

PSYCHOMETRIC PROPERTIES OF THE GAD-Q-IV AND DERS IN
OLDER COMMUNITY-DWELLING GAD PATIENTS AND
NONANXIOUS CONTROLS

By

ALISON MARY STAPLES

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ABSTRACT OF THE THESIS

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By ALISON MARY STAPLES

Thesis Director:

Dr. Jan Mohlman

Recent research suggests that generalized anxiety disorder (GAD) in late life is common (Flint, 2005) and is associated with severe consequences, such as decreased life satisfaction and increased risk of physical disability (De Beurs et al., 1999). Yet, our understanding of this disorder in late life, including knowledge of efficient assessment tools, lags behind our growing knowledge of GAD in younger adults. The current study investigated the psychometric properties of the Generalized Anxiety Disorder Questionnaire for DSM-IV (GAD-Q-IV; Newman et al., 2002) and the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) in a community-dwelling, older adult population. Thirty-seven adults diagnosed with GAD and 37 controls (all age 60 or older) completed the GAD-Q-IV, DERS, and other measures of anxiety and depression. Both measures were assessed for internal consistency reliability, construct validity (convergent and discriminant), and test-retest reliability, all of which indicated good psychometric performance. Receiver operating characteristic analyses suggested

that the optimal cutoff for diagnosing GAD in this sample was 3.71, with .97 sensitivity and .92 specificity. However, including only those participants diagnosed with GAD in addition to another Axis I disorder (e.g., social phobia, dysthymia, panic disorder with or without agoraphobia; n = 18), revealed a higher optimal cutoff score (4.42; 100% sensitivity and 92% specificity). ROC analyses also revealed an optimal DERS cutoff score of 62.5, which achieved .76 sensitivity and .86 specificity. Findings from the current study support the utility of an emotion regulation deficit model of late-life GAD, and are discussed in relation to age specific characteristics of worry and GAD.

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CHAPTER I

INTRODUCTION

Epidemiological research has classified generalized anxiety disorder (GAD) as the most common or second most common anxiety disorder (with phobias taking the lead) in older adults (Flint, 1994). Reports of GAD prevalence in older adult populations vary from .7% to 9% across studies, depending on the inclusion of patients with comorbid psychiatric illness (e.g., major depression; Flint, 2005). Therefore, despite the previously held notion that anxiety disorders are rare in older adult populations (Fuentes & Cox, 1997), there is mounting evidence to suggest that the prevalence of anxiety disorders overall (Regier et al., 1988) and GAD in particular (Flint, 1994; Flint, 2005) is considerable across the lifespan. Thus, these topics deserve increased research attention.

While the prevalence of GAD in older adults is relatively high, there are indeed lower reported incidence rates of all anxiety disorders in older versus younger adults (Blazer, George, & Hughes, 1991; Flint, 1994). While some accept these findings as valid, others have questioned our adoption of popular diagnostic measures, which have been assessed only for their accuracy in younger adult populations, to be used with the elderly (Palmer, Jeste, & Sheikh, 1997; Fuentes & Cox, 1997; Mohlman et al., in press). Moreover, our ability to disentangle the presence of anxiety and its associated symptoms from natural aging or age-related medical problems is questionable (Cohen, 1991; Wetherell, Le Roux, & Gatz, 2003).

In light of the need for a diagnostic tool that is both reliable and sensitive to the distinctions of late life GAD, the current study assessed the psychometric properties and the predictive utility of two measures, the Generalized Anxiety Disorder Questionnaire-

IV (GAD-Q-IV; Newman et al., 2002) and the Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004), in a community-dwelling, older adult population. The GAD-Q-IV and the DERS were developed and tested predominantly for use with younger populations. Therefore, more research is needed to evaluate the capability of these measures to detect late life GAD. In consideration of the current investigation, the physiological underpinnings of aging in addition to age differences in worry manifestation are two potentially important topics. Due to extensive physical changes throughout the aging body and brain, the intersection between age-related physiology and anxiety symptomatology is both complicated and crucial for understanding late life GAD.

Age and Anxiety Related Physiological Changes

Due to the many age related changes that may complicate our assessment of anxiety disorders in older adults, including changes to the nervous system, neurotransmitter levels, and organ sensitivity to neurotransmitters (Kogan, Edelstein, & McKee, 2000), research on the physiological profile of older adults with GAD is important but currently nonexistent. Psychophysiological research on GAD in younger adults suggests that individuals with chronic anxiety demonstrate a reduced range of variability in peripheral measures of autonomic nervous system activity such as heart rate and skin conductance when exposed to laboratory stressors (Hoehn-Saric & McLeod, 1988; Hoehn-Saric, McLeod, & Zimmerli, 1989; Lyonfields, Borkovec, & Thayer, 1995; Thayer, Friedman, & Borkovec, 1996). Along with this “diminished physiological flexibility” is a delayed return of physiological measures to baseline once the stressor is removed, prompting theorists to conceptualize this physiological pattern as indicative of a maladaptive response to stress in patients with chronic anxiety (Hoehn-Saric & McLeod,

2000, p. 219). An increase in reported frequency of somatic symptoms such as muscle tension, heart rate, and sweatiness in GAD patients is incongruent with this blunted psychophysiological response profile (Hoehn-Saric & McLeod, 2000), but may be explained by an increased sensitivity to or excessive attention toward bodily sensations in these individuals (Hoehn-Saric & McLeod, 2000; Hoehn-Saric, McLeod, Funderburk, & Koalski, 2004).

While research on the physiology of older adults with GAD is lacking, an understanding of the changes that occur in healthy older adults may inform our understanding of GAD in this population. With regard to changes in neurotransmitter levels, research has shown that norepinephrine levels as well as organ response to norepinephrine increase with age (Sunderland, Lawlor, Martinez, & Molchan, 1991). Norepinephrine, a neurotransmitter tied to the sympathetic nervous system responsiveness, increases blood pressure and decreases cardiac output. Indeed, older adults show a greater increase in plasma catecholamines (i.e. norepinephrine and epinephrine) in response to stressors and also demonstrate a longer time to return to baseline catecholamine levels after a stressor when compared to younger adults (McNeilly & Anderson, 1997). Postmortem studies of older adults generally show a decrease in the number of neurons in the mid-brain locus coeruleus, an area containing approximately half of the brain's norepinephrine-containing neurons (Vijayashankair & Brody, 1979; Manaye, McIntire, Mann, & German, 1995). This decrease in locus coeruleus neurons may be related to the reduced sensitivity of sympathetic nervous system responsiveness and subsequent increase in plasma catecholamines in older adults when exposed to stress. Moreover, clonidine (an α_2 agonist, with stimulation of α_2

receptors inhibiting the release of NE) challenge studies comparing the response of older versus younger adults have revealed a decrease in cerebrospinal fluid NE levels in younger but not older adults, suggesting decreased responsivity of this system with age (Raskind et al., 1988). Overall, these studies suggest a decrease in noradrenergic functioning associated in the aging brain. Poor sympathetic nervous system regulation in older adults as indicated by relatively high levels of catecholamines and a prolonged return to baseline in response to stress may mimic the increase in somatic symptom (e.g., heart rate, respiration, dizziness) frequency and severity associated with GAD. Therefore, we may expect to see an increase in somatic symptoms associated with chronic anxiety in older adults both with and without GAD. Indeed, many psychologically healthy older adults experience occasional symptoms of GAD (e.g., insomnia, feeling ‘keyed up’; Stanley & Novy, 2000) and subsyndromal anxiety symptoms are thought to be common in this population (Wetherell et al., 2003).

Additional differences in central nervous system functioning between younger and older adults provide further support for the influence of a distinct physiological profile in late life GAD. Existing research suggests differences in emotion-related brain functioning in older adults, with one study showing that older adults demonstrated lower arousal ratings and reduced amygdala response after exposure to negative, but not positive, pictures (Mather et al., 2004). Additionally, there is evidence to suggest that the prefrontal cortex (PFC), thought to play a predominate role in executive functioning and worry processes, demonstrates disproportionate decline with age (Raz, Gunning-Dixon, Head, Dupuis, & Acker, 1998; Tisserand et al., 2002). In line with research suggesting an age-related anatomical deterioration of the PFC and subsequent impairments in cognitive

functioning controlled by the PFC (e.g., executive functioning; Hasher & Zacks, 1988), researchers proposed a similar decrease in PFC involvement in worry processes in older adults (Mohlman et al., 2008). Indeed, there is research to suggest a decrease in worry frequency (Brenes, 2006; Basevitz, Pushkar, Chaikelson, Conway, & Dalton, 2008) and severity (Beck, Stanley, & Zebb, 1996; Stanley, Beck, & Zebb, 1996; Stanley et al., 2003; Wetherell, Gatz, & Craske, 2003; Wetherell et al., 2003; Mohlman & Gorman, 2005) in older adults. Providing further support for the relationship between PFC decline and reduced worry severity, Mohlman et al. (2008) found that medial orbital cortex (mOFC; a region of the prefrontal cortex) volume was positively related to worry scores in a sample of older adults with GAD. Additional findings from Price and Mohlman (2007) suggested that inhibitory control (a specific executive ability) was positively related to worry symptom severity in a sample of older adults with GAD but not in a sample of matched controls. Taken together, we might predict that worry severity (but not somatic symptoms of GAD) and emotion regulation deficits would be less prominent in older as compared to younger adults, due to decreased emotion-related brain functioning.

Age Differences in GAD, Worry, and Negative Affect

In addition to age-related physiological changes, the increased prevalence of aversive physical symptoms in late life (e.g., sleep disturbance, fatigue, restlessness) may complicate our understanding of GAD in older adults. Indeed, some researchers have speculated that GAD is indistinguishable from certain medical conditions associated with aging (Wetherell et al., 2003; Gurian & Miner, 1991). Moreover, it has been suggested that older adults are more likely to emphasize somatic symptoms associated with anxiety

than psychological or cognitive aspects (Stanley & Novy, 2000), making differential diagnoses more difficult. The question of whether GAD is a distinct disorder in older adulthood or simply a culmination of these age-related physical changes has been dispelled by recent research focused on determining the key features of late life GAD. Findings from Wetherell et al. (2003) suggest older adults with GAD are more likely to report frequent and uncontrollable worry, distress and impairment, as well as 5 of the 6 associated symptoms (i.e. fatigue, restlessness, irritability, muscle tension, sleep disturbance) when compared to older normal controls. Even symptoms associated with GAD that are thought to naturally increase with age such as sleep disturbance and fatigue were found to be significantly more predominant in older adults with GAD as compared to normal controls. Moreover, demographics such as age, marital status, work status, cognitive impairment as well as the number of medical diseases did not significantly differ in adults with GAD as compared to those without (Wetherell et al., 2003). Similar support for the use of full DSM-IV criteria to assess late life GAD exists using confirmatory factor analysis of the Worry and Anxiety Questionnaire (WAQ; Dugas et al., 2001; mimics DSM-IV criteria), with results revealing a similar factorial structure of the WAQ for both younger and older adults (Nuevo et al., 2008).

Despite support for GAD as a distinct disorder in late life, age-related differences in emotion-related brain functioning (e.g., deterioration of the PFC) and the effects of physical changes throughout the body as it naturally ages (e.g, potential increase in unwanted physical symptoms; increases in health concerns) implicate the possible differences in experience and expression of anxiety in older versus younger adults. An examination of worry content in older versus younger adults with GAD revealed that

older adults reported more health related worry topics and fewer work related worry topics as compared to younger adults (Diefenbach, Stanley, & Beck, 2001). In addition, socially relevant worry topics are predominant in younger but not older samples of individuals with GAD (Ladouceur, Freeston, Fournier, Dugas, & Doucet, 2002). As discussed, research consistently suggests that older adults experience a reduction in worry frequency (Brenes, 2006; Basevitz et al., 2008) and severity (Beck et al., 1996; Stanley et al., 1996; Stanley et al., 2003; Wetherell, Gatz, & Craske, 2003; Wetherell, Le Roux, & Gatz, 2003; Mohlman & Gorman, 2005). However, there is research to suggest that older adults utilize fewer coping strategies to control worry (Hunt, Wisocki, & Yanko, 2003) and those attempts to cope are less successful (e.g. Felton & Revenson, 1987). In terms of emotion regulation, older adults report greater control over emotions than younger adults (Gross et al., 1997) as well as greater use of effective coping strategies (e.g., distancing, positive reappraisal) in response to stressful situations than younger adults (Folkman, Lazarus, Pimley, & Novacek, 1987).

Evidence also suggests that older adults experience reductions in negative affect frequency and duration (Lawton, Kleban, & Dean, 1993; Stacey & Gatz, 1991). However, these findings are mixed, with some studies suggesting no age-related differences in the frequency of negative affect (see Kunzmann, Little, & Smith, 2000 for a review). Additionally, some studies suggest that while the frequency and duration of negative affect is decreased in comparison to younger adults, the intensity of negative affect across the lifespan remains stable (e.g., Carstensen, Pasupathi, Mayr, & Nesselrode, 2000; Charles, 2005). Again, these findings are mixed, with additional studies finding an overall decrease in intensity of negative affect in older adults (e.g.,

Gross, Carstensen, Pasupathi, Tsai, Skorpen, & Hsu, 1997). Finally, Lawton et al.'s (1993) study on affect structure and prevalence in older versus younger adults revealed a trend for affect to be less bothersome as age increases. These differences may alter the presentation and symptom profile of GAD in older adults. Therefore, these distinctions require consideration when evaluating diagnostic measures for late life GAD.

When examining specific measures of worry, we find strong support for the notion of age-related differences in the experience and manifestation of anxiety and GAD in particular. Scores on measures of worry (e.g., PSWQ; Meyer, Miller, Metzger, & Borkovec, 1990) and worry-related constructs (Cognitive Failures Questionnaire; Broadbent, Cooper, Fitzgerald, & Parkes, 1982) are consistently lower in older versus younger GAD patients, further supporting the diminished role of the PFC in late life worry processes (Mohlman et al., 2008). In primary care settings the suggested cutoff score on the PSWQ for identifying older adults with GAD is 50 (Stanley et al., 2003), more than 10 points lower than the suggested cutoff for younger adults with GAD (Behar, Alcaine, Zuellig, & Borkovec, 2003; Fresco, Mennin, Heimberg, & Turk, 2003), and mean scores on measures of worry are consistently lower in older (Beck et al., 1996; Stanley et al., 2003; Wetherell, Gatz, & Craske, 2003; Wetherell, Le Roux, & Gatz, 2003; Mohlman & Gorman, 2005) than in younger adults with GAD (Molina & Borkovec, 1994; Fresco, Mennin, Heimberg, & Turk, 2002). Despite differences in anxiety severity, frequency, and worry content, evidence supports the use of diagnostic measures that assess the full range of GAD symptoms in older, as in younger adults (Wetherell, Le Roux, & Gatz, 2003; Nuevo et al., 2008). Indeed, to date, the majority of psychometric research on self-report measures of GAD for use with older adults has

focused on those measures initially developed for their younger counterparts.

Self-report Measures of GAD in Older Adult Samples

The Penn State Worry Questionnaire (PSWQ; Meyer et al., 1990) has consistently demonstrated strong psychometric properties across samples of treatment seeking younger adults and analogue GAD samples (e.g. Meyer et al., 1990, Fresco et al., 2002; Molina & Borkovec, 1994), and is generally considered the gold standard in worry symptom assessment. Within older adults, the PSWQ has demonstrated adequate psychometric properties for community-dwelling GAD patients and nonanxious controls, with validation of a similar two-factor structure as identified in younger samples (worry items and nonworry items; Beck, Stanley, & Zebb, 1995). A replication study involving a larger sample of older adults with GAD revealed similar support for adequate internal consistency and convergent validity of the PSWQ with other anxiety measures, as well as an increased divergent validity with the Beck Depression Inventory (BDI; Beck & Steer, 1987) in comparison to the initial study (Stanley, Novy, Bourland, Beck, & Averill, 2001). However, further investigation by Hopko et al. (2003) of the factor structure of the PSWQ with confirmatory factor analysis revealed an inadequate fit of the one and two factor structure of the PSWQ when tested with the older adult sample. These findings were thought to be in part due to older adults' reported difficulty completing and interpreting the questionnaire items (in particular, the reverse scored items; Hopko et al., 2003). Analysis of an abbreviated version of the PSWQ including only 8 items (as opposed to 16) with the removal of all reverse scored items revealed strong fit indices and comparable psychometric properties to the full length PSWQ.

Various other measures of worry and GAD have been tested with older adult

samples, albeit with relatively little research as compared to their younger counterparts. Use of the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch & Lushene, 1970) within two community dwelling older adult populations, a subsample with GAD and one without, demonstrated adequate psychometric properties (Stanley et al., 1996). Yet, within the GAD subsample the STAI-State failed to demonstrate strong convergent validity with other measures of anxiety (including the Worry Scale [WS; Wisocki, Handen, & Morse, 1986], a questionnaire used to assess the severity of various worry topics in older adults). Additionally, when tested with a sample of older adult outpatients, the STAI evidenced adequate internal reliability and discriminant validity but poor construct validity and poor predictive accuracy (Kabacoff, Segal, Hersen, & Van Hasselt, 1997). Taken together, these findings suggest that the construct tapped by the STAI may not be related to the severity of worry in older adults with GAD.

The Generalized Anxiety Disorder Severity Scale (GADSS; Shear, Belnap, Mazumdar, Houck, & Rollman, 2006), a measure that specifically assesses for GAD severity, has also garnered evidence of good convergent, concurrent, and discriminant validity in a sample of mixed community dwelling and primary care older adults and controls (Andreescu et al., 2008). As the GADSS contains only six items, its ease of use may make it more appropriate for older adult populations. However, a study involving older primary care patients referred for anxiety treatment revealed strong psychometric properties yet poor diagnostic accuracy and a lack of divergent validity when correlated with the BDI (Beck & Steer, 1987; Weiss et al., 2009).

Finally, the BAI (Beck, Epstein, Brown, & Steer, 1988) has been tested for its efficacy in screening anxiety in older adults in multiple studies (Kabacoff et al., 1997;

Morin et al., 1999; Wetherell & Arean, 1997). Despite its reported reliability and validity in both community and primary care samples (Kabacoff et al., 1997, Wetherell & Areán, 1997), Wetherell & Gatz (2005) found poor discriminant validity when examining the BAI and measures of depression in a sample of older adults with GAD. With its predominant focus on somatic symptoms, the BAI may be lacking in terms of its ability to tap into the cognitive features of GAD. Particularly important with older adults, the BAI may tap symptoms of medical illness in nonclinical samples rather than anxiety, confounding response differences (Wetherell & Gatz, 2005).

Overall, studies of popular anxiety measures with older GAD patients have yielded mixed support for the appropriateness of these measures when used with the elderly. In particular, measures that predominantly focus on the somatic symptoms of GAD may inflate (Wetherell & Gatz, 2005) or minimize (Blazer et al., 1991) GAD severity in the elderly and should therefore be avoided. Additionally, the large item count and use of reverse scoring in measures discussed thus far appear to compromise the validity and reliability of these measures with older adults. Due to the numerous disadvantages inherent in the use of diagnostic interviews with adults age 60 and over (e.g., excessive length, response inaccuracy; Mohlman et al., in press), a brief self-report measure that efficiently assesses the full range of GAD symptoms would be of potentially great import to mental health researchers and practitioners.

The GAD-Q-IV: Appropriateness for Use with Older Adults

The Generalized Anxiety Disorder Questionnaire-IV (GAD-Q-IV; Newman et al., 2002) is a relatively new measure that was initially developed based on DSM-III-R (APA, 1987; GAD-Q; Roemer, Borkovec, Posa, & Borkovec, 1995) symptomatology and

was later revised to assess the full range of DSM-IV (APA, 1994) diagnostic criteria (worry, associated symptoms) of GAD. It is currently the only known self-report measure that captures the entire range of primary and associated symptoms of GAD (Newman et al., 2002). Initially developed for use with undergraduate samples, the GAD-Q-IV has demonstrated solid psychometric properties with younger adults. Early research found that the GAD-Q was fairly reliable in determining a GAD diagnosis and very accurate in determining the absence of a GAD diagnosis among a college undergraduate sample (Roemer et al., 1995). A subsequent study by Newman et al. (2002) further supported the use of the GAD-Q-IV as a screening tool in younger samples by comparing GAD-Q-IV diagnoses to structured interview diagnoses of GAD along with other anxiety disorders such as social phobia and panic disorder, in addition to nonanxious controls. Using Receiver Operating Characteristics (ROC) analysis to determine a cutoff score of 5.7 (scored based on a sum total response; with a sensitivity of 83% and a specificity of 89%), the GAD-Q-IV demonstrated adequate test-retest reliability along with good convergent and discriminate validity. In addition, Newman et al. (2002) compared their study's undergraduate sample to a community sample of individuals with GAD and found that they did not differ on two measures of anxiety, the PSWQ (Meyer et al., 1990) and the STAI (Spielberger et al., 1970), suggesting that these results are generalizable to community samples.

Objectively, the GAD-Q-IV (Newman et al., 2002) has many of the attributes of an appropriate assessment instrument for late life. The length of the measure is relatively short when compared to popular assessment tools such as GAD modules from the Structured Clinical Interview for DSM-IV (SCID; First, Gibbon, Spitzer, & Williams,

1995) or Anxiety Disorders Interview Schedule for DSM-IV (DiNardo, Brown, & Barlow, 1994). Interview duration is particularly important for older patients, with shortened length facilitating accuracy and comprehension (Mohlman et al., in press). As discussed, it may be more difficult for older adults to answer reverse score items on a self report measure (Hopko et al., 2003), making the GAD-Q-IV an attractive measure to use with older populations. Additionally, the GAD-Q-IV's equal attention to both somatic and cognitive symptoms is in line with research that suggests the need for a diagnostic tool that does not focus predominantly on somatic symptoms, reports of which may confound with the natural increase of symptoms related to medical illness in older adults (Wetherell & Gatz, 2005). Moreover, as discussed earlier, current research suggests that the DSM-IV-TR (APA, 2000) criteria for GAD apply adequately to older adults (Wetherell et al. 2003, Nuevo et al., 2008), further justifying exploration of the GAD-Q-IV with late life GAD patients. Overall, the GAD-Q-IV is gaining popularity, perhaps due to its ease of use and strong performance as a screening instrument for GAD (Rodebaugh, Holaway, & Heimberg, 2008).

The GAD-Q-IV (Newman et al., 2002) has been recognized as a potentially useful screening tool in older adults and has been tested in a small number of studies. Within a treatment-seeking sample of older adults with GAD and a mixed sample of treatment-seeking older adults with other or no psychiatric diagnoses, Webb et al. (2008) used an ROC analysis to determine the optimal cutoff score when using the GAD-Q-IV to assess GAD status with these older adults. A score of 4.5 resulted in the highest specificity and sensitivity. However, they found that item 2 of the GAD-Q-IV, in addition to an abbreviated version of the PSWQ (Meyer et al., 1990), provided stronger predictions of

GAD than the GAD-Q-IV total score. Item 2 on the GAD-Q-IV is a dichotomously scaled question that asks, “Is your worry excessive in intensity, frequency, or amount of distress it causes?” The possibility of screening for GAD with one question is enticing, especially from a cost-benefit perspective. However, limitations of this study, including the screening of the patients for anxiety prior to evaluation and the fact that they were treatment seeking, constrain generalization of findings and highlight the necessity of additional research in this area.

Another recent study examined various assessment tools for anxiety, including the GAD-Q-IV (Newman et al., 2002), in older adults receiving home care due to a range of medical conditions (Diefenbach, Tolin, Meunier, & Gilliam, 2009). When compared to the GADSS (Shear et al., 2006), the only other measure included in the study that specifically evaluates GAD, the GAD-Q-IV demonstrated weaker test-retest reliability. This finding, in addition to the perceived lack of user friendliness prompted the authors to suggest that the GAD-Q-IV may not be the best assessment choice when working with older adults in a home care setting (Diefenbach et al., 2009). However, it is important to keep in mind the needs and demographics of each older adult population, as these characteristics greatly influence the goals of an assessment tool. For example, when working with older adults in a home care setting, even a brief measure such as the GAD-Q-IV may be unavoidably difficult for these participants to complete due to the high incidence of interfering factors such as chronic and pressing medical illnesses and an overall increased need of assistance. As is evident, surprisingly little psychometric data is available on the GAD-Q-IV, especially regarding the use of the measure with older adults, despite its growing acceptance in the field.

The DERS: The Potential Importance of Emotion Regulation in Late Life GAD

While the GAD-Q-IV (Newman et al., 2002) serves as a logical starting point when searching for a strong GAD diagnostic tool for older adults, recent research on the influence and role of emotion regulation or dysregulation in GAD (e.g. The Emotion Dysregulation Model of GAD; Mennin, Turk, Heimberg, & Carmin, 2004) suggests that this construct may also predict GAD diagnoses. In an attempt to better understand the emotional avoidance commonly associated with GAD, Mennin and colleagues suggest that individuals with GAD have difficulties with emotion regulation. Emotion regulation is defined as one's ability to both understand and skillfully modulate emotional experiences (Mennin, Heimberg, Turk, & Fresco, 2002). In particular, individuals with GAD are thought to experience more intense emotions, have difficulty identifying their emotions, struggle with the acceptance of these primary emotions, and also fail to implement effective strategies for regulating these emotions (Mennin, Heimberg, Turk, & Fresco, 2005). This emotion dysregulation profile may lead individuals to embrace emotional avoidance strategies that are prominent in GAD. The Difficulties in Emotion Regulation Scale (DERS; Gratz & Roemer, 2004) was developed as a comprehensive tool to evaluate emotion regulation. The DERS is a 39-item self-report measure with questions drawing from 4 dimensions of emotion regulation: (1) awareness and understanding of emotions; (2) acceptance of emotions; (3) the ability to engage in goal directed behavior and to avoid impulsive behavior when feeling negative emotions; (4) the ability to use emotion regulation strategies that are appropriate to a given situation (Gratz & Roemer, 2004).

Research exploring the relationship between emotion regulation and anxiety suggest that differences in emotion regulation are indeed related to GAD diagnosis. A study examining emotion regulation in an analogue sample of GAD participants and controls found that those with analogue GAD status reported significantly greater difficulties in emotion regulation (as assessed by the DERS; Gratz & Roemer, 2004) than those with GAD (Salters-Pedneault, Roemer, Tull, Rucker & Mennin, 2006). In addition, deficits in emotion regulation were associated with chronic worry (i.e. scores on the PSWQ; Meyer et al., 1990). DERS scores have also been found to predict GAD diagnosis above and beyond other proposed factors (i.e. panic attacks, panic disorder; Tull, Stipelman, Salters-Pedneault & Gratz, 2009), with the specific subscales of emotional intensity and impaired regulation strategies within the DERS best predicting a GAD diagnosis (Mennin et al., 2009).

While there is preliminary evidence to suggest that emotion regulation plays an important role in GAD, there is no research on this relationship in older adult populations. While the DERS (Gratz & Roemer, 2004) does not assess specifically for GAD, its ability to predict GAD diagnosis in younger samples makes it a potentially useful testing tool.

The Current Investigation

The current study investigated the psychometric properties of the GAD-Q-IV (Newman et al., 2002) and the DERS (Gratz & Roemer, 2004) in an older sample of community dwelling GAD patients and nonanxious controls (NC). We sought to provide data on the internal consistency reliability, construct validity (convergent and discriminant), and test-retest reliability of both the GAD-Q-IV and the DERS. In

addition, ROC analyses were conducted with both measures to determine the sensitivity, specificity, positive predictive power and negative predictive power of optimal cutoff scores. While the PSWQ only includes questions regarding worry frequency and severity, mounting evidence supports the use of full DSM-IV criteria (Wetherell et al., 2003; Nuevo et al., 2008), such as that found in the GAD-Q-IV, to assess GAD in late life. Therefore, we predicted that the GAD-Q-IV will outperform the PSWQ (Meyer et al., 1990), the current gold standard, in terms of predictive utility in determining GAD vs. control status. Additionally, we posited that while the DERS will not outperform or equal the predictive utility of the GAD-Q-IV or PSWQ, its psychometric performance will nevertheless be strong and will support the role of emotion dysregulation in late life GAD.

CHAPTER II

METHOD

Participants

Recruitment took place through media ads and community outreach. Participants were 74 adults age 60 and over ($M = 67.89$, $SD = 5.93$, range = 60 – 88 years) recruited from the community using radio and print ads. Those participants in the GAD group had a principal diagnosis of GAD ($n = 37$; mean age = 66.43 years, $SD = 4.50$, range = 61-79) according to DSM-IV criteria (APA, 2000), with no history of suicidality within the last five years and no lifetime history of psychotic symptoms. Exclusion criteria for the GAD participants also included current use of antianxiety medications, a progressive disease diagnosis, or a comorbid diagnosis of major depressive disorder. The GAD sample was 68% female; 46% of the sample met criteria for at least one additional disorder (27% specific phobia, 16% dysthymic disorder, 11% social phobia, 3% agoraphobia without panic disorder, 3% post traumatic stress disorder). A nonanxious control group of 37 adults age 60 and over ($M = 68.67$, $SD = 6.66$, range 60 - 84) was also recruited from the community, and had no current or past psychiatric diagnoses. The control group was 65% female. See Table 1 for sample demographics and characteristics.

Measures

Participants who responded were first screened using a phone interview, and those who endorsed symptoms of GAD or no psychiatric disorders whatsoever were invited for an in-person assessment. The Structured Clinical Interview Diagnostic for DSM-IV (SCID; First et al.,1995) was administered to establish diagnoses and provide data on associated features and comorbidity. Variables derived from the interview included basic

demographic information (e.g., age, education, marital status, employment status, sex), variables related to illness and treatment (e.g., age of onset, medication use, new versus recurring disorder, precipitating event), and variables related to physical health (major and minor health problems, current use of medication for health problems).

Assessors in the study were graduate students (Master's level or beyond) enrolled in a clinical practicum course who completed formal training to reliability on the SCID (First et al., 1995). Each assessor viewed the full, videotaped training program, and then matched with the gold standard on two consecutive interviews. Additionally, the supervisor sat in on a SCID conducted by each assessor before interviews were done independently. A random sample of audiotaped SCID interviews ($n = 14$) was rated to estimate interrater reliability, and the pair of raters matched on the diagnosis of GAD on 12 of the 14 SCIDs. The two cases on which raters diverged were resolved through consensus by the research team, and both were then randomized. Interrater coefficients were $\kappa = .83$ and $r = .86$ for diagnoses of GAD; however because an initial phone screen was used to confirm the presence of GAD symptoms, these estimates may be somewhat inflated.

Participants completed a self-report questionnaire packet, both pre- and post-treatment, containing the following measures relevant to the current study:

GAD-Q-IV. The GAD-Q-IV (Newman et al., 2002) is a 9 question diagnostic self-report measure that was developed to reflect the criteria for GAD listed in the DSM-IV (APA, 1994). The questionnaire probes for excessive, unrealistic, and uncontrollable worry, as well as whether or not these symptoms have been present for more days than not, with a yes/no question format. A question regarding topics of frequent worry allows

for the respondent to fill in up to 6 topics of which the individual worries excessively, unrealistically, or uncontrollably, followed by a yes/no question pertaining to the length and pervasiveness of worry. An item regarding interference is also present (i.e. “How much does worry interfere with your life, work, social activities, family?”) with a Likert-style response format allowing the respondent to choose from a scale of ‘0’ (“None”) to ‘8’ (“Very Severely”). Finally, the GAD-Q-IV includes the list of associated symptoms present in the DSM-IV diagnostic criteria, requiring the respondent to indicate those that have been present and bothersome during times of anxiety. Various methods have been established for scoring the GAD-Q-IV (Roemer et al., 1995; Newman et al., 2002). Original use of the measure utilized a dichotomous scoring strategy that required the respondent to report affirmatively to all of the DSM-IV diagnostic criteria (i.e. excessive and uncontrollable worry more days than not for past 6 months; 2 or more worry topics; interference to a “moderate” degree or greater; 3 or more of the associated symptoms) in order to be classified as having GAD. It can also be used as a continuous measure.

A dimensional scoring system without the skip-out rule was used for GAD-Q-IV (Newman et al., 2002) administration. The skip-out rule of the GAD-Q-IV instructs respondents to skip items 7 through 9 of the questionnaire if they answer “no” to items 6 (“During the last six months, have you been bothered by excessive and uncontrollable worries more days than not?” Newman et al., 2002). In order to use the GAD-Q-IV as a continuous dimension of severity, the authors chose not to use the skip-out rule when administering the measure (as recommended by Newman et al., 2002). This allows for analysis of psychometric properties such as internal consistency and construct validity using item-total correlations.

DERS. The DERS (Gratz & Roemer, 2004) is a 39-item self-report measures used to assess emotion regulation along 6 dimensions: (1) nonacceptance of emotional responses (NONACCEPTANCE), (2) ability to engage in goal-directed behavior (GOALS), (3) impulse control (IMPULSE), (4) emotional awareness (AWARENESS), (5) emotion regulation strategies (STRATEGIES), (6) emotional clarity (CLAIRTY; Gratz & Roemer, 2002). These dimensions produce the 6 subscales as determined by factor analysis (Gratz & Roemer, 2002). Respondents rate each item on a 5-point Likert-type scale ranging from '1' ("not at all") to '5' ("completely"). Higher scores on the DERS indicate higher dysregulated emotion. The DERS has demonstrated good psychometric properties, with the total score having high internal consistency ($\alpha = .93$) good test-retest reliability and adequate construct and predictive validity (Gratz & Roemer, 2004). Preliminary analyses also suggest that the DERS subscale scores demonstrate adequate internal consistency (all α s > .80 for each subscale; Gratz & Roemer, 2004).

PSWQ. The PSWQ (Meyer et al., 1990) is a 16-item inventory designed to assess the uncontrollability, excessiveness, and generality of pathological worry in clinical and non-clinical samples. The scale includes 11 forward- and 5 reverse-scored items, and respondents choose a number to indicate the extent to which each statement is typical of them. Responses are chosen from a '1' to '5' Likert-type scale on which '1' means "very little" and '5' means "very much." The PSWQ has been shown to have sound psychometric properties in older adult samples (e.g., Beck et al., 1995), and the scale is considered by many to be the leading self-report measure of GAD. In the current sample, the PSWQ demonstrated strong internal consistency ($\alpha = .94$).

Anxiety Sensitivity Index (ASI). The ASI (Peterson & Reiss, 1987) is a 16-item instrument composed of items that investigate fears about symptoms of anxiety and panic and their negative consequences. Respondents rate each item on a '0' to '4' Likert-type scale (0 = "very little," 4 = "very much") according to how much the item reflects their usual way of thinking or feeling. The ASI (Peterson & Reiss, 1987) has shown good psychometric properties, with internal consistency coefficients ranging from .82 to .91 (Peterson & Reiss, 1992), good predictive validity (Reiss, 1991), and test-retest reliability of $r = .71$ over a three-year period (Maller & Reiss, 1992). In the current sample, the ASI demonstrated strong internal consistency ($\alpha = .93$).

The Beck Depression Inventory (BDI). The BDI (Beck & Steer, 1987) is a 21-item instrument that broadly assesses the symptoms of depression. Each item includes four statements that increase in intensity, which are scored '0' through '3' to best describe how the respondent felt over the past week. The measure has been used extensively in research and treatment settings with adults of all ages. A meta-analysis of the BDI (Beck, Steer, & Garbin, 1988) found a mean coefficient alpha across 25 years of studies to be .86 in psychiatric populations and .81 in non-psychiatric populations. The BDI has been shown to have sound psychometric properties in older adult samples (e.g. Gallagher, Breckenridge, Steinmetz, & Thompson, 1983; Gallagher, Nies, & Thompson, 1982), and in the current sample, the measure demonstrated strong internal consistency ($\alpha = .87$).

Beck Anxiety Inventory (BAI). The BAI (Beck et al., 1988) is a 21-item instrument that taps cognitive and somatic symptoms of anxiety. The items list individual symptoms and the respondent chooses from four points on a 4-point Likert-type scale that

ranges from '0' ("not at all") to '3' ("severe, I could barely stand it") to indicate how much each symptom has bothered them over the past week. The BAI has well documented utility among older adults (e.g., Kogan et al., 2000). In the current sample, the BAI demonstrated strong internal consistency ($\alpha = .90$).

Procedure

The study was conducted at a university in an urban setting. Each participant was given a consent form to read and sign, after which the pretreatment interview, self-report questionnaires, and a computer task (not relevant to this investigation) were completed. Participants returned two months later to repeat the assessment. All participants were compensated \$25.00 for completing the measures.

CHAPTER III

RESULTS

Data Analytic Strategies

All psychometric analyses for the GAD-Q-IV (Newman et al., 2002) and the DERS (Gratz & Roemer, 2004) were conducted separately for the GAD and control groups due to the non-normal distribution of scores on both measures in the full sample (as indicated by the Shapiro-Wilk tests of $p < .05$). Internal consistency reliability and construct validity of the GAD-Q-IV and DERS total score was also calculated for the full sample of participants. The GAD and control groups significantly differed on the GAD-Q-IV and DERS as well as all other self report measures (PSWQ; Meyer et al., 1990, BAI; Beck et al., 1988, ASI; Peterson & Reiss, 1987, BDI; Beck & Steer, 1987; all $ps < .001$, see Table 1).

Internal consistency reliability was calculated for each measure using coefficient alpha (Cronbach, 1951) for continuously scaled items and K-R 20 (Kuder & Richardson, 1937) for items of the GAD-Q-IV (Newman et al., 2002) that are dichotomously scaled. Coefficient alphas were also calculated separately for the subscale scores of the DERS (Gratz & Roemer, 2004). In addition to Cronbach's alpha, the average interitem correlation was calculated for the DERS (Gratz & Roemer, 2004) as an estimation of internal consistency reliability due to its large item count (Clark & Watson, 1995). Both Cronbach's and K-R 20 are calculated based on two parameters: the number of items in a measures and average intercorrelation between the items (Cronbach, 1951). Therefore, measures high in internal consistency reliability (as indexed by Cronbach's) may be high in item count, high in the intercorrelation between items, or both. As measures increase in

their item count, the more likely we are to find a high reliability estimate, making both Cronbach's and K-R 20 inappropriate for large scales (Clark & Watson, 1995). Cortina (1993) suggests that Cronbach's is completely ineffective as a measure of internal consistency for scales including 40 or more items. In comparison, a direct estimate of the average interitem correlation is independent of item count and is therefore preferable for calculating internal consistency reliability for scales with many items. Adequate interitem correlation values were identified as falling in the range of .15-.50 (Clark & Watson, 1995). Corrected item-total correlations as well as re-calculated alphas with each item removed were calculated for those scales with poor internal consistency (i.e. $\alpha < .7$). Interrelationships of DERS subscale scores were examined with Pearson's r correlation coefficients.

Construct validity (both convergent and discriminant) was estimated with Pearson's r correlation coefficients in order to assess the relationship between the GAD-Q-IV (Newman et al., 2002) and the DERS (Gratz & Roemer, 2004) with other study measures (i.e. ASI; Peterson & Reiss, 1987, BAI; Beck et al., 1988, PSWQ; Meyer et al., 1990, BDI; Beck & Steer, 1987). In an attempt to control for experimentwise error, the significance level for these correlations was set to $p < .01$. Test-retest reliability was estimated for both the GAD-Q-IV and the DERS for the GAD group, only. Finally, receiver operating characteristics (ROC) analyses were conducted with both measures to determine the sensitivity, specificity, positive predictive power and negative predictive power of optimal cutoff scores. An ROC analysis (Kraemer, 1992) is a nonparametric test that uses the area under the curve (AUC) to index the probability that a particular test will correctly classify participants into groups. More specifically, the AUC is the probability

that the measure will provide a higher value for a randomly chosen individual with the disorder than for a randomly chosen individual without the disorder (Lasko, Bhagwat, Zou, & Ohno-Machado, 2005). With ROC values ranging from 0 to 1, the null hypothesis specifies that the AUC is 0.50, and values greater than 0.5 indicate a probability greater than chance (Streiner & Cairney, 2007; Fresco et al., 2003). Positive and negative predictive power differ from sensitivity and specificity in that they determine the probability that an individual has a disorder or does not have a disorder given that the measure identifies the individual as having or not having the disorder (Kessel & Zimmerman, 1993). These values may be more clinically significant, as they provide an indication of the measure's accuracy (taking into account participants accurately identified or overlooked in both groups) as opposed to simply identifying the probability that the measure has correctly identified the individual as having or not having the disorder (Kessel & Zimmerman, 1993).

Full Sample

Descriptive data. Means and standard deviations for the GAD-Q-IV (Newman et al., 2002) and the DERS (Gratz & Roemer, 2004) within the full sample are included in Table 1. No significant gender differences were found on either measure. Tests of normality revealed a non-normal distribution within the full sample for the GAD-Q-IV (Shapiro-Wilk, $p < .001$; skewness < 1) as well as for the DERS (Shapiro-Wilk, $p < .001$, skewness < 1).

Internal consistency reliability. The continuously scaled items of the GAD-Q-IV (Newman et al., 2002; items 5, 7, 8 and 9) resulted in $\alpha = .85$ in the full sample, indicating strong internal consistency (Nunnally & Bernstein, 1994). The dichotomously

scaled items of the GAD-Q-IV (1, 2, 3, 4, and 6) resulted in $\text{KR-20} = .90$, also indicating strong internal consistency. Internal consistency for the DERS (Gratz & Roemer, 2004) total score was estimated using the average interitem correlation and resulted in $r = .44$, which indicates adequate internal consistency (Clark & Watson, 1995). Cronbach's alpha also indicated adequate internal consistency ($\alpha = .76$).

Construct validity. Intercorrelations of the GAD-Q-IV (Newman et al., 2002) and DERS (Gratz & Roemer, 2004) with other self-report measures of anxiety and depression in the full sample are presented in Table 4. A strong correlation was found between the GAD-Q-IV and the PSWQ (Meyer et al., 1990), a well-known measure of worry, demonstrating strong convergent validity. However, strong correlations were also found between the GAD-Q-IV and the BDI (Beck & Steer, 1987), ASI (Peterson & Reiss, 1987), and BAI (Beck et al., 1988), indicating weak divergent validity when comparing the GAD-Q-IV to a measure of depression and other measures of anxiety. The utility of a simple summing scoring procedure, an alternative for the dimensional system described by Newman and colleagues for the GAD-Q-IV (2002) was also tested by calculating Pearson's r correlation coefficients with the same self-report measures of anxiety and depression. This scoring procedure yielded similar correlations with all measures, indicating that the simple sum does not appreciably enhance convergent validity, thus it will not be discussed further.

Intercorrelations of the DERS (Gratz & Roemer, 2004) with other study measures in the full sample revealed strong correlations between the DERS and the BDI (Beck & Steer, 1987), ASI (Peterson & Reiss, 1987), BAI (Beck et al., 1988), and PSWQ (Meyer et al., 1990).

GAD Subsample

Descriptive data. Means and standard deviations for the GAD-Q-IV (Newman et al., 2002) and the DERS (Gratz & Roemer, 2004) within the GAD subsample are included in Table 1. No significant gender differences were found on either measure. Tests of normality revealed a normal distribution within the GAD group for the GAD-Q-IV (Shapiro-Wilk, $p > .05$; skewness < 1) and the DERS total score (Shapiro-Wilk, $p > .05$; skewness < 1).

Internal consistency reliability. The continuously scaled items of the GAD-Q-IV (Newman et al., 2002; items 5, 7, 8 and 9) resulted in $\alpha = .78$ in the GAD subsample, which indicates adequate internal consistency (Nunnally & Bernstein, 1994). The dichotomously scaled items of the GAD-Q-IV (1, 2, 3, 4, and 6) resulted in $\text{KR-20} = .60$, indicating marginal internal consistency. Removal of item #6 (“During the last six months, have you been bothered by excessive and uncontrollable worries more days than not?”) improved the internal consistency of the dichotomously scaled items within the GAD subsample ($\text{KR-20} = .72$). Internal consistency for the DERS (Gratz & Roemer, 2004) total score was estimated using the average interitem correlation and resulted in $r = .35$, which indicates adequate internal consistency (Clark & Watson, 1995). Cronbach’s alpha indicated strong internal consistency ($\alpha = .95$). Alpha coefficients for the DERS subscale scores revealed strong internal consistency across all subscales (all α s $\geq .84$, see Table 2).

Intercorrelations of subscales. Intercorrelations of DERS (Gratz & Roemer, 2004) subscale scores revealed strong correlations between the subscale scores and the total score, however, the Nonacceptance subscale established only weak to moderate

correlations with the other DERS subscales (see Table 3). While little research to date has focused on use of the DERS within GAD, weak correlations between subscales have been previously reported within a sample of younger adults with GAD and/or social anxiety disorder (Mennin et al., 2009).

Construct validity. Intercorrelations of the GAD-Q-IV (Newman et al., 2002) and DERS (Gratz & Roemer, 2004) with other self-report measures of anxiety and depression in the GAD subsample are presented in Table 4. A significant, positive correlation was found between the GAD-Q-IV and the PSWQ (Meyer et al., 1990) demonstrating strong convergent validity. In addition, there was a weak and nonsignificant relationship found between the GAD-Q-IV and the BDI (Beck & Steer, 1987), an indication of good divergent validity. However, strong correlations were found between the GAD-Q-IV and the ASI (Peterson & Reiss, 1987) in addition to the GAD-Q-IV and the BAI (Beck et al., 1988), indicating weak divergent validity when comparing the GAD-Q-IV to other measures of anxiety.

Intercorrelations of the DERS (Gratz & Roemer, 2004) with other study measures revealed a strong, positive correlation between the DERS and the ASI (Peterson & Reiss, 1987). The DERS revealed weak to moderate, nonsignificant correlations with the BAI (Beck et al., 1988), GAD-Q-IV (Newman et al., 2002), PSWQ (Meyer et al., 1990), and BDI (Beck & Steer, 1987; see Table 4).

Test-retest reliability. In the subsample of 33 GAD participants who returned for the second administration (89%), test-retest reliability over a two-month period was good, at .53 for the DERS (Gratz & Roemer, 2004) and .42 for the GAD-Q-IV (Newman et al., 2002).

Nonanxious Control Subsample

Descriptive data. Means and standard deviations for the GAD-Q-IV (Newman et al., 2002) and the DERS (Gratz & Roemer, 2004) within the normal control subsample are included in Table 1. There was a significant gender difference found on DERS total scores, with males reporting more difficulty with emotion regulation ($M = 58$, $SD = 7.87$) than females ($M = 51.39$, $SD = 8.99$), $t(34) = 2.21$, $p < .05$). Tests of normality revealed a non-normal distribution within the NC group for the GAD-Q-IV (Shapiro-Wilk, $p < .05$; skewness > 1) and a normal distribution within the NC group for the DERS total score (Shapiro-Wilk, $p > .05$; skewness < 1).

Internal consistency reliability. The continuously scaled items of the GAD-Q-IV (Newman et al., 2002; items 5, 7, 8 and 9) resulted in $\alpha = .56$ in the NC group, which indicates poor internal consistency for these items (Nunnally & Bernstein, 1994). Removal of item #7 (participants are asked to check off the physical symptoms they have been bothered by in the past six months) improved the internal consistency of the continuously scaled items of the GAD-Q-IV ($\alpha = .73$). The dichotomously scaled items of the GAD-Q-IV (1, 2, 3, 4, and 6) resulted in adequate internal consistency ($KR-20 = .78$). Internal consistency for the DERS (Gratz & Roemer, 2004) total score within the NC group was estimated using the average interitem correlation and resulted in $r = .21$, which indicates adequate internal consistency (Clark & Watson, 1995). Cronbach's alpha indicated strong internal consistency ($\alpha = .86$). Alpha coefficients for the DERS subscale scores ranged from poor to strong internal consistency across the six subscales (α s from .46 to .83, see Table 2). Corrected item-total correlations as well as re-calculated alphas with each item removed were calculated for both the IMPLUSE and CLARITY

subscales. Removal of item #24 (a reversed scored item; “When I’m upset, I feel like I can remain in control of my behaviors”) within the IMPULSE subscale improved the internal consistency of the subscale ($\alpha = .63$). Removal of item #5 (“I have difficulty making sense out of my feelings”) within the CLARITY subscale improved the internal consistency of the subscale ($\alpha = .51$).

Intercorrelations of subscales. Intercorrelations of DERS (Gratz & Roemer, 2004) subscale scores revealed strong correlations between the subscale scores and the total score, however, there were many subscales with weak-moderate sized correlations (see Table 3). These findings are not consistent with prior research on the DERS in an undergraduate sample, but this may be due at least partly to the relatively small sample size in the current study (Gratz & Roemer, 2004).

Construct validity. Intercorrelations of the GAD-Q-IV (Newman et al., 2002) and DERS (Gratz & Roemer, 2004) with other self-report measures of anxiety and depression in the NC subsample are presented in Table 4. Again, a significant, positive correlation was found between the GAD-Q-IV and the PSWQ (Meyer et al., 1990), demonstrating strong convergent validity. In addition, there were moderate, nonsignificant correlations found between the GAD-Q-IV and other measures of anxiety (ASI; Peterson & Reiss, 1987, BAI; Beck et al., 1988) as well as between the GAD-Q-IV and the BDI (Beck & Steer, 1987). This suggests strong divergent validity for the GAD-Q-IV when examining nonanxious controls.

Intercorrelations of the DERS (Gratz & Roemer, 2004) with other study measures within the NC subsample revealed significant, strong correlations between the DERS and the ASI as well as the DERS and the PSWQ (Meyer et al., 1990; see Table 4). In

addition, there was a significant, strong correlation between the DERS and GAD-Q-IV (Newman et al., 2002) within the NC subsample. The DERS revealed weak, nonsignificant correlations with the BAI (Beck et al., 1988) or BDI (Beck & Steer, 1987).

Receiver Operating Characteristic Curves

Results of the ROC analyses indicated that an optimal GAD-Q-IV (Newman et al., 2002) cutoff score of 3.71 achieved .97 sensitivity and .92 positive predictive power (see Table 5). This cutoff score also produced .92 specificity and .97 negative predictive power. The AUC for the GAD-Q-IV was .97 ($SE = .02$), $p < .001$, indicating a 97% probability that a participant diagnosed with GAD (as determined by the SCID; First et al., 1995) will have a higher score on the GAD-Q-IV than a participant without GAD (see Figure 1). Group designation based on a GAD-Q-IV cutoff score of 3.71 demonstrated strong agreement with the original SCID diagnoses ($\kappa = .89$). While this cutoff score performed better than the cutoff score suggested for older primary care patients with GAD (4.5; Webb et al, 2008) as well as both the liberal and conservative cutoff scores suggested for younger adults with GAD (4.7 and 4.5, respectively), it is quite low. In order to test the ability of item #2 of the GAD-Q-IV to predict GAD diagnosis (as demonstrated in Webb et al, 2008), Kappa coefficients for each dichotomously scaled item were calculated. Kappas for the GAD-Q-IV items ranged from .57 to .84, all lower than that achieved with the GAD-Q-IV total score ($\kappa = .89$). Therefore, we did not replicate the finding of a single GAD-Q-IV item more strongly predicting GAD diagnosis than the total score, as found in Webb et al. (2008).

Due to the overlap between physical symptoms associated with GAD and common medical conditions of late life (e.g., hypertension, heart disease, dementia;

Wetherell et al., 2003; Gurian & Miner, 1991), difficulty distinguishing psychologically healthy participants from older adults with GAD alone (i.e., “pure GAD;” no comorbid conditions such as major depression) may manifest in smaller differences between pure GAD and control scores on the GAD-Q-IV (Newman et al., 2002). Indeed, an ROC analysis of the GAD-Q-IV with only those participants diagnosed with GAD in addition to another Axis I disorder (e.g., social phobia, dysthymia, panic disorder with or without agoraphobia; $n = 18$), revealed a higher optimal cutoff score (4.42; 100% sensitivity and 92% specificity) than that achieved in the full sample (3.71). This cutoff score of 4.42 is closer to reports of previous ROC findings with older adult GAD samples (Webb et al., 2008). Additionally, mean scores on the GAD-Q-IV were on average higher in the comorbid GAD group ($M = 9.2$) than the pure GAD group ($M = 7.6$), with a trend toward significance ($t(35) = -1.20$, $p = .054$). The optimal cutoff score for the sample of pure GAD participants ($n = 19$) is identical to the full sample (3.71; 95% sensitivity and 92% specificity).

The optimal DERS (Gratz & Roemer, 2004) cutoff score of 62.5 achieved .76 sensitivity and .85 positive predictive power (see Table 6). This cutoff score also produced .86 specificity and .78 negative predictive power. The AUC for the DERS was .89 ($SE = .036$), $p < .001$, indicating an 89% probability that a participant with GAD will have a higher total score on the DERS than a participant without GAD (see Figure 2). Diagnoses based on a DERS cutoff score of 62.5 resulted in adequate agreement with the original SCID diagnoses ($\kappa = .62$).

Lastly, a PSWQ (Meyer et al., 1990) cutoff score of 42 achieved .97 sensitivity and .97 positive predictive power, with .97 specificity and .97 negative predictive power

(see Table 7). The AUC for the PSWQ was .99 ($SE = .01$), $p < .001$, indicating a 99% probability that a participant with GAD will have a higher total score on the PSWQ than a participant without GAD. Diagnoses based on a PSWQ cutoff score of 42 resulted in excellent agreement with the original SCID diagnoses ($\kappa = .95$).

CHAPTER IV

DISCUSSION

Findings from the GAD-Q-IV

The results of this study indicate that the GAD-Q-IV (Newman et al., 2002) cutoff score of 3.71 achieved high sensitivity and specificity, suggesting that it is an appropriate GAD screening measure for community-dwelling older adults. However, one notable limitation was that participants were recruited specifically for their endorsement of GAD diagnostic criteria or lack of current psychiatric illness in order to participate in a treatment outcome study from which the current data originated. As suggested by Kraemer (1992), it is important to consider the type of sample used in screening studies when evaluating the predictive utility of measures. This is apparent when taking note of the remarkably high rates of sensitivity (.97) and specificity (.92) as well as the non-normal distribution of GAD-Q-IV scores across the full sample of our study participants ($M = 5.10$, $SD = 3.94$). Additionally, the optimal cutoff score of 3.71 calculated with this sample is lower than that found in the only other study testing the predictive utility of the GAD-Q-IV in an older adult samples (4.5; Webb et al., 2008).

However, when including only those participants with GAD and comorbid Axis I diagnoses (e.g., social phobia, dysthymia, panic disorder with or without agoraphobia), the optimal cutoff score for the GAD-Q-IV was similar to that found in Webb et al., 2008 (4.42 in the current study as compared to 4.5). An unusually low cutoff score is needed to detect GAD in our sample of participants with pure GAD (3.71, identical to that in the full sample), suggesting that individuals with pure GAD may present with symptoms similar to those found in psychologically healthy older adults. This is consistent with

research suggesting that there is substantial overlap between several symptoms of GAD (e.g., sleep disturbance, restlessness, difficulty concentrating) and experiences associated with normal aging, age-related medical conditions or medications commonly taken in late life (Wetherell et al., 2003), and may help to explain the low GAD-Q-IV cutoff score found in the current study. With older adults more likely to disclose or emphasize somatic symptoms over cognitive symptoms of anxiety (Stanley & Novy, 2000), individuals with late life GAD alone may be more apt to report predominantly somatic symptoms as opposed to those individuals with compounding psychological profiles (e.g., GAD in addition to social phobia or panic disorder). Older adults with comorbid conditions may also be more likely to recognize their worries as pathological (as opposed to reasonable), given their life situation. In other words, an older adult with GAD in addition to another Axis I disorder (e.g., social phobia or panic) may be more likely to interpret worry over social situations or anticipation of the next panic attack as pathological and to minimize worries associated with every day living. Incorporation of these findings into our conceptualization of late life GAD may increase diagnostic sensitivity and accuracy.

While some have argued that the DSM-IV diagnostic criteria do not accurately capture GAD in older adults (e.g., Fuentes & Cox, 1997; Palmer et al., 1997), the current study suggests that there is not an absence of DSM-IV symptoms in older adults with GAD. Rather, it is the overlap between symptoms associated with GAD and aging or age-related issues that complicates detecting of the disorder in this population. Existing research suggests that frequency of somatic symptoms may serve as an important indicator of pathology in older adults, as the frequency of symptoms (e.g., insomnia,

fatigue) has been found to be greater in adults with GAD when compared to normal controls (Wetherell et al., 2003). Paired with an increase in awareness regarding the similarities between psychologically healthy adults and those adults with GAD, more research on the differences between psychologically healthy adults and those with GAD is needed.

Overall, while these results are promising for the use of the GAD-Q-IV (Newman et al., 2002) as a screening instrument for GAD in older adults, they may not generalize to settings with non-referred populations with more variability in anxiety severity. Therefore, in subsequent research, we would expect the sensitivity and specificity rates to be lower than those found herein. However, in research settings, where participants are referred due to a specific diagnostic profile, the strength of the GAD-Q-IV as a screening measure may be maintained, and therefore the cutoff score of 3.71 may serve as a guideline for researchers recruiting participants through referral and advertisement.

Whereas the current study does not contribute to our understanding of the effectiveness GAD-Q-IV (Newman et al., 2002) as an initial screening instrument, it does support the use of the GAD-Q-IV as a diagnostic tool in replacement of longer, structured interviews with older adults. The agreement between GAD-Q-IV diagnoses based on the cutoff score of 3.71 and SCID diagnoses was excellent ($\kappa = .89$), suggesting that the GAD-Q-IV would make an appropriate substitute for more lengthy assessments of GAD in older, community-dwelling adults. As interview length is particularly important when considering appropriate diagnostic tools for older adults (Mohlman et al., in press), use of the GAD-Q-IV in place of longer GAD diagnostic assessments may increase accuracy

and the ease of administration for both researchers and clinicians working with this population.

Despite its excellent predicative performance, the GAD-Q-IV (Newman et al., 2002) failed to outperform the PSWQ (Meyer et al., 1990), commonly considered the gold standard in assessment of worry symptoms, in terms of predictive power in this study. Again, we find unusually high rates of sensitivity (.97) and specificity (.97) for the PSWQ in this sample, findings that are most likely attributable to the strict inclusion criteria imposed on the original study participant recruitment. It may be interesting for future studies to compare the predictive utility of the GAD-Q-IV with the abbreviated, 8-item version of the PSWQ suggested by Hopko et al. (2003) for use with older adults with GAD. While the length and complexity (i.e. reverse scored items) of the PSWQ did not appear to hinder its utility in this community-dwelling sample, both the GAD-Q-IV and abbreviated PSWQ are desirable measures for use with older adults (e.g. short duration, no reverse-scored items, little focus on somatic symptoms). In particular, it would be useful to test the GAD-Q-IV and abbreviated PSWQ with an unselected sample of older adults, where the presence of multiple medical illnesses, progressive disease, or overall health barriers will likely be greater than that found in a sample recruited for research purposes.

Findings from the DERS

Consistent with findings of reduced scores on measures tapping into worry and worry-related constructs in older adults with GAD as compared to younger adults (e.g. Stanley et al., 2003), our study revealed lower scores on the DERS (Gratz & Roemer, 2004) in older adults ($M = 79.5$, $SD = 19.76$) than in previous studies of the DERS in

younger adults with GAD ($M = 94.81$, $SD = 22.96$; Salters-Pedneault et al., 2006). Researchers theorize that overall, older adults may engage in more antecedent-focused emotion regulation as opposed to response-focused emotion regulation (Gross et al., 1997). Antecedent-focused emotion regulation is described as attempts to control emotional experiences prior to the onset of the emotion, either through external means such as altering the environment, or internal means such as cognitive reappraisal. In comparison, response-focused emotion regulation refers to an individual's attempt to control or cope with emotion after its' onset through means such as cognitive suppression. We might categorize worry as a response-focused emotion regulation strategy; an individual may worry as a maladaptive coping strategy in response to feelings of distress or discomfort. Our findings of reduced scores on the DERS in older as compared to younger adults supports findings of an age-related increase in use of effective coping strategies (Foklman et al., 1987) and self-reported emotion regulation success (Gross et al., 1997; Shiota & Levenson, 2009). Additionally, the dampening in DERS scores associated with aging is consistent with research suggesting that older adults experience an age related decline in PFC functioning, including a decrease in PFC involvement in worry processes. While older adults may have more difficulty coping with worry when it does occur (e.g, Felton & Revenson, 1987), they are more likely to utilize effective coping strategies rather than worrying in response to distress or undesirable emotions.

Despite an overall increase in emotion regulation efficacy with age (Gross et al., 1997; Shiota & Levenson, 2009), findings from the current study support the utility of an emotion regulation deficit model of late-life GAD. As the first known report of the DERS

(Gratz & Roemer, 2004) with older adults, the current study revealed adequate predictive utility of GAD diagnosis using the DERS in this sample of community-dwelling older adults. A cutoff score of 62.5 yielded moderately high sensitivity (.76) and specificity (.86) and the AUC was significant, indicating that there was a greater than likelihood chance that a higher score on the DERS would correctly identify a participant with GAD than a participant without GAD. Since the DERS does not measure GAD symptoms directly, but rather a worry related construct (dysregulated emotion), there is greater support for the generalizability of these findings for screening purposes within a more representative sample of patients in a clinical or research setting. Furthermore, the average DERS score was over 20 points higher in the GAD group than the control group (see Table 1), a statistically significant group difference. These findings not only support the potential use of the DERS as a diagnostic screening instrument for older adults with chronic worry, but also implicate the importance of dysregulated emotion in late life GAD.

Existing models of GAD in younger adults include the Emotion Dysregulation Model (EDM), a relatively new conceptualization of GAD that has prompted the creation of assessment tools and a therapeutic intervention centered around the EDM.

The framework of the Emotion Dysregulation model (EDM) includes four key components that have been drawn predominantly from literature on emotion theory and emotion regulation (e.g., Ekman & Davidson, 1994; Gross, 1998; Mennin et al., 2004). To begin, the EDM asserts that individuals with GAD experience emotional hyperarousal in regards to both positive and negative emotions (Turk, Heimberg, Luterek, Mennin, & Fresco, 2005). Along with emotional hyperarousal, it is assumed that individuals with

GAD have a lower sensitivity threshold for the experience of emotions and that they experience emotions more readily than others (Mennin et al., 2005). Second, according to the EDM, individuals with GAD have a poorer understanding of their emotions than others. This includes 1) difficulty describing and labeling emotions appropriately and, 2) effectively applying information conveyed by emotions in daily life. Third, they portray more negative attitudes about emotions than do other individuals, resulting in distress, discomfort, and more anxiety. Lastly, individuals with GAD utilize maladaptive emotion regulation and management strategies, such as suppression of emotions, emotional outbursts, or excessive worry (Mennin et al., 2004). A therapeutic intervention based on the EDM is currently in development and combines elements of CBT with techniques designed to address problems with emotion regulation (e.g., increasing emotional awareness) and emotional avoidance (e.g., exposure). Specific treatment components of emotion regulation therapy for GAD include relaxation exercises, belief reframing, psychoeducation about emotions, emotional skills training, and experiential exposure exercises (Mennin, 2004). There is currently no research on the effectiveness of an EDM based treatment for older adults with GAD. Future research should aim to increase our understanding of emotion dysregulation in late life GAD, beginning with an evaluation of the maladaptive coping strategies most frequently employed by older adults with GAD. Subsequent research on the incorporation of EDM-based strategies into existing treatment models (e.g., cognitive-behavioral therapy for late life GAD; see Mohlman, 2004 for a review) would be needed to evaluate the efficacy of incorporating EDM components into standard, evidence-based treatment for late life GAD.

Although ROC findings and DERS (Gratz & Roemer, 2004) score differences in

the current study suggest emotion regulation deficits in late life GAD, many of the DERS subscales demonstrated multicollinearity, challenging the relevance of these subscales or constructs for this population. In particular, there were strong correlations between the subscales assessing difficulties engaging in goal-directed behavior (Goals) and impulse control difficulties (Impulse; $r = .83$), and the subscales assessing lack of emotional awareness (Awareness) and lack of emotional clarity (Clarity; $r = .76$). The strong correlation between items assessing awareness and clarity of emotions suggests that these two constructs coincide in our conceptualization of late life GAD. As discussed, research suggests an age-related increase in antecedent-focused emotion regulation (Gross et al., 1997). Coupled with GAD, antecedent-focused emotion regulation may serve to perpetuate the disorder. If older adults with GAD are preemptively reappraising their emotions or changing their environment in order to avoid feeling a particular emotion, they may lack experience identifying and labeling emotions, a deficit described within Mennin's model (Mennin et al., 2004). This may explain the strong relationship between items assessing awareness and clarity of emotions in the current study. If older adults are less likely to attend to or assess emotions (Awareness), then we would not expect them to comprehend those emotions (Clarity). Future studies might test the ability of older adults with GAD to identify emotions (e.g., anger, happiness, sadness, anxiety) and relate their performance to their overall endorsement of emotion regulation strategies such as cognitive reappraisal, changing one's environment, suppression, or worry.

In terms of the strong correlation between items assessing impulse control and goal-directed behavior, one might expect that these items would be interdependent. For example, if an individual has difficulty controlling their behavior (item from Impulse

subscale), this might affect their ability to concentrate or maintain productivity (items from Goals). However, it is noted that the control group did not demonstrate a similar collinearity between DERS Goals and Impulse subscales, suggesting that this relationship is particularly strong for older adults with GAD. Perhaps, if an individual often experiences negative affect (as is suggested in GAD), then they may be more likely to notice how these emotions are affecting their daily life (e.g., negative affect precluding difficulty focusing).

In terms of internal consistency reliability and construct validity, both the GAD-Q-IV (Newman et al., 2002) and DERS (Gratz & Roemer, 2004) performed well. Internal consistency reliability of the continuously scaled items of the GAD-Q-IV in the NC sample was poor, but adequate for both the GAD and NC samples when examining the dichotomously scored items. The GAD-Q-IV demonstrated strong convergent validity with the PSWQ (Meyer et al., 1990) and strong divergent validity with other measures of anxiety and depression (BDI; Beck & Steer, 1987) within both the GAD and NC samples.

Conclusion

Taken together, these findings support the use of the GAD-Q-IV (Newman et al., 2002), DERS (Gratz & Roemer, 2004), and PSWQ (Meyer et al., 1990) as screening instruments for GAD in older, community-dwelling adults. While cognitive behavioral therapy (CBT) has been found to outperform no treatment or non-specific treatment for GAD in younger adults samples (Borkovec & Ruscio, 2001), there are mixed findings regarding the effectiveness of CBT with older adults (see Mohlman, 2004 for a review). Therefore, more research is needed to continue testing the effectiveness of CBT as well as modified treatments with evidence-based components in order to elucidate the

psychosocial treatment of choice for older adults with GAD. In particular, testing the efficacy of a therapeutic intervention based off of the Emotion Dysregulation Model (EDM; Turk et al., 2005) may be of particular interest, as suggested by the adequate predictive utility of the DERS with this sample of community-dwelling older adults and the large score difference between healthy controls and GAD participants on the DERS. Findings from this study suggest that the age-related increase in effective coping strategies and emotion regulation success enjoyed by psychologically healthy older adults may be lacking in individuals with late life GAD (Foklman et al., 1987; Gross et al., 1997; Shiota & Levenson, 2009).

Due to the high demands of clinical research (e.g., budget constraints for screening processes) a feasible self-report measure such as the GAD-Q-IV (Newman et al., 2002) or the DERS (Gratz & Roemer, 2004) would most certainly prove valuable. If, for example, a researcher is recruiting participants for a study and specifically advertises or accepts referrals for individuals with chronic worry or individuals without chronic worry/depression, the investigator could reasonably use the GAD-Q-IV within the initial phone screen process, administer a cutoff of 3.71, and accurately identify older adult GAD patients with 97% sensitivity and 92% specificity. As discussed, a potential limitation of this study is the selected sample of participants recruited for their GAD diagnosis or lack of psychiatric illness. Therefore, future research should assess the utility of the GAD-Q-IV and DERS in predicting GAD diagnosis in an unselected sample of older adults in order to provide the relevant cutoff indexes for other settings (e.g., a community mental health center or hospital) as well as to evaluate the strength of the

DERS in predicting GAD vs. other anxiety disorder diagnoses (e.g. panic disorder, PTSD).

Researchers in the field of late life psychopathology are becoming increasingly aware of the prevalence of anxiety disorders in older adults (Flint, 1994; Flint, 2005), with high rates of GAD eliciting needed research attention. However, research on late life GAD is seriously limited when considering the progress made to accurately and efficiently assess and treat GAD in younger adults. In a population already bombarded with age-related medical concerns, potential improvements in mental health should be feasible and prioritized in our care for and treatment of older adults. Findings from the current study simultaneously evaluate the utility of two diagnostic measures in assessing late life GAD while providing a preliminary test of the Emotion Dysregulation Model framework for use with this population, paving the way for advances in this public health domain.

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TABLES AND FIGURES

Table 1
Demographic Data for Older Adults with GAD and Nonanxious Controls

	Controls (n = 37)	GAD (n =37)	Full (n = 74)
Age	69.35 (6.85)	66.43 (4.50)	67.89 (5.93)
Female	65%	68%	66%
Caucasian	86%	90%	88%
Married	57%	70%	64%
High School Grad or Above	100%	97%	99%
Retired	62%	49%	55%
Annual Income Above 45K	68%	62%	65%
# Health Problems	0.70 (0.78)	1.03 (1.55)	0.86 (1.23)
Mini-Mental Status	28.86 (1.48)	28.78 (1.27)	28.82 (1.37)
ASI	8.41 (6.91)	24.70 (12.21)***	16.55 (12.82)
BAI	1.97 (2.14)	12.16 (7.64)***	7.07 (7.57)
BDI	3.51 (2.89)	13.49 (5.66)***	8.5 (6.72)
PSWQ	29.73 (7.92)	56.86 (8.09)***	43.30 (15.81)
GAD-Q-IV	1.81 (1.76)	8.40 (2.45)***	5.10 (3.94)
DERS	53.78 (9.08)	79.51 (19.76)***	66.82 (20.08)

Note. *** significant group differences between GAD and NC of $p < .001$

Table 2
*Coefficient Alphas for Older Adults with GAD and Nonanxious Controls
on the DERS Subscales*

Subscale (Number of Items)	GAD	NC
NONACCEPTANCE (6)	.87	.83
GOALS (5)	.86	.73
IMPULSE (6)	.87	.52
AWARENESS (6)	.86	.73
STRATEGIES (8)	.89	.71
CLARITY (5)	.84	.46

Table 3
Intercorrelations Between DERS Subscales for Older Adults with GAD and NC

Subscale	1	2	3	4	5	6	Total Score
GAD (n = 37)							
1. NONACCEPTANCE	—	.27	.48**	.34	.25	.41	.62**
2. GOALS		—	.83**	.54**	.55**	.63**	.81**
3. IMPLUSE			—	.50**	.71**	.61**	.90**
4. AWARENESS				—	.39**	.76**	.72**
5. STRATEGIES					—	.48**	.74**
6. CLARITY						—	.81**
NC (n = 36)							
1. NONACCEPTANCE	—	.046	.49**	.28	.38	.09	.71**
2. GOALS		—	.28	.19	.38	.28	.61**
3. IMPLUSE			—	.27	.62**	.24	.64**
4. AWARENESS				—	.22	.69**	.68**
5. STRATEGIES					—	.20	.61**
6. CLARITY						—	.53**

Note. ** $p < .01$

Table 4
Intercorrelations of GAD-Q-IV and DERS with Other Self-Report Measures in Older Adults with GAD and NC

Measure	BAI	ASI	PSWQ	BDI	GAD-Q-IV
GAD (n = 37)					
GAD-Q-IV	.56**	.51**	.55**	.26	—
DERS	.28	.51**	.26	.37	.33
NC (n = 36)					
GAD-Q-IV	.35	.39	.50**	.31	—
DERS	.28	.45**	.60**	.24	.51**
Full (n = 73)					
GAD-Q-IV	.76**	.74**	.87**	.73**	—
DERS	.59**	.71**	.69**	.66**	.69**

Note. ** $p < .01$

Table 5
Screening utility of the GAD-Q-IV in screening for GAD in an older adult sample

	Sensitivity	Specificity
GAD-Q-IV Score		
3.38	.97	.89
3.71	.97	.92
4.71	.92	.92
5.46	.89	.95
5.75	.87	.95
6.08	.84	.97
6.33	.81	.97
6.58	.78	.97
6.83	.76	.97
7.08	.73	.97
7.25	.70	.97
7.41	.68	.97
7.54	.65	.97
7.79	.62	1.0

Table 6
Screening utility of the DERS total score in screening for GAD in an older adult sample

	Sensitivity	Specificity
DERS Total		
61.5	.76	.83
62.5	.76	.86
64.0	.73	.86
65.5	.70	.86
66.5	.68	.86
67.5	.65	.89
68.5	.65	.92
69.5	.65	.97
70.5	.62	.97
72.5	.60	.97
75.0	.60	1.0
77.0	.57	1.0
78.5	.49	1.0
79.5	.46	1.0

Table 7
Screening utility of the PSWQ in screening for GAD in an older adult sample

	Sensitivity	Specificity
PSWQ		
40.0	.97	.92
42.0	.97	.97
44.0	.95	.97
46.5	.92	.97
49.0	.87	.97
50.5	.78	.97
51.5	.73	.97
52.5	.65	.97
53.5	.60	1.0
55.0	.57	1.0
56.5	.49	1.0
58.0	.46	1.0
59.5	.38	1.0
61.0	.27	1.0

Figure 1
ROC Curve for GAD-Q-IV

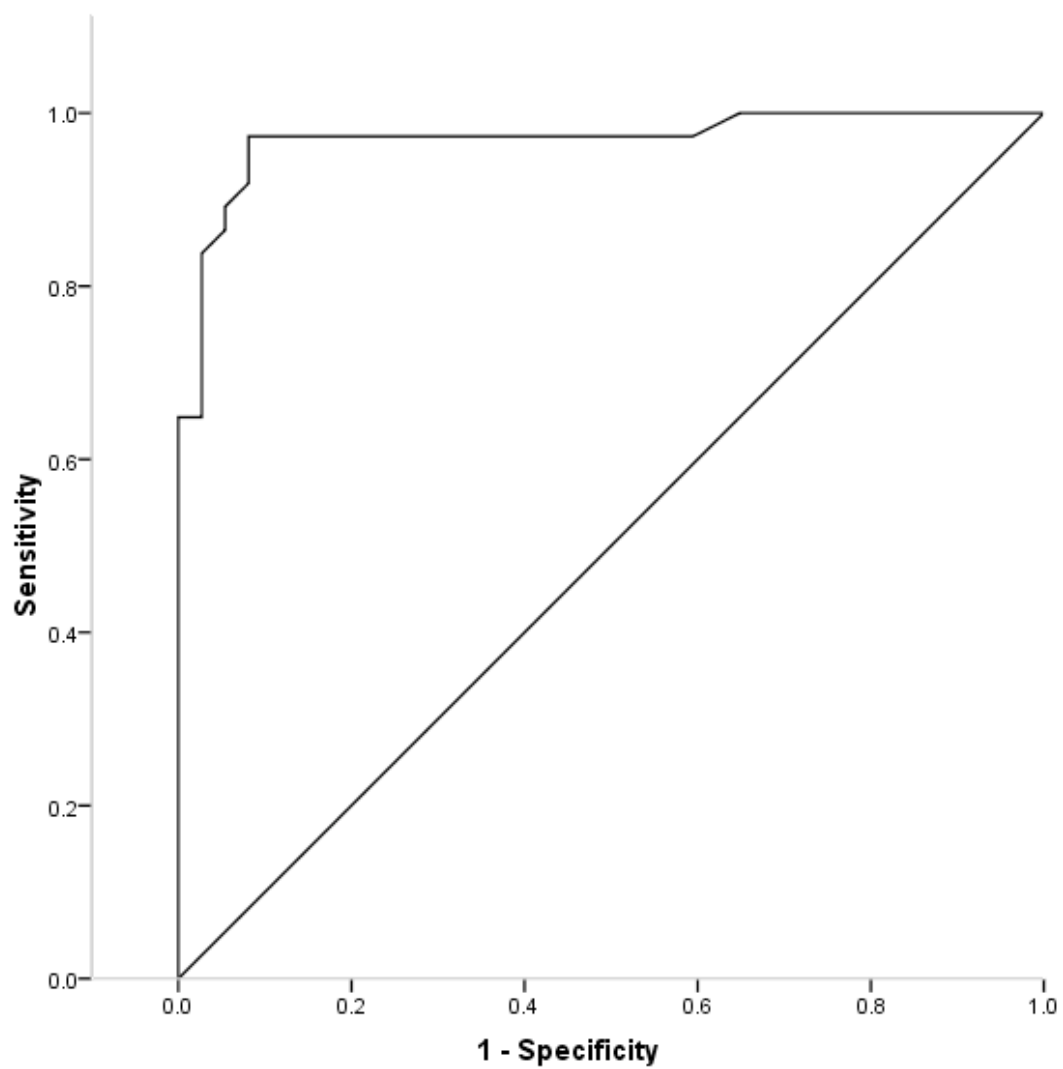


Figure 2
ROC Curve for DERS

