct of the EDS and the Beck Hopelessness Scale (BHS) will demonstrate significant positive correlations.

Aim 3: Determine whether the EDS has incremental predictive validity beyond the K-6.

H 3.1 There will be a significant improvement in ΔR^2 when the EDS constructs are added to the K-6.

Aim 4: Determine the model fit of the EDS in a general population sample.

H 4.1 The comparative fit index (CFI) of the confirmatory analysis will demonstrate a good fit which will be greater than the recommended .95 cutoff.

H 4.2 The Tucker Lewis index (TLI) of the confirmatory analysis will demonstrate a good fit which will be greater than the recommended .90 cutoff.

H 4.3 The root mean square error of approximation (RMSEA) of the confirmatory analysis will be less than .06.

H 4.4 The standardized root mean residual (SRMR) of the confirmatory factor analysis will be less than .05.

Aim 5: Identify participant attitudes and acceptability of the EDS.

H 5.1 Participants will find the Elkins Distress Scale acceptable with a mean score of 3.5 on a scale of 1-5 with 1 being “strongly disagree” and 5 “strongly agree”.

Participants

Participants were recruited via Amazon’s Mechanical Turk (MTurk). MTurk is a program invented by Amazon that allows people to create tasks, recruit workers, compensate workers, and collect data (Buhrmester, Kwang, & Gosling, 2011). Recent research evaluating the quality of the data collected by MTurk has found that a) MTurk participants are slightly more demographically diverse than standard Internet samples, and are significantly more diverse than typical American college samples; b) realistic compensation rates do not affect data quality; and c) the data obtained are at least as reliable as those obtained utilizing traditional collection methods (Buhrmester, et al., 2011). Additionally, results indicate that the prevalence of depression, general anxiety, and trauma among MTurk participants matches or exceeds the prevalence of these issues in the general population (Shapiro, Chandler, & Mueller, 2013).

Participants recruited were required to be at least 18 years old, U.S. residents (based on the ownership of a U.S. bank account), and have a 90% task approval rate for their previous Human Intelligence Tasks (HITs). Exclusion criteria included: a) history of psychosis; b) cognitive impairment that prevents participation (e.g. dementia, delirium,

borderline intellectual functioning); and c) impairment in reading and comprehension that results in an inability to read, understand, and complete study instruments (e.g. severe learning disorders); including the informed consent documents. Additionally, participants who provided non-American internet protocol addresses were excluded.

Procedure

Eligible participants were able to sign-up for the study on MTurk's website. The listing of the study included a brief description of the study, the estimated length of time to complete the study, and the compensation amount. Eligible participants were asked to participate in a study on psychological distress. Participants were paid \$0.75 for approximately 30 minutes. This rate of pay is above average for MTurks HITs; the median hourly wage for tasks performed on MTurk is \$1.38 (Horton & Chilton, 2010). After obtaining informed consent, participants were tasked with the completion of all the psychometric instruments which took approximately 30 minutes. All participants were administered a demographic questionnaire, the distress thermometer, the Elkins Distress Scale, the Beck Depression Inventory, the Beck Hopelessness Scale, the Beck Anxiety Inventory, the State Trait Anger Expression Inventory, the Positive and Negative Affect Scale, Kesler-6, and the Toronto Empathy Questionnaire. In addition, participants completed numeric rating scales assessing attitudes and the acceptability of the EDS.

Measures

Acceptability of the Elkins Distress Scale. The study is investigating the acceptability of a psychological distress screener, but no measures have been developed for this evaluation. The writer and her mentor developed a set of questions designed to

evaluate the scale. Participants were asked the following questions after the administration of the brief psychological distress assessment: (1) “I would find it acceptable to take the Elkins Distress Scale;” (2) “This measure was easy to complete;” (3) “I would find it acceptable to take this measure of in the waiting room of a health care office;” (4) “I believe that this scale would provide beneficial information to my health-care provider;” (5) “I believe that this scale adequately captured my state of mind;” (6) “I would feel comfortable discussing the answers I provided with my physician”. The scale is anchored with the following: (1) strongly disagree; (2) disagree; (3) neither agree nor disagree; (4) agree; (5) strongly agree.

Beck Depression Inventory–II. The BDI (BDI–II: Beck, Steer, & Brown, 1996) is a 21-item self-report rating inventory measuring depressive symptoms. Scores are obtained by summing the 21 item ratings (possible score range = 0–63). Moderate associations between the BDI-II and other scales measuring depression such as the Hamilton Psychiatric Rating Scale for Depression (.73), the Zung Self-Reported Depression Scale (.76), and the MMPI Depression Scale (.76) have been reported (Groth-Marnat, 1990). Test-retest reliability coefficients have varied (.48 to .86) according to the duration between assessment periods and the nature of the participants’ presenting problems (Groth-Marnat, 1990).

Beck Anxiety Inventory. Respondents are asked to rate the extent to which they have experienced 21 anxiety-related symptoms over the preceding week on a 4-point Likert scale (BAI: Beck & Steer, 1993). Scores are obtained by summing the 21 item ratings (possible score range = 0–63). Internal consistency reliability in the normative

sample ranged from .92 to .94. The test-retest interval correlation coefficient (administrations one week apart) on 83 participants was .75. The BAI has been found to be significantly related to clinician ratings of patient anxiety and self-report measures of anxiety, such as the Hamilton Anxiety Rating Scale-Revised ($r = .51$) and the State-Trait Anxiety Inventory-Trait anxiety scale ($r = .58$) (Beck & Steer, 1993).

Beck Hopelessness Scale. The Beck Hopelessness Scale (BHS; Beck & Steer, 1988) is a 20-item true/false scale for measuring pessimistic attitudes about the future. Responses are obtained by summing the items and some items are reversed scored. Higher scores reflect greater hopelessness. Internal consistency reliability ranged from .82 to .93 (Beck & Steer, 1988). Scores on BHS obtained one week apart (during an intake evaluation and one week later before beginning treatment had moderate correlations ($r = .69$; Beck & Steer, 1988).

Distress Thermometer. Subjective distress will be assessed using the distress thermometer (DT; Roth, Kornblith, Batel-Coper, Peabody, Scher & Holland, 1998). Participants will be asked to, “Please circle the number (0-10) that best describes how much distress you have been experiencing in the past week including today.” Scores of four or above should have further evaluation. This single-item distress measure is one of the most widely utilized and recommended for its use in oncology. (National Comprehensive Cancer Network, 2003). Previous psychometric evaluation of the DT indicated that a cutoff point of four and above yielded the best sensitivity and specificity in distinguishing between individuals who were distressed and those who were not, as judged by the established cutoff scores on the HADS and BSI-18 (Jacobsen et al., 2005).

Elkins Distress Scale. The EDS consists of 19 items assessing constructs of distress, including: depression, anxiety, anger, and hopelessness (Elkins et al., 2012). For each item, a Likert scale was used consisting of “strongly disagree,” which was given a score of one, “disagree,” scored as two, “neutral,” scored as three, “agree,” scored as four, and “strongly agree,” scored as five. All items in the hopelessness construct reflect a tone of well-being and will be reversed scored.

K-6. The 6-item short form of the Kessler Psychological Distress scale (K-6) measures non-specific psychological distress. Both scales have strong psychometric properties and are able to discriminate psychiatric cases from non-cases (8,19,21,23,30). The K-6 consists of 6 items each assessed on a Likert scale with categories: (1) “none of the time”, (2) “some of the time”, (3) “most of the time”, (4) “all of the time”. The K-6 is a subset of the Kessler 10-item, using items 2,4,5,8,9, and 10, with sum scores ranging from 6 to 30.

Positive and Negative Affect Scale. The PANAS (Positive and Negative Affect Schedule) consists of 10 positive affects (interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active) and 10 negative affects (distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid). Participants are asked to rate items on a scale from 1 to 5, based on the strength of emotion where 1 = “very slightly or not at all,” and 5 = “extremely”.

State Trait Anger Expression Inventory-II. The STAXI-2 is a 57-item instrument that measures the likelihood of having angry feelings as well as the intensity of anger as an emotional condition. There are six scales within the STAXI-2 including: Trait Anger,

Anger Expression-Out, Anger Expression-In, Anger Control-Out, Anger Control-In, and State Anger. Internal consistency reliability ranges from $\alpha = .73$ to $.95$ for the total scale and from $\alpha = .73$ to $.93$ for the subscales (Spielberger, 1999).

Toronto Empathy Questionnaire. The Toronto Empathy Questionnaire (TEQ) represents empathy as a primarily emotional process. In three studies, the TEQ demonstrated strong convergent validity, correlating positively with behavioral measures of social decoding, self-report measures of empathy, and negatively with a measure of Autism symptomatology. Moreover, it exhibited good internal consistency and high test-retest reliability. The TEQ is a brief, reliable, and valid instrument for the assessment of empathy (Spreng, Mckinnon, Mar, & Levine, 2009).

Study 2

Objectives

The objective of Study 2 of this dissertation is to evaluate the sensitivity of the Elkins Distress Scale in a psychiatric sample. Study 2, will examine the EDS as potential multidimensional, state measure of psychological distress by examining the change EDS scores collected from an inpatient psychiatric sample.

Specific Aims

Aim 1: Determine if the EDS has the sensitivity to capture changes in levels of psychological distress between pre and post scores collected over an interval of a week in a psychiatric sample.

H 1.1 There will be a significant difference between mean depression time 1 scores and mean depression scores time 2.

H 1.2 There will be a significant difference between mean hopelessness time 1 scores and mean hopelessness scores time 2.

H 1.3 There will be a significant difference between mean anxiety time 1 scores and mean anxiety scores time 2.

H 1.4 There will be a significant difference between mean anger time 1 scores and mean anger scores time 2.

Participants

Participants were recruited during inpatient admissions to a psychiatric unit in a major medical center in the southwestern United States over an 18-month period. Participants were recruited by means of self-selection from a psychiatric residential treatment center upon admission. Exclusion criteria for the clinical sample included: a) active psychosis, b) cognitive impairment that prevented participation (e.g. dementia, delirium, mental retardation, borderline intellectual functioning), and c) impairment in reading and comprehension that resulted in an inability to read, understand, and complete study instruments, as well as the informed consent documents (e.g. severe learning disorders). The study was reviewed and approved by the institutional review board of the psychiatric facility in which the data were collected.

Procedure

All participants were provided with informed consent documents and were reassured that nonparticipation would in no way affect their treatment in the facility. Confidentiality was established by means of coding the data immediately after collection and the removal of any personally identifying information from questionnaires. After

obtaining informed consent, participants were tasked with the completion of all the psychometric instruments which took approximately 30 minutes. During assessment time 1, all participants were administered a demographic questionnaire, the Elkins Distress Scale, the Beck Depression Inventory, the Beck Hopelessness Scale, the Beck Anxiety Inventory, the State Trait Anger Expression Inventory, all were administered in a paper and pencil format. Approximately a week later, at assessment time 2, participants were administered the Elkins Distress Scale a second time.

Study 3

Objectives

The objective of Study 3 of this dissertation is to evaluate the Elkins Distress Scale's sensitivity to change in psychological distress in a sample of the general population. Study 3, will examine the EDS as potential multidimensional, state measure of psychological distress by examining changes in EDS scores a collected during 5 different assessment times.

Specific Aims

Aim 1: Determine if the EDS has the sensitivity to detect changes in levels of psychological distress over a two-week interval with five assessment points.

H 1.1 There will be a significant time effect in mean depression of the EDS.

H 1.2 There will be a significant time effect in mean hopelessness of the EDS.

H 1.3 There will be a significant time effect in mean anxiety of the EDS.

H 1.4 There will be a significant time effect in mean anger of the EDS.

Participants

Participants recruited were required to be at least 18 years old, U.S. residents (based on the ownership of a U.S. bank account), and have a 90% task approval rate for their previous Human Intelligence Tasks (HITs). Exclusion criteria included: a) history of psychosis; b) cognitive impairment that prevents participation (e.g. dementia, delirium, borderline intellectual functioning); and c) impairment in reading and comprehension that results in an inability to read, understand, and complete study instruments (e.g. severe learning disorders); including the informed consent documents. Additionally, participants who provide non-American internet protocol addresses were excluded.

Procedure

Participants were recruited via MTurk. Eligible participants were able to sign-up for the study on MTurk's website. Participants were invited to complete a survey containing the psychometric instruments and questionnaires. Participants were given a brief description of the study, the total compensation amount (\$1.00), and the estimated length of time to complete the survey questionnaires (approximately 8 minutes). Participants were informed that the study occurred in five sessions. Once they completed the initial set of questionnaires (day 1), participants will be notified via MTurk to retake the same questionnaires on: day 3, day 5, day 7, and day 14. Participants received \$0.25 in compensation for each session completed.

Measures

Elkins Distress Scale. The EDS consists of 19 items assessing constructs of distress, including: depression, anxiety, anger, and hopelessness (Elkins et al., 2012). For

each item, a Likert scale was used consisting of “strongly disagree,” which was given a score of one, “disagree,” scored as two, “neutral,” scored as three, “agree,” scored as four, and “strongly agree,” scored as five. All items in the hopelessness construct reflect a tone of well-being and will be reversed scored.

CHAPTER THREE

Results

Demographic Variables: Study 1 Descriptive Statistics

The demographic characteristics taken from a sample of the general population via MTurk (n=371). Table 1 provides the frequencies and percentages associated with gender, race, marital status, and level of education.

Table 1

Demographic factors of study 1 participants. .

<i>Characteristics</i>	<i>Frequency (%)</i>
<i>Gender, No. (%)</i>	
Female	221 (59.5)
Male	152 (40.9)
<i>Age in years, mean (range)</i>	37.3 (19-79)
<i>Race, No. (%)</i>	
Caucasian	297 (80.4)
Hispanic	17 (4.5)
African American	27 (7.2)
Asian	21 (5.6)
American Indian	4 (1.1)
Other	7 (1.8)
<i>Marital status, No.(%)</i>	
Married	141 (38.0)
Single	176 (47.4)
Separated or Divorced	49 (13.2)
Widowed	7 (1.8)
<i>Education</i>	
Less than high school diploma	3(0.8)
High school graduate	112(30.2)
Associates degree or 2 year technical training	82 (22.1)
Bachelor's degree	128 (34.5)
Master's degree	36 (9.7)
Doctoral degree	12 (3.2)

Of the sample, 58% were female (n = 221) and 40% were male (n = 152); 78% of participants were Caucasian, 5% were Hispanic, 7% were African American, 6% were Asian, and 1% was American Indian. Of the sample, 37% were married, 46% were single, 13% were separated or divorced, and 2% were widowed.

Distressed and Non-Distressed Participants as Determined by the Distress Thermometer and K6

Participants were categorized as distress versus non-distress based on their self-reported rating on the Distress Thermometer and K-6. Previous psychometric evaluation of the DT indicated that a cutoff point of four and above yielded the best sensitivity and specificity in distinguishing between individuals who were distressed and those who were not (Jacobsen et al., 2005). In a sample of 371 MTurk participants (Table 2), according to the Distress Thermometer scoring criterion, 175 participants were classified as non-distressed ($M=1.59$, $SD= 1.27$), and 196 participants were classified as distressed ($M=6.38$, $SD=1.57$).

Table 2

Distressed and non-distressed participants as determined by the Distress Thermometer

EDS Construct	Non- Distressed		Distressed		T
	N	M(SD)	N	M(SD)	
Depression	175	7.66 (3.61)	196	12.74 (3.87)	-12.96**
Hopelessness	175	13.71 (4.12)	196	15.13 (2.85)	-3.78**
Anxiety	175	10.24 (4.18)	196	16.13 (4.04)	-13.64**
Anger	175	12.38 (5.15)	196	18.10 (5.99)	-9.802**

**p<.001

An independent-samples *t* test was conducted to evaluate the hypothesis that significance differences exist between distress and non-distressed groups on EDS scores

as determined by the Distress Thermometer. Results showed a significant independent samples *t*- test for each of the four constructs of the EDS (Table 2).

Participants were categorized as distress versus non-distress based on their self-reported rating on the K-6. Previous psychometric evaluation of the K-6 indicated that a cutoff point of 14 and above yielded the best sensitivity and specificity in distinguishing between individuals who were distressed and those who were not (Cornelius, Groothoff, van der Klink, Brouwer, 2013). In a sample of 371 (Table 3), according to the K-6 cut-off criterion, 346 participants were classified as non-distressed ($M=3.05$, $SD= 3.34$), and 25 participants were classified as distressed ($M=17.26$, $SD=3.78$).

Table 3

Distressed and non-distressed participants as determined by the K-6

EDS Construct	Not Distressed		Distressed		<i>t</i>
	N	<i>M(SD)</i>	N	<i>M(SD)</i>	
Depression	346	9.88 (4.35)	25	16.42 (3.16)	-8.42**
Hopelessness	346	14.32 (3.58)	25	16.21 (3.37)	-2.24**
Anxiety	346	12.97 (4.84)	25	19.68 (4.41)	-5.90**
Anger	346	14.93 (6.02)	25	22.99 (6.34)	-5.59**

p<.05*, ***p*<.001

An independent-samples *t* test was conducted to evaluate the hypothesis that significance differences exist between distress and non-distressed groups on EDS scores as determined by the K-6. Results showed a significant independent samples *t*- test on all four constructs of the EDS (Table 3). These results suggest that the EDS can discriminate against non-distressed and distressed participants as identified by the K-6, which has a more stringent criterion than the Distress Thermometer. Future studies are required before cut-off criterion scores can be established for the EDS.

Item and Reliability Analyses

All study 1 measures were completed by 371 participants. Descriptive analysis of each study measure is presented below (Table 4).

Table 4

Minimum, maximum, mean and standard deviation scores across psychological distress measures in a general population sample

Measure	Minimum	Maximum	Mean	Standard Deviation
Elkins Distress Scale	19	94	53.59	15.84
Distress Thermometer	0	10	4.12	2.79
Beck Anxiety Inventory	0	63	10.75	11.95
Beck Depression Inventory-II	0	58	13.81	12.25
Beck Hopelessness Scale	0	20	6.95	6.11
State-Trait Anger Expression Inventory II-State	15	60	18.97	7.75
State-Trait Anger Expression Inventory II-Trait	10	40	16.87	6.19
Positive and Negative Affect Scale-Positive Subscale	10	50	26.19	8.84
Positive and Negative Affect Scale-Negative Subscale	10	50	15.05	7.28
K- 6	0	24	3.81	4.63
Toronto Empathy Questionnaire	16	80	45.45	5.92

Descriptive and item analyses was conducted on each of the four constructs of the EDS. The depression construct reported a mean of 10.36 and SD of 4.52 with a Cronbach's alpha of 0.932. Evaluation of the anxiety construct (5 items, $n = 371$; $M = 13.34$, $SD = 5.05$) indicated a Cronbach's alpha of .887 construct. Additionally, the anger

construct showed (6 items, $M = 15.43$, $SD = 6.30$), $\alpha = .914$, and a mean of 13.98 ($SD = 4.55$), $\alpha = 0.835$ for the hopelessness construct. An item analysis was conducted to assess each item for normality and skewed distributions. Out of the 19 items, two items were positively skewed due to the limited range of responses: “I feel my heart racing all of the time,” and “I believe people have seen me as being angry”. Deletion of such items had no pronounced effect on alpha. Table 5 shows the inter-item correlations of the EDS. All of the EDS items are significantly correlated. Statistical evaluations of the EDS items suggest good reliability on all 4 constructs.

Convergent and Divergent Validity

Convergent and divergent validity analyses of the four constructs of psychological distress scale are indicated in a multi-trait matrix for convergent and divergent validity (Table 6). The results demonstrate that the four constructs of the EDS show the strongest correlations with the hypothesized corresponding validated measures. The depression construct of the EDS showed the strongest correlation with the Beck Depression Inventory-II, $r(369) = .713$, $p < .01$. Additionally, the anxiety construct presented the strongest correlation with the Beck Anxiety Inventory, $r(369) = .730$, $p < .01$, and the hopelessness construct with the Beck Hopelessness Scale $r(369) = .407$, $p < .01$. The anger construct was significantly correlated with the State subscale of the State Trait Anger Expression Inventory-II, $r(369) = .688$, $p < .01$. The results provide initial support for the convergent and divergent validity of the EDS. However, further support is needed.

Table 5.

Inter-item correlations of the Elkins Distress Scale

Item	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
EDS1	2.4	1.2	--																		
EDS2	2.4	1.9	.84**	--																	
EDS3	2.9	1.3	.77**	.76**	--																
EDS4	2.7	1.0	.75**	.77**	.77**	--															
EDS5	3.2	1.2	-.39**	-.34**	-.27**	-.26**	--														
EDS6	3.2	1.0	-.44**	-.47**	-.44**	-.45**	.59**	--													
EDS7	3.3	1.0	-.57**	-.54**	-.58**	-.55**	.58**	.71**	--												
EDS8	3.2	1.1	-.55**	-.54**	-.55**	-.51**	.58**	.66**	.80**	--											
EDS9	2.9	1.3	.65**	.61**	.63**	.60**	-.32**	-.37**	-.52**	-.45**	--										
EDS10	3.1	1.2	.55**	.55**	.60**	.61**	-.23**	-.28**	-.49**	-.39**	.67**	--									
EDS11	2.2	1.3	.49**	.45**	.46**	.49**	-.20**	-.21**	-.37**	-.29**	.52**	.52**	--								
EDS12	2.5	1.2	.58**	.52**	.57**	.59**	-.18**	-.20**	-.42**	-.36**	.63**	.57**	.67**	--							
EDS13	2.6	1.3	.52**	.52**	.56**	.57**	-.17**	-.23**	-.41**	-.31**	.58**	.63**	.61**	.71**	--						
EDS14	3.0	1.3	.50**	.51**	.52**	.51**	-.15**	-.26**	-.33**	-.30**	.51**	.56**	.34**	.49**	.51**	--					
EDS15	2.0	1.2	.48**	.46**	.46**	.43**	-.15**	-.24**	-.31**	-.25**	.40**	.42**	.46**	.41**	.48**	.51**	--				
EDS16	2.2	1.2	.63**	.63**	.57**	.61**	-.24**	-.35**	-.47**	-.41**	.53**	.50**	.47**	.51**	.50**	.64**	.70**	--			
EDS17	2.8	1.4	.49**	.50**	.51**	.51**	-.20**	-.32**	-.37**	-.37**	.43**	.49**	.37**	.39**	.49**	.62**	.59**	.75**	--		
EDS18	3.1	1.3	.46**	.46**	.48**	.46**	-.15**	-.23**	-.33**	-.32**	.46**	.57**	.36**	.43**	.53**	.77**	.48**	.59**	.71**	--	
EDS19	2.4	1.2	.47**	.46**	.47**	.50**	-.18**	-.20**	-.32**	-.30**	.38**	.44**	.44**	.46**	.47**	.62**	.65**	.67**	.66**	.63**	--

Table 6.

Multi-trait matrix for convergent and divergent validity of the 19-item psychological distress scale

	ANX	ANG	HLP	DEP	BAI	STAXI-S	BHS	BDI	PANAS-P	PANAS-N	K-6	TEQ
ANXIETY	(.887)											
ANGER	.659**	(.914)										
HOPELESSNESS	.327**	.355**	(.835)									
DEPRESSION	.636**	.656**	.379**	(.932)								
BAI	.730**	.479**	.129*	.533**	(.951)							
STAXI-S	.413**	.688**	.130*	.469**	.594**	(.964)						
BHS	.537**	.461**	.407**	.680**	.418**	.316**	(.934)					
BDI	.633**	.598**	.299**	.713**	.701**	.539**	.221**	(.947)				
PANAS-P	-.265**	-.268**	-.391**	-.285**	-.118*	-0.077	-.393**	-.331**	(.913)			
PANAS-N	.482**	.473**	.382**	.527**	.685**	.750**	.395**	.585**	-0.057	(.943)		
K-6	.612**	.512**	.217**	.674**	.707**	.514**	.213**	.834**	-.285**	.584**	(.889)	
TEQ	0.058	0.089	-0.080	0.076	.208**	.194**	-0.038	.128*	.173**	.271**	.188**	(.601)

Coefficient alpha appears on the diagonal.

* Correlation is significant at the 0.05 level (2-tailed), ** Correlation is significant at the 0.01 level (2-tailed).

Regression Analyses

To investigate convergent validity, a regression analysis was performed where scores on the K-6 scale were predicted using subtotal scores of depression, hopelessness, anxiety, and anger from the Elkins Distress Scale. The two predictors explained a significant portion of variance in K-6 scores ($R^2 = .489$, $F = 84.4$, $p < .001$). This is supportive of convergent validity. Correlations and standardized betas are reported in Table 7.

Table 7.

Predicting K-6 from EDS constructs

EDS Construct	Correlation	Standardized Beta
Depression	0.674**	0.481**
Hopelessness	0.217**	-0.065
Anxiety	0.612**	0.237**
Anger	0.512**	0.068

** $p < .001$

Scores on the EDS constructs all showed a large positive correlation with scores from the Kessler-6 which is supportive of convergent validity. However only the depression and anxiety constructs explained unique variance after controlling for the predictors. The construct hopelessness, although moderately correlated with the K-6, failed to significantly explain unique variance in K-6 after controlling for depression, anxiety and anger.

A *t* test was conducted for each pair of constructs to test for significant differences between two correlations (Steiger, 1980). For results to support convergent validity, there should be no significant differences between constructs. In a test for

differences between correlations, the correlation between depression and the K-6 was compared with the correlation between hopelessness and the K-6. Results indicated that the correlation for depression was significantly larger than the correlation for hopelessness ($t(369) = 3.56, p < .05$). Additionally, there was a significance difference between the hopelessness construct of the EDS and the construct of anger ($t(369) = 2.09, p < .05$). Despite these two significant differences between correlations, there were no other significant differences in correlations between constructs.

To investigate divergent validity, items of the Toronto Empathy Scale were predicted using scores from constructs of depression, hopelessness, anxiety, and anger of the EDS. The predictors did not explained a significant portion of variance in empathy scores ($R^2 = .205, p < .065$). Correlations and standardized betas are reported in Table 8.

Table 8.

Predicting the Toronto Empathy Scale from EDS constructs

EDS Construct	Correlation	Standardized Beta
Depression	0.076	0.077
Hopelessness	-0.080	-0.138*
Anxiety	0.058	-0.018
Anger	0.089	0.099

** $p < .001$

The Toronto Empathy Scale was not correlated with any of the EDS constructs of depression, hopelessness, anxiety, and anger. Additionally, out of the four constructs only hopelessness explained a significant variance in the empathy scale while controlling for one another. This is supportive of the hypothesized divergent validity.

A *t* test was conducted for each pair of constructs to test for significant differences between two correlations (Stieger, 1980). For results to support divergent validity, there should be significant differences between constructs. In a test for differences between correlations, the correlation between depression and the TEQ was compared with the correlation between hopelessness and the TEQ. The results indicated that the correlation for depression was significantly larger than the correlation for hopelessness ($t(369) = 4.519, p < .05$). Additionally, there was a significance difference between the depression construct and the construct of anxiety ($t(369)=10.08, p<.05$). The correlation between depression and the TEQ was compared with the correlation between anger and the TEQ which indicated that the correlation for depression was significantly larger than the correlation for anger ($t(369) = 10.24, p < .05$). Additionally, there was a significance difference between the hopelessness construct of the EDS and the construct of anxiety ($t(369) = 3.58, p < .05$). There was a significance difference between the hopelessness construct of the EDS and the construct of anger ($t(369) = 4.078, p < .05$). Furthermore, there was a significance difference between the hopelessness construct of the EDS and the construct of anxiety ($t(369) = 3.58, p < .05$). There was a significance difference between the anxiety construct of the EDS and the construct of anger ($t(369) = 10.70, p < .05$). The significant differences in correlation between the EDS and TEQ provide support for divergent validity. Further replication with additional divergent measures should be conducted as the TEQ had lower reliability estimates than previously reported.

Evaluation of the Incremental Validity of the Elkins Distress Scale

A number of researchers have suggested that a new measure should demonstrate incremental validity above and beyond established measures to be deemed pragmatic and

value-added in application (Cronbach & Gleser, 1957; Day & Silverman, 1989; Sechrest, 1963). An open question is whether the EDS has predictive validity beyond commonly utilized psychological distress measures. Due to the fact that EDS measures constructs that are not present in other theoretical conceptualizations of psychological distress, hopelessness and anger, it is hypothesized that the EDS will expand the predictive validity of psychological distress measures. To examine incremental validity, the EDS was tested to see whether the EDS constructs could predict components of psychological distress over and above the K-6.

Hierarchical multiple regressions were used to test whether the EDS total added incremental predictive validity beyond the K-6. Analyses focus on the incremental validity of the aggregate EDS in comparison with the aggregate K-6 (Table 9).

Table 9.

Incremental predictive validity comparisons between the Elkins Distress Scale (EDS) and the Kessler-6 (K-6)

Scale	R ² for K-6 alone	ΔR ² adding EDS to K-6	R ² for EDS alone	ΔR ² adding K-6 to EDS
Beck Anxiety Inventory	0.50	0.03	0.59	0.19
Beck Depression Inventory-II	0.62	0.21	0.67	0.06
Beck Hopelessness Scale	0.38	0.09	0.41	0.08
Positive Affect	0.08	0.05	0.12	0.01
Negative Affect	0.34	0.04	0.29	0.01
State-Trait Anger Expression Inventory	0.26	0.06	0.29	0.05

Note. Bold indicates which scale K-6, or EDS, is the strongest predictor alone.

In every analysis, the EDS made a significant improvements to predictions when added to the K-6 (average $\Delta R^2 = 10.7\%$; all ΔR^2 s significant at $p < .001$) with the exception of the positive affect subscale of the PANAS. R^2 and ΔR^2 for the scales and

psychological distress measures can be found in Table 9. Additionally, R^2 for the EDS alone, was investigated to further compare its predictive validity with that of the K-6. As the bolded values in Table 8 show, the EDS was actually a more powerful predictor than the K-6 for most of the psychological distress scales. This study provides support for incremental predictive validity of the Elkins Distress Scale.

Confirmatory Factor Analyses and Model Fit of the Elkins Distress Scale in a General Population Sample.

The procedure employed for the statistical analysis was conducted in multiple steps. Three separate models were computed utilizing Lisrel 8.8 (Jöreskog & Sörbom, 2005). All confirmatory factor analyses models allowed factors to correlate with one another and all correlations between error variances were fixed at zero.

Model 1: Four Correlated Factors

The first confirmatory factor analyses (CFA) model consisted of four latent variables representing depression, hopelessness, anxiety, and anger. The constructs of depression and hopelessness each have four indicators, while anxiety has 5 indicators, and anger has 6 indicators. The four latent variables were allowed to correlate with one another and all correlations between error variances were fixed at zero (Figure 2). The first CFA was performed to investigate the proposed multidimensional assessment of psychological distress. The criterion for recommended cutoff for good fit was set as greater than or equal to 0.95 for the Comparative Fit Index (CFI) and less than or equal to .05 for the Standardized Root Mean Residual (RMR) (Hu & Bentler, 1999).

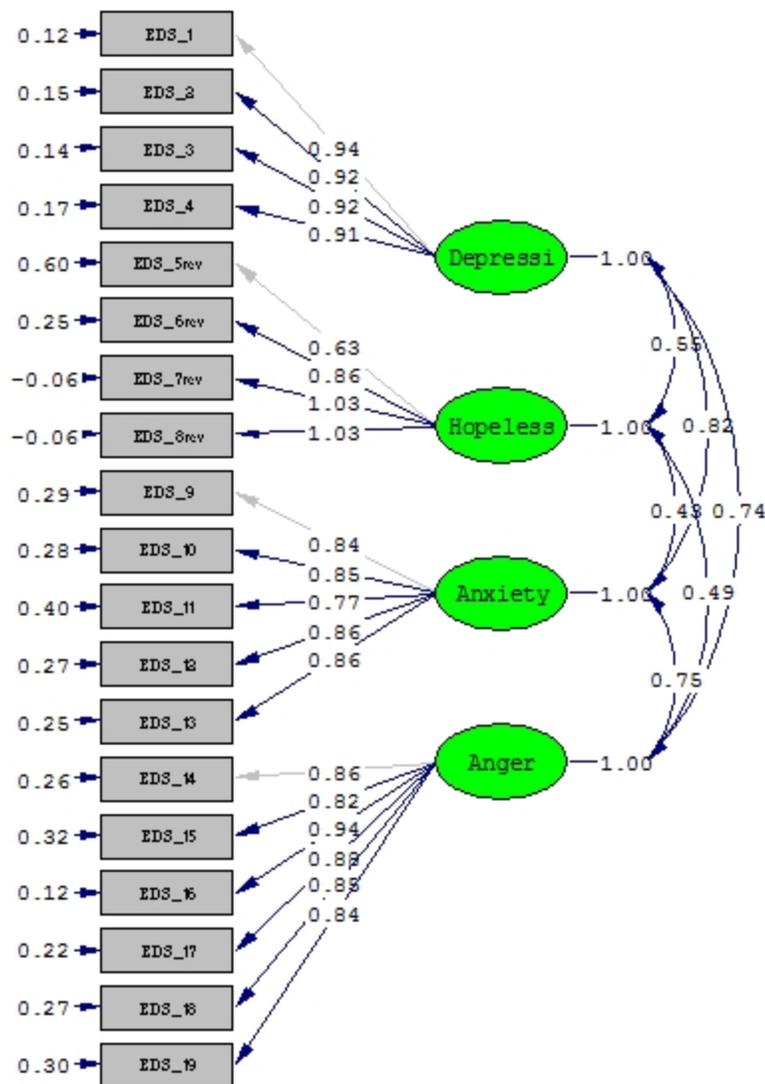


Figure 2. Model 1, Four-factor model of the Elkins Distress Scale

Evaluation of the loadings of the EDS showed significant loadings on all indicators. Goodness of Fit statistics suggested that the chi-square corrected for non-normality was not significant ($\chi^2 = 164.45, p = .14$). The Comparative Fit Index suggested that the model had good fit at 0.99, which is above the recommended criterion of 0.95. The SMSR is .040 which meets the recommended under .05 cutoff for good fit (Hu & Bentler, 1999). The correlations between latent variables of hopelessness and depression

resulted in a lower correlation ($r=0.55$) than hypothesized. However, there was a high correlation between depression and anxiety ($r=0.82$).

Model 2: Three Correlated Factors

The second confirmatory factor analysis (CFA) model tested a three-factor model, representing anxiety, anger, and overall depression (Figure 3).

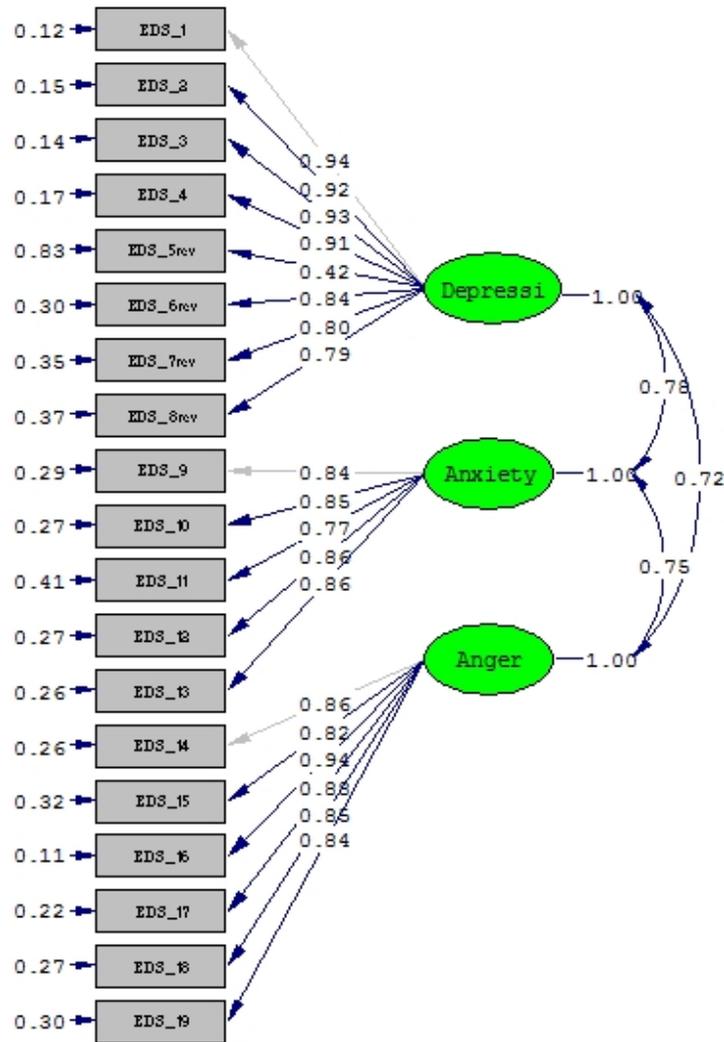


Figure 3. Model 2, Three-factor model of the Elkins Distress Scale

There is debate in the distress literature questioning if hopelessness should be viewed as a distinct variable separate from depression. Should the model fit indices for this model be superior to model 1, it will lend support to the hypothesis that hopelessness may not be a distinct construct from depression. For model specification, the construct of depression has eight indicators, anxiety with 5 indicators, and anger with six indicators.

Evaluation of the loadings of the EDS showed significant loadings on all indicators for the analyses conducted. Goodness of Fit statistics suggested that the chi-square corrected for non-normality was significant ($\chi^2 = 1014.78, p < .01$). The Comparative Fit Index suggested that the model had adequate fit at 0.95; however the Standardized Root-Mean Residual of 0.11 did not meet the recommended criteria of under .09 cutoff for good fit (Hu & Bentler, 1999). The correlations between latent variables of depression and anxiety ($r = 0.78$).

Model 3: Single Correlated Factor

The third CFA model tested a single-factor model, representing overall psychological distress (Figure 4). For model specification, the single latent variable had 19 indicators. Evaluation of the loadings of the EDS showed significant loadings on all indicators for the analyses conducted. Goodness of Fit statistics suggested that the chi-square corrected for non-normality was significant ($\chi^2 = 1572, p < .001$). The Comparative Fit Index suggested that the model had poor model fit at 0.87 and Standardized Root-Mean Residual of 0.15 did not meet the recommended criteria under .09 cutoff for good fit (Hu & Bentler, 1999).

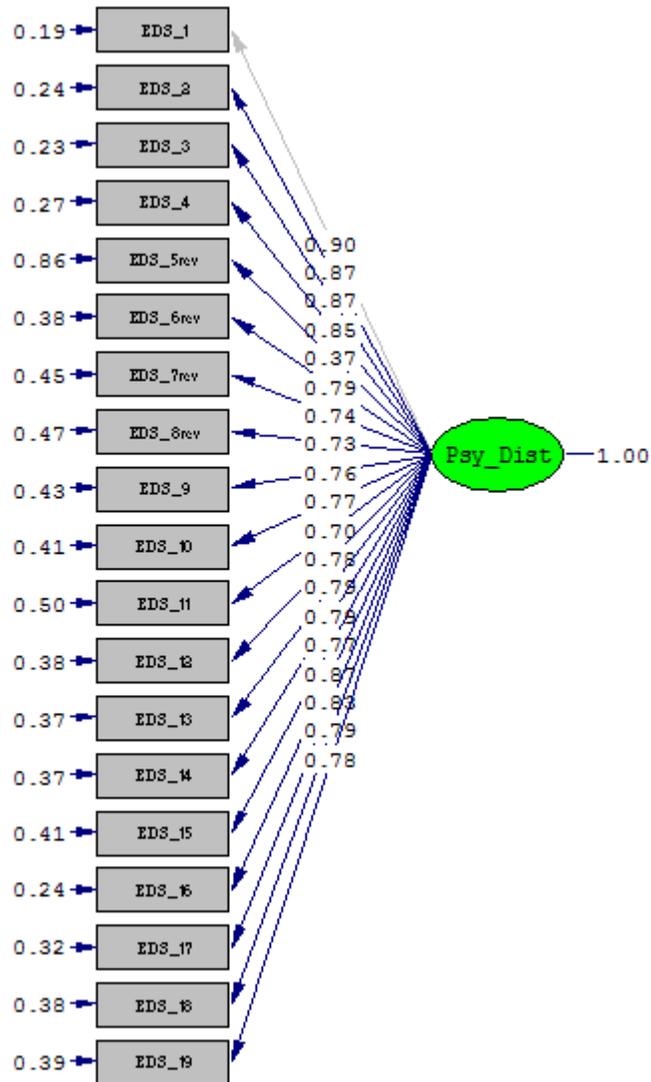


Figure 4. Model 3, Single-factor model of the Elkins Distress Scale

Model Comparisons

The results of the CFA comparing the fit indices for each model are displayed in Table 10. Given the lower chi-squared values, high CFI, high TLI, low RMSEA and low SMSR values, the four-factor model appears to fit the data better than the one and three-factor models.

Table 10

Goodness-of-fit indices for structural models representing confirmatory factor analyses of the Elkins Distress Scale

Model	χ^2	Df	P	CFI	GFI	TLI	RMSEA
1 factor	1572	152	0.00	0.87	0.91	.86	0.150
3 factor	1014	149	0.00	0.95	0.96	0.94	0.110
4 factor	164.4	146	0.14	0.99	1.00	0.98	0.018

Model 3 conceptually represents psychological distress as a unidimensional construct (Figure 5). In this sample of the adult general population, psychological distress does not appear to be unidimensional given the low CFI and TFI and higher RMSEA and SRMR values. Model 2, which represents depression and hopelessness not as distinct but rather as combined latent variable is not supported by the present study (Figure 4). The model with the best fit is Model 1 which represents the four-factor model (Figure 3).

Attitudes and Acceptability of the Elkins Distress Scale

To investigate the acceptability of administering the EDS, frequencies, mean scores and standard deviations were evaluated. Number and frequency by acceptability item are displayed below. Likert ratings were utilized in order to evaluate the acceptability of the EDS as a potential screening instrument in a primary care scenario (Table 11). It was hypothesized that participants would find the Elkins Distress Scale acceptable with a mean score of 3.5 on a scale of 1-5 with 1 “being strongly disagree” and 5 “strongly agree”. Participants mean average rating for each of the five items was above a 3.5. Additionally, when separated into distressed vs. non-distressed groups by both the

distress thermometer and the K-6, both groups had a mean rating above a 3.5 on each statement (Table 12).

Table 11

Frequency and descriptives on acceptability of the Elkins Distress Scale

Item	Strongly Disagree	Disagree	Undecided	Agree	Strongly Agree
I would find it acceptable to take the EDS.	2 (.5)	10 (2.6)	47 (12.4)	205 (54.1)	103 (27.5)
The EDS was easy to complete.	3 (.8)	10 (2.6)	30 (7.9)	180 (47.5)	144 (38.0)
I would find it acceptable to take the EDS in the waiting room of a healthcare office.	5 (1.3)	19 (5.0)	41 (10.8)	187 (49.3)	115 (30.3)
I would feel comfortable discussing the answers I provided with my physician.	12 (3.2)	17 (4.5)	54 (14.2)	164 (43.3)	120 (31.7)
I believe that the EDS would provide beneficial information to my healthcare provider.	5 (1.3)	13 (3.4)	84 (22.2)	172 (45.5)	93 (24.5)

Table 12

Means and standard deviations for acceptability of the EDS in distressed vs. non-distressed as determined by the Distress Thermometer and K-6.

	ND*	D*	ND†	D†
I would find it acceptable to take the EDS.	3.99 (.79)	4.18 (.69)	4.08 (.74)	4.47 (.51)
The EDS was easy to complete.	4.19 (.82)	4.26 (.73)	4.22 (.78)	4.63 (.49)
I would find it acceptable to take the EDS in the waiting room of a healthcare office.	3.96 (.94)	4.15 (.78)	4.05 (.85)	4.47 (.61)
I would feel comfortable discussing the answers I provided with my physician.	3.99 (.98)	3.98 (.97)	3.96 (.98)	4.58 (.61)
I believe that the EDS would provide beneficial information to my healthcare provider.	3.84 (.85)	3.97 (.86)	3.91 (.84)	4.37 (.85)

Note: *As determined by the Distress Thermometer; † As determined by the K-6

Means and standard deviations are displayed in Table 12 for each statement. Initial ratings show that the EDS may be acceptable as a potential screening instrument. Further replication in a primary care setting is necessary.

Demographic Variables: Study 2 Descriptive Statistics

The demographic characteristics taken from a sample of a psychiatric sample ($n=$ via MTurk ($n=62$)). Table 13 provides the frequencies and percentages associated with gender, race, marital status, and level of education.

Table 13

Demographic factors of psychiatric study participants

<i>Characteristics</i>	<i>Frequency (%)</i>
<i>Gender, No. (%)</i>	
Female	41 (66.1)
Male	21 (33.9)
<i>Age in years, mean (range)</i>	44.29 (21-71)
<i>Race, No. (%)</i>	
Caucasian	49 (78.7)
Hispanic	4 (6.6)
African American	2 (3.3)
Asian	2 (3.3)
Other	5 (8.2)
<i>Marital status, No.(%)</i>	
Married	32 (51.6)
Divorced/Separated	19 (30.2)
Single	10 (16.1)
Widowed	1 (1.6)
<i>Education</i>	
Less than high school diploma	2 (3.2)
High school graduate	5 (8.1)
Associates degree or 2 year technical training	28 (46.8)
Bachelor's degree	18 (29.0)
Master's degree	5 (8.1)
Doctoral degree	3 (4.8)

Evaluation of the Sensitivity of the Elkins Distress Scale in a Psychiatric Sample: Two Assessment Points during a One-Week Interval

A one way-repeated measures ANOVA was conducted for each EDS construct, depression, hopelessness, anxiety, and anger at time 1 and time 2. The mean, standard deviation, and *F* values are reported in below (Table 14).

Table 14

Results of one-way repeated measures ANOVA for time 1 and time 2

EDS Construct	T ₁ M(SD)	T ₂ M(SD)	df	Error	<i>F</i>	<i>p</i>
Depression	15.18 (6.91)	12.71 (6.14)	1	60	4.04	0.047*
Hopelessness	10.95 (4.51)	12.83 (5.01)	1	60	4.37	0.040*
Anxiety	15.13 (4.34)	13.37 (5.12)	1	60	5.15	0.027*
Anger	15.26 (5.39)	15.47 (6.01)	1	60	0.46	0.832

p<.05*

The standard univariate ANOVA indicates a significant time effect for the constructs of depression, hopelessness, and anxiety with sphericity assumed. The multivariate test for the depression construct indicated a significant time effect, Wilks's $\Lambda = .940$, $F(1, 60) = 4.04$, $p < .05$, multivariate $\eta^2 = .06$. Additionally, the multivariate test for hopelessness construct indicated a significant time effect, Wilks's $\Lambda = .932$, $F(1, 60) = 4.37$, $p < .05$, multivariate $\eta^2 = .06$. The anxiety construct had a significant time effect with a Wilks's $\Lambda = .921$, $F(1, 60) = 5.15$, $p < .05$, multivariate $\eta^2 = .07$. Although, the initial results are promising for possibility of the EDS as a potential trait measure, further replication is necessary with a larger sample of the general population and multiple assessment points for each participant.

Demographic Variables: Study 3 Descriptive Statistics

The demographic characteristics taken from a sample of the general population via MTurk (n=71). Table 15 provides the frequencies and percentages associated with gender, race, marital status, and level of education.

Table 15

Demographic factors of study 3 participants.

All values are expressed as a percentage of the specified population (n=71).

<i>Characteristics</i>	<i>Frequency (%)</i>
<i>Gender, No. (%)</i>	
Female	42 (58.3)
Male	30 (41.7)
<i>Age in years, mean (range)</i>	34.3 (20-74)
<i>Race, No. (%)</i>	
Caucasian	51 (71.0)
Hispanic	3 (4.1)
African American	7 (6.9)
Asian	6 (8.3)
American Indian	1 (1.3)
Other	4 (5.5)
<i>Marital status, No.(%)</i>	
Married	29(31.9)
Single	34(47.2)
Separated or Divorced	8 (9.7)
Widowed	1 (1.4)
<i>Education</i>	
Less than high school diploma	1 (1.3)
High school graduate	18 (25.0)
Associates degree or 2 year technical training	14 (19.4)
Bachelor's degree	30 (41.7)
Master's degree	7 (9.7)
Doctoral degree	2 (3.2)

*Evaluation of the Sensitivity of the Elkins Distress Scale in a General Population Sample:
5 Assessments during a Two-Week Interval*

A one way-within-subjects ANOVA was conducted for each EDS construct, depression, hopelessness, anxiety, and anger, to determine if there is a significant time effect (Table 16). The mean, standard deviation, and *F* values are reported in below.

Table 16

Results of one-way-within subjects ANOVA for time effect across a 2 week period

EDS	Day 1 <i>M(SD)</i>	Day 3 <i>M(SD)</i>	Day 5 <i>M(SD)</i>	Day 7 <i>M(SD)</i>	Day 14 <i>M(SD)</i>	df	<i>F</i>	<i>p</i>
DEP	9.43 (3.94)	11.27 (4.33)	12.07 (4.94)	9.27 (4.34)	11.66 (4.38)	4	4.64	0.001**
HPLN	11.19 (4.11)	12.25 (4.77)	12.70 (5.09)	10.31 (3.76)	12.78 (4.41)	4	3.01	0.019*
ANX	13.94 (4.55)	12.19 (4.09)	13.68 (5.23)	14.82 (5.28)	15.49 (5.32)	4	3.55	0.008**
ANG	14.75 (6.08)	13.75 (4.50)	12.25 (4.13)	15.94 (5.40)	14.75 (5.98)	4	3.40	0.010*

p<.05**p*<.001**

A one-way-within subjects ANOVA was conducted to determine whether there were statistically significant differences EDS depression scores over a 2 week period of 5 assessment points. There were no outliers and the data was normally distributed for each group, as assessed by boxplot and Shapiro-Wilk test (*p* > .05), respectively. For the depression constructs, Mauchly's test of sphericity indicated that the assumption of sphericity had not been violated, $\chi^2(9) = 11.92, p = .218$. The standard univariate ANOVA indicates a significant time effect for the constructs of depression (Table 16). The multivariate test for the depression construct indicated a significant time effect, Wilks's $\Lambda = .713, F(4, 47) = 4.72, p = .003$, multivariate $\eta^2 = 0.287$. Post hoc analysis with a Bonferroni adjustment revealed that EDS scores significantly increased from day 1 to day

5 ($M = -2.6$, 95% CI [-0.48 to -0.37], $p < .05$), and significantly decreased from day 5 to day 7 ($M = 2.80$, 95% CI [0.16 to 5.44], $p = .001$).

A second, repeated measures ANOVA was conducted to determine whether there were statistically significant differences on EDS hopelessness scores over a 2 week period on 5 assessment points. Mauchly's test of sphericity indicated that the assumption of sphericity had not been violated, $\chi^2(9) = 11.43$, $p = .247$. The univariate ANOVA indicates a significant time effect (Table 16). Furthermore, the multivariate test for hopelessness construct indicated a significant time effect, Wilks's $\Lambda = .760$, $F(4, 47) = 4.37$, $p < .001$, multivariate $\eta^2 = .24$. Post hoc analysis with a Bonferroni adjustment revealed that hopelessness scores significantly increased from day 7 to day 14 ($M = 2.47$, 95% CI [.182 to 4.75], $p < .05$).

For the anxiety construct, a repeated measures ANOVA was conducted to determine whether there were statistically significant differences on EDS anxiety scores over a 2 week period. Mauchly's test of sphericity indicated that the assumption of sphericity had not been violated, $\chi^2(9) = 6.03$, $p = .736$. The univariate ANOVA indicates a significant time effect, (Table 16) while the multivariate test also indicates significant time effect with a Wilks's $\Lambda = .744$, $F(4, 47) = 4.04$, $p = .007$, multivariate $\eta^2 = .256$. Post hoc analysis with a Bonferroni adjustment showed that anxiety scores significantly increased from day 3 to day 7 ($M = 2.62$, 95% CI [.042 to 5.21], $p < .05$), and from day 3 to day 14 ($M = 3.29$, 95% CI [.706 to 5.88], $p < .05$),

A final repeated measures ANOVA was conducted to determine whether there were statistically significant differences on EDS anger scores over a 2 week period. Mauchly's test of sphericity indicated that the assumption of sphericity had not been

violated, $\chi^2(9) = 8.32, p = .504$. The univariate ANOVA indicates a significant time effect (Table 16). Additionally, the multivariate test for anger construct indicated a significant time effect, Wilks's $\Lambda = .748, F(4, 47) = 3.96, p = .008$, multivariate $\eta^2 = .252$. Post hoc analysis with a Bonferroni adjustment revealed that anger scores significantly increased from day 5 to day 7 ($M = 3.68, 95\% \text{ CI } [.940 \text{ to } 6.43], p < .05$). These results support the hypothesis that the EDS has the sensitivity to detect changes in levels of psychological distress over a two-week interval with five assessment points. However, replication is necessary with a larger samples size.

CHAPTER FOUR

Discussion and Conclusions

Recently psychological distress research, has sought to identify specific constructs that would allow for greater prediction of psychological distress. Results of a longitudinal study showed at the five-year follow up depression alone predicted an increase of inpatient (24.1%) and outpatient costs (8.9%) (Grabe, Baumeister, John, Freyberger, & Volzke, 2009). Additionally, comorbidity of depression along with anxiety, predicted an overall increase in health costs greater than 50% (Grabe et al., 2009). With increasing worldwide cost attributed to the effects associated with psychological distress, there is an increasing demand for accountability of economic resources and demonstrations of effectiveness in treatment interventions (Iyer, Rothmann, Vogler, & Spaulding, 2005). Furthermore, Grabe and colleagues (2009) recommend the use of simple and time-efficient screening procedures to assist in identifying patients at risk for future health care utilizations. A brief instrument that allows clinicians to assess and screen and psychological functioning of their patients is needed. Though many instruments exist to capture multiple and unitary constructs of psychological distress, there is currently no brief, single measure that that adequately assess state levels across multiple constructs of psychological distress.

Thus, the purpose of this dissertation is to evaluate the validity, acceptability and model fit of the Elkins Distress Scale (EDS) in a sample of the adult general population. Additionally, to determine the EDS's utility as a multidimensional state measure. The goal of Study 1 was to collect normative data to determine the reliability, validity, model

fit, and acceptability in a sample of the general population. Study 2 and 3 determined if the EDS is suitable to be utilized as a state screening measure of psychological distress by analyzing longitudinal data obtained from a psychiatric and a general population sample.

To determine if the EDS was a potential reliable and valid instrument for use as a psychological distress measures, a sample of 371 participants were recruited via Amazon's Mechanical Turk (MTurk). Results of Study 1, show support for the reliability of the EDS as all four constructs exhibited an alpha level above 0.80. An additional aim of Study 1 was to determine if the EDS could discriminate between distressed and non-distressed participants as identified by the Distress Thermometer. Study 1 results support the hypothesis that significance differences exist between distress and non-distressed groups on EDS scores as identified by the Distress Thermometer.

To evaluate convergent and divergent validity of the EDS, a multi-trait matrix was utilized. The results demonstrated that the four constructs of the EDS showed the strongest correlations with the hypothesized corresponding validated measure. Additionally, scores on the EDS constructs all showed a large positive correlation and explained a significant portion of variances in Kessler-6 scores that is supportive of convergent validity. To investigate divergent validity, items of the Toronto Empathy Scale were predicted using scores from the EDS. The predictors did not explain a significant portion of variance in empathy scores. This is supportive of the hypothesized divergent validity. To examine incremental validity, the EDS was tested to see whether the EDS constructs could predict components of psychological distress over and above the K-6. Using hierarchical multiple regressions, the EDS made a significant

improvements to predictions when added to the K-6. The EDS was actually a more powerful predictor than the K-6 for most of the psychological distress scales with exception of positive affect.

To investigate model fit of the EDS, three separate confirmatory factor analysis models were compared. Model 3 conceptually represents psychological distress as a unidimensional construct. In this sample of the adult general population psychological distress does not appear to be unidimensional given the low CFI and TFI and higher RMSEA and SRMR values. Model 2, which represents depression and hopelessness not as distinct but rather as combined latent variable is not supported by the present study. The model with the best fit is Model 1 which represents the four-factor model.

Likert ratings were utilized in order to evaluate the acceptability of the EDS as a potential screening instrument in a primary care scenario. It was hypothesized that participants would find the Elkins Distress Scale acceptable with a mean score of 3.5 on a scale of 1-5 with 1 “being strongly disagree” and 5 “strongly agree”. Participants mean average rating for each of the five items was above a 3.5. Although further investigation is necessary to determine if the EDS may be an acceptable potential screening instrument in a primary care setting, these results show promise for the EDS acceptability.

Study 2 and 3 determined if the EDS would be suitable to be utilized as a state screening measure of psychological distress by analyzing longitudinal data obtained from a psychiatric and general population sample. To determine if the EDS has the sensitivity to capture changes in levels of psychological distress, pre-and post-EDS scores were collected over an interval of a week in a psychiatric sample. A univariate ANOVA indicated a significant time effect for the constructs of depression, hopelessness, and

anxiety. Although, the initial results are promising for possibility of the EDS as a potential trait measure, further replication is necessary with a larger sample of the general population and multiple assessment points for each participant.

Study 3 evaluated the EDS as potential multidimensional, state measure of psychological distress by examining changes in EDS scores collected during 5 different assessment times. A one way-within-subjects ANOVA was conducted for each EDS construct. These results supported the hypothesis that the EDS has the sensitivity to detect changes in levels of psychological distress over a two-week interval with five assessment points. However, replication is necessary with a non-MTurk sample.

Limitations of the Study

In interpreting the findings of this research, several limitations that may have influenced study outcomes should be acknowledged. First, MTurk participants may overrepresent the presence of psychological distress in the general population which may limit generalizability. A primary aim of this dissertation was to collect data on multiple measures of psychological distress to establish mean EDS scores from the general population. Participants were recruited via MTurk due to recent research that suggests MTurk participants are slightly more demographically diverse than standard Internet samples, and are significantly more diverse than typical American college samples (Buhrmester, Kwang, Gosling, 2011). Additionally, results indicate that the prevalence of depression, general anxiety, and trauma among MTurk participants matches or exceeds the prevalence of these issues in the general population (Shapiro, Chandler, Mueller, 2013).

Despite these advantages, MTurk recruitment poses limitations. Research has shown a large proportion of workers endorsed items consistent with malingering (i.e., they reported a high frequency of symptoms that should be exceedingly rare); this may suggest that a small proportion of MTurk participants may be motivated to fake distress (Shapiro, Chandler, Mueller, 2013). It has been proposed that one possibility for this, is participants perceived distress to be of interest to the researcher and thus reported high levels of distress for a variety of reasons that range from selfish (e.g., gaining access to future surveys) to altruistic (e.g., being a cooperative research participant); (Shapiro, Chandler, Mueller, 2013; Rosenthal & Rosnow, 2009). Due to these limitations, it may be that the sample of 371 MTurk participants may over represent the presence of psychological distress in the general population. It is necessary to replicate with non-MTurk sample before establishing mean EDS scores for the general population.

Furthermore, the current 19-item scale includes only positive items for the construct of hopelessness due results of the initial, principal component analysis. Additionally, research has suggested hopelessness is more strongly correlated with positive future thinking than it did with negative future thinking (MacLeod et al., 2005). However, the fact that positive and negative cognitions show different effects is consistent with a growing body of research that views positive and negative aspects of experience as reflecting the activity of separate systems rather than being unipolar opposites (Ito & Cacciopo, 1998). The findings do suggest a different mechanism for how anticipated positive outcomes relate to well-being compared with negative outcomes. Hopelessness may need to be assessed as a multifaceted construct.

One further limitation of the study is in the small sample size of the psychiatric sample. However, given this limitation, the sample did support the primary aim of this psychiatric sample: to provide initial investigation into the sensitivity of the EDS. Additionally, data on current medications was available, thus it was not possible to control for this potential confound.

Directions for Future Research

This study provides further investigation towards the development of a brief, multidimensional measure of psychological distress. First, study 1 yielded promising results for the reliability, convergent and divergent validity, increment validity, model fit, and acceptability of the EDS. Second, Study 2 and 3 showed the EDS may have potential use as a state screening measure of psychological distress.

Future directions for the Elkins Distress Scale include replication with a different sample. The items for the construct of hopelessness should include both positive and negative items to assess if hopelessness should be assessed as a multidimensional construct. Additionally, cross-validation is necessary to confirm the results obtained in Study 1 and Study 3. The next study should implement the same procedures and measures as Study 1 with the addition of a malingering scale. Removing participants who score high on malingering may provide a more accurate measure of distress in the general population. Additionally, a future study should be conducted which utilizes a multi-trait multi-method matrix. The multi-trait multi-method matrix is way of examining more than one trait and more than one method to establish discriminant validity and the relative contributions of the trait or method specific variance. This would entail, in addition, to collecting Study 1 psychological distress measures that each participant be assessed in a

structured clinical interview. From there, the specificity and the positive predictive value can be determined to provide data of the scales utility to efficiently and effectively screen for psychological distress.

Should the subsequent validation studies of the Elkins Distress Scale be successful, the next step would be implementing the scale into primary care clinics to determine the feasibility of screening for psychological distress. Recent findings demonstrate that primary care is becoming the “front line” in the treatment of mental disorders (Kessler et al., 2005; Cwikel, Zilber, Feinson, & Lerner, 2008). In 2007, data suggested that one out of every five primary-care patients had at least one diagnosable anxiety or depressive disorder in the past year (Kroenke, Spitzer, Willaims, Monahan & Lowe, 2007). Further, Kroenke and colleagues also showed that mental health treatment rate had increased more than 150% in the general, medical-services sector. Despite this increase, there was no accompanied increase in efficacy, data showing that many patients receiving treatment did not complete the clinical assessment or receive the appropriate monitoring in accordance with accepted standards of care (Wang, Berglung, & Kessler, 2000; Kessler et al., 2005).

Carr (2008) proposed a model to meet the complexities associated with the development of effective assessment and evaluation of psychological distress. This model suggests assessment should begin with a broad screening measure for psychological distress symptoms. If symptoms are present, a more detailed instrument that further assesses a particular symptom should follow (e.g. for hopelessness the Beck Hopelessness Scale). If elevated scores on these instruments occur, then it is appropriate to conduct a structured interview to assess psychological distress from a syndromal

perspective with the mood disorder module with interviews such as the Structured Clinical Interview for the DSM-IV (SCID; First, Spitzer, Williams & Gibbon, 1995), MINI International Neuropsychiatric Interview (MINI; Sheehan et al, 1998), or the Longitudinal Interval Follow-Up Evaluation (LIFE; Keller et al., 1987). To integrate the proposed model and to meet the need for assessment in primary care, a multidimensional screener of psychological distress should be implemented. A brief screening instrument of psychological distress is appropriate and feasible given physicians' restricted time and lack of training in administering lengthy, structured clinical interviews. Self-report measures can be easily administered by non-clinicians such as nurses or office administrative staff in a waiting room setting. As psychological distress may increase health care costs, prolong medical treatment, and lead to unnecessary hospitalization, early identification and intervention may produce a significant financial benefit to both health care providers and patients alike. In sum, the Elkins Distress Scale appears to be a potentially reliable and valid measure, with subsequent study only serving to improve its possibility as a potential primary care screening measure.

WORKS CITED

- Aish, A. M., & Wasserman, D. (2001). Does Beck's Hopelessness Scale really measure several components. *Psychological Medicine, 31*, 367–372.
- Beck, A. T., Steer, R. A., & Brown, G. K. (1996) *Manual for the Beck Depression Inventory*. (2nd ed.) San Antonio, TX: The Psychological Corporation.
- Beck, A.T., Steer, R.A., Beck, J.S. & Newman, C.F. (1993). Hopelessness, depression, suicidal ideation and clinical diagnosis of depression. *Suicide & Life- Threatening Behavior, 23* (2), 139-145.
- Beck, A.T., Brown, G., Berchick, R.J., & Steer, R.A. (1990). Relationship between hopelessness and ultimate suicide: A replication with psychiatric outpatients. *American Journal of Psychiatry, 147*, 190-195.
- Beck, A. T., & Steer, R. A. (1988) *Manual for the Beck Hopelessness Scale*. San Antonio, TX: The Psychological Corporation.
- Beck A.T., Epstein N., Brown, G.& Steer, R.A. (1988). An inventory for measuring clinical anxiety: Psychometric properties. *Journal of Consulting and Clinical Psychology, 56*: 893–897.
- Beck, A. T., Steer, R. A., Kovacs, M., & Garrison, B. (1985) Hopelessness and eventual suicide: a 10-year prospective study of patients hospitalized with suicidal ideation. *American Journal of Psychiatry, 142*, 559-563.
- Benzeval, M & Judge, K. (2001). Income and health: The time dimension. *Social Science and Medicine, 52*, 337-1390.
- Bohus, M., Limberger, M., Ebner, U., Glocker, FX., Schwarz, B., Wernz, M., & Leib, K. (2000). Pain perception during self-reported distress and calmness in patients with borderline personality disorder and self-mutilating behavior. *Psychiatry Research, 11*, 95(3), 251-260.
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives of Psychological Science, 6*, 3-5.
- Carr, A. (2008). Depression in young people: Description, assessment, and evidence – based treatment. *Developmental Neurorehabilitation, 11* (1), 3-15.

- Cattell, R.B. (1966). The scree test for the number of factors. *Multivariate Behav. Res.* 1, 245-276.
- Chittleborough, C.R., Winefield, H., Gill, T.K., Koster, C., & Taylor, A.W. (2011). Age differences in associations between psychological distress and chronic conditions. *International Journal of Public Health*, 56, 71-80.
- Conaghan, S., & Davidson, K. (2002). Hopelessness and the anticipation of positive and negative future experiences in older parasuicidal adults. *British Journal of Clinical Psychology*, 41, 233–242.
- Cornelius, B.L., Groothoff, J.W., Klink, J.L., & Brouwer, S. (2013). The performance of the K10, K6, and GHQ-12 to screen for present DSM-IV disorder among disability claimants. *BMC Public Health*, 13, 128.
- Craighead, W.E., Sheets, E.S., Brosse, A.L., & Ilardi, S.S. (2007). Psychosocial treatments for major depressive disorder. In P.E. Nathan, & Gorman, J.M. (Ed.). *A guide to treatments that work* (3 ed.) New York: Oxford University Press.
- Cwikel J, Zilber N, Feinson M, Lerner Y. (2008). Prevalence and risk factors of threshold and sub-threshold psychiatric disorders in primary care. *Social Psychiatry and Psychiatric Epidemiology* 43(3):184-191.
- Derogatis, L. R. (1977) *SCL-90-R: Administration, scoring, and procedures manual*. Minneapolis, MN: National Computer Systems
- Derogatis, L. R. (1992) *BSI: Administration, scoring, and procedures manual–II*. Towson, MD: Clinical Psychometric Research.
- Derogatis, L. R. (2000) *BSI–18: Administration, scoring, and procedures manual*. Minneapolis, MN: National Computer Systems.
- Drapeau, A., Marchand, A., & Beaulieu-Prévost, D. (2012). Epidemiology of psychological distress. In Luciano L’Abate (Ed.) *Mental Illnesses - Understanding, Prediction and Control*. Rijeka: Intech.
- Duvdevany, I., Cohen, M., Minsker-Valtzer, A., & Lorber, M. (2011) Psychological correlates of adherence to self-care, disease activity and functioning in persons with systemic lupus erythematosus. *Lupus*, 20, 14-22.
- Elkins, G., Fisher, W., & Johnson, A. (2012) Initial development of a brief measure of psychological distress. *Psychological Reports*, 110, 1-9.
- Faulkner, A., Maguire, P. & Regnard, C. (1994). Breaking bad news: A flow diagram. *Palliative Medicine* 8, 145-151.

- Fava, M., Rosenbaum, J.F., Pava, J.A., McCarthy, M.K., Steingard, R.J., & Bouffides, E. (1993). Anger attacks in unipolar depression, Part 1: Clinical correlates and response to fluoxetine treatment. *American Journal of Psychiatry, 150*(8), 1158-1163.
- First, M. B., Spitzer, Robert L, Gibbon Miriam, and Williams, Janet B.W.(1996) *Structured Clinical Interview for DSM-IV Axis I Disorders, Clinician Version (SCID-CV)*. Washington, D.C.: American Psychiatric Press, Inc.
- Gill, D. & Sharpe, M. (1999). Frequent consulters in general practice: a systematic review of studies of relevance, associations, and outcome. *Journal of Psychosomatics Research, 47*, 115-130.
- Gispert, R., Rajmil, L., Schiaffino, A. & Herdman, M. (2003). Sociodemographic and health related correlated of psychiatric distress in a general population. *Social Psychiatry and Psychiatric Epidemiology, 38*, 677-683.
- Gotlib, I.H., & Hammen, C.L. (1992). *Psychological aspects of depression: Toward a cognitive-interpersonal integration*. Wiley, London.
- Gould R.A., Ball, S., Kaspi, S.P., Otto, M.V., Pollack, M. H., Shekhar,A., Fava, M. (1996). Prevalence and correlated of anger attacks: a two site study. *Journal of Affective Disorders, 39*, 31-38
- Greene, S.M. (1981). Levels of hopelessness in the general population. *British Journal Clinic Psychology, 20*, 11-14
- Grabe, H. J., Baumeister, S. E., John, U., Freyberger, H. J., & Voelzke, H. (2009) Association of mental distress with health care utilization and costs: A 5-year observation in a general population. *Social Psychiatry and Psychiatric Epidemiology, 44*, 835-844.
- Haatainen, K., Tanskanen, A., Kylma, J., Honkalampi, K., Koivumaa-Honkanen, H., Hintikka, J., & Vinamaki, H. (2004) Factors associated with hopelessness: A population study. *International Journal of Social Psychiatry, 50* (2), 142-152.
- Hall, J. H., & Fincham, F. D. (2009) Psychological distress: Precursor or consequence of dating infidelity. *Personality and Social Psychology Bulletin, 35*, 143-159.
- Hamera, E., Schneider, J. K., & Deviney, S. (1995) Alcohol, cannabis, nicotine, and caffeine use and symptom distress in schizophrenia. *Journal of Nervous and Mental Disease, 183*, 559-565.

- Hansen, M.S., Fink, P., Frydenberg, M., & Oxhoj, M. L., (2002). Use of health services, mental illness, and self-rated disability and health in medical patients. *Psychosomatic Medicine*, *64*, 688-675.
- Hasler, W. L., Parkman, H. P., Wilson, L. A., Pasricha, P. J., Koch, K. L., Abell, T. L., Snape, W. ... Hamilton, F. (2010) Psychological dysfunction is associated with symptom severity but not disease etiology or degree of gastric retention in patients with gastroparesis. *American Journal of Gastroenterology*, *105*, 2357-2367.
- Henrichs, J., Schenk, J. J., Roza, S. J., van den Berg, M. P., Schmidt, H. G., Steegers, E. A. P., Hofman, A. ...Tiemeier, H. (2009) Maternal psychological distress and fetal growth trajectories: the Generation R study. *Psychological Medicine*, *40*, 633-643.
- Hilari, K., Northcott, S., Roy, P., Marshall, J., Wiggins, R. D., Chataway, J., & Ames, D. (2010) Psychological distress after stroke and aphasia: The first six months. *Clinical Rehabilitation*, *24*, 181-190.
- Hilton, M. F., Scuffham, P. A., Vecchio, N., & Whiteford, H. A. (2010) Using the interaction of mental health symptoms and treatment status to estimate lost employee productivity. *Australian and New Zealand Journal of Psychiatry*, *44*, 151-161.
- Holm, E. L., & Severinsson, E. (2008) The emotional pain and distress of borderline personality disorder: a review of the literature. *International Journal of Mental Health Nursing*, *17*, 27-35.
- Horton, J. J., Chilton, L.B. (2010).The labor economics of paid crowdsourcing. In *Proceedings from EC'10: The 11th ACM Conference on Electronic Commerce* (pp. 209-218). New York, NY:ACM.
- Hu, L., & Bentler, P. M. (1999) Cutoff criteria for fit indexes in covariance structure analysis: conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55.
- Iyer, S., Rothmann, T. L., Vogler, J. E., & Spaulding, W. D. (2005). Evaluating outcomes of rehabilitation for severe mental illness. *Rehabilitation Psychology*, *50*, 43-55.
- Ito, T. A., & Cacciopo, J. T. (1998). Representations of the contours of positive human health. *Psychological Inquiry*, *9*, 43-48.
- Jacobsen, P.B., Donovan, K.A, Trask, P.C. et al. (2005). Screening for psychologic distress in ambulatory cancer patients. *Cancer* *103*: 1494-1502.

- Joreskog, K. G. & Sorbom, D. (2005). LISREL 8.72 [Computer software]. Scientific Software International.
- Karasz, A., Sacajiu, G., & Garcia, N. (2003). Conceptual models of psychological distress among low-income patients in an inner-city primary care clinics. *Journal of General Internal Medicine*, *18*, 475-477.
- Kaiser H. (1960). The application of electronic computers to factor analysis. *Educ Psychol Meas.* *20*,141–151.
- Kasper, S. (2006).Anxiety disorders: under-diagnosed and insufficiently treated. *International Journal of Psychiatry in Clinical Practice*, *10*, 3-9.
- Keller, M.B., Lavori, P.W., Friedman, B., Nielsen, E., Endicott, J. McDonald-Scott, Andreasen, N.C. (1987). The longitudinal interval follow-up evaluation: a comprehensive method for assessing outcome in prospective longitudinal studies. *Archive General Psychiatry*, *44*(6), 540- 548.
- Kern, S., Schrepf, W., Schneider, H., Schultheiß, Reichmann, H., & Ziemssen, T. (2009) Neurological disability, psychological distress, and health-related quality of life in MS patients within the first three years after diagnosis. *Multiple Sclerosis*, *15*, 752-758.
- Kessler, R.C., Chiu, W.T., Demler, O., Merikangas, K.R., & Walters E.E. (2005). Prevalence, severity, and comorbidity of 12 month DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, *62* (7), 617-627.
- Kessler, R.C., Berglund, P.A., Demler, O., Jin, R., & Walters, E.E. (2005). Lifetime prevalence and age –of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication (NCS-R). *Archives of General Psychiatry*. *62*(6), 593-602.
- Kessler, R.C., & Merikangas, K.R. (2004). The National Comorbidity Survey Replication (NCS-R): Background and aims. *The International Journal of Methods in Psychiatric Research*, *13* (2) 60-68.
- Kessler R.C. Berglund, P.A., Demler, O., Jin, R., Koretz, D., Merikangas, K.R., Rush, A.J. & Walters, E.E. (2003). The epidemiology of major depressive disorders: results from the National Comorbidity Survey Replication (NCS-R). *Journal of the American Medical Association*, *289* (23), 3095-3105.

- Kessler, R. C., Andrews, G., Colpe, L. J., Colpe, E., Hiripi, D. K., Morczek, S., Normand, L.T. ... Zaslavsky, A.M. (2002) Short screening scales to monitor population prevalence's and trends in non-specific psychological distress. *Psychological Medicine*, 32, 959-976.
- Kronenke, K., Spitzer, R., Williams, J., Monahan, P., Lowe, B. (2007). Anxiety disorders in primary care: prevalence, impairment, comorbidity, and detection. *Annals of Internal Medicine*, 6, 317-325.
- Kuriyama, S., Nakaya, N., Okmori-Matsuda, K., Shimazu, T., Kikuchi, N., Kakizaki, M... Tsuji, I. (2009). Factors associated with psychological in community-dwelling Japanese population: the Ohasaki Cohort 2006 study. *Journal of Epidemiology*, 19, 294-302.
- Lanyon, R. I. (1970) Development and validation of a psychological screening inventory. *Journal of Consulting and Clinical Psychology*, 35, 1-24.
- Lanyon, R. I. (2007) Utility of the psychological screening inventory: a review. *Journal of Clinical Psychology*, 63, 283-307.
- Leiner, A. S., Compton, M. T., Houry, D., & Kaslow, N. J. (2008). Intimate partner violence, psychological distress, and suicidality: A path model using data from African American women seeking care in an urban emergency department. *Journal of Family Violence*, 23, 478-481.
- Maggio, D., Ercolani, S., Andreani, S., Ruggiero, C., Mariani, E., Mangialasche, F., Palmari, N.... Mecocci, P. (2010) Emotional and psychological distress of persons involved in the care of patients with Alzheimer disease predicts falls and fractures in their care recipients. *Dementia and Geriatric Cognitive Disorders*, 30, 33-38.
- Mannucci, E., Petroni, M. L., Villanova, N., Rotella, C. M., Apolone, G., & Marchesini, G.. (2010) Clinical and psychological correlates of health-related quality of life in obese patients. *Health and Quality of Life Outcomes*, 8, 90-99.
- Masse R. (2000). Qualitative and quantitative analyses of psychological distress: methodological complementarity and ontological incommensurability. *Qualitative Health Research*, 10,411-423.
- Masse, R., Poulin, C., Dassa, C., Lambert, J., Belair, S., Battaglini, A. (1998). The structure of mental health: Higher-order confirmatory factor analyses of psychological distress and well-being measures. *Social Indicators Research*, 45, 475-504.

- McLeod, A.K., Tata, P., Tyrer, P., Schmidt, U., Davidson, K., Thompson, S. (2005). Hopelessness and positive and negative future thinking in parasuicide. *British Journal of Clinical Psychology*, 44, 495-504.
- MacLeod, A. K., Pankhania, B., Lee, M., & Mitchell, D. (1997). Depression, hopelessness and future-directed thinking in parasuicide. *Psychological Medicine*, 27, 973–977.
- MacLeod, A. K., & Byrne, A. (1996). Anxiety, depression and the anticipation of future positive and negative experiences. *Journal of Abnormal Psychology*, (105), 286–289.
- MacLeod, A. K., Rose, G. S., & Williams, J. M. G. (1993). Components of hopelessness about the future in parasuicide. *Cognitive Therapy and Research*, 17, 441–455.
- Mirowsky, J. & Ross, C.E. (2002). Selecting outcomes for the sociology of mental health: Issues of measurement and dimensionality. *Journal of Health and Social Behavior*, 43, 152-170.
- National Comprehensive Cancer Network.(2003). Distress management clinical practice guidelines. *J Natl Comp Cancer Network*, 1, 344 –374.
- Nagel, R., Lynch, D., Tamburrino, M.(1998). Validity of the Medical Outcomes Study depression screener in family practice training centers and community settings. *Family Medicine*,30, 362-365.
- Pompili, M., Rihmer, Z., Akiskal, H. S., Innamorati, M., Iliceto, P. Akiskal, K. K., Lester, D...Girardi, P. (2008) Temperament and personality dimensions in suicidal and nonsuicidal psychiatric inpatients. *Psychopathology*, 41, 313-321.
- Ridner, S. H. (2004) Nursing theory and concept development or analysis. Psychological distress: concept analysis. *Journal of Advanced Nursing*, 45, 536-545.
- Romanov, K., Hatakka, M., Keskinen, E., Laaksonen, H., Rose, R.J.& Koskenuom M. (1994). Self-reported hostility and suicidal acts, accidents, and accidental deaths: a prospective study of 21,443 adults aged 25 to 59. *Psychosomatic Medicine*,56, 328-336.
- Rosenthal, R., Rosnow, R. L., & Rubin, D. B. (2000). *Contrasts and effect sizes in behavioral research: A correlational approach*. Cambridge, England: Cambridge University Press.

- Rosenthal, B. S., & Wilson, W. C. (2003) Impact of exposure to community violence and psychological symptoms on college performance among students of color. *Adolescence, 38*, 239-249.
- Roth A.J., Kornblith A.B, Batel-Copel L., Peabody, E., Scher, H.I, & Holland, J.C. (1998). Rapid screening for psychologic distress in men with prostate carcinoma:A pilot study. *Cancer, 82*, 1904–1908.
- Selye H. (1976). Further thoughts on “stress without distress”. *Medical Times, 104*, 124-132.
- Serrano-Blanco, A., Palao, D.J., Luciano, J.V., Pinto-Meza, A., Lujan, L., Fernandez, A. (2010). Prevalence of mental disorders in primary care: Results from the diagnosis and treatment of mental disorders in primary care case study (DASMAP). *Social Psychiatry and Psychiatry Epidemiology, 45*, 201-210.
- Shapiro, D.N., Chandler, J. Mueller, P.A. (2013). Using Mechanical Turk to study clinical populations. *Clinical Psychological Sciences,1*, 213-220.
- Sheehan, D., Lecrubier, Y., Sheehan, K., Amorim,P., Janvas, J., Weiller,E., Herqueta, T., Baker, R., & Dunbar, G. (1998). The Mini-International Neuropsychiatric Interview (M.I.N.I.): The development and validation of a structured diagnostic psychiatric interview for DSM-IV ad ICD-10. *Journal of Clinical Psychiatry, 59*, 22-33.
- Song, E. K., Son, Y-J., & Lennie, T. A. (2009) Trait anger, hostility, serum homocysteine, and recurrent cardiac events after percutaneous coronary interventions. *American Journal of Critical Care, 18*, 554-561.
- Soni, A. (2009).The five most costly conditions, 1996 and 2006: Estimates for the U.S civilian noninstitutionalized population. *Medical Expenditure Panel Survey, 248*.
- Spielberger, C. D. (1999). *Sate-Trait Anger Expression Inventory-2: STAXI-2*. PAR, Psychological Assessment Resources.
- Steiger, J.H. (1980), Tests for comparing elements of a correlation matrix, *Psychological Bulletin, 87*, 245-251.
- Tanaka, J.S., Huba, G.J. (1984). Confirmatory hierarchical factor analysis of psychological distress measures. *Journal of Personality and Social Psychology, 46*, 621-635.

- Terluin, B. (1996) De Vierdimensionale Klachtenlijst (4DKL): Een vragenlijst voor het meten van distress, depressie, angst en somatisatie [The Four-Dimensional Symptom Questionnaire (4DSQ): a questionnaire to measure distress, depression, anxiety, and somatization]. *Huisarts en Wetenschap*, 39, 538-547.
- Üstün, T. B., Ayuso-Mateos, J. L., Chatterji, S., Mathers, C., & Murray, C. J. (2004). Global burden of depressive disorders in the year 2000. *The British Journal of Psychiatry*, 184, 386-392.
- Veit, C.T., Ware, J.E. (1983). The structure of psychological distress and well-being in general populations. *Journal of Consulting and Clinical Psychology*, 51, 730-742.
- Von Korff M, Shapiro S, Burke JD.(1987). Anxiety and depression in a primary care clinic. *Arch Gen Psychiatry*, 44,152–156.
- Wheaton, B. (2007). The twain meets distress: Disorder and the continuing conundrum of categories. *Health*, 11, 303-319.
- Young, Q., Ignaszewski, A., Fofonoff, D., & Kann, A. (2007) Brief screen to identify five of the most common forms of psychosocial distress in cardiac patients: validation of the screening tool for psychological distress. *Journal of Cardiovascular Nursing*, 22, 525-534.