



University of Tennessee, Knoxville
Trace: Tennessee Research and Creative Exchange

Doctoral Dissertations

Graduate School

8-2016

Psychometric Properties of Three Common Depression Measures in Breast Cancer Patients with Major Depressive Disorder

Audrey Ashton File

University of Tennessee - Knoxville, afile@vols.utk.edu

Recommended Citation

File, Audrey Ashton, "Psychometric Properties of Three Common Depression Measures in Breast Cancer Patients with Major Depressive Disorder." PhD diss., University of Tennessee, 2016.
https://trace.tennessee.edu/utk_graddiss/3913

This Dissertation is brought to you for free and open access by the Graduate School at Trace: Tennessee Research and Creative Exchange. It has been accepted for inclusion in Doctoral Dissertations by an authorized administrator of Trace: Tennessee Research and Creative Exchange. For more information, please contact trace@utk.edu.

To the Graduate Council:

I am submitting herewith a dissertation written by Audrey Ashton File entitled "Psychometric Properties of Three Common Depression Measures in Breast Cancer Patients with Major Depressive Disorder." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Psychology.

Derek R. Hopko, Major Professor

We have read this dissertation and recommend its acceptance:

Todd M. Moore, Jennifer Bolden, John L. Bell

Accepted for the Council:

Dixie L. Thompson

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

**Psychometric Properties of Three Common Depression Measures in
Breast Cancer Patients with Major Depressive Disorder**

A Dissertation Presented for the
Doctor of Philosophy
Degree
The University of Tennessee, Knoxville

Audrey Ashton File
August 2016

Copyright © 2015 by Audrey Ashton File
All rights reserved.

Acknowledgements

I would like to express my gratitude to my advisor, Dr. Derek Hopko, for his continuous guidance, support, patience, and sense of humor. I am so grateful to have had the opportunity to work with you over the past five years. I would also like to thank my committee members, Dr. Todd Moore, Dr. Jennifer Bolden, and Dr. John Bell, for taking time to contribute to this research and to several other projects. Your kindness and support have been greatly appreciated. Finally, I would like to thank my family and Chris for always believing that I could achieve whatever I put my mind to and for supporting me every step of the way. I couldn't have done this without you. Thank you so much.

Abstract

Breast cancer is the most frequently diagnosed cancer among women in the United States and MDD is the most common mental health problem in women with breast cancer. There is lack of research on measures of depression in this population. This study examined the psychometric properties of three commonly used depression measures, the BDI-II, CES-D, and HRSD, with clinically depressed breast cancer patients ($n = 127$). Findings revealed the measures displayed good distributional characteristics, internal consistency, and convergent validity. Discriminative validity with the BAI was not demonstrated, however, and confirmatory factor analyses indicated that the existing models of these measures are inadequate. The results indicate that these measures are appropriate for use with clinically depressed breast cancer patients, but that further investigation of discriminative validity is necessary to better determine construct validity with anxiety measures. Because of inadequate fit of this sample with existing models, interpretation of scores on these measures may be better accomplished via reference to more valid structural models obtained through exploratory factor analyses, providing a more accurate conceptualization of the dimensions of MDD in breast cancer patients.

Table of Contents

Chapter 1 Introduction.....	1
Literature Review.....	1
Hypotheses.....	6
Chapter 2 Method.....	7
Participants.....	7
Assessment Measures	8
Procedure	10
Chapter 3 Results.....	11
Descriptive Data and Internal Consistency.....	11
Convergent and Discriminant Validity	12
Confirmatory Factor Analyses.....	13
Hypothesized Models.....	14
Exploratory Factor Analyses.....	15
Chapter 4 Discussion.....	18
List of References	22
Appendix.....	40
Vita.....	53

List of Tables

Table 1. Correlations Among Depression and Anxiety Measures.....	41
Table 2. Confirmatory Factor Analyses of Established Models.....	42
Table 3. Varimax Rotated Factor Loadings of BDI-II Items.....	44
Table 4. Varimax Rotated Factor Loadings of CES-D Items.....	45
Table 5. Varimax Rotated Factor Loadings of HRSD Items.....	46

Chapter 1

Introduction

Breast cancer is the most frequently diagnosed cancer among women in the United States and second to only lung and bronchial cancer in mortality rates (Center for Disease Control and Prevention: National Program of Cancer Registries, 2014). Functional difficulties during and following treatment can include neurological impairment in the form of executive functioning, attention, and memory deficits (Kessler, Kent, & O'Hara, 2011; McDonald, Conroy, Ahles, West, & Saykin, 2012), poorer quality of life, decreased vitality, and social impairment (Hopko et al., 2008), physical inactivity increasing risk for cardiovascular disease (Elme et al., 2013), increased bodily pain and muscle rigidity (Hopko et al., 2008; Siegal et al., 2012), as well as fatigue, insomnia, depression, and anxiety (Kim et al., 2008; Hall, Mishel, & Germino, 2014). Indeed, women diagnosed with breast cancer are particularly vulnerable to depression and anxiety in the first year following diagnosis (Burgess et al., 2005; Hopwood, Sumo, Mills, Haviland, & Bliss, 2010; Reyes-Gibby, Anderson, Morrow, Shete, & Hassan, 2012). Relative to non-depressed patients, depressed breast cancer patients have increased functional impairment in terms of decreased quality of life, increased anxiety and substance use, impaired sexual functioning, sleep disorders, decreased immune system functioning, more rapid progression of cancer, more pain and fatigue, and possibly increased mortality (Deshields, Tibbs, Fan, & Taylor, 2006; Hopko, McIndoo, Gawrysiak, & Grasseti, 2014; Reich, Lesur, & Perdrizet-Chevallier, 2008; Somerset, Stout, Miller, & Musselman, 2004; Spiegel & Giese-Davis, 2003).

A recent meta-analysis indicated depression is fairly common in cancer patients, with prevalence ranging from 8-24% based on differential methods of assessment, type of cancer, and phase of cancer treatment (Krebber et al., 2014). Specific to breast cancer, major depressive

disorder (MDD) is the most common mental health problem, with a prevalence rate of 15-25% (Fann et al., 2008; Hopko et al., 2014; Massie, 2004), with some suggesting up to 50% of women with breast cancer experience debilitating depression (Hong, Tian, & Wu, 2014; Sachs et al., 1995). Determining the precise prevalence and incidence of MDD in breast cancer patients has proven challenging due to heterogeneity among patients, overlap of depressive and medical symptoms, differing operational definitions and methods of assessing depression, and small, non-representative samples in several studies. Perhaps most problematically, the psychometric properties of self-report and clinician-rated depression measures are highly understudied among breast cancer patients with well-diagnosed MDD as assessed via structured diagnostic interviews (Fann et al., 2008; Hopko et al., 2014). Accordingly, the primary aim of this study was to examine the psychometric properties of three commonly used measures of depression in breast cancer patients with MDD: the Beck Depression Inventory (BDI-II; Beck et al., 1996), Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977), and Hamilton Rating Scale for Depression (HRSD; Hamilton, 1960).

The psychometric properties of the BDI-II have been studied extensively among various samples of younger and older adults, adolescents, college students, primary care patients, and psychiatric outpatients (Arnau, Meagher, Norris, & Bramson, 2001; Beck et al., 1996; Dozois, Dobson, & Ahnberg, 1998; Huang & Chen, 2014; Osman et al., 1997; Segal, Coolidge, Cahill, & O'Riley, 2008; Steer, Ball, Ranieri, & Beck, 1999; Steer & Clark, 1997; Steer, Kumar, Ranieri, & Beck, 1998). The BDI-II is considered a highly valid and reliable measure of depression (Huang & Chen, 2014; Nezu et al., 2001) and with few exceptions (Seignourel, Green, & Schmitz, 2008; Vanheule, Desmet, Groenvynck, Rosseel, & Fontaine, 2008; Whisman, Judd, Whiteford, & Gelhorn, 2013) consistently yields a two factor solution: somatic-affective and

cognitive (Arnau et al., 2001, Huang & Chen, 2014; Steer et al., 1998). The CES-D is also well studied among adults, adolescents, college students, and primary care patients, (Devins et al., 1988; Hann, Winter, Jacobsen, 1999; Knight, Williams, McGee, Olaman, 1997; Verhoeven, Sawyer, & Spence, 2013). The CES-D has good reliability and construct validity and although alternative factor structures have been reported (Carleton et al., 2013), a four-factor model consistently has been identified: depressive affect, absence of positive affect or anhedonia, somatic symptoms, and interpersonal problems and challenges (Shafer, 2006). The HRSD is commonly used to assess depression (Nezu et al., 2001; Steer, Beck, Riskind, & Brown, 1987) and a recent meta-analysis on its psychometric properties revealed the HRSD generally has good internal consistency, inter-rater, and test-retest reliability (Trajković et al., 2011). Although both two- (depression, neurovegetative: Bech, Fava, Trivedi, Wisniewski, & Rush, 2011) and three-factor solutions (depression severity, insomnia, psychomotor behavior) have been proposed (Hamilton, 1960, 1967), several studies identify a four-factor solution: depression, anxiety, insomnia, and somatic components (Pancheri, Picardi, Pasquini, Gaetano, & Biondi, 2002; Shafer, 2006). In summary, the BDI-II, CES-D, and HRSD are frequently used measures of depression with very good psychometric properties across multiple samples and studies.

Assessing depression in breast cancer patients has involved utilization of several self-report instruments. For example, the Hospital Anxiety and Depression Scale (HADS; Zigmond & Snaith, 1983) was used to screen for depression in patients with operable breast cancer within one year of cancer diagnosis and was a sensitive indicator of mood disorders in women under the age of 50 (Ramirez, Richards, Jarrett, & Fentiman, 1995). However, the majority of studies utilizing the HADS have revealed questionable psychometric properties including poor reliability, discriminant validity, predictive validity, and sensitivity toward identifying mood

disorders in breast cancer patients (Berard et al., 1998; Costantini et al., 1999; Hall, A'hern, & Fallowfield, 1999; Love, Grabsch, Clark, Bloch, Kissane, 2004; Love, Kissane, Bloch, & Clark, 2002; Ramirez et al., 1995). In one large study that included breast cancer patients from outpatient oncology clinics (Berard, Boormeester, & Viljoen, 1998), the HADS and Beck Depression Inventory (BDI: Beck, Ward, Mendelson, Mock, & Erbaugh, 1968) were used to screen for depression. Approximately 22% of participants also completed a structured diagnostic interview and the overall prevalence of MDD was estimated at 14%. Results indicated the HADS depression subscale and BDI collectively allowed for maximum sensitivity with optimal cut-points specified (HADS: 8; BDI: 16). Another study of head and neck cancer patients examined the sensitivity, specificity, and positive predictive values of the BDI-II, CES-D, HADS, and HRSD in screening for MDD (Katz, Kopek, Waldron, Devins, & Tomlinson, 2004). The prevalence of MDD was 20% and all measures had strong convergent and predictive validity.

A study including a sample of newly diagnosed patients with various cancer types used the CES-D to assess depression prevalence, indicating the CES-D had strong internal consistency ($\alpha = .87$) and a depression prevalence rate of 40% based on a cut-point of 16 (Beeber, Shea, & McCorkle, 1998). Pasacreta (1997) used the Diagnostic Interview Schedule (DIS; Robins, Helzer, Croughnan, Williams, & Spitzer, 1987) and CES-D with women less than seven months following their breast cancer diagnosis and reported 9% met criteria for MDD and 24% showed elevated depressive symptoms. Pasacreta (1997) concluded the CES-D had limited predictive power, however a more recent study demonstrated the CES-D (as well as BDI-II and HRSD) had strong internal consistency and high sensitivity and specificity in distinguishing depressed and non-depressed patients with various cancer types (Hopko et al., 2007). Finally, there are very limited data suggesting the Patient Health Questionnaire-9 depression module (PHQ-9; Spitzer,

Kroenke, & Williams, 1999) distress and impact thermometers (Akizuki, Yamawaki, Akechi, Nakano, & Uchitomi, 2005; Holland, 1999), and other abbreviated assessment methods may be reliable and valid measures of depression in medical samples including individuals with breast cancer (Gil, Grassi, Travado, Tomamichel, & Gonzalez, 2005; Mitchell, 2007; Hegel et al., 2008; Kroenke, Spitzer, & Williams, 2001).

The BDI-II, CES-D, and HRSD are three of the most widely used depression measures and there are many significant reasons for investigating their psychometric properties. These reasons include the need to examine construct validity through comparing depression symptom factors across different depression measures, determining the equivalence of factor structures across samples or groups (e.g., gender, ethnicity, age, or medical diagnoses), assessing differential depression severity across patient samples, determining whether specific depression symptom factors within a measure correlate differentially with external variables, and evaluating the practicality and empirical value of using these depression measures in the assessment and intervention process among patients with varying demographic, psychological, and medical characteristics (Shafer, 2006). Accordingly, in the context of a paucity of research exploring psychometric properties of depression measures in breast cancer patients with MDD and considering how frequently these instruments are used with this population, systematic evaluation of factor structures, internal consistency, and convergent and discriminant validity of depression measures has major theoretical and clinical implications. Considering the prevalence and impact of depression in breast cancer patients, examining psychometric properties of potentially valuable depression screening measures is a pressing need.

This study investigated the properties of three depression measures in a sample of breast cancer patients with MDD as diagnosed via structured clinical interviews. Primary hypotheses

were as follows: (a) descriptive data would reveal normatively distributed data (i.e., skewness and kurtosis); (b) descriptive data would resemble that reported in other clinical samples of MDD patients and exceed that of non-clinical samples; (c) the BDI-II, CES-D, and HRSD would be associated with high internal consistency; (d) strong convergent validity would be demonstrated via high correlations across depression measures and MDD severity as assessed through structured diagnostic interviews; and (e) discriminant validity would be demonstrated with relatively lower correlations with a commonly used measure of anxiety (i.e., Beck Anxiety Inventory: Beck & Steer, 1993). Finally, as this was the pioneering study of factor structures of these measures in breast cancer patients with MDD, both confirmatory and exploratory factor analyses were conducted to examine similarities to existing structural models.

Chapter 2

Method

Participants

Participants included 127 female breast cancer patients recruited at the University of Tennessee Medical Center Cancer Institute. Participants were included from treatment outcome studies examining the efficacy of behavioral activation treatments for breast cancer patients with MDD (Hopko et al., 2005, 2008, 2011) and were recruited by advanced clinical psychology doctoral students or referred by treating oncologists. The principal investigator of the three studies (DH) supervised all doctoral students. Participants were eligible if they were above 18 years of age, had been diagnosed with breast cancer, and had a principal (and primary) diagnosis of MDD of moderate severity [i.e., at least “4” on a 0 (no depressive symptoms) to 8 (very severe symptoms) scale]. Depending on the study, MDD was diagnosed using either the Structured Clinical Interview for DSM-IV (SCID-I; First, Spitzer, Gibbon, & Williams, 1996) or the Anxiety Disorders Interview Schedule-IV (ADIS-IV; Brown, DiNardo, & Barlow, 1994).

Participants ranged in age from 38 to 78 years [$M = 54.9$ years ($SD = 11.7$)]. The majority of participants were Caucasian (95.3%; 4.7% African American). Marital status was as follows: Married (56.7%), Single (25.2%), Divorced (15%), and Separated (3.1%). The participants averaged 14.4 years of education ($SD = 2.7$). Approximately 42% of the sample was employed either full or part-time, and remaining patients were unemployed (28%) or retired (30%). Cancer data were gathered from pathology reports at the University of Tennessee Medical Center’s Cancer Institute. The average length of time since cancer diagnosis was 2.8 years ($SD = 3.8$), and 78.7% of patients had infiltrating ductal carcinoma (IDC), 11% ductal carcinoma in situ (DCIS), and 10.3% lobular carcinoma in situ (LCIS). The sample included

patients of all cancer stages (Stage 0: 22%; Stage 1: 33.9%; Stage 2; 30.7%; Stage 3; 11.8%; Stage 4; 1.6%). A total of 75% tested positive for estrogen receptor status, 65% for positive progesterone receptor status, and 16% for the HER-2/NEU gene. In terms of cancer treatment, 94% of patients had surgery (i.e., lumpectomy, mastectomy), 74% had chemotherapy, 60% had radiation treatment, and 1% had hormonal therapy. Participants were included if not taking antidepressant or anti-anxiety medication (48%), or if they were taking such medications, had been stabilized at a *consistent* dosage for 8 weeks prior to study assessment (48%). Due to ethical considerations with regard to withholding treatment, patients also were included who had initiated taking medication but were not stabilized (4%). A total of 10% reported having been hospitalized for depression and 3% for another psychiatric problem. Mean level of ADIS-IV or SCID-I clinician-rated severity of MDD was 5.3 ($SD = 1.1$), suggesting moderate clinical depression. Coexistent diagnoses included GAD ($n = 39$; 30.7%), PTSD ($n = 6$; 4.7%), Social Phobia ($n = 12$; 9.3%), Panic Disorder ($n = 4$; 3.1%), Anxiety NOS ($n = 4$; 3.1%), Specific Phobia ($n = 3$; 2.4%), Dysthymia ($n = 2$; 1.6%), and OCD ($n = 1$; 0.8%).

Assessment Measures

The *Anxiety Disorders Interview Schedule for DSM-IV* (ADIS-IV; Brown et al., 1994) is a semi-structured interview used as a diagnostic assessment for anxiety, mood, somatoform, substance abuse and psychotic disorders. Disorders are separated into distinct modules and symptoms are rated on a nominal scale and given ratings based on a continuum of severity and interference. The ADIS-IV has excellent reliability and validity (Brown, DiNardo, Lehman, & Campbell, 2001).

The *Structured Clinical Interview for DSM-IV* (SCID-I; First, Spitzer, Gibbon, & Williams, 1996) is a semi-structured interview used to diagnose Axis I disorders based on DSM-

IV criteria. The SCID is separated into modules according to diagnosis. Symptoms for each diagnosis are categorized as present, sub-threshold, or absent. The inter-rater reliability of the SCID-I ranges from good to excellent depending on the sample and diagnostic module (Lobbestael, Leurgans, & Arntz, 2011; Löwe et al., 2004).

The *Beck Depression Inventory-II* (BDI-II; Beck et al. 1996) consists of 21 items rated on a 4-point Likert scale. The instrument has excellent reliability and validity data with depressed younger and older adults (Beck et al., 1996; Dozois, Dobson, & Ahnberg, 1998; Nezu, Ronan, Meadows, & McClure, 2001). The psychometric properties of the BDI-II have been studied in cancer patients and a diverse primary care sample, with the instrument having strong predictive validity as it pertains to a diagnosis of MDD, strong internal consistency ($\alpha = .94$), and adequate item-total correlations (Arnau, Meagher, Norris, & Bramson; 2001; Hopko et al., 2007; Katz, Kopek, Waldron, Devins, & Thomlinson, 2004).

The *Center for Epidemiologic Studies Depression Scale* (CES-D; Radloff, 1977) contains 20 items selected from previously validated scales of depression. It includes six components: depressed mood; feelings of guilt and worthlessness; feelings of helplessness and hopelessness; psychomotor retardation; loss of appetite; and sleep disturbance. Reliability and validity of the CES-D have been tested in general and clinical populations, yielding very good internal consistency [$\alpha = .85$ for the general population and 0.90 for a psychiatric population]. Satisfactory test-retest reliability over a 2- to 8-week period ranged from 0.51 to 0.67 and from 0.32 to 0.54 over a 3- to 12-month period. The CES-D has moderate convergent validity with the HRSD ($r = 0.65$) (Craig, Richardson, Pass, & Bregman, 1985).

The *Hamilton Rating Scale for Depression* (HRSD; Hamilton, 1960) is a 17-item semi-structured interview designed to measure symptom severity in depressed patients. The instrument

is the most widely used outcome measure for evaluating depression and is a standard outcome measure in clinical trials (Kobak & Reynolds, 1999; Wolf & Hopko, 2008).

The *Beck Anxiety Inventory* (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item measure designed to distinguish cognitive and somatic symptoms of anxiety from those of depression. Good psychometric properties have been demonstrated among community, medical, and psychiatric outpatient samples (Antony, Orsillo, & Roemer, 2001; Morin et al., 1999; Wetherell & Areán, 1997).

Procedure

All participants were administered either the SCID or ADIS-IV by an advanced clinical psychology doctoral student trained by the principal investigator (DH). Those patients who were diagnosed with MDD then completed the BDI-II, BAI, CES-D, and HRSD. The original studies (Hopko et al., 2005, 2008, 2011) included several assessment intervals (i.e., pre-treatment, post-treatment, 3-month, 6-month, 9-month, and 12-month follow-ups). All data used for the following analyses were from the pre-treatment assessments of all patients. All assessments were completed at the University of Tennessee Medical Center Cancer Institute.

Chapter 3

Results

Descriptive Data and Internal Consistency

Tests of multivariate normality were used to examine distributional characteristics of data for each depression measure ($n = 127$). For the BDI-II ($M = 26.32$, $SD = 10.27$; $\alpha = .90$), both the symmetry (skewness = $.72$, $SE = .22$) and “flatness” (kurtosis = $.33$, $SE = .43$) of the distribution were within acceptable limits (Hair et al., 1995). In addition, a powerful test of normality for sample sizes over 100 (Razali & Wah, 2007), the Kolmogorov-Smirnov (KS) statistic suggested sample data were normally distributed ($KS = .08$, $p = .06$). Significantly increased depression was observed relative to a large non-clinical sample [$(M = 8.36$, $SD = 7.16)$; $t(152) = 18.77$, $p < .01$; Whisman, Perez, & Ramel, 2000]. The BDI-II scores did not significantly differ from a sample of clinically depressed outpatients [$(M = 28.64$, $SD = 11.75)$; $t(293) = -1.90$, $p = .06$; Steer, Ball, Ranieri, & Beck, 1999], but was significantly lower than a recent treatment-seeking sample of depressed patients [$(M = 32.0$, $SD = 7.5)$; $t(198) = -5.52$, $p < .01$; Dimidjian et al., 2006]. The current sample of depressed breast cancer patients did report significantly greater depression relative to three groups of cancer patients including patients receiving antineoplastic and supportive treatments [$(M = 15.47$, $SD = 8.36)$; $t(151) = 7.83$, $p < .01$; O’Mahony et al., 2005], women receiving chemotherapy for early stage breast cancer [$(M = 11.10$, $SD = 6.55)$; $t(139) = 11.71$, $p < .01$; Bower et al., 2011], and breast cancer patients following treatment (i.e., chemotherapy, radiation, surgery) [$(M = 7.34$, $SD = 7.58)$; $t(130) = 13.72$, $p < .01$; Bower et al., 2011]. For this study sample, internal consistency of the BDI-II was strong ($\alpha = .90$).

For the CES-D ($M = 30.56$, $SD = 10.05$; $\alpha = .85$), both the skewness ($-.12$, $SE = .22$) and kurtosis ($-.49$, $SE = .43$) were within acceptable limits and data were normally distributed ($KS =$

.06, $p = .20$). Internal consistency of the CES-D was strong ($\alpha = .85$). Significantly greater depression was reported on the CES-D in this sample relative to a large non-clinical community sample [$(M = 5.02, SD = 7.23)$; $t(161) = 26.86, p < .01$; Boyd, Weissman, Thompson, & Myers, 1982], a sample of depressed cancer patients [$(M = 23.6, SD = 7.02)$; $t(120) = 5.16, p < .01$; Bodurka-Bervers et al., 2000], and several medical samples including a non-cancerous medical group [$(M = 8.3, SD = 6.4)$; $t(185) = 22.59, p < .01$; Van Wilgen, Dijkstra, Stewart, Ranchor, & Roodenburg, 2006], and two samples of breast cancer patients [$(M = 10.5, SD = 8.3)$; $t(234) = 18.63, p < .01$; Van Wilgen et al., 2006]; [$(M = 11.53, SD = 9.01)$; $t(221) = 14.77, p < .01$; Antoni et al., 2001].

Finally, for the HRSD ($M = 14.31, SD = 6.11$; $\alpha = .75$), sample data also were normally distributed [skewness (.35, $SE = .22$); kurtosis (-.40, $SE = .43$); KS = .07, $p = .20$]. Internal consistency of the HRSD for the current sample was acceptable ($\alpha = .75$). Because the HRSD is a clinician-rated measure for individuals with MDD, there were no non-clinical samples to compare to the present sample. Clinician-rated depression on the HRSD was significantly lower than two large sample of depressed patients [$(M = 20.7, SD = 4.2)$; $t(187) = -10.65, p < .01$; Dimidjian et al., 2006] [$(M = 19.5, SD = 4.4)$; $t(197) = -8.48, p < .01$; Elkin et al., 1989] but was comparable to heterogeneous samples of patients with cancer across many sites and stages [Sample 1: ($M = 16.02, SD = 7.28$); $t(88) = -1.53, p = .13$; Sample 2: ($M = 14.31, SD = 8.12$); $t(91) = -0.06, p = .95$; Foley, Baillie, Huxter, Price, & Sinclair, 2010].

Convergent and Discriminant Validity

Convergent validity was assessed based on Pearson Product-Moment correlations among depression measures and MDD depression severity as measured by a structured clinical interview. As presented in Table 1, strong convergent validity was evident between the BDI-II

and CES-D. Convergent validity was more moderate between the HRSD and both the BDI-II and CES-D. All three measures exhibited moderate convergent validity with depression severity as assessed via structured diagnostic interviews. Discriminant validity was examined through correlations between depression measures and the BAI. Based on a series of non-significant Pearson's tests of dependent correlations, there was minimal evidence to support discriminative validity in terms of the BAI correlating significantly less with depression measures relative to the inter-correlations among depression measures. In fact, only the relationship of the BDI-II and CES-D ($r = .72$) compared to the BDI-II and BAI ($r = .63$) approached statistical significance ($z = 1.60, p = .06$).

Confirmatory Factor Analyses

Confirmatory factor analyses (CFA) were used to examine the adequacy of existing structural models for the BDI-II, CES-D, and HRSD as applied to data obtained from the current sample of female breast cancer patients diagnosed with MDD. All statistics were computed using SPSS Amos for structural equation modeling (Arbuckle, 2006). As per recommendations in reporting results of CFA (Thompson & Daniel, 1996), the Root Mean Square Error of Approximation (RMSEA), chi-square, and the Bentler's comparative (BCFI), goodness-of-fit (GFI), adjusted goodness of fit (AGFI), and normed fit (NFI) indexes are presented. Contemporary goodness-of-fit criteria were used whereby an RMSEA of .06 and a CFI (and GFI) value of .95 were required for conclusions to be drawn that a good fit existed between the hypothesized model and observed data (Browne & Cudeck, 1992; Hu & Bentler, 1998). The χ^2/df values were expected to be as low as 2 and as high as 5 to indicate a value within the range of reasonable fit (Marsh & Hocevar, 1985).

Hypothesized Models

As outlined in the introduction, the BDI-II was assessed using both two- and three-factor models, as well as one hierarchical four-factor measurement model. The two-factor models included somatic-affective and cognitive subscales (Steer et al., 1998; Arnau et al., 2001; Huang & Chen, 2014). The two three-factor models included somatic, affective, and cognitive factors (Seignourel, Green, & Schmitz, 2008; Vanheule, Desmet, Groenvynck, Rosseel, & Fontaine, 2008). The hierarchical four-factor measurement model was made of three first-order factors (negative attitude, performance difficulty, somatic elements) and one second order factor (depression) (Whisman, Judd, Whiteford, & Gelhorn, 2013).

The CES-D was compared to a both three and four-factor models. The three-factor model consisted of negative affect, anhedonia, and somatic symptoms subscales (Carleton et al., 2013). The four-factor model included somatic, depressed affect, positive affect, and interpersonal problems subscales (Shafer, 2006). Finally, the HRSD was examined using a one-factor model (depression; Bech, Fava, Trivedi, Wisniewski, & Rush, 2011) and several four-factor models. One model consisted of a somatic anxiety/somatization, psychic anxiety, pure depression, and anorexia subscales (Pancheri, Picardi, Pasquini, Gaetano, & Biondi, 2002). The original Hamilton (1960) article and subsequent study (1967) both discuss four-factor models, but all of the subscales are not clearly labeled. Some factor labels from those models include retarded depression, agitated depression, anxiety reaction, general depression, and retarded vs. agitated depression. The final model examined consisted of anxiety, depression, insomnia, and somatic subscales and was the closest to being considered an appropriate fit with this sample's data (Shafer, 2006). As highlighted in Table 2, data from the current patient sample generally was a poor fit with previously established factor structures for all three depression measures.

Exploratory Factor Analyses

Following the CFA findings, exploratory factor analyses (EFA) were performed on the BDI-II, CES-D, and HRSD to investigate alternative factor structures. For each EFA, a principal components extraction and varimax rotation method was used with the number of factors initially unspecified. An orthogonal varimax rotation was chosen to allow for clarification of uncorrelated factors within each measure. The factor loadings and related interpretability (i.e., face validity of items), scree-plot analysis (Cattell, 1966), and factor eigenvalues as assessed using parallel analysis procedures (Glorfeld, 1995; Watkins, 2000) were employed to determine optimal factor structure of the three depression measures.

BDI-II. An EFA was first performed on the BDI-II items with the number of factors unspecified for the model. Factor eigenvalues were then assessed using parallel analysis. A two-factor model was found to be most parsimonious for the data. A second EFA was then performed specifying a two-factor model. The two factors accounted for 43% of the variance in participants' responses (Factor 1 = 34%, eigenvalue = 7.17; Factor 2 = 9%, eigenvalue = 1.81). The two-factor solution is presented in Table 3. To load significantly on a factor, an item had to have a factor loading greater than or equal to .40, with the loading on the alternative factor(s) being greater than or equal to a .20 difference from the primary factor (Hair, Anderson, Tatham, & Black, 1995). Given the nature of the nine items loading onto factor 1, it was labeled Negative Attitudes Toward Self, while the nine items loading onto factor 2 were labeled Somatic-Affective. The agitation, indecisiveness, and concentration difficulty items did not load significantly or discriminantly onto either of the two factors.

CES-D. An initial EFA with the number of factors unspecified was performed on the CES-D. Following examination of results of the first EFA and using parallel analysis procedures

to determine optimal factor structure, the second EFA was performed with three factors specified. The three factors accounted for 49% of the variance in participants' responses (Factor 1 = 28%, eigenvalue = 5.56; Factor 2 = 12%, eigenvalue = 2.39; Factor 3 = 9%, eigenvalue = 1.70). The three-factor solution is displayed in Table 4. Items were designated as significant loadings based on the algorithm described above. The items loading significantly onto factor 1 were almost identical to two of Radloff's (1977) original factors, the Somatic and Retarded Activity factor and Depressed Affect factor. Factor 1 was labeled Somatic-Depressed Affect. The items that loaded onto factor 2 were three of the four items included in Radloff's Positive Affect factor, and therefore factor 2 was given the same label. Finally, factor 3 consisted of both items in Radloff's original Interpersonal Problems factor, and two additional items. Because the additional two items, "I felt that I was just as good as other people" and "I thought my life had been a failure," could be interpreted as interpersonal comparisons, factor 3 was labeled Interpersonal. On the CES-D, only items 7 and 20 did not load significantly on any of the three factors.

HRSD. As with the two self-report measures, results from an initial EFA with unspecified factors and parallel analyses indicated a three-factor model was most parsimonious with data obtained on the HRSD. A second EFA was then performed specifying three factors. The three factors accounted for 40% of the variance (Factor 1 = 22%, eigenvalue = 3.73; Factor 2 = 9%, eigenvalue = 1.61; Factor 3 = 9%, eigenvalue = 1.47). The three-factor solution is presented in Table 5. Using the item designation procedure highlighted above, unlike the BDI-II and CES-D, which more concisely mapped onto empirically derived factor structures, the HRSD factors were not as clearly defined. Due to the nature of the six items loading significantly onto factor 1, it was labeled Somatic Anxiety. The five items loading onto factor 2 were all symptoms of

depression, so factor 2 was labeled Depressive Affect. Three of the four items loading onto factor 3 were insomnia and the fourth assessed weight loss, resulting in this factor being labeled Neurovegetative. Although somewhat less clearly defined than the BDI-II and CES-D factors, HRSD factors reveal high face and content validity with the construct of depression.

Chapter 4

Discussion

The primary aim of this study was to investigate the psychometric properties and factor structures of three common measures of depression to evaluate their appropriateness for use with depressed breast cancer patients. Following tests of data normality, internal consistency as well as convergent and discriminant validity of the three measures were assessed. Confirmatory factor analyses investigated the fit of sample data with several existing factor structures for each depression measure and exploratory factor analyses provided additional information about the underlying factor structure of the data. For all three depression measures, tests of multivariate normality revealed that distribution scores were within acceptable limits, indicating sample data were normally distributed. Internal consistency of both the BDI-II and CES-D were strong, with the HRSD having lower but adequate internal consistency. Good convergent validity also was evident in the relationships of all three depression measures as well as their associations with severity of MDD as assessed by structured diagnostic interviews. It is conceivable that the more moderate convergent validity between the BDI-II and the HRSD was an administration artifact (i.e., self-report versus clinician-rated). Discriminant validity with a measure of somatic anxiety (BAI) was not demonstrated, suggesting that for depressed breast cancer patients it might be difficult to discriminate between symptoms of depression, anxiety, and somatic complaints potentially related to the diagnosis and treatment of breast cancer (Raison & Miller, 2003).

Pertaining to cross-sample descriptive comparisons, self-reported depression on the BDI-II was significantly higher than a non-clinical sample as well as referenced samples of cancer patients, and the data were equivocal in terms of comparisons with clinically depressed patients. Similar to the BDI-II, self-reported depression on the CES-D was significantly higher than a

non-clinical community sample. Relative to clinically depressed samples, CES-D rated depression was lower in the current sample but higher when compared to several medical samples that included depressed cancer patients. Clinician-rated depression on the HRSD was significantly lower relative to clinically depressed samples, but largely consistent with studies of cancer patients at different stages in cancer treatment, and regardless of whether cancer patients were seeking treatment for depression. Collectively, these findings indicate breast cancer patients with depression report significant psychological distress on common measures of depression.

For all three depression measures, confirmatory factor analyses of existing factor structures did not fit well with current data. For the BDI-II, the closest fit to this sample was a three-factor model including somatic, affective, and cognitive subscales (Vanheule, Desmet, Groenvynck, Rosseel, & Fontaine, 2008). Nonetheless, even this model was rejected as all fit indices were all outside acceptable ranges. A subsequent exploratory factor analyses revealed that the BDI-II consisted of two-factors, labeled “Negative Attitudes Toward Self” and “Somatic-Affective.” The “Somatic-Affective” factor is common among two-factor models (Steer et al., 1998; Arnau et al., 2001; Huang & Chen, 2014) but the “Negative Attitudes Towards Self” is not generally evident in two-factor structures. The “Negative Attitudes Towards Self” factor does overlap with the “Negative Attitude” first-order factor in a recent hierarchical model, however (Whisman, Judd, Whiteford, & Gelhorn, 2013), and is similar to the “Negative Attitudes Towards Self” factor observed in the original BDI (Beck & Lester, 1973).

Sample data on the CES-D were subjected to both a three- and four-factor model of the CES-D using confirmatory factor analyses, with the former model providing the closest fit, albeit still unsatisfactory based on not meeting fit index criteria. A subsequent exploratory factor analyses revealed a three-factor model consisting of “Somatic-Depressed Affect,” “Positive

Affect,” and “Interpersonal” factors. Similar to self-report measures, confirmatory factor analyses of the HRSD revealed inadequate fit for the one-factor model as well as several four-factor models. Exploratory factor analyses revealed an underlying three-factor structure of the HRSD, including “Somatic Anxiety,” “Depressive Affect,” and “Neurovegetative” factors.

The present study yielded provocative findings in terms of the utility of three common measures to assess depression in breast cancer patients. A few notable limitations include using a reasonably large sample size, however, a larger sample size from several different recruitment sites would strengthen study findings. Second, this sample consisted mainly of Caucasian females, and although this demographic feature is representative of the area in which data were collected, it reduces the generalizability of the results to other racial and ethnic groups. Third, the majority of the sample was composed of patients diagnosed with Stage 0-2 breast cancer, with only 13% of the sample diagnosed with Stage 3 or 4 breast cancer. Although it is understandable that patients with more severe cancer and (possibly) more invasive cancer treatment would be less likely to have the energy and motivation to participate in treatment outcome studies, it will be important to address this issue in future research to better understand whether depression measures are appropriate for use with breast cancer patients in all stages of cancer. Finally, as the study sample included breast cancer patients from one medical center from largely rural areas, it will be important to assess the generalizability of results to other medical centers and geographical regions.

Although the study has some noteworthy limitations, it provides an important preliminary investigation of three commonly used depression measures with a clinically depressed breast cancer sample. A psychometric examination of this kind has not been done with both a clinically depressed sample of breast cancer patients and thus adds to our knowledge of the appropriateness

of measures toward assessing depression and cancer patients and medical populations in general. Results of this study reveal several findings that support the notion that these measures are suitable for use in depressed breast cancer patients, including good distributional characteristics, adequate to strong internal consistency, and good convergent validity. However, further investigation of the discriminative validity of these measures is necessary to better determine construct validity relative to affective measures of anxiety. Given the medical sample studied, perhaps using less somatic measures of anxiety such as the State-Trait Anxiety Inventory or Penn State Worry Questionnaire might yield increased support for the discriminant validity of depression measures. Finally, it was evident that existing factor structures of depression measures were largely inadequate insofar as generalizing to this sample of cancer patients. Accordingly, interpretation of scores on these measures may be better accomplished via reference to more valid structural models obtained through exploratory factor analyses -- providing a more accurate conceptualization of the dimensions of MDD in breast cancer patients.

References

- Akizuki, N., Yamawaki, S., Akechi, T., Nakano, T., & Uchitomi, Y. (2005). Development of an Impact Thermometer for use in combination with the Distress Thermometer as a brief screening tool for adjustment disorders and/or major depression in cancer patients. *Journal of Pain and Symptom Management, 29*, 91-99.
- American Psychiatric Association. (1994). *Diagnostic and statistical manual of mental disorders* (4th ed.). Washington, DC: Author.
- Antoni, M. H., Lehman, J. M., Kilbourn, K. M., Boyers, A. E., Culver, J. L., Alferi, S. M., Yount, S. E., McGregor, B. A., Arena, P. L. Harris, S. D., Price, A. A., & Carver, C. S. (2001). Cognitive-behavioral stress management intervention decreases the prevalence of depression and enhances benefit finding among women under treatment for early-stage breast cancer. *Health Psychology, 20*, 20-32.
- Antony, M. M., Orsillo, S. M., & Roemer, L. (Eds.). (2001). *Practitioner's guide to empirically-based measures of anxiety*. New York: Kluwer Academic/Plenum Press.
- Arbuckle, J. L. (2006). Amos (Version 7.0) [Computer Program]. Chicago: SPSS.
- Arnau, R. C., Meagher, M. W., Norris, M. P., & Bramson, R. (2001). Psychometric evaluation of the Beck Depression Inventory-II with primary care medical patients. *Health Psychology, 20*, 112-119.
- Bech, P., Fava, M., Trivedi, M. H., Wisniewski, S. R., & Rush, A. J. (2011). Factor structure and dimensionality of the two depression scales in STAR* D using level 1 datasets. *Journal of Affective Disorders, 132*, 396-400.
- 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.

- Beck, A. T. & Lester, D. (1973). Component of depression in attempted suicides. *Journal of Psychology, 85*, 257-260.
- Beck, A.T., Steer, R.A., 1993. *Beck Depression Inventory Manual*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., Steer, R. A. & Brown, G. K. (1996). *Manual for Beck Depression Inventory-II*. San Antonio, TX: Psychological Corporation.
- Beck, A. T., Steer, R. A., & Carbin, M. G. (1988). Psychometric properties of the Beck Depression Inventory: Twenty-five years of evaluation. *Clinical Psychology Review, 8*, 77-100.
- Beck, A.T., Ward, C.H., Mendelson, M., Mock, J. and Erbaugh, J. (1968) An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561-571.
- Beeber, L. S., Shea, J., & McCorkle, R. (1998). The Center for Epidemiologic Studies Depression Scale as a Measure of Depressive Symptoms in Newly Diagnosed Patients. *Journal of Psychosocial Oncology, 16*, 1-20.
- Berard, R. M. F., Boermeester, F., & Viljoen, G. (1998). Depressive disorders in an outpatient oncology setting: Prevalence, assessment, and management. *Psycho-Oncology, 7*, 112-120.
- Bodurka-Bervers, D., Basen-Engquist, K., Carmack, C. L., Fitzgerald, M. A., Wolf, J. K., de Moor, C., & Gershenson, D. M. (2000). Depression, anxiety, and quality of life in patients with epithelial ovarian cancer. *Gynecologic Oncology, 78*, 302-308.
- Bord, J. H., Weissrnan, M. M., & Thopmson, W. D. (1982). Screening for depression in a community sample. *Archives of General Psychiartry, 39*, 1195-1200.

- Bower, J. E., Ganz, P. A., Irwin, M. R., Kwan, L., Breen, E. C., & Cole, S. W. (2011). Inflammation and behavioral symptoms after breast cancer treatment: do fatigue, depression, and sleep disturbance share a common underlying mechanism? *Journal of Clinical Oncology*, *29*, 3517-3522.
- Boyd, J. H., Weissman, M. M., Thompson, W. D., & Myers, J. K. (1982). Screening for depression in a community sample: understanding the discrepancies between depression symptom and diagnostic scales. *Archives of General Psychiatry*, *39*, 1195-1200.
- Brown, M. W., & Cudeck, R. (1992). Alternate ways of assessing model fit. *Sociological Methods & Research*, *21*, 320-258.
- Brown, T. A., DiNardo, P., & Barlow, D. H. (1994). Anxiety disorders interview schedule for DSM-IV. San Antonio, TX: The Psychological Corporation.
- Brown, T. A., Di Nardo, P. A., Lehman, C. L., & Campbell, L. A. (2001). Reliability of DSM-IV anxiety and mood disorders: Implications for the classification of emotional disorders. *Journal of Abnormal Psychology*, *110*, 49-58.
- Burgess, C., Cornelius, V., Love, S., Graham, J., Richards, M., & Ramirez, A. (2005). Depression and anxiety in women with early breast cancer: Five-year observational cohort study. *British Medical Journal*, *330*, 702-705.
- Byar, K. L., Berger, A. M., Bakken, S. L., & Cetak, M. A. (2006). Impact of adjuvant breast cancer chemotherapy on fatigue, other symptoms, and quality of life. *Oncology Nursing Forum*, *33*, E18-E26.
- Carroll, B. T., Kathol, R. G., Noyes, R., Wald, T. G., & Clamon, G. H. (1993). Screening for depression and anxiety in cancer patients using the Hospital Anxiety and Depression Scale. *General Hospital Psychiatry*, *15*, 69-74.

- Cattell, R. B. (1966). The scree test for the number of factors. *Multivariate Behavioral Research*, *1*, 245–276.
- Carleton, R. N., Thibodeau, M. A., Teale, M. J., Welch, P. G., Abrams, M. P., Robinson, T., & Asmundson, G. J. (2013). The center for epidemiologic studies depression scale: a review with a theoretical and empirical examination of item content and factor structure. *PLoS One*, *8*, e58067.
- Centers for Disease Control and Prevention. (2014). National Program of Cancer Registries.
- Clarke, D. M., Smith, G. C., Herrman, H. E., & McKenzie, D. P. (1998). Monash Interview for Liaison Psychiatry (MILP) Development, Reliability, and Procedural Validity. *Psychosomatics*, *39*, 318-328.
- Costantini, M., Musso, M., Viterbori, P., Bonci, F., Del Mastro, L., Garrone, O., Venturini, M., & Morasso, G. (1999). Detecting psychological distress in cancer patients: validity of the Italian version of the Hospital Anxiety and Depression Scale. *Supportive Care in Cancer*, *7*, 121-127.
- Costanzo, E. S., Lutgendorf, S. K., Mattes, M. L., Trehan, S., Robinson, C. B., Tewfik, F., & Roman, S. L. (2007). Adjusting to life after treatment: distress and quality of life following treatment for breast cancer. *British Journal of Cancer*, *97*, 1625-1631.
- Craig, T. J., Richardson, M. A., Pass, R., & Bregman, Z. (1985). Measurement of mood and affect in schizophrenic patients. *American Journal of Psychiatry*, *142*, 1272-1277.
- De Haes, J., van Knippenberg, F., & Neijt, J. (1990). Measuring psychological and physical distress in cancer patients: structure and application of the Rotterdam symptom checklist. *British Journal of Cancer*, *62*, 1034–1038.

- Deshields, T., Tibbs, T., Fan, M. Y., & Taylor, M. (2006). Differences in patterns of depression after treatment for breast cancer. *Psycho-Oncology*, *15*, 398-406.
- Devins, G. M., Orme, C. M., Costello, C. G., Binik, Y. M., Frizzell, B., Stam, H. J., & Pullin, W. M. (1988). Measuring depressive symptoms in illness populations: Psychometric properties of the Center for Epidemiologic Studies Depression (CES-D) scale. *Psychology and Health*, *2*, 139-156.
- Dimidjian, S., Hollon, S. D., Dobson, K. S., Schmaling, K. B., Kohlenberg, R. J., Addis, M. E., Gallop, R., McGlinchey, J. B., Markley, D. K., Gollan, J. K., Atkins, D. C., & Jacobson, N. S. (2006). Randomized trial of behavioral activation, cognitive therapy, and antidepressant medication in the acute treatment of adults with major depression. *Journal of Consulting and Clinical Psychology*, *74*, 658-670.
- Dozois, D. J., Dobson, K. S., & Ahnberg, J. L. (1998). A psychometric evaluation of the Beck Depression Inventory—II. *Psychological Assessment*, *10*, 83-89.
- Elkin, I., Shea, M. T., Watkins, J. T., Imber, S. D., Sotsky, S. M., Collins, J. F., Glass, D. R., Pilkonis, P. A., Leber, W. R., Docherty, J. P., Fiester, S. J., & Parloff, M. B. (1989). National Institute of Mental Health treatment of depression collaborative research program: General effectiveness of treatments. *Archives of General Psychiatry*, *46*, 971-982.
- Elme, A., Utriainen, M., Kellokumpu-Lehtinen, P., Palva, T., Luoto, R., Nikander, R., huovinen, R., Kautiainen, H., Jarvenpaa, S., Penttinen, H. M., Vehmanen, L., Jaaskelainen, A., Ruohola, J., Blomqvist, C., & Saarto, T. (2013). Obesity and physical inactivity are related to impaired physical health of breast cancer survivors. *Anticancer Research*, *33*, 1595-1602.

- Endicott J. (1984). Measurement of depression in patients with cancer. *Cancer*, *53*, 2243–2248.
- Endicott, J., & Spitzer, R.L. (1978). A diagnostic interview: the schedule for affective disorders and schizophrenia. *Archives of General Psychiatry*, *35*, 837–844.
- Fann, J. R., Thomas-Rich, A. M., Katon, W. J., Cowley, D., Pepping, M., McGregor, B. A., & Gralow, J. (2008). Major depression after breast cancer: A review of epidemiology and treatment. *General Hospital Psychiatry*, *30*, 112-126.
- First, Michael B., Spitzer, Robert L, Gibbon Miriam, and Williams, Janet B.W.: Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Research Version, Patient Edition. (SCID-I/P) New York: Biometrics Research, New York State Psychiatric Institute, November 2002.
- Gil, F., Grassi, L., Travado, L., Tomamichel, M., & Gonzalez, J. R. (2005). Use of distress and depression thermometers to measure psychosocial morbidity among southern European cancer patients. *Supportive Care in Cancer*, *13*, 600-606.
- Giordano, S. H., Buzdar, A. U., Smith, T. L., Kau, S. W., Yang, Y., & Hortobagyi, G. N. (2004). Is breast cancer survival improving? *Cancer*, *100*, 44-52.
- Glorfeld, L. W. (1995). An improvement on Horn's parallel analysis model for selecting the correct number of factors to retain. *Educational and Psychological Measurement*, *55*, 377–393.
- Greenberg, P. E., Kessler, R. C., Birnbaum, H. G., Leong, S. A., Lowe, S. W., Berglund, P. A., & Corey-Lisle, P. K. (2003). The economic burden of depression in the United States: how did it change between 1990 and 2000? *Journal of Clinical Psychiatry*, *64*, 1465-1475.

- Hair, J. F., Anderson, R. E., Tatham, R. L., & Black, W. C. (1995). *Multivariate data analysis* (4th ed.). Englewood Cliffs, NJ: Prentice Hall.
- Hall, A., A'hern, R., & Fallowfield, L. (1999). Are we using appropriate self-report questionnaires for detecting anxiety and depression in women with early breast cancer? *European Journal of Cancer, 35*, 79-85.
- Hall, D. L., Mishel, M. H., & Germino, B. B. (2014). Living with cancer-related uncertainty: Associations with fatigue, insomnia, and affect in younger breast cancer survivors. *Supportive Care in Cancer, 22*, 2489-2495.
- Hamilton, M. (1960). A rating scale for depression. *Journal of Neurology, Neurosurgery and Psychiatry, 23*, 56-61.
- Hamilton, M. (1967). Development of a rating scale for primary depressive illness. *British Journal of Social and Clinical Psychology, 6*, 278-296.
- Hann, D., Winter, K., & Jacobsen, P. (1999). Measurement of depressive symptoms in cancer patients: evaluation of the Center for Epidemiological Studies Depression Scale (CES-D). *Journal of Psychosomatic Research, 46*, 437-443.
- Hatcher, L. (1996). Using SAS® PROC CALIS for path analysis: An introduction.
- Hegel, M. T., Collins, E. D., Kearing, S., Gillock, K. L., Moore, C. P., & Ahles, T. A. (2008). Sensitivity and specificity of the Distress Thermometer for depression in newly diagnosed breast cancer patients. *Psycho-Oncology, 17*, 556-560.
- Holland, J. C. (1999). Update: NCCN practice guidelines for the management of psychosocial distress. *Oncology-Huntington, 13*, 459-507.

- Hong, J. S., Tian, J., & Wu, L. H. (2014). The influence of chemotherapy-induced neurotoxicity on psychological distress and sleep disturbance in cancer patients. *Current Oncology, 21*, 174-180.
- Hopko, D. R., Armento, M. E., Robertson, S., Ryba, M. M., Carvalho, J. P., Colman, L. K., ... & Lejuez, C. W. (2011). Brief behavioral activation and problem-solving therapy for depressed breast cancer patients: randomized trial. *Journal of Consulting and Clinical Psychology, 79*, 834-849.
- Hopko, D. R., Bell, J. L., Armento, M. E. A., Hunt, M. K., & Lejuez, C. W. (2005). Behavior Therapy for Depressed Cancer Patients in Primary Care. *Psychotherapy: Theory, Research, Practice, Training, 42*, 236-243.
- Hopko, D. R., Bell, J. L., Armento, M. E., Robertson, S. M., Hunt, M. K., Wolf, N. J., & Mullane, C. (2007). The phenomenology and screening of clinical depression in cancer patients. *Journal of Psychosocial Oncology, 26*, 31-51.
- Hopko, D. R., Bell, J. L., Armento, M., Robertson, S., Mullane, C., Wolf, N., & Lejuez, C. W. (2008). Cognitive-behavior therapy for depressed cancer patients in a medical care setting. *Behavior Therapy, 39*, 126-136.
- Hopko, D. R., McIndoo, C., Gawrysiak, M., & Grasetti, S. (2014). Psychosocial Interventions for Depressed Breast Cancer Patients. In S. Richards and M. O'Hara (Eds.), *The Oxford Handbook of Depression and Comorbidity* (pp. 546-583). New York, NY: Oxford University Press.
- Hopwood, P., Sumo, G., Mills, J., Haviland, J., & Bliss, J. M. (2010). The course of anxiety and depression over 5 years of follow-up and risk factors in women with early breast cancer:

- results from the UK Standardisation of Radiotherapy Trials (START). *The Breast*, 19, 84-91.
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. *Psychological Methods*, 3, 424-453.
- Huang, C., & Chen, J. H. (2014). Meta-Analysis of the Factor Structures of the Beck Depression Inventory–II. *Assessment*, 1073191114548873.
- Katz, M. R., Kopeck, N., Waldron, J., Devins, G. M., & Tomlinson, G. (2004). Screening for depression in head and neck cancer. *Psycho-Oncology*, 13, 269-280.
- Kesler, S. R., Kent, J. S., & O’Hara, R. (2011). Prefrontal cortex and executive function impairments in primary breast cancer. *Archives of Neurology*, 68, 1447-1453.
- Kessler, R.C., Berglund, P., Demler, O., Jin, R., Koretz, D., Merikangas, K.R., Rush, A.J., Walters, E.E., & Wang, P.S. (2003). The epidemiology of major depressive disorder: Results from the National Comorbidity Survey Replication (NCS-R). *Journal of the American Medical Association*, 289, 3095–3105.
- Kessler, R. C., Berglund, P., Demler, O., Jin, R., Merikangas, K. R., & Walters, E. E. (2005). Lifetime prevalence and age-of-onset distributions of DSM-IV disorders in the National Comorbidity Survey Replication. *Archives of General Psychiatry*, 62, 593-602.
- Kim, S. H., Son, B. H., Hwang, S. Y., Han, W., Yang, J., Lee, S., & Yun, Y. H. (2008). Fatigue and depression in disease-free breast cancer survivors: Prevalence, correlates, and association with quality of life. *Journal of Pain and Symptom Management*, 35, 644-665.
- Knight, R. G., Williams, S., McGee, R., & Olanoff, S. (1997). Psychometric properties of the Centre for Epidemiologic Studies Depression Scale (CES-D) in a sample of women in middle life. *Behaviour Research and Therapy*, 35, 373-380.

- Kobak, K. A., & Reynolds, W. M. (1999). Hamilton Depression Inventory. In M. E. Maruish (Ed.), *The use of psychological testing for treatment planning and outcomes assessment* (2nd Edition, pp. 935-969). Mahwah, NJ: Lawrence Erlbaum.
- Krebber, A. M. H., Buffart, L. M., Kleijn, G., Riepma, I. C., Bree, R., Leemans, C. R., Becker, A., Brug, J., van Straten, A., Cuijpers, P., & Verdonck-de Leeuw, I. M. (2014). Prevalence of depression in cancer patients: a meta-analysis of diagnostic interviews and self-report instruments. *Psycho-Oncology*, *23*, 121-130.
- Kroenke, K., Spitzer, R. L., & Williams, J. B. (2001). The Phq-9. *Journal of General Internal Medicine*, *16*, 606-613.
- Love, A. W., Grabsch, B., Clarke, D. M., Bloch, S., & Kissane, D. W. (2004). Screening for depression in women with metastatic breast cancer: a comparison of the Beck Depression Inventory Short Form and the Hospital Anxiety and Depression Scale. *Australian and New Zealand Journal of Psychiatry*, *38*, 526-531.
- Lobbestael, J., Leurgans, M., & Arntz, A. (2011). Inter-rater reliability of the structured clinical interview for DSM-IV axis I disorders (SCID I) and axis II disorders (SCID II). *Clinical Psychology & Psychotherapy*, *18*, 75-79.
- Love, A. W., Kissane, D. W., Bloch, S., & Clarke, D. M. (2002). Diagnostic efficiency of the Hospital Anxiety and Depression Scale in women with early stage breast cancer. *Australian and New Zealand Journal of Psychiatry*, *36*, 246-250.
- Löwe, B., Spitzer, R. L., Gräfe, K., Kroenke, K., Quenter, A., Zipfel, S., Buchholz, C., Witte, S., & Herzog, W. (2004). Comparative validity of three screening questionnaires for DSM-IV depressive disorders and physicians' diagnoses. *Journal of Affective Disorders*, *78*, 131-140.

- Marsh, H. W., & Hocevar, D. (1985). Application of confirmatory factor analysis to the study of self-concept: First-and higher order factor models and their invariance across groups. *Psychological Bulletin, 97*, 562.
- Massie, M. J. (2004). Prevalence of depression in patients with cancer. *Journal of the National Cancer Institute, 32*, 57-71.
- McDonald, B. C., Conroy, S. K., Ahles, T. A., West, J. D., & Saykin, A. J. (2012). Alterations in brain activation during working memory processing associated with breast cancer and treatment: a prospective functional magnetic resonance imaging study. *Journal of Clinical Oncology, 30*, 2500-2508.
- MacNair, D. M., Lorr, M., & Droppelman, L. F. (1971). *EDITS manual for the profile of mood states*. Educational and Industrial Testing Service, San Diego, CA.
- Mehnert, A., & Koch, U. (2008). Psychological comorbidity and health-related quality of life and its association with awareness, utilization, and need for psychosocial support in a cancer register-based sample of long-term breast cancer survivors. *Journal of Psychosomatic Research, 64*, 383-391.
- Mitchell, A. J. (2007). Pooled results from 38 analyses of the accuracy of distress thermometer and other ultra-short methods of detecting cancer-related mood disorders. *Journal of Clinical Oncology, 25*, 4670-4681.
- Morin, C. M., Landreville, P., Colecchi, C., McDonald, K., Stone, J., & Ling, W. (1999). The Beck Anxiety Inventory: Psychometric properties with older adults. *Journal of Clinical Geropsychology, 5*, 19-29.

- Nezu, A. M., Ronan, G. F., Meadows, E. A., McClure, K. S. (2000) AABT Clinical assessment series: Practitioner's guide to empirically based measures of depression. New York, NY: Kluwer/Plenum.
- O'Mahony, S., Goulet, J., Kornblith, A., Abbatiello, G., Clarke, B., Kless-Siegel, S., Breitbart, W., & Payne, R. (2005). Desire for hastened death, cancer pain and depression: report of a longitudinal observational study. *Journal of Pain and Symptom Management*, 29, 446-457.
- Osman, A., Downs, W. R., Barrios, F. X., Kopper, B. A., Gutierrez, P. M., & Chiro, C. E. (1997). Factor structure and psychometric characteristics of the Beck Depression Inventory-II. *Journal of Psychopathology & Behavioral Assessment*, 19, 359-376.
- Pancheri, P., Picardi, A., Pasquini, M., Gaetano, P., & Biondi, M. (2002). Psychopathological dimensions of depression: a factor study of the 17-item Hamilton depression rating scale in unipolar depressed outpatients. *Journal of Affective Disorders*, 68, 41-47.
- Pasacreta, J. V. (1997). Depressive phenomena, physical symptom distress, and functional status among women with breast cancer. *Nursing Research*, 46, 214-221.
- Radloff, L. (1977). The CES-D scale: A self-report depression scale for research in the general population. *Applied Psychological Measurement*, 1, 385-401.
- Raison, C. L., & Miller, A. H. (2003). Depression in cancer: New developments regarding diagnosis and treatment. *Biological Psychiatry*, 54, 283-294.
- Ramirez, A. J., Richards, M. A., Jarrett, S. R., & Fentiman, I. S. (1995). Can mood disorder in women with breast cancer be identified preoperatively? *British Journal of Cancer*, 72, 1509.

- Razali, N. M., & Wah, Y. B. (2011). Power comparisons of shapiro-wilk, kolmogorov-smirnov, lilliefors and anderson-darling tests. *Journal of Statistical Modeling and Analytics, 2*, 21-33.
- Reich, M., Lesur, A., & Perdrizet-Chevallier, C. (2008). Depression, quality of life and breast cancer: a review of the literature. *Breast Cancer Research and Treatment, 110*, 9-17.
- Reyes-Gibby, C. C., Anderson, K. O., Morrow, P. K., Shete, S., & Hassan, S. (2012). Depressive symptoms and health-related quality of life in breast cancer survivors. *Journal of Women's Health, 21*, 311-318.
- Robins, L. N., Helzer, J. E., Croughnan, J, Williams, J. B. W., & Spitzer, R. L. (1987). *NIMH Diagnostic Interview Schedule: Version III-R*. Rockville, MD: National Institutes of Mental Health.
- Sachs, G., Rasoul-Rockenschaub, S., Aschauer, H., Spiess, K., Göber, I., Staffeijn, A., et al. (1995). Lytic effector cell activity and major depressive disorder in patients with breast cancer: a prospective study. *Journal of Neuroimmunology, 59*, 83-89.
- Segal, D. L., Coolidge, F. L., Cahill, B. S., & O'Riley, A. A. (2008). Psychometric properties of the Beck Depression Inventory—II (BDI-II) among community-dwelling older adults. *Behavior Modification, 32*, 3-20.
- Seignourel, P. J., Green, C., & Schmitz, J. M. (2008). Factor structure and diagnostic efficiency of the BDI-II in treatment-seeking substance users. *Drug and Alcohol Dependence, 93*, 271-278.
- Shafer, A. B. (2006). Meta-analysis of the factor structures of four depression questionnaires: Beck, CES-D, Hamilton, and Zung. *Journal of Clinical Psychology, 62*, 123-146.

- Siegel, R., DeSantis, C., Virgo, K., Stein, K., Mariotto, A., Smith, T., Cooper, D., Gansler, T., Lerro, C., Fedewa, S., Lin, C., Leach, C., Spillers Cannady, R., Cho, H., Scoppa, S., Hachey, M., Kirch, R., Jemal, A., & Ward, E. (2012). Cancer treatment and survivorship statistics, 2012. *CA: A Cancer Journal for Clinicians*, *62*, 220-241.
- Somerset, W., Stout, S. C., Miller, A. H., & Musselman, D. (2004). Breast cancer and depression. *Oncology*, *18*, 1021-34.
- Spiegel, D., & Giese-Davis, J. (2003). Depression and cancer: Mechanisms and disease progression. *Biological Psychiatry*, *54*, 269-282.
- Spielberger, C. D., Gorsuch, R. L., & Lushene, R. E. (1970). Manual for the state-trait anxiety inventory. Palo Alto, CA: Consulting Psychologists Press.
- Spitzer, R.L., Endicott, J., & Robins, E. (1978). Research diagnostic criteria: rationale and reliability. *Archives of General Psychiatry*, *35*, 773–782.
- Spitzer, R. L., Kroenke, K., Williams, J. B., & Patient Health Questionnaire Primary Care Study Group. (1999). Validation and utility of a self-report version of PRIME-MD: The PHQ primary care study. *The Journal of the American Psychological Association*, *282*, 1737-1744.
- Spitzer, R. L., Williams, J. B., Gibbon, M., & First, M. B. (1992). The structured clinical interview for DSM-III-R (SCID): I: History, rationale, and description. *Archives of General Psychiatry*, *49*, 624-629.
- Steer, R. A., Ball, R., Ranieri, W. F., & Beck, A. T. (1999). Dimensions of the Beck depression inventory - II in clinically depressed outpatients. *Journal of Clinical Psychology*, *55*, 117-128.

- Steer, R. A., Beck, A. T., Riskind, J. H., & Brown, G. (1987). Relationships between the Beck Depression Inventory and the Hamilton Psychiatric Rating Scale for depression in depressed outpatients. *Journal of Psychopathology and Behavioral Assessment, 9*, 327-339.
- Steer, R. A., & Clark, D. A. (1997). Psychometric characteristics of the Beck Depression Inventory–II with college students. *Measurement and Evaluation in Counseling and Development, 30*, 128-136.
- Steer, R. A., Kumar, G., Ranieri, W. F., & Beck, A. T. (1998). Use of the Beck Depression Inventory-II with adolescent psychiatric outpatients. *Journal of Psychopathology and Behavioral Assessment, 20*, 127-137.
- Thompson, B., & Daniel, L. G. (1996). Factor analytic evidence for the construct validity of scores: A historical overview and some guidelines. *Educational and Psychological Measurement, 56*, 197-208.
- Trajković, G., Starčević, V., Latas, M., Leštarević, M., Ille, T., Bukumirić, Z., & Marinković, J. (2011). Reliability of the Hamilton Rating Scale for Depression: A meta-analysis over a period of 49 years. *Psychiatry Research, 189*, 1-9.
- U.S. Department of Health and Human Services, National Institutes of Health (NIH) (2013). Breast cancer fact sheet. Retrieved from <http://report.nih.gov/nihfactsheets/viewfactsheet.aspx?csid=73&key=b>
- Vahdaninia, M., Omidvari, S., & Montazeri, A. (2010). What do predict anxiety and depression in breast cancer patients? A follow-up study. *Social Psychiatry and Psychiatric Epidemiology, 45*, 355-361.

- Van Wilgen, C. P., Dijkstra, P. U., Stewart, R. E., Ranchor, A. V., & Roodenburg, J. L. N. (2006). Measuring somatic symptoms with the CES-D to assess depression in cancer patients after treatment: comparison among patients with oral/oropharyngeal, gynecological, colorectal, and breast cancer. *Psychosomatics*, *47*, 465-470.
- Vanheule, S., Desmet, M., Groenvynck, H., Rosseel, Y., & Fontaine, J. (2008). The factor structure of the Beck Depression Inventory-II: An evaluation. *Assessment*, *15*, 177-187.
- Verhoeven, M., Sawyer, M. G., & Spence, S. H. (2013). The factorial invariance of the CES-D during adolescence: Are symptom profiles for depression stable across gender and time? *Journal of Adolescence*, *36*, 181-190.
- Watkins, M. W. (2000). *Windows receiver operating characteristic (ROC) program*. Retrieved from <http://espse.ed.psu.edu/spsy/Watkins/Watkins3.ssi>.
- Watkins, M. W. (2000). *Windows parallel analysis pro-gram*. Retrieved from <http://espse.ed.psu.edu/spsy/Watkins/Watkins3.ssi>.
- Weissman, M. M., Sholomskas, D., Pottenger, M., Prusoff, B. A., & Locke, B. Z. (1977). Assessing depressive symptoms in five psychiatric populations: a validation study. *American Journal of Epidemiology*, *106*, 203-214.
- Wetherell, J. L., & Areán, P. A. (1997). Psychometric evaluation of the Beck Anxiety Inventory with older medical patients. *Psychological Assessment*, *9*, 136.
- Whisman, M. A., Judd, C. M., Whiteford, N. T., & Gelhorn, H. L. (2013). Measurement invariance of the Beck Depression Inventory-Second Edition (BDI-II) across gender, race, and ethnicity in college students. *Assessment*, *20*, 419-428.

- Whisman, M. A., Perez, J. E., & Ramel, W. (2000). Factor structure of the Beck Depression Inventory—Second Edition (BDI-II) in a student sample. *Journal of Clinical Psychology, 56*, 545-551.
- Wolf, N. J., & Hopko, D. R. (2008). Psychosocial and pharmacological interventions for depressed adults in primary care: A critical review. *Clinical Psychology Review, 28*, 131-161.
- Wing, J., Cooper, J., & Sartorius, N. (1974). Measurement and classification of psychiatric symptoms. Cambridge, England: Cambridge University Press.
- Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale. *Acta Psychiatrica Scandinavica, 67*, 361-370.

Appendix

Table 1.
Correlations Among Depression and Anxiety Measures

	1	2	3	4	5
1. BDI-II	-	.72	.58	.63	.60
2. CES-D		-	.58	.56	.58
3. HRSD			-	.56	.57
4. BAI				-	.35
5. SCID/ADIS					-

Note. All correlations are significant at the 0.001 level (2-tailed).

BDI-II = Beck Depression Inventory-II; CES-D = Center for Epidemiologic Studies Depression Scale; HRSD = Hamilton Rating Scale for Depression; BAI = Beck Anxiety Inventory; SCID/ADIS = Severity rating from structured clinical interview (ADIS-IV or SCID-I).

Table 2.
Confirmatory Factor Analyses of Established Models

	Citation	Factor Model	Co-variance of factors	RMSEA	BCFI	GFI	AGFI	NFI	χ^2/df	<i>p</i>
BDI-II	Steer et al., 1998	2	Yes	.08	.87	.84	.79	.75	1.76	.00
BDI-II	Arnau, Meagher, Norris, & Bramson, 2001	2	Yes	.07	.85	.82	.78	.71	1.65	.00
BDI-II	Huang & Chen, 2014	2	Yes	.08	.84	.81	.76	.71	1.81	.00
BDI-II	Seignourel, Green, & Schmitz, 2008	3	Yes	.08	.82	.80	.75	.69	1.86	.00
BDI-II	Vanheule, Desmet, Groenvynck, Rosseel, & Fontaine, 2008	3	Yes	.07	.89	.87	.83	.76	1.67	.00
BDI-II	Whisman, Judd, Whiteford, & Gelhorn, 2013	Hierarchical	4	.08	.84	.81	.76	.71	1.75	.00
CES-D	Carleton et al., 2013	3	Yes	.07	.92	.87	.81	.81	1.59	.00
CES-D	Shafer, 2006	4	Yes	.08	.81	.79	.73	.68	1.87	.00
HRSD	Bech, Fava, Trivedi, Wisniewski, & Rush, 2011	1	No	.08	.72	.84	.80	.53	1.72	.00
HRSD	Hamilton, 1960	4	No	.10	.57	.80	.73	.44	2.13	.00
HRSD	Hamilton, 1967	4	No	.09	.67	.89	.77	.54	1.99	.00

Table 2. Continued

	Citation	Factor Model	Co-variance of factors	RMSEA	BCFI	GFI	AGFI	NFI	χ^2/df	p
HRSD	Pancheri, Picardi, Pasquini, Gaetano, & Biondi, 2002	4	Yes	.07	.81	.88	.83	.62	1.53	.00
HRSD	Shafer, 2006	4	Yes	.06	.85	.88	.83	.64	1.40	.00

Note. BDI-II = Beck Depression Inventory-II; CES-D = Center for Epidemiologic Studies Depression Scale; HRSD = Hamilton Rating Scale for Depression; BAI = Beck Anxiety Inventory; RMSEA = Root Mean Square Error Approximation; CFI = Comparative Fit Index; GFI = Goodness-of-Fit Index; AGFI = Adjusted Goodness-of-Fit Index; NFI = Normed Fit Index; χ^2 = Chi-square / df = Degrees of Freedom; p = p -value of χ^2/df .

Table 3.
Varimax Rotated Factor Loadings of BDI-II Items

Item	Factor Loading	
	1	2
1. Sadness	.36	.59
2. Pessimism	.52	.26
3. Past Failure	.78	.19
4. Loss of Pleasure	.27	.61
5. Guilty Feelings	.81	.09
6. Punishment Feelings	.62	.18
7. Self-Dislike	.62	.30
8. Self-Criticalness	.82	.19
9. Suicidal Thought or Wishes	.47	.19
10. Crying	.25	.46
11. Agitation	.39*	.32*
12. Loss of Interest	.30	.59
13. Indecisiveness	.44•	.48•
14. Worthlessness	.67	.18
15. Loss of Energy	.18	.71
16. Changes in Sleep Pattern	.23	.44
17. Irritability	.54	.21
18. Changes in Appetite	.08	.68
19. Concentration Difficulty	.41•	.44•
20. Tiredness or Fatigue	.14	.73
21. Loss of Interest in Sex	.15*	.37*

Note. BDI-II = Beck Depression Inventory-II. Factor loadings in bold specify the designated factor. * = Undesignated item. • = Item loads on to more than one factor. Factor 1 = Negative Attitudes Toward Self. Factor 2 = Somatic-Affective.

Table 4.
Varimax Rotated Factor Loadings of CES-D Items

Item	Factor Loading		
	1	2	3
1. Bothered by things	.60	.14	.14
2. Poor appetite	.51	.18	.31
3. Could not shake the blues	.73	.32	.09
4. Feel as good as others	.04	.14	.61
5. Couldn't keep mind on tasks	.55	.04	.01
6. Felt depressed	.66•	.41•	.15
7. Everything an effort	.56•	.50•	.04
8. Hopeful about future	.08	.70	.05
9. Life is a failure	.26	.25	.68
10. Felt fearful	.58	.13	.34
11. Restless sleep	.59	.11	.08
12. Felt happy	.01	.80	.21
13. Talked less than usual	.47	.04	.20
14. Felt lonely	.60	.03	.27
15. People were unfriendly	.10	.10	.59
16. Enjoyed life	.05	.78	.18
17. Crying spells	.48	.17	.28
18. Felt sad	.68	.24	.23
19. People dislike me	.25	.01	.78
20. Could not get going	.56•	.46•	.13

Note. CES-D = Center for Epidemiologic Studies Depression Inventory Scale. Factor loadings in bold specify the designated factor. • = Item loads on to more than one factor. Factor 1 = Somatic-Depressed Affect. Factor 2 = Positive Affect. Factor 3 = Interpersonal.

Table 5.
Varimax Rotated Factor Loadings of HRSD Items

Item	Factor Loading		
	1	2	3
1. Depressed mood	.02	.66	.22
2. Guilt	.28	.50	.06
3. Suicide	.42	.05	.16
4. Insomnia initial	.03	.25	.46
5. Insomnia middle	.12	.25	.61
6. Insomnia delayed	.27	.12	.68
7. Work and interests	.19	.50	.30
8. Retardation	.20	.42	.18
9. Agitation	.12	.39*	.38*
10. Anxiety psychic	.53•	.53•	.04
11. Anxiety somatic	.70	.26	.02
12. Gastrointestinal	.59	.13	.38
13. General somatic	.71	.26	.01
14. Libido loss	.68	.20	.06
15. Hypochondriasis	.44	.24	.15
16. Weight loss	.14	.14	.63
17. Insight loss	.01	.40	.13

Note. HRSD = Hamilton Rating Scale for Depression. Factor loadings in bold specify the designated factor. * = Undesignated item. • = Item loads on to more than one factor. Factor 1 = Somatic Anxiety. Factor 2 = Depressive Affect. Factor 3 = Neurovegetative.

Vita

Audrey Ashton File was born in Beckley, WV in 1988. Audrey earned a B.S. in Psychology from West Virginia University in May of 2010. She began her graduate career working with Dr. Derek Hopko at the University of Tennessee in the fall of 2010. Audrey completed her Master's Degree in Psychology at the University of Tennessee in 2013. During her time as a student in the clinical psychology program she worked at the UT Psychological Clinic for four years, the University of Tennessee Medical Center Cancer Institute for two years, and Cherokee Health Systems for one year. Audrey will begin her clinical internship at the Tuscaloosa VA Medical Center in the fall of 2015.