# VALIDATION OF THE REVISED CHILDREN'S MANIFEST ANXIETY SCALE, SECOND EDITION (RCMAS-2) SCORES FOR CHILDREN WITH SPECIFIC LEARNING DISABILITIES

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# ABSTRACT

Specific learning disabilities are one of the most common and debilitating disorders experienced by children and adolescents, and students with specific learning disabilities may be particularly vulnerable to anxiety. The Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) is a newly revised measure of chronic, manifest anxiety among children and adolescents. Although reliability and validity of the RCMAS-2 scores have been reported among a general sample of children and adolescents, use of the RCMAS-2 has not yet been empirically-examined among children and adolescents with specific learning disabilities. This study investigates the psychometric properties, including reliability and validity, of the RCMAS-2 scores among children and adolescents with specific learning disabilities, and considers whether the RCMAS-2 is an appropriate instrument for measuring anxiety among students with specific learning disabilities. Results indicated that the RCMAS-2 demonstrates a different factor structure among students with specific learning disabilities compared to a general sample of children and adolescents, which does not support the factorial invariance of the RCMAS-2 scores across students with and without specific learning disabilities. With regard to the RCMAS-2 three-factor structure, some evidence of convergent and discriminant validity was found between the scores of the RCMAS-2 scales and subscales and scores of conceptually-similar and dissimilar scales, respectively, although other analyses did not yield the expected results. Reliability estimates indicated adequate internal consistency reliability and temporal stability for the RCMAS-2 scores among students with specific learning disabilities. Overall, the validity of the RCMAS-2 scores among students with specific learning disabilities could not be adequately established, and more research is necessary to determine whether the RCMAS-2 is an appropriate measure of anxiety for students with specific learning disabilities.

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# CHAPTER I

## Introduction

"Specific learning disabilities" represent the most prevalent type of educational disability within the United States, and are estimated to significantly affect approximately 4% of all U.S. children (U.S. Department of Education, 2009). Specific learning disabilities refer to a heterogeneous group of educational difficulties, characterized by academic achievement that is substantially lower than expected given a child's age, intellectual ability, and exposure to appropriate educational instruction (American Psychiatric Association [APA], 2013; National Joint Committee on Learning Disabilities [NJCLD], 1990; U.S. Department of Education, 2006). Students with specific learning disabilities may experience difficulties across a wide range of academic subjects, including math, reading, and history (Lackaye & Margalit, 2006). In addition, students with specific learning disabilities may feel extra pressure to "work harder" than their classmates, in an effort to avoid being thought of as lazy or unmotivated (Lackaye & Margalit, 2006).

With the pressure and frustration experienced by students with specific learning disabilities, these students often experience social and emotional difficulties as well (APA, 2000; Learning Disabilities Association of America [LDAA], 2004). Students with specific learning disabilities may feel less invested in or motivated by academic success, develop a negative opinion of their own academic skills and abilities, and experience more frequent instances of academic uncertainty, frustration, and failure than students without specific learning disabilities (Bear, Minke, & Manning, 2002; Lackaye & Margalit, 2006; Palombo, 2001). These students may also be particularly vulnerable to social difficulties, such as loneliness and isolation (Lackaye & Margalit, 2006). Students with specific learning disabilities are more likely to avoid

social situations, be rejected by their peers, and experience bullying and peer victimization compared to students without specific learning disabilities (Al-Yagon & Mikulincer, 2004; Margalit & Efrati, 1996; Mishna, 2003). Furthermore, students with specific learning disabilities also appear to be at greater risk for emotional difficulties. In addition to difficulties related to academic demands and interpersonal relationships, students with specific learning disabilities express significantly lower levels of hope and positive mood, higher levels of negativity, and greater difficulty understanding and interacting successfully with their environment than children without specific learning disabilities (Lackaye & Margalit, 2006; Palombo, 2001). Overall, students with specific learning disabilities are thought to be less able to understand their environment, use less effective strategies to cope with challenging situations, and to be less emotionally-resilient than their peers without specific learning disabilities (Lackaye & Margalit, 2006; Palombo, 2001; Tsovili, 2004).

Children and adolescents with specific learning disabilities appear to be particularly vulnerable to anxiety (Arnold et al., 2005; Emerson, 2003; Fisher, Allen, & Kose, 1996; Paget & Reynolds, 1984; Rodriguez & Routh, 1989). Research suggests that anxiety, a future-oriented emotion characterized by feelings of worry, negativity, apprehension, and physiological arousal (Barlow, 2002b; Clark & Watson, 1991), is negatively associated with academic achievement (McKeachie, 1984). For example, students with specific learning disabilities are at higher risk for both academic difficulties and general anxiety compared to students without specific learning disabilities (Carroll & Iles, 2006). Furthermore, research suggests that, among students with specific learning disabilities, those with high levels of anxiety experience the most impairment on academic-related activities (Fisher et al., 1996). This finding indicates that, not only are students with specific learning disabilities at greater risk for anxiety than students without

specific learning disabilities, but students with specific learning disabilities *and* high levels of anxiety are at even greater risk for academic difficulties compared to their peers without specific learning disabilities and lower levels of anxiety. Though it is uncertain whether high levels of anxiety impede academic skills and achievement or whether academic difficulties result in heightened levels of anxiety (Palombo, 2001; Pekrun, 1992), research has clearly identified an inverse relationship between anxiety and academic achievement, particularly among children with specific learning disabilities.

In order to accurately assess levels of anxiety for a given population, it is important that clinicians and researchers utilize measurement instruments which produce valid and reliable scores for that population. Several measurement instruments have been developed over the years to assess symptoms of anxiety in children and adolescents, including the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978). The RCMAS represented a revision of the Children's Manifest Anxiety Scale (CMAS; Castaneda, McCandless, & Palermo, 1956), which was developed as a downward extension of the adult Manifest Anxiety Scale (MAS; Taylor, 1953). The development of the MAS, in turn, can be directly traced to one of psychology's earliest assessments of personality, the Minnesota Multiphasic Personality Inventory (MMPI; McKinley & Hathaway, 1943). The RCMAS represents a measure of chronic, manifest anxiety in children, and has been used extensively in both research and clinical settings (Holmbeck et al., 2008; Myers & Winters, 2002; Silverman & Ollendick, 2005). The RCMAS was recently revised, resulting in the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2; Reynolds & Richmond, 2008a).

Like the RCMAS, the RCMAS-2 provides a measure of chronic, manifest anxiety among children and adolescents (Reynolds & Richmond, 2008b), and has great potential to be used

effectively and appropriately with a variety of child and adolescent populations, including children of different ethnicities and educational abilities (Paget & Reynolds, 1984; Pina, Little, Knight, & Silverman, 2009; Reynolds, 1980; Reynolds, 1982; Reynolds & Paget, 1981; Reynolds & Paget, 1983; Reynolds & Richmond, 1978; Reynolds & Richmond, 1979; Varela, Sanchez-Sosa, Biggs, & Luis, 2008). However, the reliability and validity of the RCMAS-2 scores among these different populations, including children with specific learning disabilities, has yet to be extensively examined.

In addition, research has consistently shown that females demonstrate higher scores on measures of manifest anxiety than males. For example, Kessler and colleagues (1994) found that, among a sample of 8,098 participants ages 15 through 54, 30.5% of women reported experiencing an anxiety disorder within their lifetime, compared to only 19.2% of men. This trend of higher levels of anxiety among females appears to begin in early childhood, and continues throughout adolescence and adulthood (Cohen et al., 1993; Gau, Chong, Chen, & Cheng, 2005; Gullone, King, & Ollendick, 2001; Kessler et al., 1994; Reynolds, 1998; Roberts, Roberts, & Xing, 2007; Roberts, Stuart, & Lam, 2008; Schniering, Hudson, & Rapee, 2000). Given this relatively consistent finding among the research literature, it is important to determine whether the RCMAS-2 will reveal a similar result among school-age children.

With new and revised measures, it is important to examine the issue of construct validity and factorial invariance across groups of interest (Reynolds, 1980; Reynolds & Carson, 2005; Reynolds & Lowe, 2009; Reynolds, Lowe, & Saenz, 1999). Important components of construct validity include convergent and discriminant validity. Convergent validity refers to the degree of correlation between scores from independent measures of the same or similar constructs, while discriminant validity refers to the lack of correlation between scores from independent measures

of dissimilar constructs (Cicchetti, 1994). When developing a measurement instrument, the instrument will be hypothesized as related to other scales purported to measure similar constructs, while it will be hypothesized as not related to other scales purportedly measuring dissimilar constructs. Significant positive correlations between the scores of conceptually-similar scales indicate that the scales are indeed measuring the same or similar constructs, while lack of correlation between the scores of conceptually-dissimilar scales indicate that the scales are indeed measuring different constructs. For example, scores from measures of chronic, manifest anxiety have demonstrated moderate to strong correlation with scores from measures of trait anxiety, while the same scores have demonstrated negligible to small correlation with scores from measures of state anxiety (Reynolds, 1980, 1982). Factorial invariance refers to the degree to which an instrument yields a similar factor structure when it is administered to different groups or under different circumstances (Cicchetti, 1994). If an instrument demonstrates factorial invariance across different groups, the instrument is likely measuring the same construct across those groups. Failure to demonstrate factorial invariance, however, suggests that the instrument is not measuring the same construct across those groups, and limits the degree to which any conclusions, interpretations, or comparisons can be drawn about any differences between groups (Horn & McArdle, 1992; Lowe & Raad, in press; Vandenberg & Lance, 2000).

Although the RCMAS-2 represents the latest in a long line of widely-used and well-established measures of anxiety in children and adolescents, its use among students with specific learning disabilities has not yet been examined. Furthermore, before the RCMAS-2 may be utilized to assess levels of anxiety among students with specific learning disabilities, as well as determine the degree to which these levels of anxiety may differ based on specific learning disability status, the reliability and validity of the RCMAS-2 scores must first be examined in

relation to children and adolescents with specific learning disabilities and in comparison to general populations of school children.

**Statement of Purpose**

The purpose of this study was two-fold. First, data were collected using the RCMAS-2 to determine whether the RCMAS-2 yielded valid and reliable scores when used with children with specific learning disabilities. To do so, analyses were conducted to determine the factor structure of the RCMAS-2 among children with specific learning disabilities, and compared those results with the factor structure of the RCMAS-2 among non-referred children. In addition, analyses were conducted to assess the internal consistency reliability and test score stability of the RCMAS-2 scores, as well as the convergent and discriminant validity of the RCMAS-2 scores, among children with specific learning disabilities. Thus, this study determined whether the RCMAS-2 is an appropriate instrument for use among children with specific learning disabilities.

Second, the RCMAS-2 scores obtained from students with specific learning disabilities were to be compared to those of non-referred children from the full reference subsample, in order to identify significant differences among the groups that may be due to disability status and/or gender. Consistent with the literature, it was expected that children with specific learning disabilities would score higher than non-referred children on the RCMAS-2.

**Research Questions**

1) Is the factor structure of the RCMAS-2 similar across non-referred children and children with specific learning disabilities?
2) Do the RCMAS-2 scores demonstrate adequate convergent and discriminant validity, as demonstrated by higher correlations between the RCMAS-2 scores and the scores of

conceptually-similar scales (e.g. trait anxiety), and lower correlations between the RCMAS-2 scores and the scores of conceptually-dissimilar scales (e.g. state anxiety) for children with specific learning disabilities?

3) Will factor analyses of scales measuring similar and dissimilar constructs further support the convergent and discriminant validity of the RCMAS-2 scores for children by yielding conceptually-distinct factors (i.e., a cluster of scales related to chronic, manifest, or trait anxiety, and a cluster of scales related to state or situational anxiety with specific learning disabilities)?
4) Do the RCMAS-2 scores demonstrate adequate internal consistency and temporal stability for children with specific learning disabilities?
5) Do children with specific learning disabilities experience significantly higher levels of anxiety (as measured by the RCMAS-2) than non-referred children?
6) Do females with specific learning disabilities experience higher levels of anxiety (as measured by the RCMAS-2) than males with specific learning disabilities?

For clarification purposes, the specific learning disability subsample refers to children who receive special education services for an identified specific learning disability, while the non-referred (i.e., full reference) subsample refers to the participants recruited by Reynolds and Richmond (2008b) during initial development of the RCMAS-2. Finally, the total sample refers to the combined sample comprised of both the specific learning disability and non-referred subsamples.

**Significance of the Study**

Implications of this study include determination of the usefulness of the RCMAS-2 among children with specific learning disabilities. Results of this study will help determine

whether the scores of the RCMAS-2 provide a valid and reliable assessment of anxiety in children with specific learning disabilities, and can help establish this instrument as an acceptable and useful tool within this population and school psychology. Furthermore, the results of this study will provide increased awareness and improved knowledge of the emotional difficulties experienced by students with specific learning disabilities. Better understanding of these factors can help school and mental health personnel recognize and target symptoms of anxiety in children with specific learning disabilities, and promote higher levels of both emotional and academic functioning.

Additionally, this study will help determine whether the RCMAS-2 is an appropriate measure for use with children with specific learning disabilities. Failure to demonstrate adequate validity and reliability, or demonstrating a dissimilar factor structure may suggest that the RCMAS-2 is not appropriate for use with children with specific learning disabilities, possibly due to the presence of bias in the scores of the measure. For example, children with specific learning disabilities may have difficulties reading and/or understanding the items of the measure. Alternately, children with specific learning disabilities may experience different types or symptoms of anxiety than general populations of children, and the items may therefore not apply to or assess the anxiety of children with specific learning disabilities in an accurate or comprehensive manner.

**Summary**

Specific learning disabilities are one of the most common and debilitating disorders experienced by children and adolescents, and the effects of specific learning disabilities may extend well beyond the academic setting into one's social and emotional experiences. In particular, children and adolescents with specific learning disabilities appear to be particularly

vulnerable to anxiety, which may result from and/or exacerbate existing academic difficulties. The RCMAS-2 represents a newly revised version of a commonly used and well-established measure of chronic, manifest anxiety among children and adolescents (Holmbeck et al., 2008). Although reliability and validity of the RCMAS-2 scores have been reported among a general, non-referred sample of children and adolescents (i.e., the full reference subsample), its use has not yet been empirically-examined among children and adolescents with specific learning disabilities. In light of research which suggests that children with specific learning disabilities are also at particular risk for anxiety, the present study will determine whether the scores of the RCMAS-2 are reliable and valid among children and adolescents with specific learning disabilities, and can therefore be considered an appropriate instrument for measuring anxiety among students with specific learning disabilities. In addition, given past research which suggests that children with specific learning disabilities exhibit higher levels of anxiety than children without specific learning disabilities, the scores of students with specific learning disabilities on the RCMAS-2 will be compared to those of the non-referred sample, in order to identify potentially significant differences in anxiety scores between the groups.

CHAPTER II

# Review of the Literature

In today's educational system, children and educators face a myriad of obstacles that challenges a student's ability to learn. These challenges may range from personal characteristics (such as personality conflicts or lack of interest) to environmental/situational factors (such as noisy or dimly lit environments, or lack of learning materials and supplies) to family- or home-related factors (such as financial strain, conflict with siblings, or lack of parental support). Medical conditions may challenge the student's ability to attend school, while social relationships (either positive or negative) may challenge a student's ability to focus his or her attention on academic tasks. However, even among the best of circumstances, children may still face academic difficulties, for which an immediate cause or solution is not evident. Children may be exposed to high quality instruction, express interest and motivation to learn, receive positive and consistent parental support, and be in excellent physical shape, and yet continue to experience significant academic difficulties. In such cases, the child's academic difficulties may be attributed to a "specific learning disability." Educators are becoming more aware of the risk factors, both academic and non-academic, that may potentially accompany a specific learning disability, and the need to address not only a child's academic needs, but his or her psychological needs as well.

## Specific Learning Disabilities

In general, "learning disability" is a term that refers to a wide variety of educational difficulties. Unlike many other types of educational disabilities and clinical disorders, the term "learning disability" has been notoriously difficult to clarify and define (Hammill, 1990; Kavale & Forness, 2000; NJCLD, 1990). Within the clinical realm of the Diagnostic and Statistical

Manual of Mental Disorders, Fifth Edtion (DSM-5; APA, 2013), specific learning disabilities are referred to as a "specific learning disorder," and considered to be a "neurodevelopmental disorder with a biological origin" (p. 68). The DSM-5's specific learning disorder contains several diagnostic subtypes representing different types of academically-related difficulties, including inaccurate, slow, and effortful reading, and difficulties with reading comprehension, spelling, written expression, number sense, and mathematical reasoning. The DSM-5 specifies that these difficulties must have persisted for at least six months, despite the provision of educational interventions, and the onset of difficulties must occur during school-age years. Furthermore, the individual's academic skills must be "substantially and quantifiably below those expected for the individual's chronological age, and cause significant interference with academic or occupational performance, or with activities of daily living" (APA, 2013, p. 67). In addition, consistent with other definitions, the difficulties cannot be better explained by other factors, such as intellectual or developmental disabilities, neurological disorders, psychosocial adversity, sensory difficulties, or lack of appropriate educational instruction (APA, 2013).

Prior to the publication of the DSM-5, the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, Text Revision (DSM-IV-TR; APA, 2000) referred to specific learning disabilities as "learning disorders," and specific diagnostic categories were available depending on the type of academic difficulty, including a Reading Disorder, Mathematics Disorder, Disorder of Written Expression, and Learning Disorder Not Otherwise Specified. In general, learning disorders were defined by the DSM-IV-TR as academic achievement in the areas of reading, mathematics, or written expression "that is substantially below that expected given the person's chronological age, measured intelligence, and age-appropriate education" (APA, 2000, p. 38). Like the DSM-5, the DSM-IV-TR required such learning difficulties to result in

substantial impairment in the individuals' academic achievement or activities of daily living. Finally, the DSM-IV-TR also cautioned that learning disorders may be accompanied by "[d]emoralization, low self-esteem, and deficits in social skills" (APA, 2000, p. 47), indicating that the effects of specific learning disabilities may extend well beyond the academic setting.

In addition to clinical definitions, professional and advocacy groups, including speech-language pathologists, school psychologists, and learning disability associations, have produced a joint statement regarding the definition of specific learning disabilities. According to the National Joint Committee on Learning Disabilities (NJCLD; 1990), specific learning disabilities refers to a "heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning or mathematical abilities" (p. 65). Furthermore, the NJCLD clarified that specific learning disabilities are not primarily caused by other "handicapping" disabilities (such as mental retardation, sensory impairment, or social or emotional disturbances), or cultural or environmental influences (such as cultural differences or lack of quality instruction). Rather, the NJCLD indicates that specific learning disabilities are considered to be due to innate dysfunction within the central nervous system, resulting in outwardly observable academic difficulties (NJCLD, 1990).

Similarly, the Learning Disabilities Association of America [LDAA] put forth another definition of specific learning disabilities. According to the LDAA (2004), "learning disability" is defined as a "chronic condition of neurological origin which selectively interferes with development, integration, and/or demonstration of verbal and/or nonverbal abilities" (p.7). The definition further explains that specific learning disabilities are distinct "handicapping" conditions, and may vary in degree of severity. Finally, similar to the DSM-IV-TR, this definition calls attention to other non-academic areas which may be impacted as a result of

specific learning disabilities, including self-esteem, employment/career, family relationships, social interactions, and activities of independent daily living (LDAA, 2004).

Finally, perhaps the most important and influential definition is contained within the Individuals with Disabilities Education Improvement Act (IDEIA) of 2004 (U.S. Department of Education, 2006). IDEIA is a reauthorization of the Education for All Handicapped Children Act (P.L. 94-142) of 1975. Public Law 94-142 was enacted to guarantee the right to a free and appropriate public education to all children, ages 3-21, regardless of the presence or severity of a disability. This act puts forth definitions for various types of educational disabilities, including "specific learning disability," for which students can receive special education services. Although IDEIA serves as a revision of its immediate predecessor, the Individuals with Disabilities Education Act (IDEA) of 1997 (U.S. Department of Education, 1999), the definition of specific learning disabilities remained unchanged during the revision. According to IDEIA, "specific learning disability" refers to a "disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia" (34 C.F.R. § 300.8; U.S. Department of Education, 2006, p. 46757). Similar to the definition adopted by the NJCLD, IDEIA clarifies that specific learning disabilities may not include learning difficulties that are primarily caused by visual, auditory, or motor disabilities, mental retardation, emotional difficulties, lack of appropriate educational instruction, limited English proficiency, or other environmental, cultural, or economic factors (34 C.F.R. §§ 300.8, 300.306; U.S. Department of Education, 2006). In addition, in order to qualify for special education and related services, a student must also

demonstrate an educational need to receive such services (34 C.F.R. §300.306; U.S. Department of Education, 2006).

Students whose specific learning disability negatively affects their educational or academic achievement may qualify for special education services under IDEIA. If a student meets the criteria for special education services, an individualized education plan (IEP) will be created. This document further protects the student's rights to an appropriate education in that the IEP is based on the student's strengths and needs, identifies specific areas for growth, and describes the steps or interventions necessary to achieve goals toward academic achievement (34 C.F.R. § 300.320; U.S. Department of Education, 2006). An IEP can also provide accommodations and modifications for the student within the classroom, to ensure access to the curriculum, as well as direct and indirect special education services and supports, such as one-on-one specialized instruction with a special education teacher. These services are funded from the federal government, and may be delivered within or outside of the general education classroom, depending on the child's needs.

**Prevalence of specific learning disabilities.** According to the U.S. Department of Education (2009), over six million children, ages 6 through 21, receive special education and related services in the United States for an educational disability. This represents approximately 9.2% of all children and adolescents between the ages of 6 and 21. The number of students receiving special education and related services has steadily increased over the past ten years, due in part to increased awareness of the needs of children with disabilities, as well as improved screening procedures and early intervention services. Among the over six million school-age children who receive special education and related services for an educational disability, the most prevalent educational disability continues to be a specific learning disability, which affects

slightly more than 4% of all school-age children and accounts for over 46% of all students served by special education. In contrast, the next most prevalent disability is a speech-language impairment, which affects approximately 1.7% of all school-age children within the United States and accounts for just over 18% of all students receiving special education services (U.S. Department of Education, 2009). Therefore, although the proportion of children with specific learning disabilities is relatively low when compared to the general population of school-age children, specific learning disability represents the most common or prevalent disability among school-age children receiving special education and related services.

**School-related difficulties of students with specific learning disabilities.** Research suggests that children with specific learning disabilities experience a variety of school-related difficulties, including difficulties with academic achievement, social interactions, and emotional and behavioral functioning. Each of these areas will be explored in more detail below.

***Academic difficulties.*** As might be expected, children with specific learning disabilities experience significantly more academic difficulties than children without specific learning disabilities. For example, in a study involving 571 seventh grade students with and without specific learning disabilities, Lackaye and Margalit (2006) found that students with specific learning disabilities earned significantly poorer grades across several academic areas, including math, reading, and history, than their peers without specific learning disabilities. Traditional wisdom often suggests that academic achievement is a function of a student's effort and preparation. Therefore, teachers and parents may attribute academic difficulties to a lack of effort and preparation, even among children with identified specific learning disabilities. As a result, these students may feel even greater pressure to "work harder" than their classmates to

achieve in the classroom and meet the expectations of their teachers and parents (Lackaye & Margalit, 2006).

In addition, students with specific learning disabilities may perceive their own academic skills and abilities in a more negative light than students without specific learning disabilities. In a meta-analysis of 61 studies, Bear and colleagues (2002) found that children with specific learning disabilities viewed their own skills and abilities (including academic competence) significantly less favorably than children without specific learning disabilities. Similarly, Lackaye and Margalit (2006) reported that, among adolescent students, students with specific learning disabilities expressed significantly lower levels of academic self-efficacy than students without specific learning disabilities. It is likely that students' beliefs about their own academic self-efficacy or self-competence may be strongly influenced by previous academic experiences, and play a key role in future academic achievement.

***Social difficulties.*** Evidence suggests that children with specific learning disabilities also experience difficulties with social relationships and interactions (Mishna, 2003). It is possible that social difficulties, as well as emotional and behavioral difficulties, may originate from the same type of cognitive or neurological impairments that impede learning (Bender & Wall, 1994). That is, difficulties with certain cognitive processes may not only affect a child's ability to learn, but may also impair the child's ability to interpret social information, as well as appropriately regulate his or her own emotional and behavioral responses. For example, in a study comparing students with and without specific learning disabilities, Lackaye and Margalit (2006) found that 7$^{th}$ grade students with specific learning disabilities reported significantly more feelings of loneliness than students without specific learning disabilities. Furthermore, males tended to report more feelings of loneliness than females. Similarly, Al-Yagon and Mikulincer (2004)

studied patterns of close relationships in elementary school children with and without specific learning disabilities, and reported that students with specific learning disabilities experienced significantly less secure attachment in their social relationships (e.g., less likely to trust others, depend on others, hold a positive view of others), and engaged in significantly more avoidant behaviors (such as avoiding social encounters, distancing themselves from others, and denying their social needs) as well as anxiety-related behaviors (such as being hypervigilant towards or overdependent on others) in their close social relationships. A study by Margalit and Efrati (1996) provided more information on the friendships of children with specific learning disabilities. Specifically, Margalit and Efrati surveyed 230 elementary school students regarding their friendships, and found that students with specific learning disabilities reported themselves as significantly lonelier than children without specific learning disabilities. Children with specific learning disabilities also described their friends as being less caring and less able to resolve conflicts, and indicated that they spent less enjoyable time with their best friend than children without specific learning disabilities. In addition, children with specific learning disabilities were also significantly less likely to be accepted by their peers without specific learning disabilities, as documented by a peer rating/nomination system. Furthermore, these characteristics (e.g., insecure social attachment, peer rejection, poor conflict resolution skills, etc.) may place students with specific learning disabilities at particular risk for bullying and peer victimization (Mishna, 2003). Indeed, in a study involving sixth- and seventh-grade students with and without specific learning disabilities, Sabornie (1994) found that students with specific learning disabilities experience significantly more peer victimization (including theft of belongings, threats of physical violence, etc.) than students without specific learning disabilities. Overall, these studies suggest that children with specific learning disabilities are significantly

less likely to experience a secure or satisfying friendship than students without specific learning disabilities, are more likely to experience feelings of loneliness than students without specific learning disabilities, and are less likely to be accepted by students without specific learning disabilities.

***Emotional and behavioral difficulties***. Children with specific learning disabilities also appear to be at greater risk for emotional and behavioral difficulties (Lackaye & Margalit, 2006; Michaels & Lewandowski, 1990; Palombo, 2001; Yu, Buka, McCormick, Fitzmaurice, & Indurkhya, 2006). With regard to vulnerability to emotional difficulties, children with specific learning disabilities may be exposed to more instances of difficulty, frustration, and failure than children without specific learning disabilities, and may dread situations in which their academic difficulties may become apparent to peers or teachers. Children with specific learning disabilities may also experience more frequent interruptions or corrections by peers and teachers within the learning environment than students without specific learning disabilities (Palombo, 2001). Overall, research suggests that children and adolescents with specific learning disabilities hold more negative perceptions about themselves and their environment than children and adolescents without specific learning disabilities (Bear, Minke, & Manning, 2002; Lackaye & Margalit, 2006; Tsovili, 2004). For example, Tsovili (2004) surveyed 136 adolescents with and without learning difficulties, and found that children with learning difficulties were more likely to report feeling that they have little control over the outcome of their efforts, and are held to unattainable academic standards by teachers. Furthermore, these students were also more likely to report using avoidant and emotion-focused coping strategies in response to academic difficulties. Similarly, Lackaye and Margalit (2006) surveyed students with and without a learning disability about various feelings and emotions. Results indicated that students with

specific learning disabilities reported significantly lower levels of hope and positive mood (such as feeling friendly, in control, or happy), and higher levels of negative mood (such as feeling tired, sad, or worried) than students without specific learning disabilities. In addition, students with specific learning disabilities may be less likely than other students to view the world as understandable, manageable, and meaningful. In particular, Lackaye and Margalit found that children with specific learning disabilities expressed significantly more difficulty understanding their environment, managing their environment, and achieving desirable outcomes, resulting in a significantly poorer sense of cohesion about their world compared to children without specific learning disabilities. According to Palombo (2001), a sense of cohesion about one's world is critical to the development of one's sense of self, which includes self-esteem, self-efficacy, motivation, and the ability to organize and understand one's experiences. Although new situations and experiences represent normal and constant challenges to one's sense of cohesion (and therefore, sense of self), these challenges may have a particularly more negative effect on children with specific learning disabilities, as these children may lack the skills and abilities to effectively understand and cohesively integrate these new experiences and challenges. Overall, individuals with specific learning disabilities may be less able to successfully plan for, cope with, and make sense of challenging situations, and may ultimately be less emotionally-resilient than individuals without specific learning disabilities (Lackaye & Margalit, 2006; Palombo, 2001).

In addition to emotional difficulties, research suggests that children with specific learning disabilities may experience a variety of behavioral difficulties. A meta-analysis by Bender and Wall (1994) identified the most common behavioral difficulties associated with specific learning disabilities: adaptive behaviors (including on-task behavior, interpersonal/social skills, and self-management skills), misconduct (including acting out, disruptive behaviors, hostility, aggression,

and violence), impulsivity, inattention, and hyperactivity. Research further suggests that children with specific learning disabilities may exhibit significantly more behavioral difficulties than children without specific learning disabilities. For example, in a study involving 124 boys, ages 6 through 12, Michaels and Lewandowski (1990) reported that boys with specific learning disabilities not only exhibited higher levels of internalizing difficulties, such as anxiety, depression, and obsessive worry, but also significantly higher levels of externalizing difficulties, particularly hyperactive behaviors, than boys without specific learning disabilities. Similarly, Yu and colleagues (2006) examined the behavioral characteristics of 713 eight-year-old children with and without specific learning disabilities, and found an increased risk of externalizing behavioral difficulties, particularly among children with verbal learning disabilities (i.e., involving reading or general verbal skills). Specifically, the authors reported that children with verbal learning disabilities were three times more likely to engage in aggressive behaviors than children without verbal learning disabilities. Overall, although behavioral difficulties are not by themselves an identifying characteristic of specific learning disabilities, children with specific learning disabilities do appear to be at an increased risk for behavioral difficulties than children without specific learning disabilities (Bender & Wall, 1994; Michaels & Lewandowski, 1990; Yu et al., 2006).

**Anxiety**

Anxiety is one of the most common and debilitating emotional conditions among adults and children (Costello et al., 1996; Kessler, Chiu, Demler, & Walters, 2005; Kessler et al., 1994; Roberts et al., 2007; Shaffer et al., 1996). Prevailing conceptualizations of anxiety define it as "a future-oriented emotion, characterized by perceptions of uncontrollability and unpredictability over potentially aversive events" (Barlow, 2002b, p. 104). Furthermore, anxiety is thought to be

multidimensional in nature, encompassing cognitive, affective/emotional, somatic/physiological, and behavioral components (Zeidner, 2008). Therefore, when faced with perceived or potential threats or danger, individuals typically experience symptoms of anxiety that can be categorized into several types of manifestations: cognitive, behavioral/motor/emotional, and physiological/somatic responses (Barlow, 2002b; Barlow, Allen, & Choate, 2004; Huberty, 1997; Ramirez, Feeney-Kettler, Flores-Torres, Kratochwill, & Morris, 2006; Silverman & Ollendick, 2005; Zeidner, 2008).

Cognitive responses encompass a wide variety of subjective thoughts, feelings, and emotions. Individuals may describe feeling afraid, anxious, or oversensitive; engage in high levels of worry; exclusively shift their attention to the perceived threat; have difficulties concentrating; or experience a preoccupation with the threatening object or event (Huberty, 1997; Huberty & Dick, 2006; Ramirez et al., 2006). Cognitive responses of particular concern to school-age children include difficulties with attention, memory, concentration, and problem-solving abilities, all of which are central to academic achievement (Aronen, Vuontela, Steenari, Salmi, & Carlson, 2005; Huberty & Dick, 2006). Research suggests that anxiety results in two types of cognitive difficulties: cognitive distortions and cognitive deficiencies. Cognitive distortions occur when social and environmental information is processed illogically, irrationally, inaccurately, or in an otherwise distorted manner (Huberty, 1997). For example, a child may perceive a threatening object as larger and more dangerous than it actually is, or a threatening situation or event as more likely to occur than it actually is (Huberty, 1997; Huberty & Dick, 2006). Cognitive deficiencies, on the other hand, occur when individuals do not possess or cannot use the necessary cognitive skills to appropriately interpret information or make a decision (Huberty, 1997). For example, a child may encounter a threatening object or situation

and become paralyzed with anxiety, temporarily unable to engage in coping or problem-solving strategies. Behavioral and motor responses may include efforts to withdraw from, avoid, or even confront the perceived threat. Individuals may feel restless, fidgety, have difficulty sitting still, or express that their muscles feel tense or tight. In addition, behavioral responses may also include rapid speech, irritability, and erratic, irrational, or even aggressive behaviors (Huberty, 1997; Huberty & Dick, 2006). Finally, individuals may also experience physiological or somatic responses. Physiological responses can be thought of as the "fight-or-flight" response, and prepare the body to take action in response to the threatening object or event. Physiological responses may include muscle tension, excessive perspiration, shallow or rapid breathing, rapid heartbeat, and increased blood pressure. Physiological responses may also include negative or aversive physical symptoms, such as headaches, stomachaches, dizziness, and sleep difficulties, as well as gastrointestinal difficulties like nausea or vomiting (APA, 2000; Huberty, 1997; Huberty & Dick, 2006; Ramirez et al., 2006). Research indicates that the most common anxiety-related somatic symptoms experienced by children are headaches, followed by nausea, stomachaches, dizziness, shortness of breath, and rapid heartbeat (Muris & Meesters, 2004). Although some degree of anxiety may be a natural and adaptive reaction to potentially adverse situations or events, excessive and uncontrollable anxiety may be detrimental to and impair an individual's ability to function on a day-to-day basis (APA, 2000; Gullone, 1996; Taylor, 1951).

**Prevalence of anxiety.** Anxiety represents the most commonly experienced mental health condition within the United States, affecting over 40 million adults, or 18% of the general adult population, each year (Kessler, Berglund, et al., 2005). Indeed, estimates suggest that almost 29% of all individuals will meet the criteria for an anxiety disorder at some point in their lifetime (Kessler, Berglund, et al., 2005).

Like adults, anxiety has also been identified as the most commonly experienced mental health condition among children and adolescents (Costello et al., 1996), with an estimated 3-4% of children and adolescents meeting the criteria for an anxiety disorder (Ford, Goodman, & Meltzer, 2003; Roberts, Roberts, & Chan, 2009; Roberts et al., 2007; Yamamoto et al., 1999), indicating that they experience symptoms of anxiety as well as significant impairment resulting from anxiety. Research has also been conducted to determine how prevalent symptoms of anxiety are among children and adolescents, regardless of whether they meet the criteria for an anxiety disorder. Roberts and colleagues (2008) surveyed 153 adolescents, ages 13 through 19, and found self-reported prevalence of anxiety symptoms to be much higher than prevalence of anxiety disorders. Similarly, Shaffer and colleagues (1996) surveyed 1,285 children, ages 9 – 17, with and without impairment criteria. When considering only the presence of anxiety symptoms, 23.7% of children and adolescents indicated that they had experienced anxiety-related symptoms, an increase from the 7.1% of children who also met impairment criteria consistent with an anxiety diagnosis. Similarly, in a study involving 2,400 children and adolescents, Breton and colleagues (1999) indicated that 4.8% of children ages 6-14 experienced an anxiety disorder (based on symptoms and impairment) in the last six months, according to parental report. However, when considering anxiety symptoms alone, prevalence rates almost quadruple to include 14.7% of children and adolescents. This indicates that, although many children meet the criteria for anxiety disorders, many more children experience at least some symptoms of anxiety (Breton et al., 1999; Cartwright-Hatton, McNicol, & Doubleday, 2006; Ford, Goodman, & Meltzer, 2003; Roberts, Attkisson, & Rosenblatt, 1998; Roberts et al., 2008; Shaffer, et al., 1996).

Unlike many other mental health disorders, such as major depression, that are most likely to initially occur during adulthood, more than 75% of individuals with anxiety disorders begin experiencing difficulties by the age of 21. Indeed, the estimated median age-of-onset for anxiety disorders is 11 years (Kessler, Berglund, et al., 2005). This suggests that many, if not most, adults with anxiety disorders first began experiencing difficulties with anxiety during childhood and adolescence. Although the course of anxiety throughout the lifespan continues to be researched, evidence suggests that anxiety may be a rather continuous, stable characteristic, persisting throughout childhood, adolescence, and adulthood (Canals, Martí-Henneberg, Fernández-Ballart, Clivillé, & Domènech, 1992; Kessler, Berglund, et al., 2005).

***Anxiety and gender.*** Research has consistently found that, among adults, females tend to report more symptoms and higher levels of anxiety than males (Kessler et al., 1994). This gender effect, however, is more complex among children and adolescence. With regard to children, some research studies indicate that very young boys (under five years of age) experience higher levels of anxiety than young girls in response to stressful experiences (Bannon, DeVoe, Klein, & Miranda, 2009). It is unclear, however, whether this reflects a truly higher rate of anxiety symptoms among young boys, or whether symptoms of anxiety may simply be easier to identify in young boys than girls. For example, symptoms commonly associated with anxiety, such as shyness or social withdrawal, may be viewed by parents as more discrepant from the "normal" behavior of young boys, whereas the same symptoms in young girls may be more easily overlooked or dismissed as appropriate behaviors (Schniering et al., 2000).

In general, however, the majority of research suggests that females may begin to exhibit higher levels of anxiety as early as age six, and exhibit markedly higher levels of anxiety than

males by age twelve – a trend that continues into adolescence and adulthood (Cohen et al., 1993; Gau et al., 2005; Gullone et al., 2001; Kessler et al., 1994; Reynolds, 1998; Roberts et al., 2008; Roberts et al., 2007; Schniering et al., 2000). For example, Costello and colleagues (2003) again used clinical interviews to assess the psychological difficulties of 6,674 children ages 9 – 16, including 3,005 females and 3,669 males. The results of the study indicated that females exhibited higher levels of anxiety than males, with a 2.9% prevalence rate among females compared to a 2.0% prevalence rate among males. An additional study conducted by Roberts et al. (2008) also confirmed this gender trend among adolescent high school students. Using a computerized screening measure as well as structured diagnostic interview, the authors assessed the prevalence of psychological difficulties in 153 high school students (grades nine through twelve), including 64 males and 89 females. Consistent with previous research, results revealed the prevalence rate of anxiety symptoms to be twice as high among female students (22.3%) than male students (10.1%; Roberts et al., 2008).

Finally, research suggests that females not only experience higher prevalence rates of anxiety, but may experience higher levels or more severe symptoms of anxiety than males. For example, Gullone and colleagues (2001) assessed the levels of anxiety among 68 children, ages 10 to 18 years, over a three year period. Participants' levels of anxiety were measured using the RCMAS. Results of the study revealed that female participants reported significantly higher levels of anxiety than male participants, both at the initial assessment time as well as the follow-up time three years later. This trend was consistent for overall anxiety, as well as the three specific dimensions of anxiety (i.e., physiological anxiety, worry/oversensitivity, and social concerns/concentration) measured by the RCMAS (Gullone et al., 2001). Overall, these studies appear to suggest that, not only are females more likely to experience symptoms of anxiety (as

evidenced by higher prevalence rates of anxiety among females), but also to experience higher levels of anxiety than males (as evidenced by higher scores on self-report measures of anxiety).

However, it is also possible that females, rather than experiencing more anxiety, are simply more willing to seek help for, admit, or express their anxiety than males. It may be viewed as more socially acceptable for females to seek help for or express anxiety, while it may be considered a threat to male masculinity to do so. As a result, males may feel more motivated to deny or downplay feelings of anxiety, resulting in lower scores on measures of anxiety (Zeidner, 1998). For example, in a study focusing on factors related to seeking help for mental health needs, Levinson and Ifrah (2010) reported that women were significantly more likely than men to seek out mental health resources and support, regardless of the presence of other psychosocial variables, such as a psychological disorder or elevated levels of emotional distress. This suggests that, even when the levels of emotional distress or the presence of a psychological disorder are equivalent across both males and females, females may be more willing and likely to report and seek mental health resources for symptoms of anxiety.

Finally, some theories suggest that females may experience different symptoms of anxiety than males, and that these female-oriented symptoms are more likely to be assessed by measurement instruments. To investigate this possibility, Reynolds (1998) examined several anxiety-related assessment instruments, including the RCMAS, anxiety-related scales of the Behavior Assessment System for Children, Self-Report of Personality (BASC-SRP; Reynolds & Kamphaus, 1992), and an anxiety-related scale of the Checklist of Problems and Resiliency (COPAR; Stanton & Reynolds, 1998). Each of these instruments was administered to samples of children, adolescents, and adults to determine whether they appropriately and effectively assessed anxiety for both males and females, or whether separate and different scales for each

gender would be more appropriate. To do so, the author applied a common set of item selection rules for both males and females, and statistically analyzed the resulting item sets to identify any significant differences between the item sets for males and females. Results of these analyses indicated that, overall, the item sets created for males and for females are relatively similar. For example, of the 28 items included on the RCMAS, 26 items are found in the item sets for both males and females. Similarly, 25 of the 26 items included on the BASC-SRP child form, and 22 of the 24 items included on the BASC-SRP adolescent form are found in the item sets for both males and females. All 24 items included on the COPAR were found in the item sets across both genders. Overall, no significant differences were found in the item content across males and females. This indicates that symptoms of anxiety are similar across males and females and that anxiety can be effectively measured by a common set of items for both males and females. While females continue to score higher on measures of anxiety than males, the evidence suggests that these differences are not due to known measurement inaccuracies or biases at this time (Reynolds, 1998).

**Anxiety, cognitive processes, and academic achievement.** Research suggests that anxiety may be negatively associated with children's academic performance, even among children without a history of specific learning disabilities. Though it is not certain yet whether poor academic performance leads to higher levels of anxiety, or vice versa, the link between anxiety and academic difficulties has been firmly established (McKeachie, 1984).

Early explanations for the association between anxiety and academic difficulties involved a concept known as cognitive interference (Mandler & Sarason, 1952; Sarason, 1984). Cognitive interference refers to the tendency for anxiety to produce responses that are not related to the task at hand, and which are characterized by feelings of inadequacy and hopelessness, and an urge to

withdraw from the situation. These intrusive thoughts interfere with or obstruct an individual's thought processes related to the task at hand, and hinder the individual's ability to focus on or complete the task (Mandler & Sarason, 1952; Sarason, 1984; Sarason, Sarason, & Pierce, 1990; Whitaker, Lowe, & Lee, 2007; Wine, 1971). In other words, anxiety-related thoughts distract an individual's attention away from other cognitive processes, such as learning, thereby hindering an individual's ability to attend to or perform a task. Cognitive interference and obstruction has been incorporated into more recent theories, including the Processing Efficiency Theory (PET; Eysenck & Calvo, 1992). According to PET, high levels of worry can negatively impact an individual's capacity to efficiently perform cognitive tasks. Worry is considered a cognitive component of anxiety (Silverman, La Greca, & Wasserstein, 1995), and as such, utilizes cognitive resources, such as attention and concentration (Eysenck & Calvo, 1992). As a result, only partial cognitive resources are available for other cognitive tasks, such as working memory, and individuals may be less able to efficiently process, remember, and manipulate information (i.e., working memory). PET can also be further applied to academic achievement. For example, academic achievement is positively correlated with an individual's cognitive resources, particularly working memory (Aronen et al., 2005). Furthermore, research suggests that individuals with high levels of anxiety are at higher risk for experiencing deficits in working memory abilities (e.g., the skills necessary to remember and manipulate information), and that these difficulties may significantly impair certain areas of academic functioning (particularly mathematics and quantitative reasoning; Owens, Stevenson, Norgate, & Hadwin, 2008).

Other theories explain the relationship between anxiety, cognitive processes, and academic achievement in terms of learning deficits. According to the learning deficit model, individuals with high levels of anxiety exhibit poor academic-related skills, such as study skills

or test-taking skills. Therefore, they are less able to effectively learn new information or perform well on academic activities, as they simply do not have the skills to effectively prepare to do so. For example, research suggests that some students with high levels of anxiety will still perform poorly on academic assignments, even when books, notes, or other information sources are available to support information recall and retrieval (McKeachie, 1984). This suggests that, for some students with high levels of anxiety, academic performance may be impaired by using ineffective organizational skills, study techniques, or test-taking skills, rather than difficulties recalling or retrieving the information (McKeachie, 1984). Indeed, Onatsu-Arvilommi and Nurmi (2000) conducted a study which tracked 105 children, ages 6 – 7, as they progressed through first grade. Results of the study revealed that certain types of coping strategies served as significant predictors of later academic skills. Specifically, high levels of task-avoidant behaviors (such as engaging in irrelevant tasks, experiencing hopelessness, and lacking persistence) significantly predicted poor reading achievement. Similarly, poor reading performance was also found to significantly predict high levels of task-avoidant behaviors. The authors concluded that task-avoidant behaviors and poor reading skills most likely form a negative cycle, with task-avoidant behaviors contributing to poor reading skills, and poor reading skills leading to the development of task-avoidant behaviors.

Subsequent theories of information processing have attempted to combine the learning deficits experienced before the academic activity with the cognitive interference experienced during the academic activity (Hodapp, 1995). Information processing models suggest that information is learned in multiple stages: First, information is perceived by one or more of the physical senses (e.g., hearing, vision, etc.) and encoded with meaning. Second, information is held in short-term memory, and then integrated and organized and stored in long-term memory.

Finally, the information is retrieved from long-term memory at a later time (Shiffrin & Atkinson, 1969). McKeachie (1984) suggested that, for students who experience high levels of anxiety, academic performance could be impaired by deficits in any one of the above stages (i.e., encoding, storage/organization, retrieval). Indeed, McKeachie found that students with high levels of anxiety reported difficulties in each of the three stages, including difficulties initially learning and understanding the information, difficulties organizing and reviewing the information, and difficulties recalling or applying the information at a later time. Specifically, students with high levels of anxiety may experience more difficulties with academic assignments which require them to recall answers (such as essay or short-answer questions), and perform better on assignments which require them to recognize and identify the correct answer (such as multiple choice or matching questions). This suggests that, for some students with high levels of anxiety, academic performance may be impaired by difficulties experienced before (e.g., preparing for the learning experience), during (e.g., effectively attending to and storing the information), and after the learning experience (e.g., effectively reviewing, recalling, and retrieving the information; McKeachie, 1984). Overall, these studies indicate that high levels of anxiety are indeed related to poor academic performance, and provide insights into the nature of the relationship between anxiety, cognitive processes, and academic achievement.

**Anxiety and specific learning disabilities.** Research suggests that students across grade levels (including post-secondary students) with specific learning disabilities may be more vulnerable to anxiety and the academic difficulties associated with anxiety, compared to those without specific learning disabilities. For example, Hoy et al. (1997) examined levels of anxiety among 324 undergraduate students, 184 of whom had previously been identified with a learning disability. Participants were asked to complete several measures of emotional functioning,

including the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). Results of the study revealed that students with specific learning disabilities reported significantly higher levels of anxiety than students without specific learning disabilities (Hoy et al., 1997). Similarly, Carroll and Iles (2006) examined the rates of anxiety among 32 post-secondary students, half of whom reported a history of learning difficulties. The students completed the STAI (Spielberger et al., 1983), as well as an assessment of reading ability. As expected, results indicated that students with learning difficulties demonstrated significantly poorer reading ability, compared to students without learning difficulties. In addition, students with learning difficulties also reported significantly higher levels of both state and trait anxiety than students without learning difficulties (Carroll & Iles, 2006).

Numerous studies have also replicated this finding among children and adolescents, indicating that school-age children with learning difficulties experience significantly higher levels of anxiety than their peers without learning difficulties (Arnold et al., 2005; Emerson, 2003; Fisher et al., 1996; Paget & Reynolds, 1984; Rodriguez & Routh, 1989). For example, Paget and Reynolds (1984) compared the levels of anxiety reported by school-age children with and without specific learning disabilities on the RCMAS. Results revealed that children with specific learning disabilities reported significantly higher levels of overall anxiety than children without specific learning disabilities. Furthermore, children with specific learning disabilities experienced significantly more worry, and social concerns/concentration difficulties as a result of the anxiety (Paget & Reynolds, 1984). Similarly, Arnold and colleagues (2005) assessed levels of emotional difficulties in children with and without specific learning disabilities. Participants included 94 tenth-grade students who were classified “poor readers” and 94 tenth-grade students classified as “typical readers,” based on a screening measure of single word reading skills. The

students were asked to complete a series of self-report measures, including the Youth Self-Report Inventory (YSR; Achenbach, 1991) and the Trait Anxiety scale of the STAI (Spielberger et al., 1983). Results indicated that students classified as "poor readers" reported significantly more emotional difficulties, including anxiety (as measured by the STAI) and somatic complaints (as measured by the YSR), than students classified as "typical readers." Overall, these studies suggest that children with specific learning disabilities may be more vulnerable to anxiety and anxiety-related difficulties (especially worry, impaired concentration, and somatic complaints) than children without specific learning disabilities.

In another study, Fisher and colleagues (1996) examined the relationship between anxiety and problem-solving skills among 90 school-age boys. Half of the participants had previously been identified with a specific learning disability. Using the State-Trait Anxiety Inventory for Children (STAI-C; Spielberger, Edwards, Montuori, & Lushene, 1970), participants were assigned to one of three groups based on their levels of anxiety (low, medium, and high). Participants were then asked to complete a problem-solving activity, followed by an additional administration of the STAI-C State Anxiety scale. Results revealed several differences between the groups. First, boys with specific learning disabilities reported significantly higher levels of both state and trait anxiety, compared to boys without specific learning disabilities. Second, boys with specific learning disabilities experienced increasingly higher anxiety levels by the end of the problem solving activity, while anxiety levels of boys without specific learning disabilities remained stable. However, despite the relatively higher levels of anxiety, boys with specific learning disabilities did not exhibit significant impairments in problem-solving skills, compared to boys without specific learning disabilities. This finding indicates that children with specific learning disabilities did not experience deficits in or a lack of problem-solving skills, compared

to children without specific learning disabilities. However, the results also indicated that boys with specific learning disabilities *and* high levels of anxiety tended to exhibit less effective or successful problem-solving strategies (Fisher et al., 1996). These findings suggest that not only are children with specific learning disabilities more vulnerable to high levels of anxiety, but that their cognitive performance becomes increasingly impaired as their anxiety increases. Furthermore, this finding may help support the theories of processing efficiency (PET; Eysenck & Calvo, 1992) and cognitive interference (Mandler & Sarason, 1952; Sarason, 1984), in that anxiety and worry may divert cognitive resources away from cognitive processes and skills necessary for academic performance.

**History of anxiety.** Anxiety has been experienced by people throughout history, although the understanding and causes of anxiety have often been strongly influenced by the prevailing philosophical, religious, and political viewpoints of the times (McReynolds, 1985). Consideration of anxiety as a psychiatric condition can be traced back to William Battie (1758), a physician and teacher in 18$^{th}$ century England. According to Battie, anxiety was thought to contribute to self-preservation by inducing physical and psychological discomfort (or "sensations"). Individuals are motivated to avoid or reduce these uncomfortable sensations, and act accordingly (Battie, 1758). This theory of anxiety is notable in its suggestion that anxiety serves an adaptive or facilitative purpose for individuals, depending on its nature and intensity, as well as its regard for anxiety as a distinct mental condition (McReynolds, 1985).

One of the earliest modern scientific conceptualizations of anxiety was proposed by the American Psychiatric Association (APA; 1952). Anxiety was described as a characteristic that may be "directly felt and expressed or which may be unconsciously and automatically controlled by the utilization of various psychological defense mechanisms" (APA, 1952, p. 31). In keeping

with the prominent psychoanalytic models of the time, the explanation for anxiety largely involved the repression of emotions and impulses. Anxiety was thought to occur in response to a perceived danger or threat (such as repressed aggression, hostility, or resentment). The individual's defensive "reaction" to this emotionally-driven anxiety could include a variety of behaviors and symptoms. For example, an anxiety reaction involved diffuse anxiety that may or may not be associated with a definite situation or object, and is characterized by "anxious expectation" and somatic symptoms (APA, 1952, p. 32). This psychoanalytic approach to anxiety was largely influenced by the views of Sigmund Freud (1963), who described anxiety as a common and universal experience (as cited in Fischer, 1970). Freud identified three types of anxiety: moral anxiety, realistic anxiety, and neurotic anxiety. Moral anxiety results from perceived danger to one's conscience or ideal self, and was thought to be experienced by individuals as feelings of guilt or shame. Realistic anxiety was described by Freud as rational and adaptive, and thought to alert individuals to the realistic possibility of harm or injury from external sources. Finally, neurotic anxiety is irrational and unrealistic, and may or may not be associated with a particular object or situation (Fischer, 1970). According to Freud, neurotic anxiety resulted from repressed or unsatisfied sexual impulses (Nemiah, 1988). When such an impulse is repressed, the *idea* associated with the impulse is blocked, but the *energy* associated with the impulse remains. It is this residual energy that, according to Freud, is subsequently converted into and experienced as anxiety (Fischer, 1970).

In contrast, Harry Stack Sullivan's views are referred to as Neo-Freudian, and reject the emphasis placed by Freud upon instincts, repressed impulses, and innate, biological influences over environmental factors (Fischer, 1970). Therefore, according to Sullivan, anxiety did not result from repressed sexual impulses. Rather, Sullivan (1956) believed that individuals

constantly strive to develop interpersonal skills and relationships, and to be accepted by others within society (as cited in Fischer, 1970). Subsequently, anxiety arises when an individual feels he or she has failed to establish or maintain significant interpersonal relationships, and experiences (or expects to experience) disapproval or condemnation from others. Furthermore, Sullivan is notable in that he distinguishes anxiety from fear. While Sullivan acknowledges that the experience of fear may be very similar, they in fact result from separate circumstances and serve separate purposes. While anxiety is social and uniquely human in nature, fear is experienced by every living creature (not just humans), and its purpose is self-preservation of the creature's biological existence. Fear may be generated by new situations or objects, the danger of threat of which is unknown, or it may arise from a legitimately dangerous or painful situation (Fischer, 1970). Therefore, while Sullivan's conceptualization of fear may be similar to Freud's conceptualization of realistic anxiety (in that both serve an adaptive purpose in response to dangerous or threatening external situations or objects), Sullivan's conceptualization of anxiety focuses on the uniquely human need to form and maintain satisfying social relationships with others, rather than repressed sexual urges.

Raymond Cattell and Ivan Scheier adopted a different approach to the study and measurement of anxiety. Although the study of anxiety had made tremendous progress in the twentieth century, the field of psychology continued in a vain attempt to reconcile various and sometimes disparate theories and conceptualizations of anxiety. For example, disagreements arose with regard to the sources of anxiety, the functions or purposes of anxiety, the most accurate ways to identify and assess anxiety, the duration and intensity of anxiety, whether anxiety was bound to a specific object or "free floating," etc. (Cattell & Scheier, 1958, 1961). In the wake of these disagreements, Cattell and Scheier attempted to identify symptoms of anxiety

through the more objective methods of statistical analyses. To do so, the researchers examined multiple measures of anxiety and personality, and attempted to identify the common "factors" related to anxiety across these measures. Prior to analyzing the data, however, Cattell and Scheier identified several basic assumptions about anxiety that would guide their work. First, the researchers asserted that anxiety should be identified in terms of its symptoms or responses, rather than the object or event that preceded it. Cattell and Scheier argued that the anxiety response can result from various objects and events, and that not all objects or events lead to the same responses in all people. Therefore, when studying anxiety, the focus should remain on the anxiety response, rather than the anxiety trigger. Second, Cattell and Scheier conceded that, although most researchers viewed anxiety as a unitary response, attention must be paid to the possibility that multiple types of anxiety exist. Therefore, a wide range of anxiety symptoms and assessments should be used when studying anxiety. Finally, after anxiety-related factors are identified, researchers must compare and contrast these factors with other emotional conditions, such as stress or introversion, to better understand the relationship between similar emotional concepts and reduce confusion and overlap among the concepts. Using these basic assumptions, Cattell and Scheier conducted factor analyses of 325 anxiety variables across 13 research studies. Results revealed that the 325 anxiety variables together created an overall anxiety factor, which was present throughout the 13 research studies. This overall anxiety factor consists of overt feelings of anxiety, and includes both free-floating and situational anxiety (Cattell & Scheier, 1958). Further analysis failed to find a relationship between the anxiety factor and cognitive variables (such as intelligence, memory, or ability to learn), or personality variables (such as ambition and desire to achieve). However, analyses did confirm a relationship between the anxiety factor and other variables, including social withdrawal, a tendency to agree or conform

with others, a lack of self-assurance, a tendency toward self-criticism, and susceptibility to annoyance and frustration (Cattell & Scheier, 1958). Finally, Cattell and Scheier (1958) also identified symptoms of both state and trait anxiety, with state anxiety representing short-term anxiety and trait anxiety representing a relatively stable aspect of one's personality. The researchers conceptualized state anxiety as representing realistic, situation-specific anxiety that occurs in response to an actual external threat (Cattell & Scheier, 1961). On the other hand, trait anxiety was described as "characterological," in that it is influenced more by one's temperament, disposition, or personality than on the occurrence of an actual external threat. Furthermore, trait anxiety can influence the experience of state anxiety in that when an individual experiences state anxiety in response to an actual threat, the level of state anxiety is likely to be magnified and disproportionately greater than the situation calls for (Cattell & Scheier, 1961). The identification of state and trait anxiety allowed for the development of empirically-based theories of anxiety, as well as assessment instruments. Foremost among these is the STAI (Spielberger, Gorsuch, & Lushene, 1970), which is based on the state-trait model of anxiety (Cattell & Scheier, 1958, 1961; Spielberger, 1966). The state-trait model of anxiety, as well as the STAI, is discussed in more detail in the following sections.

As a better understanding about the nature and symptoms of anxiety was gathered through empirical study, researchers relied less on psychoanalytic explanations for anxiety, and focused more on cognitive and behavioral processes involved in anxiety. Cognitive processes were thought to play an important role in the development and experience of anxiety in both adults and children. An early cognitive theory, called rational-emotive theory, was developed by Albert Ellis (1962). Ellis believed that almost all emotional or psychological difficulties result from an individual's irrational thought processes, illogical thinking, and distorted perceptions.

Furthermore, Ellis proposed that thoughts and emotions are intertwined, each being influenced by and influencing the other. Although some degree of emotion is considered normal and adaptive, sustained emotions (particularly sustained negative emotions) are maladaptive and are evidence of irrational thoughts and distorted perceptions. Ellis identified several irrational ideas and distorted perceptions that are common to individuals with emotional or psychological difficulties. In general, these irrational ideas involve individuals living up to unattainable standards (e.g., being loved by everyone, being competent in every aspect of life), seeing the actions of others in black and white terms (e.g., people are either good or evil, and all behavior is a choice), believing that potentially catastrophic consequences will occur if events do not go as planned, assuming that happiness depends completely on external and uncontrollable factors, dwelling on past mistakes or experiences as determinants of future experiences, and many others (Ellis, 1962). Overall, emotional and psychological difficulties, such as anxiety, are inexorably tied to these irrational thinking patterns and distorted perceptions.

From another perspective, one of the major purposes of cognitive processes, in general, is to think about, anticipate, and plan for the future (Eysenck, 1992). Anxiety is related to cognitive processes, then, in that anxiety is conceptualized by cognitive psychologists as a future-oriented condition, which involves worry about possible threats and potential consequences that one might encounter (Sarason et al., 1990). In some cases, individuals may experience anxiety even in the absence of a specific threat (Beck, Emery, & Greenberg, 1985). First, an individual experiences symptoms that are often associated with anxiety (such as rapid heart beat, shallow breathing, dizziness, or nausea). These may occur due to a variety of reasons unrelated to anxiety, such as physiological arousal during strenuous physical activity. Second, almost immediately afterward, the individual experiences an automatic, almost reflexive

cognitive response, often in the form of a thought or mental image. This thought or mental image attempts to identify a source or reason for these symptoms. When the perceived source is located, anxiety (described as an unpleasant emotional state) follows. This creates a cycle in which physiological feelings of anxiety are perceived by individuals as a response to a threatening object, event, or situation (even in the absence of an actual threat), which leads to anxiety, and further physiological arousal (Beck et al., 1985). In addition, Beck identified several cognitive symptoms that are associated with the experience of anxiety. These symptoms may include sensory or perceptual difficulties (including visual difficulties, self-consciousness, hypervigilance, etc.), thinking difficulties (including forgetfulness, confusion, distractibility, loss of objectivity, etc.), and conceptual difficulties (including cognitive distortion, obsessive thoughts, irrational fears, etc.).

Beck also emphasized the role of the "schema" in the development and experience of anxiety (Beck & Clark, 1988). According to Beck, schemas represent an individual's prior knowledge and experience, and are used by individuals as a way to interpret, organize, store and retrieve information. Information consistent with an existing schema is added to and organized within that schema, while information inconsistent with an existing schema may be ignored or forgotten. With regard to anxiety, individuals possess maladaptive schemas that focus on, organize, and maintain information about potentially threatening objects or events, while ignoring information inconsistent with the threat, resulting in a heightened sense of vulnerability and feelings of anxiety (Beck & Clark, 1988).

Cognitive theories have contributed to the development of the information-processing theory of anxiety (Beck & Clark, 1988), which describes the ways in which individuals process information from their environment in either adaptive or maladaptive ways (resulting in adaptive

or maladaptive schemas). Maladaptive schemas are described as rigid, concrete, and irrational, and may override more rational and adaptive schemas, resulting in an increase in irrational and distorted thoughts, perceptions, and conclusions (Beck & Clark, 1988). Beck also identified several types of irrational thought processes that contribute to and reinforce maladaptive schemas, including a tendency to form conclusions based on inadequate or missing information; engage in dichotomous or "black and white" thinking; magnifying the importance, significance, or threat of certain situations while minimizing others; overgeneralizing one's experiences or expectations from a specific circumstance across a wide variety of other (possibly unrelated) circumstances; and exclusively focusing on certain information, often out of context (Beck & Clark, 1988). Beck believed that different psychological conditions, including anxiety, were associated with unique "cognitive profiles," consisting of particular irrational thought processes and maladaptive schemas. For example, the information-processing theory suggests that anxiety is related to an underlying perceived sense of vulnerability and concern for one's physical and psychological safety, which results in specific fallacies in information processing, including the tendency to selectively attend to perceived threats in the environment, interpret otherwise neutral or ambiguous information in a negative or threatening manner, anticipate potential negative situations or consequences, and ignore or downplay information that contradicts his/her anxiety-related assumptions or conclusions (Beck & Clark, 1997; Beck et al., 1985; Taylor, Bomyea, & Amir, 2010). These faulty cognitive processes may result in an individual overestimating the frequency and possibility of the occurrence of perceived threats, overestimating the negative impact of the event (i.e., catastrophizing), and underestimating their ability to cope with the threat, thereby reinforcing their sense of vulnerability (Beck & Clark, 1988, 1997; Ellis, 1962; Vasey & Borkovec, 1992). Together, these maladaptive cognitive tendencies not only initiate

and maintain feelings of anxiety, but may also intensify future anxiety-related thoughts, feelings, and behaviors (Vasey & Ollendick, 2000).

Other researchers, such as John Watson and B.F. Skinner, adopted a more behavioral approach. According to behavioral theories, fear and anxiety develop as a result of aversive experiences, either through classical or operant conditioning (Ramirez et al., 2006). In the case of classical conditioning, anxiety may develop when an otherwise neutral object or situation becomes associated with a negative or aversive experience. For example, in the classic experiment conducted by John Watson, a young child was exposed to loud noises each time he attempted to touch an otherwise unthreatening white rat. The child's negative reaction to the loud noises became associated with his exposure to the rat. As a result, after only a short time, the child demonstrated a fearful, anxious response (e.g., crying, covering his eyes, attempting to move away from the rat, etc.) each time he encountered the rat (Harris, 1979). Further research has found that children with high levels of anxiety do appear to have experienced more frequent negative life events than children with lower levels of anxiety, suggesting a direct link between the development of anxiety and threatening life experiences (Boer et al., 2002).

With regard to operant conditioning, an individual may behave in certain ways that ultimately reinforce feelings of fear or anxiety. For example, when a child feels anxious or fearful, he or she may cry. Witnessing their child in distress, the child's parents may approach, comfort, and try to soothe or protect the child. Thus, the child's anxiety becomes reinforced and strengthened in these situations, as the child learns that expressing anxiety will result in a positive experience (i.e., attention and affection from parents; Ramirez et al., 2006; Vasey & Ollendick, 2000). Alternatively, the very act of avoiding an anxiety-provoking situation may lead to feelings of relief and reward, thereby reinforcing the anxiety and avoidant behaviors

associated with that situation, object, or event. Furthermore, by avoiding exposure to the situation or event, individuals deprive themselves of the opportunity to strengthen their skills to manage and overcome their anxiety (Muris, 2006; Vasey & Ollendick, 2000).

Combining behavioral, cognitive, and social aspects, Albert Bandura suggested that emotions and behaviors may develop through the process of social learning. Social learning may occur through several processes, including modeling, observation, and vicarious learning experiences (such as listening to an individual describe a situation or event; Bandura, 1965; Field, Argyrus, & Knowles, 2001; Gerull & Rapee, 2002). In Bandura's (1963) classic experiment, children witnessed another person acting either in a neutral or aggressive manner toward a doll. The results showed that children who observed another person acting aggressively toward the doll were more likely to act aggressively toward the doll, than those who had witnessed the neutral interaction (Bandura, 1963). Therefore, according to social learning theory, anxiety is likely to develop when a child observes or otherwise learns about the anxious behaviors of another person. For example, parents may inadvertently reinforce feelings of anxiety in their children by modeling anxious behavior, or expressing anxiety-related thoughts or feelings to their child (Hughes, Furr, Sood, Barnish, & Kendall, 2009; Vasey & Ollendick, 2000). Overall, social learning theory suggests that both direct and indirect learning opportunities may initiate, maintain, and intensify the experience of anxiety in children.

**Models of anxiety.** Several different models have been proposed to describe and explain the nature of anxiety. Three such models of anxiety will be discussed below.

***Tripartite model of anxiety.*** With researchers and clinicians acknowledging the complex nature of anxiety (Izard, 1972), new conceptualizations were developed that depicted anxiety as a multi-dimensional construct which may encompass a variety of fundamental emotions (Cattell

& Scheier, 1961; Izard, 1972). Indeed, several theories have been offered to overcome difficulties in discriminating between symptoms of anxiety and depression, resulting from an apparent overlap in symptoms between the two disorders (Watson & Kendall, 1989). Such theories include the conceptualization of anxiety and depression as similar but independent disorders, of anxiety as both a risk factor for and potential consequence of depression, and of anxiety and depression as related disorders along a shared continuum of negative affect (Clark, 1989; Lépine, 2002; Schniering et al., 2000). In an effort to promote more accurate assessment of and further clarify the relationship between anxiety and depression, recent research has attempted to identify both the similarities and differences that exist between the two disorders. Rather than indicative of poor discriminant validity among measures of anxiety and depression, it is now more widely recognized that anxiety and depression have shared as well as distinct characteristics (Clark & Watson, 1991). The tripartite model of anxiety and depression describes three dimensions of emotional and physiological functioning: negative affect (NA; including feeling fearful, upset, unpleasant, angry, hopeless, guilty, sad, worried, lonely, gloomy, and general emotionally distressed), positive affect (PA; including feeling cheerful, active, energetic, enthusiastic, happy, proud, etc.), and physiological hyperarousal (PH; including shakiness, rapid heartbeat, sweating palms, muscle tension, etc.; Clark & Watson, 1991; Watson & Kendall, 1989). Although positive and negative affect appear to be mutually exclusive, high or low levels of positive or negative affect may actually result in unique and independent emotional states. For example, low levels of positive affect are thought to be characterized by fatigue, lethargy, sluggishness, and anhedonia (i.e., loss of interest or pleasure) rather than emotionally-aversive or distressing experiences. On the other hand, low levels of negative affect are thought to be characterized by feelings of peace, contentment, calmness, and relaxation, rather than overtly

positive emotions (Watson & Kendall, 1989). Using these three dimensions of emotional and physiological functioning, the tripartite theory of anxiety and depression identifies negative affect or general emotional distress as the common symptom found between anxiety and depression (Clark & Watson, 1991). Indeed, many terms often used to describe anxiety (such as feeling fearful, worried, or tense) and depression (such as feeling sad, gloomy, or hopeless) are often used to describe negative affectivity in general (Watson & Kendall, 1989). In addition to negative affect, anxiety is further characterized by heightened levels of physiological hyperarousal, while depression is further characterized by reduced levels of positive affect (Clark & Watson, 1991). Together, these dimensions help to explain the apparent overlap of symptoms during the assessment of anxiety and depression, account for the high degree of comorbidity between the two conditions, provide a means to differentiate symptoms of anxiety from depression, and support the use of a "mixed anxiety-depression" diagnostic condition (Clark & Watson, 1991; Laurent & Ettelson, 2001).

Although originally developed through research on adult populations, the tripartite model of anxiety and depression has been examined among child and adolescent populations and appear to adequately explain the overlap of anxious and depressive symptoms reported by these populations as well (Laurent & Ettelson, 2001). Specifically, children with depression have consistently reported lower levels of positive affect, while children with anxiety have consistently reported higher levels of physiological hyperarousal than the general population (Laurent & Ettelson, 2001; Phillips & Lonigan, 2002). This emphasizes the importance of assessing symptoms related to physiological hyperarousal when attempting to identify the presence of anxiety in both children and adults.

***Cognitive model of anxiety.*** Another recent conceptualization of anxiety has been introduced which focuses on anxiety as a primarily cognitive condition. The cognitive model proposes that anxiety is characterized by and results from abnormal, excessive worry (Wells, 1999). Worry is described as an intrusive, negative, and predominantly verbal activity (Borkovec, Robinson, Pruzinsku, & DePree, 1983; Wells & Morrison, 1994). Worry is associated with several, emotional, cognitive, and physiological components of anxiety, such as feelings of emotional and physical tension, as well as apprehension. In addition, individuals often experience difficulties reducing or eliminating worry-related thoughts, suggesting that worry may be, in part, an uncontrollable experience (Borkovec et al., 1983). Research indicates that worry may be focused on two types of events: cognitive internal events (such as one's own thoughts), or external and non-cognitive internal events (such as an object or event in one's surrounding environment; Wells, 1995, 1999). Similarly, research has identified two types of beliefs related to worry: the belief that worry is a positive, protective, solution-oriented activity; and the belief that worry is uncontrollable and may result in negative consequences (Wells, 1995, 1999). According to the cognitive model, individuals utilize worry as a coping strategy to manage potentially threatening events or experiences. When attempting to initially appraise and cope with a potentially threatening experience, individuals' positive beliefs about worry (as a positive, adaptive activity in response to an external threat) become activated, and worrying (as a protective coping strategy) begins. However, as one worries, one begins to appraise the helpfulness and appropriateness of worrying. Therefore, the individual's negative beliefs about worry begin to surface, as he or she conceptualizes worry as uncontrollable and potentially harmful. Both of these worry-related beliefs (adaptive and maladaptive) contribute to feelings of anxiety within the individual, which may reinforce or even become an additional source of

worry. In other words, although worry may initially be triggered by an external event, it may quickly increase and become uncontrollable as individuals "worry about worrying" and attempt to control or reduce their own worry. However, these attempts often simply lead to an increase in intrusive thoughts, and further contribute to feelings of anxiety, worry, and loss of control (Wells, 1995, 1999).

***State-trait model of anxiety.*** One of the most influential conceptualizations is that of the state-trait model of anxiety (Cattell & Scheier, 1958, 1961; Spielberger, 1966, 1972a, 1972b, 1972c). Based on the factor analytic work conducted by Cattell and Scheier (1958, 1961), the state-trait anxiety model suggests that individuals experience two dimensions of anxiety: state and trait. State anxiety is a short-term emotional response to an object or situation that is perceived as threatening or stressful. High levels of state anxiety would be expected in situations that are perceived to be threatening or stressful. It is important to note that state anxiety is not dependent on the actual level of threat or danger involved, but rather on the individual's subjective appraisal and perception of the threat (Spielberger, 1966). Trait anxiety, on the other hand, refers to the chronic, dispositional tendency to experience anxiety in response to a variety of situations and stressors, and can be described as the extent to which an individual is prone to anxiety (Barlow, 2002a; Spielberger, 1966, 1972b, 1972c). Although "general" anxiety could now be broken down into the more specific components of state and trait anxiety, the two dimensions of anxiety remain interrelated, as the experience of state anxiety depends on one's level of trait anxiety. That is, if an individual is inherently prone to experience anxiety, he or she is more likely to appraise an external stressor in a highly anxious way, resulting in state anxiety (Barlow, 2002a; Spielberger, 1972b, 1972c). Therefore, individuals with high levels of trait anxiety are more likely to perceive situations as threatening or stressful than individuals with low

levels of trait anxiety (Spielberger, 1972a, 1972b, 1972c). This interrelation is further seen in the measurement methods of state and trait anxiety. For example, whereas state anxiety may often be measured in physiological or behavioral ways, such as through heart rate, perspiration rate, and avoidant behaviors, the measurement of trait anxiety is less straightforward, and is typically reflected in the frequency and intensity of state anxiety reactions over time (Spielberger, 1972b).

**Measurement of anxiety.** Many measurement techniques have been developed to assess anxiety symptoms in children, such as clinical interviews, observations, and behavior rating scales provided by parents, teachers, or other caregivers; psychophysiological measures, such as heart or respiratory rate; and self-report measures, which allow children and adolescents to provide their own insight and perspective on anxiety symptoms they experience (Velting, Setzer, & Albano, 2004). The use of self-report measures to assess psychological symptoms began with the Minnesota Multiphasic Personality Inventory (MMPI). The MMPI represented an objective and standardized way to assess psychological symptoms in adults, and was developed in response to the high rates of medical patients who also experienced psychological difficulties (McKinley & Hathaway, 1943). The MMPI contained 550 statements that related to a variety of areas of personal and psychological functioning, such as general health, family and marriage, social attitudes, and morale, as well as anxiety-related symptoms including hysteria and hypochondriasis. Individuals were instructed to read each statement, and indicate how true the item was for them using a "true/false" format. The MMPI was used extensively among individuals with medical and psychological concerns, and research was conducted to determine the usefulness and accuracy of the MMPI in identifying individuals with significant psychological difficulties. For example, Hovey (1949) administered the MMPI to 199 psychiatric patients with diagnoses categorized as somatic reactions (such as gastrointestinal or

cardiovascular conditions), dissociative-conversion reactions (such as schizophrenia), or anxiety reactions. Results revealed that individuals diagnosed with anxiety demonstrated considerably more emotional distress, as measured by the MMPI, than individuals diagnosed with either somatic or dissociative-conversion reactions, which was consistent with the results of an additional psychiatric evaluation done independently of the MMPI (Hovey, 1949). This reinforced the utility of the MMPI when assessing the needs and impairment of individuals with anxiety. However, the MMPI did not contain a scale that specifically measured anxiety, and anxiety-related symptoms were found to overlap among several scales (such as depression, hypochondriasis, hysteria, psychasthenia, phobia, etc.; Modlin, 1947; Welsh, 1952). As a result, practitioners often resorted to administering a combination of certain anxiety-related scales (such as depression, hysteria, and hypochondriasis) in an effort to estimate overall levels of anxiety (Modlin, 1947; Welsh, 1952; Windle, 1955). This overlap of anxiety-related symptoms among scales as well as the lack of a dedicated anxiety scale reduced the ability of the MMPI to effectively identify and differentiate individuals with anxiety from individuals either without anxiety difficulties or with other psychological or medical difficulties. For example, Winne (1951) administered anxiety-related scales of the MMPI (including hysteria, hypochondriasis, and depression) to 560 individuals with and without anxiety disorders. Results indicated that, of the 117 items contained within the anxiety-related scales, only 33 items accurately differentiated between individuals with and without an anxiety disorder. This resulted in a high rate of misclassification, including individuals with anxiety who were classified as not having anxiety, and individuals without anxiety who were classified as having anxiety, according to the MMPI (Winne, 1951). These results suggested that, although the MMPI may have been effective in assessing the level of psychological distress experienced by individuals with anxiety, it was less

effective in identifying and differentiating individuals with anxiety from those without anxiety or with other psychological or medical difficulties.

In order to more accurately identify, differentiate, and assess anxiety, the MMPI was adapted by Taylor (1953) to create a more specific and refined measure of anxiety in adults. According to Taylor (1951), anxiety is defined as overt, behavioral symptoms (such as restlessness), and reflects an individual's motivational drive to satisfy a need (i.e., to avoid an unpleasant experience) when confronted with a potentially threatening object, event, or situation. Taylor theorized that this motivational drive includes several aspects, including cognitive/emotional aspects (such as anticipation of an unpleasant situation as a result of prior learning experiences) and physiological aspects (such as muscle tension, increased heart rate, etc.). To measure these symptoms for experimental research purposes, Taylor (1951) identified approximately 200 anxiety-related items from the MMPI, and examined them on the basis of their relationship to the current conceptualization of manifest anxiety (i.e., overt behavioral symptoms accompanied by cognitive, emotional, and physiological symptoms). The resulting Manifest Anxiety Scale (MAS) contained 225 items from the MMPI, including 50 items specific to the experience of anxiety in adults, as well as 175 "buffer" items unrelated to anxiety. Individuals were instructed to respond to each item using a "true/false" format, with higher scores on the MAS indicating higher levels of manifest anxiety. Taylor (1953) reported strong test-retest reliability coefficients for the MAS scores of .89 over a three-week period and .82 over a five-month period. In addition, the MAS was found to yield higher scores when administered to psychiatric patients, as compared to non-patients, supporting the relationship between the MAS scores and clinical observations of manifest anxiety (Spence & Taylor, 1953; Taylor, 1953) and the construct validity of the MAS scores.

In an attempt to extend the use of Taylor's (1953) scale for use with additional populations, the MAS was adapted for use with children, grades four through six, resulting in the Children's Manifest Anxiety Scale (CMAS). The CMAS included 42 items related to anxiety in children, as well as an additional 11 items designed to identify inaccurate or socially desirable responses. Children were instructed to read each item, and respond using a "yes/no" format. Higher scores on the CMAS reflected higher levels of anxiety in children (Castaneda, McCandless, et al., 1956). Strong to very strong test-retest reliability correlations were reported for the CMAS scores, ranging from .70 (*strong*) to .94 (*very strong*) over a one-week interval (Castaneda, McCandless, et al., 1956). The CMAS, which included developmentally-appropriate items and normative information for children, was widely used for over 20 years, and helped researchers and clinicians better understand anxiety in children (Reynolds & Richmond, 1978). Anxiety became more widely recognized and understood as a condition experienced by not only adults, but children as well (Castaneda, McCandless, et al., 1956). For example, significant negative relationships were discovered between levels of manifest anxiety (as measured by the CMAS) and several areas of academic achievement (including reading and math) among elementary school children (McCandless & Castaneda, 1956; Reese, 1961). In addition, research indicated that children with high levels of anxiety (as measured by the CMAS) experience greater difficulty performing complex learning activities, compared to children with low levels of anxiety (Castaneda, Palermo, & McCandless, 1956). These studies demonstrated that, like adults, children are also vulnerable to the debilitating effects of anxiety, particularly with regard to learning and academic achievement.

***Revised Children's Manifest Anxiety Scale.*** A subsequent revision of the CMAS led to the Revised Children's Manifest Anxiety Scale (RCMAS). Improvements in the RCMAS

compared to the CMAS included reduced length of the scale, shortened administration time, more developmentally-appropriate items, updated normative information, and improved reliability and validity (Reynolds & Paget, 1983; Reynolds & Richmond, 1978). The resulting 37-item self-report measure was written at a third grade reading level, and contained 28 statements related to chronic, manifest anxiety, as well as a 9-item lie scale (to identify socially-desirable response patterns). Together, the 28 statements comprise a Total Anxiety scale, which provides an overall estimate of the child's chronic, manifest anxiety. The RCMAS Total Anxiety scale further breaks down into three subscales: Physiological Anxiety, Worry/Oversensitivity, and Social Concerns/Concentration. Children were instructed to read each statement on the RCMAS, and indicate whether the statement was true for them using "yes/no" response options (Reynolds & Richmond, 1978). The RCMAS became one of the most widely used instruments for the assessment of children's anxiety in both research and clinical settings (Holmbeck et al., 2008; Myers & Winters, 2002; Silverman & Ollendick, 2005), and numerous research studies have supported the use of the measure with both genders, as well as different ages, grade levels, ethnicities, and educational abilities (Paget & Reynolds, 1984; Pina et al., 2009; Reynolds, 1980; Reynolds, 1982; Reynolds & Paget, 1981; Reynolds & Paget, 1983; Reynolds & Richmond, 1978; Reynolds & Richmond, 1979; Varela et al., 2008). For example, Reynolds (1982) administered the RCMAS to a sample of 86 elementary school students. The students included 47 males and 39 females, and were enrolled either in the third or fourth grade. The purpose of the study was to identify any effects of gender on levels of anxiety, as well as to examine the reliability and validity of the RCMAS scores for both male and female students. First, results indicated that females demonstrated higher levels of anxiety than males, which is consistent with other research findings regarding gender and anxiety (Cohen et al., 1993; Gau et

al., 2005; Gullone et al., 2001; Kessler et al., 1994; Reynolds, 1998; Roberts et al., 2008; Roberts et al., 2007; Schniering et al., 2000). In addition, the mean scores for both male and female students were similar to those of the normative sample, which supports the reliability and generalizability of the RCMAS scores across populations. Finally, the RCMAS scores of both male and female participants demonstrated positive correlations with scores from other measures of anxiety, including the Trait Anxiety scale of the STAI-C, but did not demonstrate any significant correlations with the State Anxiety scale of the STAI-C, supporting the convergent and discriminant validity of the RCMAS scores for both males and females (Reynolds, 1982). Other studies have also examined the use of the RCMAS among different ethnic and racial populations. For example, Pina and colleagues (2009) administered the RCMAS to 677 children and adolescents who met diagnostic criteria for an anxiety disorder. Of these participants, 41% (n = 279) were White, while 59% (n = 398) were Latino. The researchers reported similar factor structures across ethnic groups on the RCMAS, suggesting that the RCMAS yields valid scores for both White and Latino children and adolescents (Pina et al., 2009). Finally, the RCMAS was also administered to students with specific learning disabilities, to assess the reliability and validity of the RCMAS scores, as well as differences in mean levels of performance between students with and without specific learning disabilities (Paget & Reynolds, 1984). To do so, the RCMAS was administered to 106 children and adolescents, ages 6 – 17, who had been identified with a specific learning disability. Strong internal consistency reliability estimates for the RCMAS scores among children with specific learning disabilities were reported, ranging from .77 for males to .83 for females, and .79 for the total sample. Further analysis of the RCMAS scores revealed that children with specific learning disabilities reported significantly higher

levels of anxiety compared to children without specific learning disabilities (Paget & Reynolds, 1984).

***Revised Children's Manifest Anxiety Scale, Second Edition.*** Most recently, revisions of the RCMAS have led to the development of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2). Like its predecessor, the RCMAS-2 is a self-report measure of children's chronic, manifest anxiety. Improvements in the RCMAS-2 (as compared to the RCMAS) include updated normative information, new or reworded scale items to better represent concerns and situations experienced by children, as well as greater adherence of the scale and subscales to current conceptualizations of anxiety in children (Reynolds & Richmond, 2008b). Developed for use with children ages 6-19, the RCMAS-2 contains 49 items which children read and respond to using a "yes/no" format. In addition, similar to the RCMAS, the RCMAS-2 includes three subscales (Physiological Anxiety, Worry, and Social Anxiety), as well as a Total Anxiety scale. The Total Anxiety scale is composed of all 40 anxiety-related items (including 27 items retained from the original RCMAS as well as 13 new items), and provides an overall estimate of the child's chronic, manifest anxiety. Like the original RCMAS, the Physiological Anxiety subscale of the RCMAS-2 focuses on physical manifestations of anxiety, such as nausea, headaches, fatigue, and sleep difficulties. It contains a total of 12 items, including 11 items retained from the RCMAS as well as one new item. The Worry subscale contains 16 items (including 10 items retained from the RCMAS as well as six new items), and replaces the previously-named Worry/Oversensitivity subscale from the RCMAS. The Worry subscale focuses on cognitive and emotional symptoms of anxiety, such as obsessive worry, feeling afraid or nervous, and feeling oversensitive toward criticism or environmental pressures. Finally, the Social Anxiety subscale contains 12 items (including six items retained from the

original scale as well as six new items), and replaces the previously-named Social Concerns/Concentration subscale from the RCMAS. The Social Anxiety subscale includes items related to performance anxiety, as well as concerns related to social relationships, efficacy, and expectations (Reynolds & Richmond, 2008b). The RCMAS-2 also includes two validity indices: Inconsistent Responding and Defensiveness. The Inconsistent Responding index includes 9 pairs of similar items, and assesses the degree to which individuals endorse the content in similar ways for each pair of items. High scores on the Inconsistent Responding index may indicate that the individual did not pay close attention to the meaning of the items, or responded in a careless or random manner. The Defensiveness index includes 9 items that describe common mistakes or negative behaviors, and assesses the degree to which individuals are willing to admit engaging in these mistakes or behaviors. High scores on the Defensiveness index may indicate that the individual is unwilling to acknowledge mistakes or imperfect behavior, or is trying to portray him or herself in an overly negative manner (Reynolds & Richmond, 2008b).

Finally, the RCMAS-2 also contains a shortened version, comprised of the first 10 items from the overall scale. The RCMAS-2 Short Form takes approximately 5 minutes to complete, and allows researchers and clinicians to obtain a quick and efficient estimate of an individual's anxiety. The shortened version of the RCMAS-2 yields a Short Form Total Anxiety score. The RCMAS-2 Short Form consists of three items from the Physiological Anxiety subscale, four items from the Worry subscale, and three items from the Social Anxiety subscale. Validity indexes are not included within the RCMAS-2 short form.

A five-factor structure has consistently been found across both the RCMAS and the RCMAS-2. Specifically, factor analyses of the RCMAS yielded three anxiety factors (physiological anxiety, worry/oversensitivity, and social concerns/concentration) as well as two

lie factors. All items loaded strongly on only one factor (with the exception of one item, which loaded equally on two factors), resulting in factors that were distinct and meaningful. This five-factor structure was found to account for each item in both psychologically and statistically meaningful ways (Reynolds & Richmond, 1985). Factor analyses of the RCMAS-2 also yielded a similar five-factor structure, consisting of three anxiety-related factors (physiological anxiety, worry, and social anxiety) and two lie factors. Research has also found this same five-factor structure on the RCMAS across various populations, including gender (male, female), race (Black, White), and educational status (gifted, learning disability, non-learning disability). For example, Reynolds and Paget (1981) examined the factor structure of the RCMAS across race. The RCMAS was administered to 4,972 children, ages 6 – 19 years. Approximately 88% ($n$ = 4,384) of the participants were White, while 12% ($n$ = 588) of the participants were Black. Factor analyses revealed a five-factor structure for both racial groups, consisting of three anxiety-related factors (physiological anxiety, worry/oversensitivity, and social concerns/concentration) and two lie factors. Although various other factor solutions, including three to eight factors, were examined, the five-factor solution appeared to be the most conceptually and statistically meaningful across groups (Reynolds & Paget, 1981). This indicates that the five-factor structure is consistent across Whites and Blacks. Similarly, Reynolds and Harding (1983) examined the factor structure of the RCMAS across a large sample of children and adolescents (including 2,497 males and 2,475 females) using six different and separate methods of analyses. These analyses involved the computation of similarity index values, including the coefficient of congruence, Pearson product-moment correlation coefficient among factor loadings, Pearson product-moment correlation coefficient among Fisher-transformed factor loadings, nonparametric salient variable similarity index values, and Pearson

product-moment correlation coefficient between factor scores based on additional specific criteria. The authors reported that each of the six similarity index values suggested that the five-factor structure was invariant across both genders (Reynolds & Harding, 1983). These findings indicate that the factor structure of the RCMAS is similar across both males and females, and supports the validity of the RCMAS scores across gender. Finally, Paget and Reynolds (1984) examined the factor structure of the RCMAS among 106 public school children, ages 6 – 17, who were receiving special education services for specific learning disabilities. Sixty-nine percent (n = 73) of the participants were male, while 31% (n = 33) of the participants were female. In addition, 34% (n = 36) of the participants were Black, while 66% (n = 70) of the participants were White (Paget & Reynolds, 1984). Factor analyses of the data revealed several similarities and differences, compared with the normative sample from the RCMAS. Similar to the normative sample, the factor structure for the specific learning disability subsample included three anxiety-related factors as well as two lie factors. However, differences arose with regard to the items contained within each factor. For example, some items that previously were most salient on the Worry/Oversensitivity factor instead were most salient on the Physiological Anxiety factor, and vice versa. Similarly, some items that previously were most salient on the Social Concerns/Concentration factor instead were most salient on either the Physiological Anxiety or Worry/Oversensitivity factor. As a result, further statistical analyses indicated that the Worry/Oversensitivity factor and the Social Concerns/Concentration factor were not as strongly or consistently represented within the five-factor structure for individuals with specific learning disabilities, compared to the normative sample. Although these results confirm that, like children in the normative sample, children with specific learning disabilities appear to experience anxiety that is multidimensional in nature, it is possible that some anxiety-related

symptoms, such as worry and oversensitivity, are experienced differently or are related to different types of stress by children with specific learning disabilities, compared to the normative sample (Paget & Reynolds, 1984).

Although factor analyses of the RCMAS for children with specific learning disabilities supported a five-factor structure (Paget & Reynolds, 1984), the similarities and differences among the five-factor structure for children with specific learning disabilities compared to the normative sample underscore the need for researchers to examine the factor structure of the RCMAS-2 among children with specific learning disabilities. It is anticipated that, consistent with previous research involving the RCMAS, a similar five-factor structure consisting of three anxiety-related factors and two lie factors will emerge from the RCMAS-2 scores of individuals with specific learning disabilities. However, given the results of the factor analyses of the RCMAS, it is possible that the strength of the five factors may differ for children with specific learning disabilities, potentially reflecting qualitative differences in the experience of anxiety among children with specific learning disabilities.

**Psychometric Properties of Measurement Instruments**

When using measurement instruments, it is important to remember that test scores, rather than the test instruments themselves, are valid and reliable. Furthermore, one must also concede that the reliability and validity of these test scores may vary depending on many factors, such as the target population (Thompson & Vacha-Haase, 2000). However, the reliability and validity of test scores may also be affected by other, more global changes, such as shifts in societal attitudes, or advances in research and clinical fields. Assessment instruments must also be periodically revised to maintain relevance to current cultural, societal, and research interests, and ensure the continued applicability of the revised instrument to different populations (Paget &

Reynolds, 1984). Shortly after the development of the RCMAS, researchers began gathering data to determine whether the RCMAS produced valid and reliable scores for various populations of children. As stated previously, researchers gathered reliability and validity information from many different groups of children, including both genders, as well as various ages, grade levels, and races/ethnicities (Paget & Reynolds, 1984; Pina et al., 2009; Reynolds, 1980; Reynolds, 1982; Reynolds & Paget, 1981; Reynolds & Paget, 1983; Reynolds & Richmond, 1978; Reynolds & Richmond, 1979; Varela et al., 2008). In addition to these subgroups, the RCMAS was administered to children with specific learning disabilities to obtain normative data and assess the psychometric properties of the scores of the RCMAS for this specific population (Paget & Reynolds, 1984). Results indicated that the RCMAS produces valid and reliable scores among children with specific learning disabilities. However, the RCMAS has been revised since this study was conducted by Paget and Reynolds in 1984.

**Convergent and Discriminant Validity.** Additional verification of construct validity includes examination of convergent and discriminant validity. Convergent validity refers to the degree of correlation between independent measures of the same or similar constructs, while discriminant validity refers to the lack of correlation between independent measures of dissimilar constructs (Cicchetti, 1994). When developing a measurement instrument, various constructs will be hypothesized to be related to the construct being measured, while other constructs will be hypothesized to not be related to the construct being measured. For example, as the original RCMAS was developed as a measure of chronic, manifest anxiety in children, it was hypothesized that RCMAS scores (measuring the construct of chronic, manifest anxiety) would be related to scales measuring similar constructs. Subsequent research conducted with the RCMAS revealed significant moderate to strong correlations between the RCMAS Total Anxiety

scale scores and the Trait Anxiety scale scores of the STAI-C, indicating that the construct of chronic, manifest anxiety (as measured by the RCMAS) is indeed related to the construct of trait anxiety (as measured by the STAI-C; Reynolds, 1980, 1982). In contrast, it was hypothesized that RCMAS scores (measuring the construct of chronic, manifest anxiety) would have lower correlations with scale scores measuring dissimilar constructs. Research with the RCMAS failed to find any significant correlations between the RCMAS Total Anxiety scale scores and the State Anxiety scale scores of the STAI-C, indicating that the construct of chronic, manifest anxiety (as measured by the RCMAS) is not significantly related to the construct of situational anxiety (as measured by the STAI-C; Reynolds, 1980, 1982). In light of these results utilizing the RCMAS, it is similarly hypothesized that the RCMAS-2 scores (measuring the construct of chronic manifest anxiety) will also have higher correlations with scale scores measuring similar constructs (e.g., trait anxiety), and smaller correlations with scale scores measuring dissimilar constructs (e.g., state anxiety), lending support to the convergent and discriminant validity of the RCMAS-2 scores.

**Factorial Invariance.** An important type of validity is "factorial validity." Factorial validity is established by identifying salient "factors" from the data, through the use of exploratory (EFA) and/or confirmatory (CFA) factor analyses (Cicchetti, 1994). Factors are comprised of multiple related variables or items which, when taken together, provide an efficient representation of a certain construct (Salkind, 2007). Factorial validity assesses the degree to which one or more independent factors are measured within a single assessment instrument (Cicchetti, 1994).

Once the salient factors have been identified, researchers must determine whether the instrument yields these same latent factor structures when it is administered to different groups

or under different circumstances. For example, if an anxiety measure is administered to male and female children, the latent factor structure of an anxiety measure must be similar across both male and female children before any comparisons or interpretations can be made regarding differences or similarities of the scores between male and female children. The stability of the factors across different groups and situations refers to "factorial invariance." The presence of factorial invariance suggests that the instrument measures the same construct across different groups, and supports the generalizability of the results to other populations and contexts, and reduces the potential for test bias (Horn & McArdle, 1992; Lowe & Raad, in press; Vandenberg & Lance, 2000). However, if evidence of factorial invariance is lacking, interpretations cannot be made and conclusions cannot be drawn regarding potential differences in outcomes between groups, as it cannot be proven whether any potential differences between groups are due to "true" differences or psychometric inaccuracies and test bias (Cheung & Rensvold, 2002; Horn & McArdle, 1992; Reynolds et al., 1999; Vandenberg & Lance, 2000).

Failure to demonstrate factorial invariance indicates that the instrument is unable to yield valid scores across different populations, suggesting the presence of test bias (Friedenberg, 1995). Test bias may be present when an instrument systematically yields different outcomes for different groups of people; that is, test bias reflects a source of systematic variance that is unrelated to the construct being measured (Friedenberg, 1995; Reynolds & Carson, 2005; Reynolds & Lowe, 2009; Reynolds et al., 1999). This may occur when items on an assessment instrument apply differently to or are interpreted differently by different groups of people. For example, individuals in different subgroups may interpret items and response options of a particular assessment instrument in different ways, which may then influence the individuals'

responses as well as subsequent interpretations and recommendations based on those responses (Reynolds & Lowe, 2009; Reynolds et al., 1999; Wood, Garb, Lilienfeld, & Nezworski, 2002).

Conversely, when factorial invariance is present, one can assume that the instrument is unbiased, and capable of measuring the same construct in the same manner across different groups of people (Reynolds, 2000). For example, as stated previously, Reynolds and Paget (1981) examined the factor structure of the RCMAS, including the degree of factorial invariance across gender and ethnic groups. The researchers found that the five-factor structure identified by the factor analyses (Physiological Anxiety, Worry/Oversensitivity, Social Concerns/Concentration, Lie, and Total Anxiety) is consistent across gender (male and female) as well as race (Black and White). As a result, the researchers are able to conclude that the RCMAS is invariant across gender and certain racial/ethnic groups and does not exhibit test bias, which further supports the construct validity of the RCMAS (Reynolds & Paget, 1981).

Overall, determining the reliability and validity of test scores is a continuous process, as reliability and validity can vary as a function of population, setting, context, and many other variables. Just as this process is vital during the development of new measurement instruments, the process is equally as important during the revision of existing measures (Reynolds & Lowe, 2009; Reynolds et al., 1999). When utilizing measurement instruments to assess levels of a variable (such as anxiety) in a specific population (such as children with specific learning disabilities), or comparing levels of a variable between two or more groups (such as children with and without specific learning disabilities), researchers and clinicians must first ensure that that the instrument yields valid and reliable scores for those specific populations.

The present study has several objectives. First, this study will determine whether the factor structure of the RCMAS-2 scores among children with specific learning disabilities is

similar to that of the factor structure of the RCMAS-2 scores among non-referred children. In addition, this study will examine the psychometric properties (including convergent validity, discriminant validity, temporal stability, and internal consistency) of the RCMAS-2 scores among children with specific learning disabilities. Finally, this study will explore whether children with specific learning disabilities experience significantly high levels of general anxiety, as measured by the RCMAS-2, than non-referred children.

# CHAPTER III

## Method

The participants, instruments, and procedures used in the study are described below. Data analyses performed to answer the proposed research questions are also described below.

### Participants

One hundred seventy-eight participants were recruited from 42 elementary, middle, and high schools across six public school districts located within the midwestern United States. Overall, 133 participants (74.72% of the total sample) were recruited from two school districts in Colorado, 27 participants (15.17% of the total sample) were recruited from three school districts in Kansas, and 18 participants (10.11% of the total sample) were recruited from one school district in Illinois.

Participants included children identified within the school districts as meeting the criteria for a "specific learning disability" according to IDEIA of 2004 (U.S. Department of Education, 2006), or the 1997 Amendments to IDEA (U.S. Department of Education, 1999). Although IDEIA serves as a revision of its immediate predecessor, the 1997 Amendments to IDEA (U.S. Department of Education, 1999), the definition of specific learning disabilities remained unchanged during the revision. According to IDEIA, "specific learning disability" refers to a "disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or to do mathematical calculations, including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction, dyslexia, and developmental aphasia" (34 C.F.R. § 300.8; U.S. Department of Education, 2006, p. 46757). IDEIA further clarifies that specific learning disabilities may not include learning difficulties that are primarily

caused by visual, auditory, or motor disabilities, mental retardation, emotional difficulties, lack of appropriate educational instruction, limited English proficiency, or other environmental, cultural, or economic factors (34 C.F.R. §§ 300.8, 300.306; U.S. Department of Education, 2006). In addition, in order to qualify for special education and related services, a student must also demonstrate an educational need to receive such services (34 C.F.R. §300.306; U.S. Department of Education, 2006). Participants in this study included students for whom a specific learning disability was their only disability, as well as students who met criteria for a specific learning disability as well as other educational disabilities (for example, children who met the criteria for a specific learning disability *and* speech-language impairment). Of the 178 participants, 59.55% were male ($n$ = 106) and 40.45% ($n$ = 72) were female. Children were recruited from grades three through twelve, with a mean grade level of 5.52 years ($SD$ = 2.24). Children ranged in age from 8 to 18 years, with a mean age of 11.29 years ($SD$ = 2.30). The sample included several racial/ethnic groups, including White/Caucasian (73.60%, $n$ = 131), Black/African American (7.30%, $n$ = 13), Hispanic/Latino (5.62%, $n$ = 10), Native American/American Indian (3.93%, $n$ = 7), and Asian/Pacific Islander (1.12%, $n$ = 2). Nine participants (5.06% of the sample) identified their ethnicity as "Other," while six participants (3.37% of the sample) identified "Multiple" ethnicities (see Table 1).

It was anticipated that the sample of students recruited for this study may include higher percentages of male and minority students than in the general education population, as research suggests that the percentage of male and minority students who are identified with a specific learning disability and receive special education services may be somewhat higher than in the general educational population (U.S. Department of Education, 2007, 2009). The percentages associated with the different racial/ethnic groups identified within the current study were

compared to the percentages associated with the different racial/ethnic groups of children ages 5-17 identified by the 2011 American Community Survey (U.S. Census Bureau, 2011; see Table 2). Overall, the ethnic/racial composite of the specific learning disability subsample more closely mirrored national estimates than did the full reference subsample. For example, although the percentage of participants with specific learning disabilities who identified as White (73.60%) was slightly higher than national estimates (68.6%), the percentage was closer to the national estimates than the percentage of children within the full reference subsample who identified as White (47.2%). This trend was also true for participants who endorsed more than one ethnicity/race or who endorsed "Other" ethnicities and races. Similarly, while the percentage of participants with specific learning disabilities who identified as Black/African American was slightly lower than national estimates, the percentage more closely mirrored national estimates than did the ethnic/racial composite of the full reference subsample. Conversely, however, several ethnic/racial categories did not appear to mirror those of the national estimates, including Asian/Pacific Islander and Native American, which demonstrated percentages which were lower and higher (respectively), in comparison to both the full reference subsample and national estimates. Overall, examination of the ethnic/racial composite of the specific learning disability subsample reveals higher percentages of White/Caucasian and Native American participants, and lower percentages of other ethnic/racial categories (including Black/African American, Asian/Pacific Islander, Multiple Ethnicities/Races, and Other Ethnicities/Races) compared to the estimates of the general population of children and adolescents. Overall, the expected finding (that students of minority ethnic/racial backgrounds are likely to be over-identified with a specific learning disability) was not born out in the current sample.

Furthermore, the percentage of students who identified their gender as male or female was compared to gender data from the U.S. Census Bureau (2012). Overall, 59.55% of the participants included in the current study were male, and 40.45% were female. This is somewhat higher than the estimates of the U.S. Census, which estimates that approximately 51.2% of the general population of children and adolescents is male, and 48.8% is female. The percentage of males in the present study is higher than the percentage of males in the general population, supporting previous research (U.S. Department of Education, 2007, 2009) suggesting that male students may be more likely than female students to be identified with a specific learning disability and receive special education services.

Data collected in this study were also compared to the data collected by Reynolds and Richmond during the development of the RCMAS-2. These children are referred to as the "full reference subsample" or as "non-referred children" in this study. According to Reynolds and Richmond (2008b), the full reference subsample was collected from a large, ethnically and geographically diverse group of children and adolescents, and consisted of 3,086 children, ages 6 to 19 years. Of these participants, 48.7% were male ($n$ = 1,502) and 51.3% were female ($n$ = 1,584). The full reference subsample also included several racial/ethnic groups, including White/Caucasian (47.2%, $n$ = 1,457), Black/African-American (28.3%, $n$ = 874), Hispanic/Latino (16.0%, $n$ = 495), Asian/Pacific Islander (3.9%, $n$ = 120), Native American (1.5%, $n$ = 45), and Other (2.6%, $n$ = 79). Information regarding racial/ethnic diversity was missing or not endorsed among 16 (0.5%) of the participants.

Information about the gender and racial composition of the specific learning disability subsample, full reference subsample, and general population can be found in Table 2.

**Instruments**

Assessment instruments consisted of a set of self-report measures. The self-report measures included in the present study are the Behavior Assessment System for Children, Self-Report of Personality, Second Edition (BASC-2-SRP; Reynolds & Kamphaus, 2004a), the RCMAS-2, the State-Trait Anxiety Inventory, Form Y (STAI-Y; Spielberger et al., 1983) and the STAI-C. Due to age and grade-level restrictions of some measures, students completed versions of the measures that were appropriate for their age and grade level.

Some research suggests that young children may be less able to provide valid and reliable information about their own psychological and emotional states, particularly with regard to internalizing symptoms such as anxiety, due to immature cognitive, language, and memory abilities, as well as limited social and emotional awareness and understanding (Edelbrock, Costello, Dulcan, Kalas, & Conover, 1985; Stone & Lemanek, 1990). Although there does not seem to be a specific age at which child self-reports achieve sufficient reliability for clinical or research purposes (Edelbrock et al., 1985), research suggests that children as young as nine years old are able to provide reliable and valid reports of emotional and behavioral difficulties, as evidenced by non-significant discrepancies when compared to other assessment methods, such as clinical interviews and behavior rating scales (Jensen et al., 1999; Stone & Lemanek, 1990; Wagner, Abela, & Brozina, 2006). Flavell and colleagues (2000) also examined the introspective and retrospective abilities (such as recalling the order of activities, recalling and re-experiencing mental activities, describing recent thoughts, etc.) of kindergarten students (ages five to six years), third grade students (ages eight to nine years), and college students. While the college students, as expected, demonstrated the most advanced introspective abilities, the researchers reported that the third grade students demonstrated markedly better developed

introspective and retrospective cognitive abilities than the kindergarten students. In fact, the researchers described the third grade students as "intermediate in introspective ability between the 5-year-olds [kindergarten students] and the adults [college students]" (Flavell, Green, & Flavell, 2000, p. 108), and reported that third grade students were able to demonstrate adequate performance on demanding tasks of cognitive introspection. The authors concluded that, although introspective abilities continue to develop through childhood and adulthood, substantial improvements in introspective abilities appear to occur between the ages of five and seven years (Flavell et al., 2000). Furthermore, the BASC-2-SRP, one of the most widely used self-report measures of emotional and behavioral functioning in children, is designed for use among children as young as eight years of age. This suggests that, in general, children have developed the skills necessary to provide valid and reliable reports of their psychological and emotional states by age eight. Overall, the majority of measures chosen for this study may be used with children who are eight years of age or older (i.e., the child form of the BASC-2-SRP is designed for children ages 8-11, while the RCMAS-2 is designed for use with children ages 6-19), while the remaining measure may be used with children as young as age nine (i.e., the STAI-C was designed for children ages 9 through 12 and contains normative information for children in grades 4 through 6). Therefore, including children who are at least in the third grade and are at least eight years of age in this study is appropriate, as this age is consistent with the age range for which the target assessment instrument (i.e., the RCMAS-2) as well as one of the validating measures is intended.

**Behavior Assessment System for Children, Self-Report of Personality, Second Edition (BASC-2- SRP).** The BASC-2-SRP is a multidimensional self-report measure designed for use with children and adolescents, ages 8-21 (Reynolds & Kamphaus, 2004b). The BASC-2-

SRP assesses multiple aspects of an individual's emotional, behavioral, and social functioning. Individuals are instructed to read each item and respond using either a dichotomous "true/false" format or a 4-point Likert scale (1 = *Never*, 2 = *Somewhat*, 3 = *Often*, 4 = *Almost Always*). Several versions of the BASC-2-SRP are available depending on the child's age, including a child form (BASC-2-SRP-C) and an adolescent form (BASC-2-SRP-A; Reynolds & Kamphaus, 2004b).

The BASC-2-SRP-C is a 139-item scale designed for use with children, ages 8 through 11. The BASC-2-SRP-C yields five composite scores, including Inattention/Hyperactivity, Internalizing Problems, Personal Adjustment, School Problems, and the Emotional Symptoms Index. Each composite scale reflects different domains of functioning and is comprised of several individual scales. The Inattention/Hyperactivity composite scale reflects behaviors often associated with attention-deficit/hyperactivity disorder (such as overly active or impulsive behaviors and the tendency to rush through work or activity), and includes the Attention Problems scale (9 items related to cognitive inattention and distractibility) and the Hyperactivity scale (8 items related to the tendency to engage in impulsive or overly active behaviors). The Internalizing Problems composite scale provides a general estimate of inwardly directed stress, and includes the Anxiety scale (13 items assessing cognitive and physical symptoms related to anxiety), Depression scale (13 items assessing emotional and social difficulties related to depression), Atypicality scale (9 items reflecting the tendency to behave in odd or strange ways), Social Stress scale (8 items assessing the presence of problematic or stressful social interactions), Locus of Control scale (8 items reflecting the degree to which the child feels control over events in his or her life), and Sense of Inadequacy scale (8 items reflecting the degree to which a student feels disappointed in his or her ability to perform tasks). The Personal Adjustment composite

scale reflects the degree of positive adjustment in one's life, the presence of appropriate peer relationships, and the ability to cope with stressful and uncomfortable thoughts, feelings, or events. The Personal Adjustment composite scale includes the Self-Esteem scale (8 items assessing the student's perceptions of and attitudes toward him or herself), Relationship with Parents scale (9 items reflecting the degree of stress or satisfaction in the student's relationship with his or her parents), Self-Reliance scale (8 items reflecting the degree to which the student feels confident in his or her abilities to make decisions and solve problems), and Interpersonal Relations scale (6 items that assess the student's overall social skills and relationships with others). The School Problems composite scale reflects the student's adjustment to school, and degree of satisfaction with school staff, structure, and educational environment. The School Problems composite scale includes the Attitude To School scale (7 items assessing the student's perceptions of and attitudes toward attending school in general), as well as the Attitude To Teachers scale (7 items assessing the student's perceptions of and attitudes toward teachers). Finally, the Emotional Symptoms Index composite scale represents a general indication of serious emotional disturbances, and is particularly reflective of internalizing disorders. The Emotional Symptoms Index includes several individual scales described above, including the Social Stress, Anxiety, Depression, Sense of Inadequacy, Self-Esteem, and Self-Reliance scales (Reynolds & Kamphaus, 2004b).

The authors reported strong to very strong internal consistency reliability estimates for the BASC-2-SRP-C scores. Internal consistency reliability estimates for the composite scores ranged from .85 (*strong*) to .96 (*very strong*), and from .71 (*strong*) to .86 (*strong*) for the individual scale scores. Moderate to strong test score stability was found over a (median) 25-day test-retest period, with test stability coefficients ranging from .75 (*strong*) to .83 (*strong*) for the

composite scores, and .63 (*moderate*) to .82 (*strong*) for the individual scale scores (Reynolds & Kamphaus, 2004b).

With regard to convergent, discriminant, and construct validity, the BASC-2-SRP-C scores have demonstrated moderate relationships with the scores of several other self-report measures, including narrow-band instruments such as the Children's Depression Inventory (CDI; Kovacs, 1992), and the RCMAS, as well as broad-band instruments such as the original child form of the BASC-SRP. The BASC-2-SRP child form has been administered to children with diagnosed behavioral or emotional disorders, including those with attention-deficit/hyperactivity disorder, depression, bipolar disorder, learning disability, and mental retardation, among others. When administered to these individuals, the BASC-2-SRP yielded elevated scores in specific areas that are conceptually-relevant to those disorders, supporting the convergent validity of the BASC-2-SRP-C scores. For example, children with pervasive development disorders (such as autism and asperger's disorder) demonstrated elevated scores on scales relating to social stress, atypical behaviors, and sense of inadequacy, while children with attention-deficit/hyperactivity disorder demonstrated elevated scores on scales relating to attention problems and hyperactive behaviors (Reynolds & Kamphaus, 2004b). Low correlations among scores of scales measuring dissimilar constructs on the BASC-2-SRP-C provided evidence of discriminant validity. For example, Reynolds and Kamphaus (2004b) reported near-zero correlations between the scores of the BASC-2-SRP-C Attitude Toward Teachers scale and the CDI Interpersonal Problems scale ($r$ = .04). Similarly, virtually no correlation was found between the scores of the BASC-2-SRP-C Self-Esteem scale and the CDI Internalizing Problems scale ($r$ = .00), further supporting the discriminant validity of the BASC-2-SRP-C scales.

Evidence supporting the construct validity of the scores of the BASC-2-SRP child and adolescent forms has been found. Confirmatory factor analyses were conducted by Reynolds and Kamphaus (2004b) to evaluate the model, and modify it, if necessary, so that it more appropriately and accurately accounted for the correlations within the data. Confirmatory factor analyses initially revealed three higher-order factors: School Problems, Internalizing Problems, and Personal Adjustment. The Attention Problems and Hyperactivity scales initially demonstrated moderate to high loadings within the Internalizing Problems factor. However, the strong intercorrelations between the Inattention and the Hyperactivity subscale scores suggested the presence of a possible fourth factor. Subsequently, a revised model was tested which revealed a superior four-factor structure (consisting of School Problems, Internalizing Problems, Inattention/Hyperactivity, and Personal Adjustment) for both the child and adolescent forms. Overall, the results of the confirmatory factor analyses support the construct validity of the BASC-2-SRP scores (Reynolds & Kamphaus, 2004b).

The BASC-2-SRP-A is a 176-item scale designed for use with adolescents and young adults, ages 12-21. The BASC-2-SRP-A includes the same composite and individual scales found on the BASC-2-SRP-C (described above). However, the BASC-2-SRP-A includes several additional individual scales. Specifically, the BASC-2-SRP-A includes a Sensation Seeking scale (9 items), which assesses the student's tendency to engage in risky or unsafe behaviors, and is included within the School Problems composite. Similarly, the Internalizing Problems composite includes a Somatization scale (7 items), which assesses physical symptoms associated with emotional or psychological difficulties, such as headaches and stomachaches (Reynolds & Kamphaus, 2004b).

Strong to very strong internal consistency reliability estimates have been reported for the BASC-2-SRP-A composite scores, ranging from .83 (*strong*) to .96 (*very strong*). Internal consistency reliability estimates for individual scores are relatively weaker, ranging from .67 (*moderate*) to .88 (*strong*) for the individual scale scores. Moderate to strong test score stability has been reported over a (median) 20-day test-retest interval, with reliability estimates ranging from .74 (*strong*) to .84 (*strong*) for the composite scores and .61 (*moderate*) to .84 (*strong*) for the individual scale scores (Reynolds & Kamphaus, 2004b).

Like, the BASC-2-SRP-C, evidence has been found to support the convergent, discriminant, and construct validity of the BASC-2-SRP-A scores. Specifically, the BASC-2-SRP-A scores have shown a moderate relationship with the scores of several other self-report measures, including narrow-band instruments such as the Children's Depression Inventory (CDI), the RCMAS, and the Conners-Wells' Adolescent Self-Report Scale (CASS; Conners, 1997) as well as broad-band instruments such as the Achenbach System of Empirically Based Assessment, Youth Self Report (ASEBA-YSR; Achenbach & Rescorla, 2001), and the original adolescent form of the BASC-SRP. Specifically, strong correlations have been reported between the BASC-2-SRP-A and conceptually-similar scales of the ASEBA-YSR. For example, adolescents' scores on the BASC-2-SRP-A Emotional Symptoms Index were strongly correlated with scores on the Total Problems composite of the ASEBA-YSR Form ($r$ = .75). Similarly, the BASC-2-SRP-A Inattention/Hyperactivity composite scale scores correlated strongly with the ASEBA Youth Self-Report Form ADHD scale ($r$ = .75), as did the anxiety scale scores across both the BASC-2-SRP-A and ASEBA-YSR ($r$ = .83). Furthermore, like the child form, the BASC-2-SRP adolescent form has been administered to adolescents with diagnosed behavioral or emotional disorders, including those with attention-deficit/hyperactivity disorder, depression,

bipolar disorder, learning disability, and mental retardation, among others. When administered to these individuals, the BASC-2-SRP-A yielded elevated scores in specific areas that are conceptually-relevant to those disorders, supporting the convergent validity of the BASC-2-SRP-A scores. For example, adolescents with bipolar disorder demonstrated elevated scores on scales relating to social stress, attention problems, hyperactivity, and depression (Reynolds & Kamphaus, 2004b).

In addition, evidence of discriminant validity has been supported through weak correlations between BASC-2-SRP-A scale scores and scores of conceptually-dissimilar scales on the ASEBA. For example, Kamphaus and Reynolds (2004b) reported near-zero correlations between the scores of the BASC-2-SRP-A Interpersonal Relations scale and the Rule-Breaking Behavior scale ($r$ = .02) of the ASEBA-YSR, as well as between the scores of the BASC-2-SRP-A Sensation Seeking scale and the ASEBA-YSR Withdrawn/Depressed scale ($r$ = -.07), further supporting the discriminant validity of the BASC-2-SRP-A scale scores.

**Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2).** The RCMAS-2 is a 49-item self-report measure of chronic, manifest (trait) anxiety (Reynolds & Richmond, 2008b). Developed for use with children, ages 6 to 19 years, the RCMAS-2 is written at a second-grade reading level and may be administered in an individual or group format. Children are asked to read each item on the scale and indicate their response using a "yes/no" format.

The RCMAS-2 includes three subscales (Physiological Anxiety, Social Anxiety, and Worry). The Physiological Anxiety subscale (12 items) assesses physical symptoms, such as headaches, nausea, and fatigue, that are often associated with anxiety; the Worry subscale (16 items) assesses cognitive symptoms, such as worrying about things that might happen, that are

often associated with anxiety; and the Social Anxiety subscale (12 items) assesses anxiety associated with social or performance situations (Reynolds & Richmond, 2008b). The RCMAS-2 also has a Total Anxiety scale, comprised of 40 items and includes all of the items on the Physiological, Worry, and Social Anxiety subscales. In addition, the RCMAS-2 has two validity indices. The Inconsistent Responding Index compares an individual's responses across nine pairs of items to identify contradictory responses. For the purpose of this study, the Inconsistency Index will not be analyzed. The second validity index, the Defensiveness scale (9 items) assesses an individual's tendency to portray him or herself in an overly positive manner. Although the Defensiveness scale is conceptualized as a cohesive construct, factor analyses have indicated the presence of two scales (i.e., Defensiveness I and Defensiveness II), which together account for all nine items. This division among the Defensiveness (Lie) items was also documented in the previous version of the RCMAS (Reynolds & Richmond, 1985), resulting in a five-factor structure for both the previous and current versions of the measure (Reynolds & Richmond, 1985, 2008b).

Reynolds and Richmond (2008b) have reported strong to very strong internal consistency reliability estimates for the RCMAS-2 scores. Specifically, the authors reported internal consistency reliability estimates of .92 (*very strong*) for Total Anxiety scale scores, .86 (*strong*) for Worry subscale scores, .80 (*strong*) for Social Anxiety subscale scores, .79 (*strong*) for Defensiveness scale scores, and .75 (*strong*) for Physiological Anxiety subscale scores. With regard to temporal stability, Reynolds and Richmond (2008b) reported test score stability coefficients over a 1-week test-retest interval of .76 (*strong*) for the Total Anxiety scale scores, .73 (*strong*) for the Physiological Anxiety subscale scores, .71 (*strong*) for the Worry subscale

scores, .64 (*moderate*) for the Social Anxiety subscale scores, and .67 (*moderate*) for the Defensiveness scale scores.

According to the manual, factor analysis of the responses of the full reference subsample on the RCMAS-2 items resulted in a five-factor structure consisting of the three anxiety factors (Physiological Anxiety, Social Anxiety, and Worry) and two Defensiveness factors (Reynolds & Richmond, 2008b). The authors reported that this factor structure was consistent with the factor structure of the previous version of the scale (Reynolds & Richmond, 2008b). The RCMAS-2 anxiety scale and subscale scores demonstrate convergent validity when compared to the scores of other measures of childhood anxiety. Specifically, when comparing the RCMAS-2 anxiety scale and subscale scores to the Obsessions (mental preoccupation) and Compulsions (repetitive anxiety-relieving behaviors) scale scores on the Children's Measure of Obsessive-Compulsive Symptoms (CMOCS; Reynolds & Livingston, 2010), Reynolds and Richmond (2008b) reported weak to moderate correlation coefficients ranging from .40 to .52 and .32 to .41, respectively. Evidence supporting the convergent and discriminant validity has also been reported between the RCMAS-2 scores and the scores of several other self-report measures, including the CDI and the Conners' Rating Scale (CRS; Conners, 1989).

**State-Trait Anxiety Inventory, Form Y (STAI-Y).** The STAI-Y is a 40-item self-report measure used to assess anxiety in adolescents and adults (Spielberger, 1983; Spielberger, Gorsuch, et al., 1970). The STAI-Y provides normative information for students in grades 9 through 12, and is not intended for use with students enrolled in lower grade levels (Spielberger, 1983).

The STAI-Y is based on the state-trait model of anxiety (Spielberger, 1966), and reflects a multi-faceted conceptualization of anxiety (consisting of anxiety as a transitory mood state as

well as personality trait). The STAI-Y includes two scales, each containing 20 items, which assess the individual's levels of both state and trait anxiety (Spielberger, 1972). State anxiety refers to acute anxiety resulting from immediate environmental, situational, or other short-term variables, while trait anxiety refers to anxiety that is chronic, dispositional, and cross-situational. When both scales are administered during the same session, standardization practice indicates that the State Anxiety scale should always be administered first, followed by the Trait Anxiety scale. The STAI-Y may be administered individually or in groups and is written at a fifth grade reading level. When completing the State Anxiety scale, individuals are instructed to indicate how he or she feels *at that moment*; conversely, when completing the Trait Anxiety scale, individuals are instructed to indicate how he or she *generally* feels. Individuals respond to each item using a 4-point Likert scale for both the State Anxiety scale (1 = *Not At All*, 2 = *Sometimes*, 3 = *Moderately So*, 4 = *Very Much So*) and Trait Anxiety scale (1 = *Almost Never*, 2 = *Sometimes*, 3 = *Often*, 4 = *Almost Always*). Scores on the STAI-Y may range from a minimum of 20 to a maximum of 80. Higher total scores on the STAI-Y indicate higher levels of state or trait anxiety (Spielberger, 1983).

Test-retest reliability data were collected from two samples of high school students (Spielberger, 1983). With regard to the Trait Anxiety scale scores, Spielberger (1983) reported test score stability coefficients of .71 (*strong*) for males and .75 (*strong*) for females over a 30-day test-retest interval. Temporal stability coefficients were somewhat weaker for the State Anxiety scale scores among males ($r$ = .62, *moderate*) and females ($r$ = .34, *weak*) over a 30-day test-retest interval. Temporal stability was also examined over a 60-day test-retest interval, resulting in test score stability coefficients of .68 (*moderate*) among males and .65 (*moderate*) among females for the Trait Anxiety scale scores, and .51 (*moderate*) among males and .36

(*weak*) among females for the State Anxiety scale scores (Spielberger, 1983). According to Spielberger (1983), relatively lower test score stability coefficients are expected for the State Anxiety scale scores as this scale is designed to assess state anxiety, which is thought to be influenced by transient and situational variables. The STAI-Y scores have also shown strong to very strong internal consistency reliability, with coefficient alphas ranging from .86 (*strong*) to .95 (*very strong*) for the State Anxiety scale scores (median = .93), and .89 (*strong*) to .91 (*very strong*) for the Trait Anxiety scale scores (median = .90; Spielberger, 1983).

Evidence supporting the construct, convergent, and discriminant validity of the STAI-Y scores has been found. With regard to convergent validity, moderate correlations have been reported between the scores of the STAI-Y and other self-report measures of anxiety. For example, Bieling and colleagues (1998) reported a correlation coefficient of .42 between the STAI-Y and Beck Anxiety Inventory (BAI; Beck & Steer, 1990). With regard to discriminant validity, Spielberger (1983) reported higher scores on the Trait Anxiety scale for individuals with neuropsychiatric disorders ($M$ = 46.62) than the general normative sample (means ranged from 34.79 to 40.97). Similarly, Spielberger (1983) reported higher scores on the Trait Anxiety scale for medical patients with psychiatric difficulties ($M$ = 44.62) compared to medical patients without psychiatric difficulties ($M$ = 41.33), while Korfine and colleagues (2009) reported significantly higher scores on the Trait Anxiety scale for individuals with personality disorders (means ranged from 48.91 to 47.48) than individuals without personality disorders ($M$ = 26.45). Furthermore, Bieling and colleagues reported significantly higher scores on the Trait Anxiety scale (means ranging from 47.39 to 55.93) for individuals with pre-existing anxiety diagnoses (such as social phobia, specific phobia, obsessive-compulsive, and panic disorders), compared to individuals without anxiety disorders ($M$ = 33.39). Overall, these results indicate that the STAI-

Y is able to effectively identify individuals for whom anxiety is likely to be an area of particular concern or difficulty.

**State-Trait Anxiety Inventory for Children (STAI-C).** The STAI-C is a self-report measure used to assess both state and trait anxiety symptoms in children. Although the STAI-C was developed for use with children ages 9 through 12 (Spielberger, 1973), various research studies have examined the use of the STAI-C among adolescent children, ages 12 through 18 (Clark et al., 1994; Hoehn-Saric, Maisami, & Weigand, 1987; Strauss, Last, Hersen, & Kazdin, 1988). Results of these studies indicate that the STAI-C produces valid and reliable scores with adolescent populations (Hoehn-Saric et al., 1987; Kirisci & Clark, 1996; Kirisci, Clark, & Moss, 1996). Therefore, for the purpose of this study, the STAI-C was used with children and adolescents in grade 3 through 8.

Like the STAI-Y, the STAI-C includes two scales, each consisting of 20 items, which assess the child's levels of state and trait anxiety (Spielberger, 1973). The STAI-C can be administered in an individual or group setting. When completing the State Anxiety scale, children are instructed to indicate how he or she feels *at that moment*; conversely, when completing the Trait Anxiety scale, children are instructed to indicate how he or she *generally* feels. The response options range from 1 (*not*) to 3 (*very*) for the State Anxiety scale (e.g., *1 = not nervous*, 2 = *nervous*, *3 = very nervous*). The response options for the Trait Anxiety scale are 1 (*hardly ever*), 2 (*sometimes*) and 3 (*often*). Scores on the STAI-C may range from a minimum of 20 to a maximum of 60. Higher scores on the STAI-C indicate higher levels of anxiety (Spielberger, 1973).

Test-retest reliability data were collected from 246 elementary school children (grades 4-6) over an 8-week test-retest interval. With regard to the Trait Anxiety scale scores, Spielberger

(1973) reported moderate to strong test-retest reliability coefficients of .65 (*moderate*) for males and .71 (*strong*) for females. For the State Anxiety scale scores, Spielberger (1973) reported somewhat weaker test score stability coefficients of .31(*weak*) for males and .47 (*moderate*) for females. According to Spielberger, low temporal stability coefficients for the State Anxiety scale scores were expected, as these scores are thought to be strongly influenced by situational and transient factors. However, stronger temporal stability for the STAI-C scores were found by Finch, Montgomery, and Deardoff (1974), who reported moderate test score stability coefficients of .63 for the State Anxiety scale scores over a three-month test-retest interval among children with emotional disturbances.

With regard to internal consistency reliability, the STAI-C scores have shown strong internal consistency reliability among children with and without anxiety disorders. For the Trait Anxiety scores, Spielberger (1973) reported internal consistency reliability coefficients of .78 (*strong*) for males and .81 (*strong*) for females. For the State Anxiety scores, Spielberger reported coefficient alphas of .82 (*strong*) for males and .87 (*strong*) for females. Similarly, Finch and colleagues (1974) reported an internal consistency reliability coefficient of .88 (*strong*) for the Trait Anxiety scale scores and .89 (*strong*) for the State Anxiety scale scores, among children with emotional difficulties.

The STAI-C scores have shown moderate to strong convergent validity with the scores of other measures of children's anxiety, including the Children's Manifest Anxiety Scale (CMAS) and the General Anxiety Scale for Children (GASC; Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960). Specifically, Spielberger (1973) reported moderate to strong correlation coefficients between the STAI-C Trait Anxiety scale scores and the scores of the GASC ($r$ = .63, *moderate*), and the CMAS ($r$ = .75, *strong*). Discriminant validity was assessed by comparing

the STAI-C scores to scores of measures of aptitude and achievement among elementary school students (Spielberger, 1973). The STAI-C scores demonstrated an inverse relationship with the scores of these measures of aptitude and achievement, with correlation coefficients ranging from -.37 (*weak*) to -.08 (*very weak*) for females and -.37 (*weak*) to .18 (*very weak*) for males, supporting the discriminant validity of the STAI-C scores.

**Demographic information.** Demographic information was collected from participants via a demographic information sheet, entitled "All About Me" (see Appendices J and K), which asked participants to provide their age, gender, race/ethnicity, and grade level. Students in grades 3-8 completed the elementary version of the form (see Appendix J), while students in grades 9-12 completed the secondary version of the form (see Appendix K).

## Procedures

Approval from the University of Kansas Human Subjects Committee at Lawrence (HSC-L) was obtained before the study began (see Appendices A and B), and all research guidelines were followed with regard to the treatment of human subjects within this study. Once approval was obtained from the HSC-L, requests to conduct research (see Appendix C) were submitted to 58 public school districts in Kansas, Illinois, and Colorado. Of the 58 school districts contacted, six districts agreed to participate in the research. After approval was obtained from the six public school districts, permission from the building principals was requested (see Appendix D). In all, 131 building principals across the 6 school districts were contacted, and 43 of these buildings agreed to participate in the current study. Once approval from the HSC-L, school districts, and building principals was obtained, two testing dates were scheduled with the building principal and school staff. School personnel were then asked to identify students who received special education services for a specific learning disability through educational records.

Teachers in grades 3-12 were asked to send home with these children a parent/guardian information letter explaining the purpose of the study, as well as two copies of the informed consent form (see Appendices E and F). Parents were urged to keep one copy of the consent form for their records, and return a signed copy to the researcher if they wished for their child to participate in the study. Only students who returned a signed parent consent form were allowed to participate in the study. In all, 917 consent forms were sent home with students, of which 189 (20.6%) were returned. Assent was then requested from each child who returned parental consent to participate (see Appendix I). Children were given the opportunity to decline to participate at any time without any adverse effects. Of the 189 consent forms returned, four students did not meet the minimum age requirement, three students were absent on both testing dates, and four students declined to participate. Overall, 178 students were eligible to and assented to participate in the study. Furthermore, in order to obtain more information regarding the potential differences in procedures used to identify children with specific learning disabilities, school principals were asked to describe the identification procedures used in their buildings (e.g., standardized cognitive and academic assessment, response-to-intervention [RtI] process, etc.). Of the 43 principals who participated in the study, 60.5% ($n$ = 26) reported utilizing a combination of standardized testing and RtI procedures, 4.7% ($n$ = 2) reported utilizing only standardized testing procedures, and 34.9% ($n$ = 15) either did not provide a description of the identification procedures used in their buildings or were unable to clearly describe the procedures. Overall, the majority of principals reported utilizing a combination of standardized testing and RtI procedures to identify children with specific learning disabilities.

Measures were distributed to children for whom parental consent and child assent was obtained, within the public school setting, and within regular school hours. Children completed

the measures in small group settings or on an individual basis, depending on the structure and circumstances of the child's academic schedule. Each student completed measures appropriate for their age and grade level. The researcher returned on a second date to administer an additional set of measures to the same children. The measures were counterbalanced to minimize potential order effects and standardized test administration procedures were followed according to the instructions printed in the manuals and/or on the measures.

**Data Analyses**

The purpose of this study was to examine the reliability and validity of the RCMAS-2 scores for children identified with specific learning disabilities. Furthermore, this study also attempted to determine whether children with specific learning disabilities exhibited significantly higher levels of general anxiety than non-referred children. For clarification purposes, the specific learning disability subsample refers to children who receive special education services for an identified specific learning disability, while the non-referred (i.e., full reference) subsample refers to the participants recruited by Reynolds and Richmond (2008b) during initial development of the RCMAS-2. Finally, the combined sample refers to the specific learning disability and non-referred subsamples combined together. Analyses were conducted using the Statistical Package for the Social Sciences 20.0 (SPSS; SPSS Inc., 2011). All statistical analyses were conducted using a .05 level of significance, unless otherwise specified. When applicable, a listwise deletion approach was used to handle missing data.

Data analyses are described below, and organized according to the research questions addressed by the study.

**Research Question #1: Is the factor structure of the RCMAS-2 similar across non-referred children and children with specific learning disabilities?** First, the factor structure

of the RCMAS-2 was examined to determine whether it was similar across non-referred children and children with specific learning disabilities. Exploratory factor analyses were performed to examine the similarity of the factor structure across groups. Examination of the similarity of the factor structure through exploratory factor analysis instead of the examination of the difference of the factor structure through confirmatory factor analysis has more relevance to the practical application of tests to diagnosis (Reynolds & Carson, 2005). The factor analyses were performed using the method of principal axis factoring with an oblique (promax) rotation, with the expectation that the analyses would yield correlated factors. However, an orthogonal (varimax) rotation procedure was also performed because this is the rotation method that was used with the full reference subsample on the RCMAS-2. The results from both analyses are reported in this study.

According to the Reynolds and Carson (2005), a "small sample" is one that includes less than 200 participants, or demonstrates a variable ratio of less than 10:1. The sample size of the target population (i.e., children with specific learning disabilities) in the present study meets this criterion for consideration as a "small sample". Furthermore, Reynolds and Carson caution that small sample sizes may yield a less stable solution than larger sample sizes. Therefore, in an effort to minimize bias or instability resulting from small sample size (and as recommended by Reynolds, 2000), an exploratory factor analysis was first conducted on the total (combined) sample, and then on the specific learning disability subsample and non-referred children subsample using the same procedures. Finally, the most appropriate factor solution was compared across groups to determine whether the factor structure was invariant across groups.

***Extraction of factors.*** Several methods were used to extract the factors for the total sample, including eigenvalues-greater-than-one rule (Kaiser, 1960), examination of decrements

in the scree plots (Cattell, 1966, 1978), parallel analysis (Horn, 1965), Velicer's minimum average partial test (MAP; Velicer, 1976), and examination of the interpretability of the factor solutions (Kaiser, 1960).

One of the most commonly used methods of factor extraction is the "eigenvalues-greater-than-one rule" (Kaiser, 1960; Zwick & Velicer, 1986). Eigenvalues refer to the amount of variance that is explained by all of the variables or items included on a specific factor (Tabachnick & Fidell, 2007; Zwick & Velicer, 1986). An eigenvalue equal to 1.0 represents the amount of the variance that can be explained by a single variable, while an eigenvalue greater than 1.0 represents variance that is explained by more than one variable (Zwick & Velicer, 1986). Therefore, because factors, by definition, are comprised of more than one variable that describe a certain construct, identification of eigenvalues greater than one allows for a quick estimate of likely factors (Salkind, 2007). Generally, the number of factors identified using this method falls within a range bordered by the number of variables divided by 3 and the number of variables divided by 5 (Tabachnick & Fidell, 2007).

To provide further information on the number of factors to extract, the scree plot was examined. When the eigenvalues are plotted against the factors, the eigenvalues typically decrease in value (from highest to lowest). The number of plotted points that are evident (left to right) before the slope of the plotted points changes significantly represents an estimate of the numbers of likely factors (Cattell, 1966, 1978; Tabachnick & Fidell, 2007). However, examination of the scree plot, like the eigenvalues-greater-than-one rule, produces only a preliminary estimate, as it relies largely on the subjective judgment of the researcher (Zwick & Velicer, 1986). To provide a more reliable and objective estimate of the factors, parallel analysis (Horn, 1965) and Velicer's (1976) MAP test were also performed.

Using the parallel analysis method (Horn, 1965), random data sets were generated that are similar to the actual data set based on the number of variables and subjects in the actual data set. Eigenvalues were computed for all of these data sets. The eigenvalues from the random data sets were averaged (i.e., the first eigenvalues for all of the random data sets were averaged, then the second eigenvalues for all of the random data sets were averaged, etc.) and then compared to the corresponding eigenvalues computed for the actual data set. The eigenvalues from the actual data set that were greater than the corresponding mean eigenvalues obtained from the random data set were retained and considered probable factors (Horn, 1965; Tabachnick & Fidell, 2007). Because the eigenvalues obtained by the random data set represents the probability of discovering factors based purely on chance, comparing the research data set against the random data set helps ensure that only those factors are chosen whose probability of occurring is greater than random chance.

In addition, the data were further analyzed using Velicer's (1976) MAP test. With Velicer's MAP test, a principal components analysis was performed. The principal components were partialled out in a step-by-step fashion from the original correlation matrix of the items and average squared partial correlations were computed from these steps. This process continued k (number of items) minus one step. Then the average squared partial correlations and their corresponding step numbers were lined up. The step number with the lowest squared partial correlation indicated the number of factors to extract (Tabachnick & Fidell, 2007; Velicer, 1976).

Finally, the interpretability of the factor solutions was considered. It was important that the factors identified were conceptually relevant to the research and theory regarding anxiety among children and adolescents. For example, the current research regarding anxiety suggests the presence of multiple factors or dimensions, including cognitive, emotional, physiological,

and behavioral components (Barlow, 2002b; Barlow, Allen, & Choate, 2004; Huberty, 1997; Ramirez et al., 2006; Silverman & Ollendick, 2005). Therefore, potential solutions were considered with these anticipated components in mind, to determine how well the solutions aligned with current research and theory (Kaiser, 1960).

***Comparison of extracted factors.*** The factor pattern coefficients and structure coefficients of pairs of matched factors across children with specific learning disabilities and non-referred children were to be compared using the coefficient of congruence (Cattell, 1978; Harman, 1976; Mulaik, 2009; Tucker, 1951) and salient variable similarity index (Cattell, 1978; Cattell & Baggaley, 1960) to determine whether the factor structure was invariant across the groups of interest. The coefficient of congruence is a parametric statistic (Cattell, 1978; Harman, 1976; Tucker, 1951) and assesses the amount of shared variance between the corresponding factors (Cattell, 1978; Harman, 1976). In contrast, the salient variable similarity index is a nonparametric statistic (Cattell, 1978) used to compare matched factors. Both statistics were computed because they complement each other and the coefficient of congruence can be affected by factor size and nonequivalent variance-covariance matrices (Cattell, 1978). The coefficient of congruence values were calculated by multiplying the factor coefficients (i.e., factor loadings) for each item across both groups or data sets. Next, these values were summed, and then divided by the square root of the product of the factor coefficients squared and summed for each group (Lowe & Raad, in press). This produced a coefficient of congruence value for each pair of matched factors across groups or data sets. Similar to correlational analyses, coefficient of congruence values may range from -1.00 to +1.00, with +1.00 indicating perfect similarity and '0' indicating no similarity. Although analyses may be performed to determine whether the coefficient of congruence is significantly different from zero, it is often most helpful to consider

the magnitude of the relationship (-1.00 to +1.00) between the two matched factors. A coefficient of congruence value of .90 or higher is suggested by Cattell (1978) as indicative of strongly similar factors, although this value is arbitrary and not considered absolute (Reynolds et al., 1999; Reynolds & Lowe, 2009).

The salient variable similarity index also ranges from -1.00 to +1.00, with +1.00 indicating perfect similarity and '0' indicating no similarity. The salient variable similarity index was calculated by first identifying which items are considered "salient." Salience was determined by comparing factor pattern or structure coefficients for each item of a pair of matched factors against a cut-off value. Factor pattern or structure coefficients that exceeded the cut-off value were considered salient, while factor pattern or structure coefficients that did not exceed the cut-off value were considered "non-salient" (Cattell, 1978). A cut-off value of ± .10 was suggested by Cattell (1978), although others have suggested higher, more conservative cut-off values ranging from ± .15 to ± .25 (Reynolds, 2000). In an effort to avoid over interpretation, factor pattern and structure coefficients were compared against a cut-off value of ± .25 to indicate salience (Reynolds & Richmond, 2008b). Using this method, the factor pattern and structure coefficients for each pair of items on each pair of factors were examined to determine whether they represented salient or non-salient variables. Each pair of items on each pair of factors were recorded using tally marks in a 3x3 grid as positively salient, negatively salient, or neutral (i.e., non-salient). The frequency of these tallies was then entered into the salient variability similarity index formula, which yielded a salient variability similarity index value, and then compared against a table of values to determine its statistical significance (Cattell, 1978; Lowe & Raad, in press).

**Research Question #2: Do the RCMAS-2 scores demonstrate adequate convergent and discriminant validity, as demonstrated by higher correlations between the RCMAS-2 scores and the scores of conceptually-similar scales (e.g. trait anxiety), and lower correlations between the RCMAS-2 scores and the scores of conceptually-dissimilar scales (e.g. state anxiety) for children with specific learning disabilities?** The convergent validity of the RCMAS-2 scores was examined in relation to scores of other conceptually-similar scales. Convergent validity refers to the degree of correlation between independent measures of the same or similar constructs (Cicchetti, 1994). For example, a measure of general anxiety would demonstrate strong convergent validity if its scores correlated highly with the scores from other measures of general anxiety. The data were analyzed by comparing the scores of the RCMAS-2 with the scores of the BASC-2-SRP, STAI-Y, and STAI-C. Correlation coefficients were computed between the RCMAS-2 scores and scores of these other measures using the Pearson *r* statistic. Moderate to strong correlations between the scores of the scales and subscales of the RCMAS-2 and the scores of the Trait Anxiety scales of the STAI-Y and STAI-C (providing evidence of convergent validity) as well as conceptually-similar scales of the BASC-2-SRP were expected. Specifically, moderate to strong correlations between the RCMAS-2 scores and the BASC-2-SRP scale scores of Anxiety, Sense of Inadequacy, Internalizing Problems, and the Emotional Symptoms Index were expected, as research suggests that children with high levels of anxiety also commonly experience worry, a sense of inadequacy, and general emotional difficulties (Bandura, 1986; Mandler & Sarason, 1952; Silverman, La Greca, & Wasserstein, 1995). Conversely, it was expected that the RCMAS-2 would demonstrate smaller or weaker correlations with scores of the State Anxiety scales of the STAI-Y and STAI-C (providing evidence of discriminant validity) as well as conceptually-different scales of the BASC-2-SRP.

Specifically, negligible to small correlations were anticipated between the RCMAS-2 scale and subscale scores and the BASC-2-SRP scale scores of Self-Esteem and Self-Reliance, as research suggests that high levels of anxiety are weakly associated with effective personal resources (such as self-esteem or self-reliance; Muris, 2006; Reynolds & Kamphaus, 2004b; Roberts, Roberts, & Chan, 2009).

Straightforward guidelines for the interpretation of convergent and discriminant validity correlation coefficients are not available, as the interpretation of these results depends on several factors, such as cultural/societal changes or new insights into the understanding or accurate measurement of the construct of interest (Cicchetti, 1994). In general, Pearson *r* correlation coefficients may range from -1 to +1, with coefficients of a larger magnitude representing stronger relationships between the variables. While there is no standard rule of thumb for descriptors of *r* values, the following descriptors were used throughout this study: .00 – .19 (*very weak*), .20 – .39 (*weak*), .40 – .69 (*moderate*), .70 – .89 (*strong*), and .90 – 1.00 (*very strong*; Lowe et al., 2008).

**Research Question #3: Will factor analyses of scales measuring similar and dissimilar constructs further support the convergent and discriminant validity of the RCMAS-2 scores for children by yielding conceptually-distinct factors (e.g., a cluster of scales related to chronic, manifest, or trait anxiety, and a cluster of scales related to state or situational anxiety with specific learning disabilities)?** As an additional assessment of convergent and discriminant validity, a factor analysis was conducted on scores of the RCMAS-2, STAI-C, and BASC-2-SRP scales and subscales. As with the factor analyses of the RCMAS-2, exploratory factor analyses of the subscales were performed using the method of principal axis factoring with an oblique (promax) rotation, with the expectation that the analyses would yield

correlated factors. Scales examined in the factor analyses included the Trait Anxiety and State Anxiety scales of the STAI-C, the RCMAS-2 anxiety subscales, and the BASC-2-SRP (Depression, Self-Reliance, and Sense of Inadequacy) scales. It was expected that the factor analyses would yield distinct clusters (or factors) of conceptually-similar scales, including a "convergent" factor and two "discriminant" factors. Specifically, it was hypothesized that the "convergent" factor would include the Trait Anxiety scale of the STAI-C and the anxiety subscales of the RCMAS-2. Conversely, it was hypothesized that the one "discriminant" factor would represent other mood-related difficulties, such as the State Anxiety scale of the STAI-C, and the Depression and Sense of Inadequacy scales of the BASC-2-SRP, while the second "discriminant" factor would include the Self-Reliance scale of the BASC-2-SRP.

**Research Question #4: Do the RCMAS-2 scores demonstrate adequate internal consistency reliability and temporal stability for children with specific learning disabilities?** The internal consistency and test score stability of the RCMAS-2 scores were examined for children with specific learning disabilities. Internal consistency reliability refers to the degree to which items on a specific scale or domain are related to or correlated with each other. Scores with strong internal consistency indicates that the items contained within a scale produce similar or related scores, and are therefore thought to be contributing to the measurement of a similar construct. In contrast, poor internal consistency reliability indicates that the items are not producing similar scores, and that different items may in fact be measuring different constructs (Charter, 2003; Cronbach, 1951).

Internal consistency reliability estimates were calculated using coefficient alpha (Cronbach, 1951). In addition, a 95% confidence interval was computed around each reliability estimate (Fan & Thompson, 2001; Feldt, 1990). The coefficient alpha provides information

regarding the degree of homogeneity of scale and subscale items. Reliability coefficients range from 0.0 to 1.0, with higher values indicating stronger reliability. The following descriptors of internal consistency reliability estimates were used throughout this study: .00 – .19 (*very weak*), .20 – .39 (*weak*), .40 – .69 (*moderate*), .70 – .89 (*strong*), and .90 – 1.00 (*very strong*; Lowe et al., 2008). Coefficient alphas that met or exceeded 0.70 were considered indicators of adequate reliability (Cicchetti & Sparrow, 1990).

Test-retest reliability (also known as temporal stability or test score stability) of the RCMAS-2 scores of children with specific learning disabilities was calculated using the Pearson *r* statistic. The test score stability coefficient provides a measure of the consistency of the scores across time, and helps determine the extent to which items in a specific scale or domain measure a relatively stable construct, or are affected by the passage of time (Charter, 2003; Cronbach, 1951). Reliability coefficients may range from 0 to 1, with higher coefficients representing higher temporal stability (indicating that the scores are stable across time). While there is no standard rule of thumb for descriptors of *r* values, the following descriptors were used throughout this study: .00 – .19 (*very weak*), .20 – .39 (*weak*), .40 – .69 (*moderate*), .70 – .89 (*strong*), and .90 – 1.00 (*very strong*; Lowe et al., 2008).

In addition, intraclass correlation coefficients (ICCs) for the RCMAS-2 scores for children with specific learning disabilities were computed. The calculation of intraclass correlation coefficients is conceptualized as the ratio of between-groups variance to variance within those groups. Intraclass correlation coefficients take into consideration potential differences or discrepancies that may result from the involvement of different raters, administrations, or other repeated measures (Tabachnick & Fidell, 2007). With regard to the present study, intraclass correlations were calculated as an additional measure of test-retest

reliability. In general, the magnitude of the intraclass correlation coefficients are expected to be similar to the magnitude of the test-retest reliability coefficients, thus lending support to the hypothesis that the scores demonstrate adequate stability across time and test administrators. Finally, paired samples *t*-tests were conducted to determine whether the RCMAS-2 scores changed significantly between the first and second testing sessions for children with specific learning disabilities. Effect sizes (Cohen's *d*; Cohen, 1988, 1992) were also calculated to determine the relative impact of any significant changes in the RCMAS-2 scores for children with specific learning disabilities. As a rule of thumb, Cohen's *d* effect sizes of 0.20 are considered *small*, effect sizes of 0.50 are considered *medium*, and effect sizes ranging from 0.80 or higher are considered *large* (Cohen, 1992).

**Research Questions #5 & #6: Do children with specific learning disabilities experience significantly higher levels of anxiety (as measured by the RCMAS-2) than non-referred children? Do females with specific learning disabilities experience higher levels of anxiety (as measured by the RCMAS-2) than males with specific learning disabilities?** Analyses were planned to determine whether the RCMAS-2 scores of children with specific learning disabilities differ significantly from the scores of non-referred children, as well as whether the RCMAS-2 scores of female students with specific learning disabilities are significantly higher than the scores of male students with specific learning disabilities. To do so, it was anticipated that the data gathered would be analyzed using a multivariate analysis of variance (MANOVA) as well as two analyses of variance (ANOVAs). First, a 2 x 2 MANOVA would be conducted with gender (male, female) and specific learning disability status (children with specific learning disabilities, non-referred children) serving as the independent variables and the three anxiety (Physiological Anxiety, Social Anxiety, and Worry) subscale scores

serving as the dependent variables. Effect sizes were to be calculated using multivariate eta-squared. If the MANOVA was significant, follow-up 2 x 2 ANOVAs would be performed, and, due to the multiple comparisons, the alpha level would be adjusted using the Bonferroni adjustment to protect against Type I error. Effect sizes would also be calculated using Cohen's *d*, to provide an estimate of the magnitude of potential differences found among the groups.

Second, two 2 x 2 analyses of variance (ANOVAs) were also planned. In the first ANOVA, specific learning disability status (with children with specific learning disabilities, non-referred children) and gender (male/female) would serve as the independent variables and the RCMAS-2 Total Anxiety scale scores would serve as the dependent variable. In the second ANOVA, specific learning disability status (children with specific learning disabilities, non-referred children) and gender (male/female) would again serve as the independent variables and the RCMAS-2 Defensiveness scores would serve as the dependent variable. As described above, it was anticipated that effect sizes would be calculated using Cohen's *d*, to provide an estimate of the magnitude of potential differences found between the groups.

The analyses of potential group differences related to RCMAS-2 scores were dependent on the outcome of the analyses related to the validity of the RCMAS-2 scores. Specifically, the RCMAS-2 scores must demonstrate factorial invariance across the specific learning disability and full reference subsamples. Failure to demonstrate factorial invariance would make comparing the scores of the specific learning disability subsample with those of the full reference subsample inappropriate. As will be explained further in Chapter IV, the analyses of group differences could not be completed due to factors described above.

**Summary**

In summary, the purpose of this study was to examine the psychometric properties of the RCMAS-2. While preliminary analyses of the psychometric properties of the RCMAS-2 have been conducted with a general (i.e., non-referred) group of school children, the examination of the psychometric properties of the RCMAS-2 with students with specific learning disabilities has not yet been researched. Therefore, this study investigated the reliability and validity of the RCMAS-2 scores among students with specific learning disabilities. Specifically, this study examined the internal consistency reliability, temporal stability, construct validity, and convergent and discriminant validity of the RCMAS-2 scores. The study also examined the similarity of the factor structure of the RCMAS-2 among children with specific learning disabilities and non-referred children. Furthermore, the study attempted to determine whether children with specific learning disabilities experience significantly higher levels of general anxiety than non-referred children, and whether female students with learning disabilities experience significantly higher levels of general anxiety than male students with specific learning disabilities, as measured by the RCMAS-2.

# CHAPTER IV

## Results

The results of the data analyses are presented below and are organized according to the research questions proposed. A discussion of the implications of the findings, limitations of the study, and future research directions is presented in Chapter V.

**Research Question #1: Is the factor structure of the RCMAS-2 similar across non-referred children and children with specific learning disabilities?**

The factor structure of the RCMAS-2 was examined using exploratory factor analyses to determine whether the structure was similar across non-referred children and children with specific learning disabilities. The factor analyses were performed using principal axis factoring with an oblique (promax) rotation, with the expectation that the analyses would yield correlated factors. However, an orthogonal (varimax) rotation procedure was also performed because Reynolds and Richmond (2008b) used this rotation procedure with the full reference subsample on the RCMAS-2. The results from both analyses are reported below. In an effort to minimize bias or instability resulting from the small sample size of the target population (i.e., children with specific learning disabilities), an exploratory factor analysis was first conducted on the total (combined) sample, and then on the specific learning disability subsample and non-referred children subsample using the same procedures.

**Extraction of factors.** Methods used to determine the number of factors to extract included: a) eigenvalues-greater-than-one rule (Kaiser, 1960), b) examination of decrements in the scree plots (Cattell, 1966, 1978), c) parallel analysis (Horn, 1965), d) Velicer's minimum average partial test (MAP; Velicer, 1976), and e) examination of the interpretability of the factor solutions (Kaiser, 1960).

Eigenvalues refer to the amount of variance that is explained by all of the variables or items included on a specific factor (Kaiser, 1960; Tabachnick & Fidell, 2007; Zwick & Velicer, 1986). The eigenvalues-greater-than-one rule suggested that nine factors should be extracted for the combined sample and the full reference subsample (see Table 3). With regard to the specific learning disability subsample, the eigenvalues-greater-than-one rule suggested that 14 factors should be extracted.

Next, the scree plots were examined. Each scree plot was examined for a "natural break" in order to determine the number of factors to extract for the combined sample and full reference and specific learning disability subsamples. Examination of the scree plots suggested that five factors should be retained for the combined sample as well as the full reference subsample (see Figures 1 and 2, respectively). For the specific learning disability subsample, the scree plot suggested that three factors should be retained (see Figure 3).

Parallel analysis (Horn, 1965) was also conducted to provide a more reliable and objective estimate of the number of factors to extract. Parallel analysis compares eigenvalues from the actual data set to eigenvalues of a randomly-generated data set of comparable size and same number of variables, in this case items, to identify the number of factors that have a greater-than-random chance of occurring. The results of the parallel analysis suggested that six factors should be extracted for the combined sample (see Table 4; real eigenvalues = 7.388, 2.858, 1.877, 1.654, 1.287, 1.169, and 1.104, and the mean eigenvalues for the random data set = 1.241, 1.219, 1.202, 1.188, 1.176, 1.163, and 1.152), and the full reference subsample (real eigenvalues = 7.218, 2.869, 1.905, 1.649, 1.272, 1.177, and 1.107, and the mean eigenvalues for the random data set = 1.248, 1.225, 1.208, 1.194, 1.180, 1.168, and 1.156). Furthermore, the results of the parallel analysis suggested that three factors should be extracted for the specific

learning disability subsample (real eigenvalues = 11.063, 3.889, 2.127, and 1.818, and the mean eigenvalues for the random data set = 2.197, 2.066, 1.965, and 1.883).

Velicer's (1976) MAP test was also conducted to provide a more reliable and objective estimate of the number of factors to extract. Velicer's MAP test utilizes a step-wise principal components analysis to identify the lowest squared partial correlation, which then indicates the number of factors to retain (Tabachnick & Fidell, 2007; Velicer, 1976). Results of Velicer's MAP test indicated that three factors should be retained for the combined sample, specific learning disability subsample, and full reference subsample (see Table 5). The smallest squared partial correlations were .002900, .002895, and .009352 for the combined sample, full reference subsample, and specific learning disability subsample, respectively, and occurred at Step 3 for each sample and subsample. These results indicated that three factors should be retained.

Finally, the interpretability of the factor solutions was considered. It was important that the factors identified were conceptually relevant to the research and theory regarding anxiety among children and adolescents. For example, the current research regarding anxiety suggests the presence of multiple factors or dimensions, including cognitive, emotional, physiological, and behavioral components (Barlow, 2002b; Barlow, Allen, & Choate, 2004; Huberty, 1997; Ramirez et al., 2006; Silverman & Ollendick, 2005). In addition, Reynolds and colleagues' (Paget & Reynolds, 1984; Reynolds & Paget, 1981; Reynolds &Richmond, 1978, 1985, 1997, 2008; Scholwinski & Reynolds, 1985) work on the RCMAS and RCMAS-2 have supported a three-factor structure of anxiety, including a physiological anxiety, social anxiety/social concerns, and worry dimension. Therefore, potential solutions were considered with these anticipated components in mind, to determine how well the solutions aligned with research and theory (Kaiser, 1960).

The number of factors identified by the eigenvalues-greater-than-one rule yields an overabundance of potential factors, which is not consistent with current research or conceptualization of anxiety. Results of the parallel analysis suggested the presence of six factors for the combined sample and full reference subsample (as the combined sample is heavily influenced by the large sample size of the full reference subsample). Examination of the scree plot appeared to reflect the presence of five factors for the combined sample and full reference subsample. The relatively smaller specific learning disability subsample, however, appeared to yield only three factors, according to the scree plot and parallel analysis. Finally, Velicer's (1976) MAP test suggested that three factors should be obtained for both the specific learning disability and full reference subsamples, as well as the combined sample. The number of factors to extract differed based on the factor extraction method used; this finding can be explained by the literature on factor extraction methods. For example, the eigenvalues-greater-than-one method tends to overestimate the number of factors present (Costello & Osborne, 2005; O'Connor, 2000; Zwick & Velicer, 1982), and that seems to be the case in the present study. The scree plot also tends to overestimate the number of factors to retain, although this method is considered to be somewhat more accurate than the eigenvalues-greater-than-one method (Zwick & Velicer, 1986). However, although examination of the scree plot is a very common method for determining the number of factors to extract, this approach is also known to be quite subjective; as a result, different interpretations of the visual plot may result in different numbers of factors being retained (O'Connor, 2000; Zwick & Velicer, 1982, 1986). Parallel analysis and the MAP test are considered to be more accurate than either the eigenvalues-greater-than-one method or the scree plot (O'Connor, 2000). However, parallel analysis tends to err in the direction of over-extraction, resulting in the extraction of more factors, while the MAP test tends

to err in the direction of under-extraction, resulting in the extraction of fewer factors (O'Connor, 2000; Zwick & Verlicer, 1982, 1986).

Overall, based on the results of the eigenvalues-greater-than-one rule, examination of the scree plot, results of the parallel analyses and Velicer's MAP test, as well as consideration of the conceptual meaningfulness of the retained factors, a five-factor solution (consisting of three anxiety factors and two defensiveness factors) is considered to be the most appropriate and conceptually meaningful factor solution for the full reference subsample and combined sample, while a three-factor solution (consisting of two anxiety factors and one defensiveness factor) is considered to be the most appropriate and conceptually meaningful factor solution for the specific learning disability subsample.

While a three-factor structure for the specific learning disability subsample reflects less specificity, with fewer dimensions, compared to a five-factor structure, this interpretation is supported by the results of the scree plot, parallel analysis, and MAP test, and appears to be the most appropriate solution for the specific learning disability subsample. Furthermore, the two identified anxiety-related factors within the specific learning disability subsample are still consistent with what might be expected from current research and conceptualizations of anxiety, which describe anxiety as having multiple components (i.e., two or more dimensions). For example, some researchers have hypothesized that anxiety has at least two fundamental components: worry/cognition (such as experiencing intrusive thoughts, having concerns about one's own performance, or worrying) and emotionality (consisting of physical and/or emotional reactions, such as feeling fearful, or having a fast heartbeat; Carter, Williams, & Silverman, 2008; Liebert & Morris, 1967; Morris & Liebert, 1969). Ziedner (2008) supported a multidimensional view of anxiety, and he stated that worry and emotionality can be viewed as

correlated, yet distinct, components of anxiety. Other researchers suggest that anxiety can be separated into cognitive and somatic (physical) components (Davidson, 1978; Deffenbacher, 1986; Eisen & Silverman, 1993; Meyer & Reich, 1978). Still other researchers recommend separating anxiety into three components: cognition (such as experiencing negative thoughts about oneself), somatic symptoms (such as experiencing muscle tension or a fast heart beat), and attention/distractibility (Deffenbacher, 1986; Morris, Davis, & Hutchings, 1981). Overall, these researchers as well as other researchers favor the conceptualization of anxiety as a multidimensional construct (i.e., two or more dimensions), representing distinct yet interrelated cognitive, emotional, physiological, and behavioral components, rather than a one-dimensional construct (Behnke & Beatty, 1981; Carter et al., 2008; Morris, Davis, & Hutchings, 1981; Zeidner, 2008). For example, Behnke and Beatty (1981) argued that "neither physiological arousal nor cognitive perception alone fully account for a particular emotion" (p. 159). Rather, an interaction between multiple components is likely involved when individuals experience anxiety (Behnke & Beatty, 1981; Zeidner, 2008). These theoretical and research findings have also influenced clinical conceptualizations of anxiety. For example, the DSM-5 (APA, 2013) identifies cognition (worry) and physical symptoms as the key components of a generalized anxiety disorder. Therefore, the identification of two anxiety-related factors within the specific learning disability subsample is consistent with what might be expected based on research and conceptualizations of anxiety.

The five-factor promax solution for the combined sample contains a Worry factor (Factor I), Physiological Anxiety factor (Factor II), Social Anxiety factor (Factor V), and two Defensiveness factors (Factors III and IV; see Table 6). The Worry factor ($M$ = 6.55, $SD$ = 4.19) contains 17 items and assesses concerns related to feeling fearful, making mistakes, worrying

about events that might happen in the future, and being judged by other children. The Physiological Anxiety factor (*M* = 6.20, *SD* = 3.44) also includes 16 items, and assesses the presence of physical or somatic symptoms, such as feeling tired or sweaty, or having headaches. Finally, the Social Anxiety factor (*M* = 1.56, *SD* = 1.25) contains four items related to performing in front of others, and making negative comparisons between the self and others, while the two defensiveness scales (*M* = 2.62 and 3.38, *SD* = 1.89 and 1.60, respectively) each contain six items which assess the individual's willingness to endorse overly positive or socially desirable behaviors.

The five-factor varimax solution for the combined sample is quite similar to that of the five-factor promax solution, and also contains a Worry factor (Factor I), Physiological Anxiety factor (Factor II), Social Anxiety factor (Factor V), and two Defensiveness factors (Factors III and IV; see Table 7). The items found on the Worry factor (*M* = 6.55, *SD* = 4.19; containing 17 items) and Social Anxiety factor (*M* = 1.56, *SD* = 1.25; containing 4 items), as well as one Defensiveness factor (*M* = 2.62, *SD* = 1.89; containing six items), are identical to the items found on the same corresponding factors of the five-factor promax solution, while the items on the Physiological Anxiety factor (*M* = 6.68, *SD* = 3.65; containing 17 items) and the other Defensiveness factor (*M* = 2.90, *SD* = 1.41; containing five items) differ from the items found on the same corresponding factor of the five-factor promax solution. One item (Item 28) was most salient on both the Worry factor and the Physiological Anxiety factor for the varimax solution. Another item (Item 35) which had loaded on a Defensiveness factor for the promax solution, loaded instead on the Physiological Anxiety factor for the varimax solution.

Overall, a five-factor solution appears to be the most appropriate solution for the combined sample. Furthermore, interfactor correlations between the three anxiety-related factors

of the promax solution ranged from .47 to .67, and support the selection of the five-factor promax solution over the five-factor varimax solution as the best solution for the combined sample.

Compared to the original analysis done by Reynolds and Richmond (2008b), the factors and factor loadings of the five-factor promax solution for the combined sample were similar to the five-factor varimax solution reported in the manual, although slight variations were noted. Specifically, the original factor analyses done by Reynolds and Richmond resulted in a five-factor solution consisting of three anxiety-related factors (physiological anxiety, worry, and social anxiety) as well as two defensiveness factors. These factors were consistent with those yielded by the factor analysis of the RCMAS-2 scores for the combined sample in the present study. However, the items on the specific factors varied, particularly with regard to the Social Anxiety factor. For example, five items included on the Social Anxiety subscale in Reynolds and Richmond's analyses instead were most salient on the Worry factor for the combined sample, while three more items included on the Social Anxiety subscale in Reynolds and Richmond's analyses instead loaded most strongly on the Physiological Anxiety factor for the combined sample. Finally, one item from the Physiological Anxiety subscale and two items from the Worry subscale of the RCMAS-2 ultimately loaded most strongly on a Defensiveness factor for the combined sample in the current study. This suggested that several factors, including the Worry factor, Physiological Anxiety factor, and one Defensiveness factor were not as strongly or consistently represented within the five-factor structure for individuals with specific learning disabilities, compared to the results reported by Reynolds and Richmond. This is consistent with findings of previous research which examined the factor structure and factorial

invariance of the original RCMAS among the normative sample as well as students with specific learning disabilities (Paget & Reynolds, 1984).

The five-factor promax solution for the full reference subsample contains a Worry factor (Factor I), Physiological Anxiety factor (Factor II), Social Anxiety factor (Factor V), and two Defensiveness factors (Factors III and IV; see Table 8). The Worry factor ($M$ = 6.20, $SD$ = 3.98) contains 16 items and assesses concerns related to feeling fearful, making mistakes, worrying about events that might happen in the future, and being judged by other children. The Physiological Anxiety factor ($M$ = 6.49, $SD$ = 3.58) includes 17 items, and assesses the presence of physical or somatic symptoms, such as feeling tired or sweaty, or having headaches. Finally, the Social Anxiety factor ($M$ = 1.52, $SD$ = 1.24) contains four items related to performing in front of others, and making negative comparisons between the self and others, while the two defensiveness scales ($M$ = 2.57 and 3.42, $SD$ = 1.86 and 1.60, respectively) each contain six items which assess the individual's willingness to endorse overly positive or socially desirable behaviors.

The five-factor varimax solution for the full reference subsample is quite similar to that of the five-factor promax solution, and also contains a Worry factor (Factor I), Physiological Anxiety factor (Factor II), Social Anxiety factor (Factor V), and two Defensiveness factors (Factors III and IV; see Table 9). Specifically, the items on the Social Anxiety factor ($M$ = 1.52, $SD$ = 1.24; containing four items) and one Defensiveness factor ($M$ = 2.57, $SD$ = 1.86; containing six items), are identical to the items found on the same corresponding factors of the five-factor promax solution, while the Worry factor ($M$ = 6.49, $SD$ = 4.13; containing 17 items), Physiological Anxiety factor ($M$ = 6.67, $SD$ = 3.63; containing 17 items) and other Defensiveness factor ($M$ = 2.95, $SD$ = 1.41; containing 5 items) differ from the items on the same

corresponding factors of the five-factor promax solution. Specifically, one item (Item 28) which had loaded on the Physiological Anxiety factor for the promax solution, was most salient instead on both the Worry factor and the Physiological Anxiety factor for the varimax solution. Similarly, one item (Item 35) which had loaded on a Defensiveness factor for the promax solution, loaded instead on the Physiological Anxiety factor for the varimax solution.

Overall, a five-factor solution appears to be the most appropriate solution for the full reference subsample. Furthermore, interfactor correlations between the three anxiety-related factors of the promax solution ranged from .43 to .67, and support the selection of the five-factor promax solution over the five-factor varimax solution as the best solution for the full reference subsample.

Compared to Reynolds and Richmond's (2008b) analysis of the RCMAS-2 data, the factors and factor loadings of the five-factor promax solution for the full reference subsample were similar to the five-factor varimax solution reported in the manual, although slight variations were noted. Specifically, the original factor analyses done by Reynolds and Richmond resulted in a five-factor solution consisting of three anxiety-related factors (physiological anxiety, worry, and social anxiety) as well as two defensiveness factors. These factors were the same as the factors identified in the factor analysis of the RCMAS-2 scores for the full reference subsample in the current study. However, the items on the factors varied slightly. For example, four items included on the Social Anxiety subscale in Reynolds and Richmond's analyses instead were most salient on the Worry factor for the full reference subsample, while four more items included on the Social Anxiety subscale in Reynolds and Richmond's analyses instead loaded most strongly on the Physiological Anxiety factor for the full reference subsample. Similarly, two items from the Worry subscale of the RCMAS-2 was most salient on the Physiological Anxiety

factor for the full reference subsample in the current study, while one item from the Physiological Anxiety subscale and another two items from the Worry subscale of the RCMAS-2 ultimately loaded most strongly on a Defensiveness factor for the full reference subsample in the present study.

Interestingly, Reynolds and Richmond (2008b) included several items on certain RCMAS-2 subscales, despite loading most strongly on other factors. This was most apparent on the Social Anxiety factor, which includes 12 items designed to assess "anxiety in social and performance situations" (Reynolds & Richmond, 2008b, p. 18). However, only five of the 12 items actually loaded most strongly on the Social Anxiety factor of the RCMAS-2. The remaining seven items either loaded most strongly on a different factor (usually Physiological Anxiety or Worry), or did not demonstrate a factor loading higher than .30 on any factor. This is also true for three of the 12 items included on the RCMAS-2 Physiological Anxiety subscale, which either loaded most strongly on the Worry factor or a Defensiveness factor, or did not load strongly on any factor. Similarly, three of the 16 items included on the RCMAS-2 Worry factor loaded most strongly on either the Physiological Anxiety or a Defensiveness factor, or did not load strongly on any factor. The manual acknowledges these variations, and states that these variations are similar to those found in the original RCMAS normative data set. Specifically, Reynolds and Richmond explain in the RCMAS-2 manual that "responses to a few [RCMAS-2 Social Concerns/Concentration] items were most strongly associated with those on the Physiological Anxiety subscale, another few with those on the Worry/Oversensitivity subscale, and only a few formed the third, weak anxiety factor" (Reynolds & Richmond, 2008b, p. 53). Therefore, it is clear that a number of items loaded strongly on more than one factor, even during the RCMAS development process. However, Reynolds and Richmond go on to explain in the

manual that this trend appears to have become more pronounced with the addition of new items related to Social Anxiety in the RCMAS-2, and acknowledges a high degree of correlation between the Social Anxiety and Worry item responses. Despite this, however, the manual suggests that the overlap in factor loadings "do not appear to differ systematically enough to indicate any strong alternative scoring structure for the RCMAS-2 scales" (Reynolds & Richmond, 2008b, p. 53).

As stated above, a three-factor solution was found to be the most appropriate solution for the specific learning disability subsample. The three-factor promax solution for the specific learning disability subsample contains a Worry/Social Anxiety factor (Factor I), Physiological Anxiety factor (Factor II), and Defensiveness factor (Factor III; see Table 10). The Worry/Social Anxiety factor ($M$ = 10.85, $SD$ = 6.03) includes 23 items related to concerns about what may happen in the future, performing in front of others, and making negative comparisons between the self and others. The Physiological Anxiety factor ($M$ = 7.11, $SD$ = 4.40) includes 18 items which measure various physical and somatic complaints, such as headaches, tiredness, sweatiness, and nausea. Two items (Items 47 and 48) were most salient on both the Worry/Social Anxiety factor and the Physiological Anxiety factor. Finally, the Defensiveness factor ($M$ = 4.16, $SD$ = 2.45) contains 8 items which assess the individual's willingness to endorse overly positive or socially desirable behaviors.

The three-factor varimax solution for the specific learning disability subsample is similar to that of the three-factor promax solution, and also contains a Worry/Social Anxiety factor (Factor I), Physiological Anxiety factor (Factor II), and Defensiveness factor (Factor III; see Table 11). The three-factor varimax solution varies slightly, however, with the Worry/Social Anxiety factor ($M$ = 11.30, $SD$ = 6.53) consisting of 24 items related to concerns about the future

and interactions with others, and the Physiological Anxiety factor (*M* = 6.42, *SD* = 3.92) consisting of 16 items related to physical or somatic complaints. Finally, the Defensiveness factor (*M* = 4.41, *SD* = 2.63) includes 9 items related to overly-positive or socially desirable behaviors. Specific differences between the promax and varimax solutions include one item (Item 2) which loaded on the Physiological Anxiety factor for the promax solution but loaded instead on the Worry/Social Anxiety factor for the varimax solution, and one item (Item 48) which had loaded on the Worry/Social Anxiety factor for the promax solution, loaded instead on the Defensiveness factor for the varimax solution. Another item (Item 47) was most salient on both the Worry/Social Anxiety factor and the Physiological Anxiety factor for both the promax and varimax solutions.

Overall, a three-factor solution appears to be the most appropriate solution for the specific learning disability subsample. Furthermore, the interfactor correlation between the two anxiety-related factors of the promax solution was .60, and supports the selection of the three-factor promax solution over the three-factor varimax solution for the specific learning disability subsample.

Compared to Reynolds and Richmond's (2008b) analysis of the RCMAS-2 data, the factors and factor loadings of the three-factor promax solution for the specific learning disability subsample were quite dissimilar to those reported in the manual. The most obvious difference is with regard to the number of factors identified. While the original factor analyses performed by Reynolds and Richmond yielded five factors (three anxiety-related factors and two defensiveness factors), the factor analysis of the RCMAS-2 scores for the specific learning disability subsample yielded three factors (two anxiety-related factors and one defensiveness factor). Furthermore, although several of the factors appear similar (for example, both solutions include a

Physiological Anxiety factor), the items contained within each factor also varied. The greatest degree of similarity was observed with regard to the RCMAS-2 Defensiveness scale, which largely included the same items as the Defensiveness scale described in the manual. Only one difference was noted, with one item from the RCMAS-2 Defensiveness scale loading most strongly on the Worry/Social Anxiety factor for the specific learning disability subsample. The Physiological Anxiety factor contained many items also included on the RCMAS-2 Physiological Anxiety subscale, although differences in content were also noted. For example, the Physiological Anxiety factor of the three-factor promax solution includes five items originally included on the RCMAS-2 Worry subscale, and three items from the RCMAS-2 Social Anxiety subscale. However, the greatest differences were observed with regard to the RCMAS-2 Social Anxiety and Worry subscales. Items from these scales combined to form a Social Anxiety/Worry factor for the specific learning disability subsample, while they formed two separate scales on the RCMAS-2. However, as Reynolds and Richmond indicated, several items loaded strongly on more than one factor, and this appeared to be the case for the specific learning disability subsample as well. As a result, trying to separate these items into two distinct factors for the specific learning disability subsample was problematic in the current study.

To provide additional information about the factor structure of the RCMAS-2 scores, the Schmid-Leiman transformation (Schmid & Leiman, 1957; Wolff & Preising, 2005) was conducted for the five-factor promax solutions for the combined sample and the full reference subsample, as well as for the three-factor promax solution for the specific learning disability subsample. The Schmid-Leiman transformation can help identify independent contributions of different higher- and lower-order factors, and can be used to help determine whether a higher-order factor exists (in this case, whether a Total Anxiety factor exists along with the more

specific factors or first-order factors). Previous research has suggested that "factoring an anxiety test produces narrow scales of anxiety that correlate with each other to form a higher-order factor" (Gorsuch, 1983, p. 240). Therefore, it was reasonable to assume that a higher-order anxiety factor may be present along with the RCMAS-2 subscales.

According to the Schmid-Leiman transformation for the five-factor promax solution for the combined sample, the percentage of extracted variance explained by the first-order factors (worry, physiological anxiety, social anxiety) was 32.2% (Worry = 14.5%, Physiological Anxiety = 9.4%, Social Anxiety = 8.2%), while the percentage of extracted variance explained by a general, higher-order Total Anxiety factor was 67.8%. Results of the Schmid-Leiman transformation for the five-factor promax solution for the full reference subsample were quite similar to that of the combined sample. Specifically, the percentage of extracted variance explained by the first-order factors (worry, physiological anxiety, social anxiety) was 32.2% (Worry = 14.9%, Physiological Anxiety = 9.8%, Social Anxiety = 7.4%), while the percentage of extracted variance explained by a general, higher-order Total Anxiety factor was 67.8%. Finally, for the three-factor promax solution for the specific learning disability subsample, the percentage of extracted variance explained by the first-order factors (worry/social anxiety, physiological anxiety) was 36.4% (Worry/Social Anxiety = 23.1%, Physiological Anxiety = 13.3%), while the amount of extracted variance explained by a general, higher-order Total Anxiety factor was 63.6%. According to Gorsuch (1983), higher-order factors which account for at least 40-50% of the extracted variance are of "definite interest" (p. 253).

Results of the Schmid-Leiman transformation for the combined sample and full reference subsample indicate the presence of a higher-order Total Anxiety factor. This finding is consistent with findings reported by Reynolds and Richmond (2008b), who reported that

approximately 48% of the variance can be explained by a higher-order Total Anxiety factor. According to the authors, these findings lend "considerable support for the presence of a large general anxiety factor (ganx) in the measurement of chronic, manifest anxiety" (Reynolds & Richmond, 2008b, p. 49). The results of the present study differ slightly from the results reported by Reynolds and Richmond (2008), and suggest that slightly more variance can be explained by a higher-order Total Anxiety factor with the current samples; the difference between the findings of the current study and those reported by Reynolds and Richmond is due to the items loading on different factors and the use of a more sophisticated procedure, the Schmid-Leiman transformation, to determine the presence of a higher-order factor and the variance accounted for by the higher-order factor and the specific or first-order factors.

These results further suggest that Worry/Social Anxiety and Physiological Anxiety are both distinct but related constructs of anxiety, and also provide evidence of a higher-order Total Anxiety factor for the RCMAS-2 scores among children with specific learning disabilities. The presence of a higher-order Total Anxiety factor on the RCMAS-2 indicates that the general content of the RCMAS-2 is applicable to and consistent with broad theoretical conceptualizations of anxiety, while the first-order factors allow for narrower and more accurate assessment of specific types or dimensions of anxiety.

**Comparison of five-factor structures.** Although factor extraction methods suggested that the RCMAS-2 scores for the specific learning disability subsample yield three factors rather than the five factors yielded by the full reference subsample and combined sample, additional analyses were conducted to provide more information about the potential similarities between the factor structures, even though the three-factor solution was chosen as the most appropriate factor solution for the specific learning disability subsample. To do so, a five-factor solution was

forced for the RCMAS-2 scores of the specific learning disability subsample using a promax rotation as well as a varimax rotation. Then, the resulting five-factor promax and varimax solutions for the RCMAS-2 scores for the specific learning disability subsample (see Tables 12 and 13, respectively) were compared to the five-factor promax and varimax solutions for the full reference subsample (see Tables 8 and 9, respectively), to determine whether the factor structure was similar across the groups of interest.

The five-factor promax solution for the specific learning disability subsample contains a Worry factor (Factor I), Physiological Anxiety factor (Factor II), Social Anxiety factor (Factor V), and two Defensiveness factors (Factors III and IV; see Table 12). The Worry factor contains 17 items which assess concerns related to feeling fearful or nervous, making mistakes, worrying about events that might happen in the future, and being judged by other children. The Physiological Anxiety factor includes 12 items, and assesses concerns related to feeling worried or scared, as well as the presence of physical or somatic symptoms, such as feeling tired or sweaty, or having headaches. Finally, the Social Anxiety factor contains 10 items related to performing in front of others, having difficulty concentrating, and making negative comparisons between the self and others, while the two defensiveness scales each contain five items which assess the individual's willingness to endorse overly positive or socially desirable behaviors. One item (Item 8) was most salient on both the Worry factor and Social Anxiety factor.

The five-factor varimax solution for the specific learning disability subsample is quite similar to that of the five-factor promax solution, and also contains a Worry factor (Factor I), Physiological Anxiety factor (Factor II), Social Anxiety factor (Factor V), and two Defensiveness factors (Factors III and IV; see Table 13). The items found on the Worry factor, Physiological Anxiety factor, and Social Anxiety factor are identical to the items found on the

same corresponding factors of the five-factor promax solution, while the items on both Defensiveness factors differed from the items found on the same corresponding factors of the five-factor promax solution. Specifically, one Defensiveness factor contained 6 items, including one item (Item 38) which had loaded on the other Defensiveness factor for the promax solution. The remaining second Defensiveness factor, therefore, contained only 4 items.

To determine whether the five-factor solutions demonstrated invariance across both subsamples of interest (i.e., specific learning disability subsample, full reference subsample), the coefficient of congruence (Cattell, 1978; Harman, 1976; Mulaik, 2009; Tucker, 1951) and salient variable similarity index (Cattell, 1978; Cattell & Baggaley, 1960) were computed. The coefficient of congruence is a parametric statistic (Cattell, 1978; Harman, 1976; Tucker, 1951) and assesses the amount of shared variance between the corresponding factors (Cattell, 1978; Harman, 1976). In contrast, the salient variable similarity index is a nonparametric statistic (Cattell, 1978) used to compare matched factors. Both statistics were computed because they complement each other and the coefficient of congruence can be affected by factor size and nonequivalent variance-covariance matrices (Cattell, 1978).

Coefficient of congruence values range from -1.00 to +1.00, with +1.00 indicating perfect similarity and '0' indicating no similarity. A coefficient of congruence value of .90 or higher is suggested by Cattell (1978) as indicative of strongly similar factors, although this value is arbitrary and not considered absolute (Reynolds et al., 1999; Reynolds & Lowe, 2009). The coefficient of congruence values for the five-factor promax solution ranged from -0.10 (Defensiveness 2) to 0.86 (Worry, Defensiveness 1; see Table 14), and from -0.01 (Defensiveness 2) to 0.94 (Worry) for the five-factor varimax solution. None of the values of the promax solution met the recommended cut-off criteria, while two values of the varimax solution

(Worry, Physiological Anxiety) met the recommended cut-off criteria indicating similar factors. Despite similarity between two of the five factors of the varimax solution, however, these results indicate that neither the five-factor promax nor the five-factor varimax solution demonstrates invariance across the two subsamples.

The salient variable similarity index also ranges from -1.00 to +1.00, with +1.00 indicating perfect similarity and '0' indicating no similarity. Factor pattern or structure coefficients that exceeded the cut-off value were considered salient, while factor pattern or structure coefficients that did not exceed the cut-off value were considered "non-salient" (Cattell, 1978). In an effort to avoid over interpretation, factor pattern and structure coefficients were compared against a cut-off value of ± .25 to indicate salience (Reynolds & Richmond, 2008b). The salient variability similarity index values for the five-factor promax solution was significant for three factors (Worry, Physiological Anxiety, Defensiveness 1), and not significant for two factors (Social Anxiety and Defensiveness 2; see Table 14). The salient variability similarity index values for the five-factor varimax solution was significant for four factors (Worry, Physiological Anxiety, Social Anxiety, Defensiveness 1), and not significant for one factor (Defensiveness 2). Overall, these results do not support factorial invariance of the five-factor promax and varimax solutions across the non-referred and specific learning disability subsamples, and lend further support to the conclusion that the RCMAS-2 scores yield a different factor structure among the specific learning disability subsample, compared to the full reference subsample.

**Research Question #2: Do the RCMAS-2 scores demonstrate adequate convergent and discriminant validity, as demonstrated by higher correlations between the RCMAS-2 scores and the scores of conceptually-similar scales (e.g. trait anxiety), and lower**

**correlations between the RCMAS-2 scores and the scores of conceptually-dissimilar scales (e.g. state anxiety) for children with specific learning disabilities?**

The convergent validity of the RCMAS-2 scores was examined in relation to scores of other conceptually-similar scales. The data were analyzed by computing the Pearson *r* correlation coefficients between the factor scores of the RCMAS-2 based on the three-factor promax solution and the scores of selected scales of the BASC-2-SRP-C, BASC-2-SRP-A, STAI-Y, and STAI-C (see Table 15). The following descriptors were used throughout this study: .00 – .19 (*very weak*), .20 – .39 (*weak*), .40 – .69 (*moderate*), .70 – .89 (*strong*), and .90 – 1.00 (*very strong*; Lowe et al., 2008).

With regard to the scores of the RCMAS-2 Total Anxiety scale, strong correlations were found with the scores of the STAI-C Trait Anxiety scale ($r$ = .74), BASC-2-SRP-C Anxiety ($r$ = .72) and Internalizing Problems ($r$ = .72) scales, as well as the scores of the BASC-2-SRP-A Anxiety ($r$ = .78), Internalizing Problems ($r$ = .79), and Emotional Symptoms Index ($r$ = .76) scales. Strong correlations were also found between the scores of the RCMAS-2 Worry/Social Anxiety subscale and the scores of the STAI-C Trait Anxiety ($r$ = .73) and BASC-2-SRP-A Anxiety scales ($r$ = .70). With regard to the scores of the RCMAS-2 Physiological Anxiety subscale, strong correlations were found with the scores of the BASC-2-SRP-A Anxiety ($r$ = .79), Internalizing Problems ($r$ = .82), and Emotional Symptoms Index ($r$ = .77) scales.

Moderate correlations were found between the scores of the RCMAS-2 Total Anxiety scale and the scores of the STAI-Y Trait Anxiety scale ($r$ = .57), BASC-2-SRP-C Sense of Inadequacy ($r$ = .60), Emotional Symptoms Index ($r$ = .69), and Depression ($r$ = .59) scales, as well as the BASC-2-SRP-A Sense of Inadequacy ($r$ = .66) and Depression ($r$ = .55) scales. Moderate correlations were found between the scores of the RCMAS-2 Worry/Social Anxiety

subscale and the scores of the BASC-2-SRP-C Anxiety (*r* = .68), Sense of Inadequacy (*r* = .58), Internalizing Problems (*r* = .67), Emotional Symptoms Index (*r* = .64), and Depression (*r* = .54) scales, as well as the BASC-2-SRP-A Sense of Inadequacy (*r* = .63), Internalizing Problems (*r* = .69), Emotional Symptoms (*r* = .68), and Depression (*r* = .44) scales. Moderate correlations were found between the scores of the RCMAS-2 Physiological Anxiety subscale and the scores of the STAI-C Trait Anxiety scale (*r* = .64), STAI-Y Trait Anxiety scale (*r* = .69), BASC-2-SRP-C Anxiety(*r* = .66), Sense of Inadequacy (*r* = .53), Internalizing Problems (*r* = .66), Emotional Symptoms Index (*r* = .63), and Depression (*r* = .56) scales, as well as the BASC-2-SRP-A Sense of Inadequacy (*r* = .62) and Depression (*r* = .62) scales.

Moderate to strong correlations were expected between the RCMAS-2 scores and the Trait Anxiety scale scores of the STAI-C and STAI-Y, as well as the BASC-2-SRP scale scores of Anxiety, Depression, Sense of Inadequacy, Internalizing Problems, and the Emotional Symptoms Index, as research suggests that children with high levels of anxiety also commonly experience worry, a sense of inadequacy, and general emotional difficulties (Bandura, 1986; Mandler & Sarason, 1952; Silverman, La Greca, & Wasserstein, 1995). Overall, moderate to strong correlation coefficients were found between the RCMAS-2 scores and the scores of conceptually-similar scales, supporting the convergent validity of the RCMAS-2 scores for the specific learning disability subsample.

The discriminant validity of the RCMAS-2 scores was also examined in relation to scores of conceptually-dissimilar scales. As with convergent validity, the data were analyzed by computing the Pearson *r* correlation coefficients between the scores of the RCMAS-2 three factors (Worry/Social Anxiety, Physiological Anxiety, and Defensiveness) and the Total Anxiety factor and the scores of selected BASC-2-SRP-C, BASC-2-SRP-A, STAI-Y, and STAI-C scales

(see Table 15). The following descriptors were used throughout this study: .00 – .19 (*very weak*), .20 – .39 (*weak*), .40 – .69 (*moderate*), .70 – .89 (*strong*), and .90 – 1.00 (*very strong*; Lowe et al., 2008).

With regard to the scores of the RCMAS-2 Total Anxiety scale, weak correlations were found with the scores of the STAI-Y State Anxiety scale ($r$ = .27), as well as the BASC-2-SRP-C and BASC-2-SRP-A Self-Reliance scales ($r$ = -.29 and $r$ = -.30, respectively). Weak correlations were also found between the scores of the RCMAS-2 Worry/Social Anxiety subscale and the scores of the BASC-2-SRP-C and BASC-2-SRP-A Self-Reliance scales ($r$ = -.25 and $r$ = -.24, respectively). With regard to the scores of the RCMAS-2 Physiological Anxiety subscale, weak correlations were found with the scores of the STAI-Y State Anxiety scale ($r$ = .33), as well as the BASC-2-SRP-C and BASC-2-SRP-A Self-Reliance scales ($r$ = -.28 and $r$ = -.34, respectively). Weak correlations were found between the scores of the RCMAS-2 Defensiveness scale and the scores of the BASC-2-SRP-A and BASC-2-SRP-C Internalizing Problems scales ($r$ = -.33 and $r$ = -.26, respectively), Emotional Symptoms Index scales ($r$ = -.31 and $r$ = -.30, respectively), Sense of Inadequacy scales ($r$ = -.26 and $r$ = -.20, respectively), and Self-Esteem scales ($r$ = .27 and $r$ = .27, respectively), as well as the BASC-2-SRP-C-A Depression scale ($r$ = -.23), BASC-2-SRP-C Anxiety and Self-Reliance scales ($r$ = -.23 and $r$ = .35, respectively), and STAI-C State Anxiety scale ($r$ = -.21).

Negligible correlations were found between the scores of the RCMAS-2 Worry/Social Anxiety subscale and the scores of the STAI-Y State Anxiety scale ($r$ = .19). Finally, with regard to the scores of the RCMAS-2 Defensiveness scale, negligible correlations were found with the BASC-2-SRP-A Anxiety and Self-Reliance scales ($r$ = -.18 and $r$ = .18, respectively), BASC-2-SRP-C Depression scale ($r$ = -.18), and STAI-C Trait Anxiety scale ($r$ = -.07).

Weak to negligible correlations were expected between the RCMAS-2 scores and the scores of the State Anxiety scale of the STAI-Y and STAI-C, as well as the BASC-2-SRP scale scores of Self-Esteem and Self-Reliance, as research suggests that high levels of anxiety are weakly associated with effective personal resources (such as self-esteem or self-reliance; Reynolds & Kamphaus, 2004b; Muris, 2006; Roberts, Roberts, & Chan, 2009). Overall, weak to negligible correlation coefficients were found between the majority of the RCMAS-2 scores and the scores of conceptually-dissimilar scales, supporting the discriminant validity of the RCMAS-2 scores for the specific learning disability subsample. Contrary to expectations, however, moderate correlations were found between the RCMAS-2 scores and the scores of the BASC-2-SRP Self-Esteem scale. Possible explanations for this finding are discussed in Chapter V.

**Research Question #3: Will factor analyses of scales measuring similar and dissimilar constructs further support the convergent and discriminant validity of the RCMAS-2 scores for children with specific learning disabilities by yielding conceptually-distinct factors (i.e., a cluster of scales related to chronic, manifest, or trait anxiety, and a cluster of scales related to state or situational anxiety with specific learning disabilities)?**

As an additional measure of convergent validity, exploratory factor analyses were conducted on the scores of the RCMAS-2, STAI-C, and BASC-2-SRP-C scales. Only the scores of the child-versions of the scales were included in these analyses, as they represented the majority of the sample. Specifically, only 41% of participants ($n$ = 73) completed the adolescent version of the BASC-2-SRP rating scales, while only 12% of participants ($n$ = 21) completed the adolescent version of the STAI. This sample size was considered to be too small to appropriately be subjected to factor analyses, and was therefore excluded from the analyses. As with the factor analyses of the RCMAS-2, exploratory factor analyses of the scales and subscales

were performed using the method of principal axis factoring with an oblique (promax) rotation, with the expectation that the analyses would yield correlated factors. Scales and subscales examined in the factor analyses included the STAI-C (Trait Anxiety, State Anxiety), RCMAS-2 (Worry/Social Anxiety, Physiological Anxiety), and BASC-2-SRP-C (Depression, Self-Reliance, and Sense of Inadequacy). It was expected that the factor analyses would yield distinct clusters (or factors) of conceptually-similar scales, including a "convergent" factor and two "discriminant" factors. Specifically, it was hypothesized that the "convergent" factor would include the Trait Anxiety scale of the STAI-C, and the Worry/Social Anxiety and Physiological Anxiety subscales of the RCMAS-2. Conversely, it was hypothesized that the one "discriminant" factor would represent other mood-related difficulties, such as the State Anxiety scale of the STAI-C, and the Depression and Sense of Inadequacy scales of the BASC-2-SRP, while the second "discriminant" factor would include the Self-Reliance scale of the BASC-2-SRP.

Results of the factor analysis yielded only one factor, and did not yield distinct factors reflecting conceptually similar or dissimilar scales (see Table 16). These findings do not support the convergent or discriminate validity of the three-factor promax solution for RCMAS-2 scores for individuals with specific learning disabilities.

**Research Question #4: Do the RCMAS-2 scores demonstrate adequate internal consistency reliability and temporal stability for children with specific learning disabilities?**

Internal consistency reliability and test score stability of the RCMAS-2 scores were examined for children with specific learning disabilities. Internal consistency reliability estimates were calculated using coefficient alpha (Cronbach, 1951) and the 95% confidence interval was computed around each reliability estimate (Fan & Thompson 2001; Feldt, 1990; see

Table 17). Scores with strong internal consistency reliability indicate that the items contained within the scale produce similar or related scores, and are therefore thought to be contributing to the measurement of a similar construct. Reliability coefficients range from .00 to 1.00, with higher values indicating stronger reliability. Coefficient alphas that met or exceeded 0.70 were considered indicators of adequate reliability (Cicchetti & Sparrow, 1990). Internal consistency reliability estimates for the RCMAS-2 scale and subscale scores of the students with specific learning disabilities ranged from .80 to .92, indicating that the RCMAS-2 scale and subscale scores for children with specific learning disabilities demonstrate strong to very strong internal consistency reliability. Examination of each 95% confidence interval around each reliability estimate was also within the strong to very strong range. These findings suggest that the items included on each factor of the RCMAS-2 are similar in content, and are thought to be measuring a similar construct.

Test score stability of the RCMAS-2 scores for children with specific learning disabilities was calculated using the Pearson *r* statistic (see Table 18). The test score stability coefficient provides a measure of the consistency of the scores across time, and helps determine the extent to which items in a specific scale or domain are affected by the passage of time (Charter, 2003; Cronbach, 1951). Reliability coefficients range from 0 to 1, with higher coefficients representing higher temporal stability (indicating that the scores are stable across time). Of the 178 participants who completed the first testing session, 155 participants (87.1%) completed the RMCAS-2 again during the second testing session. The test-retest interval in the present study ranged from 7 – 70 calendar days, with a mean range of 23.69 days (*SD* = 12.85). Test score stability coefficients for the RCMAS-2 scale and subscale scores for students with specific learning disabilities ranged from .71 to .80, indicating that the RCMAS-2 scores for children

with specific learning disabilities demonstrate strong temporal stability at least over a 7 – 70 day period.

Intraclass correlation coefficients (ICCs) for the RCMAS-2 factor scores for children with specific learning disabilities were also computed (see Table 18). Intraclass correlation coefficients are conceptualized as the ratio of between-groups variance to variance within those groups, and take into consideration potential differences or discrepancies that may result from the involvement of different raters, administrations, or other repeated measures (Tabachnick & Fidell, 2007). With regard to the present study, intraclass correlations were calculated as an additional measure of test score stability. Intraclass correlation coefficients can be computed using several different models, including a two-way mixed effects model, a two-way random effects model, and a one-way random effects model. In this case, the two-way random effects model is most appropriate, as if reflects the presence of two independent variables (multiple administrators and multiple test times). The ICCs of the two-way mixed effects model ranged from .80 to .92, and are somewhat similar but higher in magnitude in comparison to the test score stability coefficients computed using Pearson *r*.

In addition, paired samples *t*-tests were conducted to determine whether the RCMAS-2 scores changed significantly between the first and second testing sessions for children with specific learning disabilities (see Table 18). Results of the paired samples *t*-tests indicated that scores of the Worry/Social Anxiety subscale were significantly higher at Time 1 compared to Time 2, while the scores of the Physiological Anxiety subscale did not differ significantly from Time 1 to Time 2. Furthermore, the scores of the Defensiveness scale also did not differ significantly from Time 1 to Time 2. Finally, the scores of the Total Anxiety scale were significantly higher at Time 1 compared to Time 2. Overall, these results suggest that the

Physiological Anxiety subscale and the Defensiveness scale demonstrate relatively stronger temporal stability, while the Worry/Social Anxiety subscale and Total Anxiety scale demonstrate relatively weaker temporal stability among children with specific learning disabilities.

Effect sizes (Cohen's *d*; Cohen, 1988, 1992) were also calculated to determine the relative impact of any significant changes in the RCMAS-2 scores for children with specific learning disabilities (see Table 18). As a rule of thumb, Cohen's *d* effect sizes of 0.20 are considered *small*, effect sizes of 0.50 are considered *medium*, and effect sizes ranging from 0.80 or higher are considered *large* (Cohen, 1992). Calculations of Cohen's *d* effect sizes yielded small effects for the Total Anxiety ($d$ = .30) and Worry/Social Anxiety ($d$ = .35) factors, and negligible effects for the Physiological Anxiety ($d$ = .15), and Defensiveness factors ($d$ = .09). This indicates that, although a significant difference was noted between the Worry/Social Anxiety subscale scores and Total Anxiety scores at Time 1 compared to those scores at Time 2, the impact of these differences is considered small to negligible and is not likely to be meaningful.

Overall, these results support the conclusion that the RCMAS-2 scores demonstrate strong to very strong consistency over time.

**Research Questions #5 & #6: Do children with specific learning disabilities experience significantly higher levels of anxiety (as measured by the RCMAS-2) than non-referred children? Do females with specific learning disabilities experience higher levels of anxiety (as measured by the RCMAS-2) than males with specific learning disabilities?**

Analyses were planned to determine whether the RCMAS-2 scores of children with specific learning disabilities differ significantly from the scores of non-referred children, as well as whether the RCMAS-2 scores of female students with specific learning disabilities were

significantly higher than the scores of male students with specific learning disabilities. To do so, it was anticipated that the data gathered would be analyzed using a multivariate analysis of variance (MANOVA) as well as two analyses of variance (ANOVAs). First, a 2 x 2 MANOVA would be conducted with gender (male, female) and specific learning disability status (children with specific learning disabilities, non-referred children) serving as the independent variables and the three anxiety (Physiological Anxiety, Social Anxiety, and Worry) subscale scores serving as the dependent variables. Effect sizes were to be calculated using multivariate eta-squared. If the MANOVA were significant, follow-up 2 x 2 ANOVAs would be performed, and due to the multiple comparisons, the alpha level would be adjusted using the Bonferroni adjustment to protect against Type I error. Effect sizes would also be calculated using Cohen's *d*, to provide an estimate of the magnitude of potential differences found between the groups.

Second, two 2 x 2 analyses of variance (ANOVAs) were also planned. In the first ANOVA, specific learning disability status (with children with specific learning disabilities, non-referred children) and gender (male/female) would serve as the independent variables and the RCMAS-2 Total Anxiety scale scores would serve as the dependent variable. In the second ANOVA, specific learning disability status (children with specific learning disabilities, non-referred children) and gender (male/female) would again serve as the independent variables and the RCMAS-2 Defensiveness scores would serve as the dependent variable. As described above, it was anticipated that effect sizes would be calculated using Cohen's *d* to provide an estimate of the magnitude of potential differences found among the groups.

The analyses of potential group differences related to RCMAS-2 scores were dependent on the outcome of the analyses related to the validity of the RCMAS-2 scores. Specifically, the RCMAS-2 scores among children with specific learning disabilities must demonstrate factorial

invariance when compared to the RCMAS-2 scores of the full reference subsample. Failure to demonstrate factorial invariance would make it inappropriate to compare the scores of the specific learning disability subsample with those of the full reference subsample. Furthermore, because the RCMAS-2 scores among the specific learning disability subsample did not demonstrate factorial invariance with the scores of the full reference subsample, it is unclear whether the scores of the specific learning disability subsample are actually measuring the construct of anxiety. For example, it is possible that students with specific learning disabilities interpreted the RCMAS-2 items in a unique way, possibly reflecting the measurement of a different underlying construct. If this is the case, it is difficult to conclude with certainty that the results of the RCMAS-2 reflect levels of anxiety among students with specific learning disabilities, and therefore, it precludes the comparison of levels of anxiety across subgroups of students with specific learning disabilities.

Overall, because the scores of the RCMAS-2 among children with specific learning disabilities yielded a different factor structure, and therefore did not demonstrate factorial invariance, the analyses of group differences could not be conducted.

**Summary**

In summary, the results of the factor analyses yielded a three-factor structure for the RCMAS-2 scores for the specific learning disability subsample, in contrast to the five-factor structure for the full reference subsample. Therefore, the factor structure for the RCMAS-2 scores did not demonstrate invariance across the specific learning disability and full reference subsamples. Furthermore, based on the three-factor structure, the RCMAS-2 scores demonstrated strong to very strong reliability for the specific learning disability subsample.

Finally, some evidence for the convergent and discriminant validity of the RCMAS-2 scores was also found for the specific learning disability subsample based on the three-factor structure.

# CHAPTER V

## Conclusion

The purpose of this study was to determine whether the RCMAS-2 is an appropriate measure for use with children with specific learning disabilities, based on examination of the scale's psychometric properties among this population. Specifically, this study examined the reliability (including internal consistency and temporal stability) and validity (including construct validity and convergent and discriminant validity) of the RCMAS-2 scores among children with specific learning disabilities. In addition, this study also investigated whether the RCMAS-2 scores demonstrate factorial invariance across children with specific learning disabilities and non-referred children. Finally, the study attempted to determine whether children with specific learning disabilities experience significantly higher levels of general anxiety than non-referred children, and whether gender differences are present with regard to general anxiety as measured by the RCMAS-2 among students with specific learning disabilities. The research questions will be discussed in light of the results obtained.

**Research Question #1: Is the factor structure of the RCMAS-2 similar across non-referred children and children with specific learning disabilities?**

The factor structure of the RCMAS-2 among children with specific learning disabilities was examined using the method of principal axis factoring with an oblique (promax) rotation. Principal axis factoring with an orthogonal (varimax) rotation was also performed to replicate the procedures used by Reynolds and Richmond (2008b) with the RCMAS-2 full reference sample. However, the promax rotation was considered most appropriate, as the factors were expected to be correlated. Then, several factor extraction methods were utilized, including the eigenvalues-greater-than-one rule, examination of the scree plot, parallel analysis, Velicer's MAP test, and

consideration of the conceptual meaningfulness of the solutions. The different factor extraction methods suggested 3 to 14 factors should be retained. Overall, the most appropriate and conceptually meaningful factor solution was the three-factor solution consisting of two factors related to general anxiety (Worry/Social Anxiety, and Physiological Anxiety), and one Defensiveness factor. This factor structure among children with specific learning disabilities differs from the factor structure of the RCMAS-2 among the full reference subsample, in terms of the number of factors as well as the specific items which load on each factor. Therefore, this three-factor structure cannot demonstrate factorial invariance with the five-factor structure for the full reference subsample.

However, to determine whether a five-factor solution could be extracted from the scores of the specific learning disability subsample, additional factor analyses were performed in which a five-factor solution was forced using the RCMAS-2 scores of the specific learning disability subsample. The resulting five-factor promax solution for the specific learning disability subsample was then compared with the five-factor promax solution for the full reference subsample. In addition, the five-factor varimax solutions for the two groups were also compared, as Reynolds and Richmond (2008b) selected a five-factor varimax solution as the most appropriate solution for their sample. Factorial invariance was assessed by calculating the coefficient of congruence (Cattell, 1978; Harman, 1976; Mulaik, 2009; Tucker, 1951) and salient variable similarity index (Cattell, 1978; Cattell & Baggaley, 1960). The results of these analyses did not support the factorial invariance of the RCMAS-2 scores across the specific learning disability subsample and the full reference subsample, suggesting instead that the RCMAS-2 scores yield a different factor structure among the specific learning disability subsample compared to the full reference subsample.

Several reasons may explain why the factor structure of the RCMAS-2 scores for children with specific learning disabilities differed from the factor structure for the full reference subsample. Specifically, the factor loadings of several items were problematic, and this was also reported both for the RCMAS-2 full reference sample (Reynolds & Richmond, 2008b), as well as the RCMAS scores among children with specific learning disabilities (Paget & Reynolds, 1984). With regard to the RCMAS, while a similar five-factor structure was found among children with and without specific learning disabilities, differences were noted with regard to the items contained within each factor. For example, some items that previously were most salient on the Worry/Oversensitivity factor for the normative sample instead were most salient on the Physiological Anxiety factor for the specific learning disability subsample. Similarly, some items that previously were most salient on the Social Concerns/Concentration factor for the normative sample instead were most salient on either the Physiological Anxiety or Worry/Oversensitivity factor for the specific learning disability subsample. Paget and Reynolds (1984) concluded that the Worry/Oversensitivity factor and the Social Concerns/Concentration factor could not be as clearly separated and so were not as strongly represented within the five-factor structure for individuals with specific learning disabilities compared to the normative sample (Paget & Reynolds, 1984). This finding is consistent with the results of the present study, in which the Worry and Social Anxiety factors of the RCMAS-2 cannot be clearly separated from each other among children with specific learning disabilities, and instead form one Worry/Social Anxiety factor.

Furthermore, Reynolds and Richmond (2008b) reported that difficulties were found during the factor analysis of the RCMAS-2 scores using the full reference sample as well. Specifically, while items related to physiological anxiety and worry were reported to have

formed cohesive, unique factors, items related to social anxiety formed only a weak factor. Many of the items related to social anxiety loaded on either the Physiological Anxiety or Worry factor, underscoring the problematic nature of identifying a separate and unique Social Anxiety factor. The test developers recognized this weakness of the RCMAS-2, and acknowledged that "the higher correlation and current factor analytic results suggest that in practice it is likely that the WOR [Worry] and SOC [Social Anxiety] standard scores will be similar in many cases" (p. 53). The test developers ultimately chose to retain a five-factor structure, due to there reportedly not being sufficient evidence for an alternative scoring structure, but, being .unable to adequately explain why items related to social anxiety form such a weak third factor, called for further research to help clarify the issue. The results of this study, overall, did not support the retention of five factors for the RCMAS-2 among children with specific learning disabilities, and instead reinforces the problematic nature of identifying a unique Social Anxiety factor.

In addition to the difficulties associated with identifying a Social Anxiety factor for both the full reference and specific learning disability subsamples, it is possible that the RCMAS-2 is particularly problematic for students with specific learning disabilities as discussed below. When creating the RCMAS-2, it was anticipated that many items of the original RCMAS would be retained, while additional new items would also be developed (Reynolds & Richmond, 2008b). New items were created through several means. First, items were developed that were thought to be more closely related to social and performance anxiety experienced by children in today's society. Items were also developed based on the most current research and literature related to children's anxiety available to the test developers. Finally, new items were also created based on opinions and feedback from professionals who regularly used the RCMAS. Therefore, the test developers claim that the RCMAS-2 contains items that have endured since

the creation of the CMAS and subsequent RCMAS, new items rooted in current literature and research, and additional items considered relevant by professionals who work with children with anxiety.

A possible reason for the lack of factorial invariance may be related to the inclusion of new items on the RCMAS-2. The test developers indicate that the new items were derived based either on current research and literature on children's anxiety, or professional opinions and feedback related to the assessment and treatment of children's anxiety. However, previous research suggests that children with specific learning disabilities may experience and/or report anxiety differently than children without specific learning disabilities. Specifically, students with specific learning disabilities are more likely to report feelings of anxiety than students without specific learning disabilities, and they also tend to report higher levels of anxiety compared to students without specific learning disabilities (Arnold et al., 2005; Carroll & Iles, 2006; Emerson, 2003; Fisher et al., 1996; Hoy et al., 1997; Paget & Reynolds, 1984; Rodriguez & Routh, 1989). This suggests that there may be something unique to the anxiety that is experienced and reported by students with specific learning disabilities, which may be overlooked by research, literature, and professionals focused on general populations of children. For example, the source of anxiety may differ depending on whether a student has a specific learning disability. Children with specific learning disabilities may be particularly vulnerable to anxiety-related cognitive difficulties (such as intrusive thoughts, poor cognitive efficiency, deficits in working memory, and difficulties focusing on a task), which in turn can exacerbate already-existing academic difficulties (such as reading, writing, math, and organizational problems; Arnold et al., 2005; Aronen et al., 2005; Eysenck & Calvo, 1992; Mandler & Sarason, 1952; McKeachie, 1984; Owens, Stevenson, Norgate, & Hadwin, 2008; Sarason, 1984).

Similarly, students with specific learning disabilities are more likely to report more negative academic experiences (such as earning lower grades, or feeling less teacher support), experience more feelings of loneliness and isolation, engage in more socially-avoidant behaviors, and express lower levels of academic self-efficacy than students without specific learning disabilities (Lackaye & Margalit, 2006). Furthermore, research suggests that students with specific learning disabilities may interpret and cope with their environments differently than students without specific learning disabilities. For example, Lackaye and Margalit (2006) found that children with specific learning disabilities express significantly more difficulty understanding their environment, managing their environment, and achieving desirable outcomes, resulting in a significantly poorer sense of cohesion about their world compared to children without specific learning disabilities. As a result, children with specific learning disabilities may lack the skills and abilities to effectively understand and cohesively integrate new experiences and challenges, compared to children without specific learning disabilities. Therefore, it is possible that students with specific learning disabilities may encounter a unique set of personal, academic, and social challenges that are less likely to be encountered by students without specific learning disabilities, which may generate or exacerbate feelings of anxiety. These feelings of anxiety may, in turn, be experienced, understood, and coped with in fundamentally different ways compared to those experienced by students without specific learning disabilities. Consequently, it is quite plausible that, when asked to reflect upon their own experiences of anxiety, students with specific learning disabilities may attribute their own feelings of anxiety to different sources, understand their own feelings of anxiety in different ways, and attempt to manage their own feelings of anxiety using different methods, compared to students without specific learning disabilities. These differences

might explain the variations in factor structure found among the RCMAS-2 scores of children with specific learning disabilities compared to the full reference subsample.

One finding from this study that is consistent with prior research using the RCMAS-2 is the presence of a higher-order Total Anxiety factor. A higher-order Total Anxiety factor was identified by Reynolds and Richmond (2008b), and estimated to explain approximately 48% of the variance in the RCMAS-2 anxiety scores for the full reference subsample. In comparison, based on the five-factor promax solution identified in this study, approximately 67.8% of the variance can be accounted for by the higher-order factor for both the combined sample and full reference subsample. Furthermore, approximately 63.6% of the variance can be explained by the higher-order factor based on the three-factor promax solution for the specific learning disability subsample. While the percentages found in this study are higher than those reported by Reynolds and Richmond (2008b) because they used a less advanced statistical procedure to estimate the variance accounted for by the Total Anxiety scores, they nevertheless lend additional support to the presence of a higher-order Total Anxiety factor, which has been suggested in different theories of anxiety (Gorsuch, 1983) and identified in previous research (Reynolds and Richmond, 2008b).

**Research Question #2: Do the RCMAS-2 scores demonstrate adequate convergent and discriminant validity, as demonstrated by higher correlations between the RCMAS-2 scores and the scores of conceptually-similar scales (e.g., trait anxiety), and lower correlations between the RCMAS-2 scores and the scores of conceptually-dissimilar scales (e.g., state anxiety) for children with specific learning disabilities?**

The second research question examined the convergent and discriminant validity of the RCMAS-2 scores among children with specific learning disabilities. Convergent and

discriminant validity refers to the degree of correlation between the RCMAS-2 scores and the scores of other measures of similar (i.e., convergent validity) or dissimilar constructs (i.e., discriminant validity; Cicchetti, 1994). Evidence of convergent validity is important in that it provides additional support for the construct validity of a measure, and indicates the degree to which scores on a newly-created or -revised measure correlate with the scores of established instruments measuring the same or similar constructs (Cicchetti, 1994; Friedenberg, 1995). Conversely, evidence of discriminant validity is important in that it provides support for the hypothesis that the scores on a newly-created or –revised measure demonstrate little correlation with the scores of instruments assessing constructs considered to be unrelated or inconsistent to those being measured by the scores of the new measure (Friedenberg, 1995). In this study, evidence of convergent validity would lend support to the hypothesis that the RCMAS-2 anxiety scores provide a valid measure of anxiety among children, while evidence of discriminant validity would support the conclusion that the construct being measured by the RCMAS-2 anxiety scores demonstrate little to no correlation with the scores of measures of unrelated or dissimilar constructs (such as self-esteem or a sense of mastery/control over one's life; Friedenberg, 1995; Muris, 2006; Roberts, Roberts, & Chan, 2009).

Overall, evidence of moderate to strong convergent validity was found between several RCMAS-2 anxiety scale and subscale scores and scores of other conceptually-similar scales. For example, moderate to strong correlations were found between the scores of the BASC-2-SRP (child and adolescent) Anxiety scales and the scores of the RCMAS-2 Total Anxiety scale and Worry/Social Anxiety and Physiological Anxiety subscales. Similarly, moderate to strong correlations were also found between the STAI-C Trait Anxiety scales and the scores of the RCMAS-2 Total Anxiety scale and Worry/Social Anxiety and Physiological Anxiety subscales,

as well as between the STAI-Y Trait Anxiety scales and the scores of the RCMAS-2 Total Anxiety scale and Physiological Anxiety subscales. These findings support the hypothesis that the RCMAS-2 anxiety scale and subscales are consistent with current theoretical conceptualizations of anxiety, which suggests not only the presence of overall chronic or manifest anxiety, but argues that manifest anxiety can be comprised of different types or dimensions of anxiety, such as physiological anxiety or worry (Barlow, 2002a; Cattell & Scheier, 1958, 1961; Clark & Watson, 1991; Izard, 1972; Reynolds & Richmond, 2008b; Spielberger, 1966, 1972b, 1972c; Wells, 1999). Finally, research has identified several other cognitive and emotional symptoms (such as feelings of depression and inadequacy, as well as overall internalizing and emotional difficulties; Clark & Watson, 1991; Watson & Kendall, 1989; Wells, 1995, 1999) which are often related to the presence of anxiety. Results of the convergent validity analysis revealed that, as anticipated, the scores of these related BASC-2-SRP scales also demonstrated moderate to strong correlations with the scores of the RCMAS-2 anxiety scale and subscales.

With regard to discriminant validity, weak to negligible correlations were found between the scores of the RCMAS-2 anxiety scale and subscales, and scores of conceptually-unrelated or dissimilar scales. As hypothesized, the STAI-Y State Anxiety scale scores demonstrated weak to negligible correlations with the scores of the RCMAS-2 Total Anxiety scale and Worry/Social Anxiety and Physiological subscales. This supports the hypothesis that the RCMAS-2 provides a measure of manifest, trait (or dispositional) anxiety, whereas the State Anxiety scale scores measure a different construct (i.e., situational anxiety; Barlow, 2002a; Reynolds & Richmond, 2008b; Spielberger, 1966, 1972b, 1972c). Furthermore, research has identified various types of protective social and emotional skills (such as self-esteem and self-reliance; Muris, 2006;

Roberts, Roberts, & Chan, 2009) which do not appear to be related to the presence of anxiety symptoms. Results of the discriminant validity analyses revealed weak to negligible correlations between the BASC-2-SRP Self-Reliance subscale scores and the scores of the RCMAS-2 anxiety scale and subscales. Contrary to previous research, however, evidence of discriminant validity was not found between the RCMAS-2 anxiety scores and scores of the BASC-2-SRP-C Self-Esteem scale or the BASC-2-SRP-A Self-Esteem scale. Specifically, the RCMAS-2 scores demonstrated moderate negative correlations with the Self-Esteem scales of the BASC-2-SRP-C and BASC-2-SRP-A. Other research, however, indicates that, rather than demonstrating a lack of relationship, levels of self-esteem and global self-worth may be inversely related to various types of anxiety, including general and social anxiety (Ginsburg, La Greca, and Silverman, 1998; Rawson, 1992; Strauss, Frame, & Forehand, 1987). Specifically, Rawson (1992) reported that anxiety, depression, and self-esteem may be interrelated, and found significant negative correlations between self-esteem and anxiety and depression among children and adolescents with emotional and behavioral difficulties. This suggests that these variables may actually demonstrate significant inverse relationships with each other. Therefore, children with high levels of anxiety may experience correspondingly low levels of self-esteem, which may explain the moderate negative correlations found between the scores of the RCMAS-2 anxiety scale and subscales and those of BASC-2-SRP Self-Esteem scales.

Although convergent validity analysis revealed moderate to strong correlations between the scores of the RCMAS-2 anxiety scale and subscales and scores of conceptually-similar scales, this study did not reveal expected weak to negligible correlations between the scores of the RCMAS-2 anxiety scale and subscales and scores of several conceptually-unrelated scales, such as the BASC-2-SRP Self-Esteem scales. Overall, however, the majority of correlations

lend support to the convergent and discriminant validity of the RCMAS-2 scores in a sample of students with specific learning disabilities.

**Research Question #3: Will factor analyses of scales measuring similar and dissimilar constructs further support the convergent and discriminant validity of the RCMAS-2 scores for children with specific learning disabilities by yielding conceptually-distinct factors (i.e., a cluster of scales related to chronic, manifest, or trait anxiety, and a cluster of scales related to state or situational anxiety with specific learning disabilities)?**

As an additional measure of convergent validity, exploratory factor analyses were conducted on the scores of the RCMAS-2 subscales and the STAI-C and BASC-2-SRP-C scales. It was expected that the factor analyses would yield distinct clusters (or factors) of similar and dissimilar scales and subscales, including a "convergent" factor and two "discriminant" factors. Specifically, it was hypothesized that the "convergent" factor would include the Trait Anxiety scale of the STAI-C and the Worry/Social Anxiety and Physiological Anxiety subscales of the RCMAS-2. Conversely, it was hypothesized that one "discriminant" factor would represent other mood-related difficulties, such as the State Anxiety scale of the STAI-C, and the Depression and Sense of Inadequacy scales of the BASC-2-SRP-C, while the second "discriminant" factor would include the Self-Reliance scale of the BASC-2-SRP-C.

Results of the factor analysis yielded only one factor, and did not yield distinct factors reflecting conceptually similar or dissimilar scales. These findings do not support the convergent or discriminate validity of the RCMAS-2 scores for students with specific learning disabilities. The apparent lack of separate factors may be due to a variety of reasons. First, the relatively small sample size may have made it difficult to conduct effective factor analysis with so many scales and subscales. In addition, just as this sample of children with specific learning

disabilities appeared to interpret and respond to the RCMAS-2 items differently than other children, it is also possible that these children may also have responded to the items of the other measures differently, impacting the validity of the scores on the measures as well. Finally, it may be difficult to identify separate factors because, rather than representing clusters of unrelated constructs, the constructs measured may actually be interrelated.

**Research Question #4: Do the RCMAS-2 scores demonstrate adequate internal consistency reliability and temporal stability for children with specific learning disabilities?**

Internal consistency reliability estimates were calculated using coefficient alpha (Cronbach, 1951) to determine whether the items contained within a specific scale or subscale appear to be contributing to the measurement of a similar construct. The internal reliability estimates for the RCMAS-2 Worry/Social Anxiety, Physiological Anxiety, Defensiveness, and Total Anxiety scales and subscales were within the strong to very strong range. This suggests that the items included on each scale or subscale are similar in content, and are thought to be measuring a similar construct.

Test-retest reliability was assessed using the Pearson *r* correlation coefficient as well as paired samples *t*-tests to determine the extent to which item responses may vary over time (Charter, 2003; Cronbach, 1951). The Pearson *r* correlation coefficients for the RCMAS-2 Worry/Social Anxiety and Physiological Anxiety subscales, Defensiveness scale, and Total Anxiety scores were within the strong range. These findings suggest that the responses to items included on each scale or subscale remained relatively stable over time, and were not overly influenced by the passage of time. Results of the paired samples *t*-tests were less conclusive, with scores from the Physiological Anxiety subscale and Defensiveness scale demonstrating non-significant changes over time and the Total Anxiety scale and Worry/Social Anxiety

subscale demonstrating significant changes over time. These results suggest that the Physiological Anxiety subscale and Defensiveness scale scores demonstrate relatively stronger temporal stability, while the Worry/Social Anxiety subscale scores and Total Anxiety scores demonstrate relatively weaker temporal stability among children with specific learning disabilities. With regard to physiological anxiety, it is possible that this dimension may demonstrate stronger temporal stability as it may be easier for children to take notice of physical symptoms, such as headaches, tiredness, nausea, etc. In contrast, children may have more difficulty "noticing" more abstract forms of anxiety, such as worries about the future, negative perceptions from others, etc. As the majority of participants in the present study were children, this may have influenced the stability of the reporting of physiological versus cognitive symptoms of anxiety.

The scores of the Worry/Social Anxiety subscale and Total Anxiety scale were significantly lower at Time 2 compared to Time 1. However, when effect sizes were calculated based on these differences, the differences were found to be small, suggesting that, although the scores were significantly lower at Time 2, the practical impact of these differences is not likely to be meaningful. Although the RCMAS-2 is intended to measure trait anxiety, it is possible that the higher scores reported at Time 1 reflect an increase in anxiety felt by some children during the first testing session. In contrast, when the examiner returned at Time 2, the children may have felt more at ease and comfortable with the procedures.

Furthermore, ICCs were calculated as an additional measure of whether the RCMAS-2 scores were affected by multiple test administrations, as well as multiple test administrators. The ICCs for the RCMAS-2 Worry/Social Anxiety, Physiological Anxiety, Defensiveness, and Total Anxiety scales and subscales were within the strong to very strong range, and are consistent with

the test score stability coefficients computed using the Pearson *r* correlation coefficients. This suggests that the scores of the RCMAS-2 scales and subscales were not overly influenced by multiple administration sessions or multiple test administrators. Overall, the reliability estimates indicate that the scores of the Total Anxiety scale, two anxiety subscales, and the Defensiveness scale of the RCMAS-2 demonstrate adequate internal consistency reliability as well as temporal stability among children with specific learning disabilities.

**Research Questions #5 & #6: Do children with specific learning disabilities experience significantly higher levels of anxiety (as measured by the RCMAS-2) than non-referred children? Do females with specific learning disabilities experience higher levels of anxiety (as measured by the RCMAS-2) than males with specific learning disabilities?**

The analyses of potential group differences related to RCMAS-2 scores were dependent on the outcome of the analyses related to the validity of the RCMAS-2 scores. Specifically, the RCMAS-2 scores among children with specific learning disabilities must demonstrate factorial invariance when compared to the RCMAS-2 scores of the full reference subsample. Failure to demonstrate factorial invariance would make it inappropriate to compare the scores of the specific learning disability subsample with those of the full reference subsample. Furthermore, because the RCMAS-2 scores among the specific learning disability subsample did not demonstrate factorial invariance with the scores of the full reference subsample, it is unclear whether the scores of the specific learning disability subsample are actually measuring the construct of anxiety. For example, it is possible that students with specific learning disabilities interpreted the RCMAS-2 items in a unique way, possibly reflecting the measurement of a different underlying construct. If this is the case, it is difficult to conclude with certainty that the results of the RCMAS-2 reflect levels of anxiety among students with specific learning

disabilities, and therefore, it precludes the comparison of mean levels of anxiety across subgroups of students with specific learning disabilities.

Overall, because the scores of the RCMAS-2 among children with specific learning disabilities yielded a different factor structure, and therefore did not demonstrate factorial invariance, the analyses of group differences could not be conducted. Had the RCMAS-2 scores demonstrated factorial invariance, it was expected that, among students with specific learning disabilities, female students would have reported higher levels of anxiety than male students. This is based on past research which suggests that school-age girls consistently report higher levels and more severe symptoms of anxiety than school-age boys, although it remains unclear whether females actually experience more anxiety than males or if they are simply more willing to report and/or seek help for their symptoms (Costello et al., 2003; Gullone et al., 2001; Kessler et al., 1994; Levinson and Ifrah, 2010; Roberts et al., 2008). Furthermore, based on the available research, it was expected that students with specific learning disabilities would report significantly higher levels of anxiety than those of the full reference subsample. Past research suggests that students with specific learning disabilities experience significantly more emotional distress, including anxiety, in both academic and social situations (Arnold et al., 2005; Carroll & Iles, 2006; Emerson, 2003; Fisher et al., 1996; Paget & Reynolds, 1984; Rodriguez & Routh, 1989).

**Implications of the Present Study**

The purpose of this study was to examine the reliability, validity, and usefulness of the RCMAS-2 among children with specific learning disabilities. Overall, limited conclusions can be drawn regarding whether the RCMAS-2 is a valid and reliable measure of anxiety among children with specific learning disabilities. Factorial invariance between the specific learning

disability and full reference subsamples could not be demonstrated, casting uncertainty on the validity of the RCMAS-2 scores for children with specific learning disabilities. Specifically, the scores for the specific learning disability subsample strongly suggested the presence of three factors (two anxiety-related factors, and one defensiveness factor), and indicated that it is problematic to differentiate between items related to Social Anxiety versus Worry for this subsample. Furthermore, even among factors that appear to be consistent with those identified by Reynolds and Richmond (2008b), such as the Physiological Anxiety factor, it is evident that the items on these factors differ from the items on the factors identified by Reynolds and Richmond. It is unclear whether these differences are due to differences in how students with specific learning disabilities experience, understand, and report symptoms of anxiety, or if other possibilities, such as potential difficulties reading and/or understanding the items of the measure, may account for the differences.

Furthermore, evidence for the construct validity of the three-factor structure of the RCMAS-2 scores among students with specific learning disabilities is mixed. Moderate to strong correlations were found between the scores of the RCMAS-2 Total Anxiety scale and the two anxiety subscales and scores of conceptually-similar scales, such as the STAI-C and STAI-Y Trait Anxiety scales, which lends support to the convergent validity of the three-factor structure of the RCMAS-2 scores among students with specific learning disabilities. In contrast, however, factor analyses of the two RCMAS-2 anxiety subscales, as well as scales of the STAI-C and BASC-2-SRP-C did not yield the expected convergent and discriminant factors. Therefore, at this time, it seems inappropriate to administer the RCMAS-2 to children with specific learning disabilities based upon the RCMAS-2's current scoring and interpretation guide, as the validity of the RCMAS-2 scores among this subsample could not be adequately established.

These results, however, do emphasize the need for further research in the area of anxiety among students with specific learning disabilities. These findings suggest that students with specific learning disabilities may experience, understand, and/or report feelings of anxiety differently than students in the general population. As a result, mental health professionals and school personnel must take these potential differences into account when attempting to screen or assess students for symptoms of anxiety, as well as when developing and implementing effective prevention and intervention programs for students with specific learning disabilities.

**Limitations of the Present Study**

Several limitations are associated with the current study, including a small sample size, a sample of convenience, and the use of self-report. In addition, additional confounding variables that have not yet been identified may have contributed to limitations of the study.

One limitation of the present study involves the sampling procedures used. Specifically, the results of the study are based on a sample of convenience, as well as a relatively small sample size. Although attempts were made to solicit participation from a variety of school settings (including rural, suburban, and urban), the ethnic/racial composition of the current sample is predominantly White (73.6%), which may limit the extent to which the conclusions of the study can be generalized to other ethnic/racial groups. Similarly, the gender and age composition of the sample predominantly included male elementary school students, which limits the extent to which the conclusions of the study can be generalized to female students, as well as students in middle or high school. However, random sampling was not possible in this study, as participation was contingent on several layers of approval and consent (i.e., approval of superintendents and building principals, consent of parents, assent of students). It is possible that the selective participation may have led to fundamental differences in students who participated

in the study compared to districts, schools, and students who declined to participate. As a result, the extent to which the conclusions of the study can be generalized to other students with specific learning disabilities may be limited.

Furthermore, participants were recruited exclusively from public school districts. As a result, the information gathered from this sample may not generalize to other populations (such as students attending private schools or who are home-schooled). Similarly, the results of the study may have been influenced by the relatively small sample size. As discussed above, although a large, robust sample was sought, participation in the study was contingent on several layers of approval and consent, and the majority of school districts, buildings, and students solicited for the study declined to participate. This resulted in a relatively small sample size for the factor analyses performed. Small sample sizes may yield less robust results and less stable solutions than larger sample sizes, and are more vulnerable to error, bias, and confounding variables (Costello & Osborne, 2005; MacCallum, Widaman, Zhang, & Hong, 1999). It is possible that the small sample size of the current study may have influenced the results of the statistical analyses, and that a larger sample size may yield different results.

The conclusions may also be limited by the study's restriction of participants to students at least eight years of age, enrolled in grades 3 through 12. Although research suggests that younger children may be able to provide valid and reliable responses to self-report measures of emotional and behavioral functioning (Jensen et al., 1999; Stone & Lemanek, 1990; Wagner, Abela, & Brozina, 2006), many of the instruments included within this study have not been developed and standardized for use with younger children. For example, the STAI-C contains normative data for children in grades 4 through 6, and does not contain current, normative data for children below the fourth grade. However, the majority of measures chosen for use in this

study were designed for use with children who are at least eight years of age (i.e., the BASC-2-SRP-C is designed for children ages 8 through 12, while the RCMAS-2 is designed for use with children as young as age six). Only one measure (i.e., STAI-C) was designed for use with slightly older children (i.e., nine years and older). Therefore, including children who are at least in the third grade and are at least eight years of age in this study is appropriate, as this is consistent with the age range for which the target assessment instrument (i.e., RCMAS-2) as well as one of the validating measures is intended. While it was not the aim of this study to examine the psychometric properties of the RCMAS-2 among different ages, this would be an important area for future research. If subsequent research reveals that the instrument is not appropriate for young children, then this would be an important finding that would impact the use of the instrument in research, educational, and clinical settings.

In addition, although the study recruited children who receive special education services for a specific learning disability, considerable variation may have existed with regard to "types" or severity of specific learning disabilities, as well as the method of identification used in various school districts. Children receiving special education services under the designation of "specific learning disability" represent the largest percentage (46%) of all special education designations, and the needs and characteristics of students classified as having a specific learning disability may be quite diverse (NJCLD, 1990). For example, specific learning disabilities may refer to a wide variety of difficulties across reading, writing, mathematics, verbal and non-verbal reasoning, memory, processing speed, and many other skills and abilities. However, although several domains of academic achievement are recognized by IDEIA of 2004 (U.S. Department of Education, 2006) as areas of potential difficulty for students with specific learning disabilities, schools are not required to identify *which* specific academic domain(s) is/are affected. Rather,

all such academic difficulties may be encompassed by the overarching term of "specific learning disability." Therefore, this study was not able to identify the specific academic area(s) impacted for each student. For example, it is possible that students with a "reading-related" specific learning disability may have reported higher levels of anxiety on the RCMAS-2 due to the fact that many of these students read the items themselves; conversely, children with a "math-related" specific learning disability may have reported lower levels of anxiety on the RCMAS-2 because these students did not have to perform tasks related to mathematics. It is possible, then, that although all students recruited for this study were identified as having a specific learning disability, the sample may not represent a homogeneous set of characteristics, needs, or abilities (due to the wide variety of difficulties which may qualify a student as having a specific learning disability). This potential for heterogeneity within the sample may limit the generalizability (external validity) of the findings to other populations of students with specific learning disabilities. Therefore, it may be advantageous if future research studies were able to identify the specific domain(s) of academic achievement related to a student's specific learning disability, and examine whether different types of specific learning disabilities are associated with different elevations on different dimensions of multidimensional self-report measures of anxiety.

Similar to the variability that may be found with regard to "types" of specific learning disabilities, there is also considerable variability with regard to the methods employed by school districts to identify specific learning disabilities. School districts have the option to use alternate methods of identification, including standardized assessments of cognitive and academic functioning, as well as RtI procedures (U.S. Department of Education, 2006). Because more than one method is available for identification of specific learning disabilities, it is possible that specific identification procedures (such as evaluation methods, instructional interventions, type

of data collected, and determination of sufficient vs. insufficient response) may vary widely not only between states, but between school districts and even individual school buildings within the same district. Within the current study, however, only two different types of identification procedures were described by building principals (a combination of standardized testing and RtI procedures, and standardized testing alone). Furthermore, over one-third of building principals did not provide a description of the identification procedures used in their buildings at all or were unable to clearly describe the procedures, making it difficult for any conclusions to be made with certainty with regard to identification procedures used. In addition, of the two types of identification procedures described by building principals, one method (standardized testing alone) was endorsed by only two building principals. As a result, it is difficult to conduct any meaningful comparisons between this group and the group that utilized a combination of standardized testing and RtI procedures.

Furthermore, it is currently unclear whether identification procedures may result in different characteristics of students with specific learning disabilities (e.g., do children who are identified using only the RtI process demonstrate different learning and personal characteristics than children who are identified using only standardized assessments, or a combination of RtI and standardized assessments?). Therefore, it is possible that students identified with a specific learning disability using one method (such as standardized cognitive and academic assessment) may demonstrate different characteristics, strengths, and needs than students identified using another method (such as RtI). This suggests that the heterogeneity of characteristics of students identified with a specific learning disability must be kept in mind when interpreting results of the study, and may serve as a useful direction for future research.

Furthermore, Fuchs and Deshler (2007) suggest that a great deal of inconsistency and lack of standardized procedures exist even among school systems who report utilizing RtI procedures. Specifically, school systems may vary with regard to the access to and implementation of "scientifically validated" instructional practices and curricula, the number of progress monitoring data points that are collected prior to referral for special education services, and how to define and measure "response" versus "non-response" to intensive interventions (Fuchs & Deshler, 2007). Furthermore, even among schools that are knowledgeable about effective RtI procedures (such as tiered levels of intervention, regular progress monitoring, etc.), the degree to which school staff are able to effectively implement those procedures are influenced by additional factors, such as support from building-level and district-level administrators, on-going opportunities for professional development, and appropriate allocation (or re-allocation) of building-level resources and staff (Fuchs & Deshler, 2007). These concerns suggest that even among the 26 school buildings that reportedly use RtI procedures in this study, limited conclusions can be drawn regarding the homogeneity of those procedures across buildings, which makes comparisons between groups who reportedly utilized RtI procedures and those who do not problematic.

Additionally, this study relied upon children's ability to complete self-report measures of emotional and behavioral symptoms. Although this study utilized self-report measures that have been created for use with children and are designed to be developmentally-sensitive, the children's responses may have been influenced by a number of instrument-related factors, such as the reading level and item complexity, as well as child-related factors, such as the child's cognitive and language development, awareness of self, and understanding of emotions (Schniering et al., 2000). Furthermore, although self-report measures are commonly used in

research and clinical settings, the responses (even among adults) may be susceptible to biases, factual inaccuracies, and subjectivity (De Los Reyes & Kazdin, 2005). Future studies may wish to utilize a multitrait, multimethod approach in order to provide additional objective and independent verification of participants' responses (such as parent and teacher reports, interviews, observations, etc.) and reduce error variance.

An additional limitation involves the potential similarities and differences between the sample groups. The present study recruited students who receive special education services for a specific learning disability. Although the non-referred subsample was collected from a large, ethnically and geographically diverse group of children and adolescents (Reynolds & Richmond, 2008b), information regarding educational disabilities for this subsample was not available. Therefore, it is possible that some children in the non-referred subsample have been identified with an educational disability, such as a specific learning disability, or may even experience a specific learning disability that has not yet been identified within the public school system. Future studies may wish to avoid this potential overlapping characteristic between groups by collecting information from all participants regarding the presence of a specific learning disability.

**Directions for Future Research**

The current study raises several possible directions for future research. Most importantly, the RCMAS-2 is a relatively new measure of childhood anxiety, and independent empirical studies on the validity and reliability of the RCMAS-2 scores are few. Additional research is necessary to replicate the original findings of the RCMAS-2, as reported by Reynolds and Richmond (2008b), as well as examine the scale's psychometric properties among various subpopulations, such as males, females, ethnicities, and grade levels. In addition, as research

regarding the use of self-report measures among young children is ambiguous, it would be beneficial to examine the use of the RCMAS-2 among children and adolescents of various ages. Furthermore, this study examined the use of the RCMAS-2 among public school students identified with a specific learning disability. Like its predecessor, one might reasonably expect that the RCMAS-2, with its ease of use and short administration time, may become a frequently-used instrument within clinical and educational settings, especially for special education evaluations. Therefore, it is important to determine the scale's usefulness with other special education populations, such as children with emotional difficulties, health impairments, or developmental disabilities (U.S. Department of Education, 2006). Additionally, it would be interesting to determine whether the psychometric properties of the RCMAS-2 differ based on the "type" of specific learning disability (e.g., math, reading, writing, etc.). Similarly, given the potential differences in identification procedures, and the possibility that different identification procedures may result in different characteristics of identified students, it would be interesting to examine the psychometric properties of the RCMAS-2 among students identified using different methods (i.e., standardized assessment, RtI, etc.). Finally, additional research is needed to replicate the results of this study. Given the limitations of the study described above, including a small sample size and a sample of convenience, it is possible that the results of the study may have been affected by bias, error, and other confounding variables. Therefore, the results of the current study must be replicated before definitive conclusions can be generalized to other, similar populations.

In summary, this study examined the psychometric properties of the RCMAS-2. While preliminary analyses of the psychometric properties of the RCMAS-2 had been conducted with a general (i.e., non-referred) sample of school-age children, the examination of the psychometric

properties of the RCMAS-2 with students with specific learning disabilities had not yet been studied. Therefore, this study examined the reliability and validity of the RCMAS-2 scores among students with specific learning disabilities. Factor analyses were conducted to determine whether the same factors and structure were present among the specific learning disabilities and full reference subsamples. Results of the factor analysis supported a three-factor structure for the specific learning disability subsample (compared to a five-factor structure for the full reference subsample), which does not support the factorial invariance of the RCMAS-2 across students with and without specific learning disabilities. Examination of the three-factor structure for students with specific learning disabilities revealed evidence of moderate to strong convergent validity between the scores of the RCMAS-2 anxiety scale and subscales and several scales measuring conceptually-similar constructs (such as general anxiety and trait anxiety). Analyses also revealed weak to negligible correlations between the scores of the RCMAS-2 anxiety scale and subscales and several scales measuring conceptually-dissimilar or unrelated constructs (such as state anxiety and self-reliance). These results support the convergent and discriminant validity of the RCMAS-2 Total Anxiety scale, two anxiety subscales, and Defensiveness scale scores among students with specific learning disabilities.

The study also examined the internal consistency reliability and temporal stability of RCMAS-2 scores among children with specific learning disabilities. Internal consistency reliability estimates for each of the RCMAS-2 scales and subscales were within the strong to very strong range, while test-retest reliability estimates were within the strong range, with the Physiological Anxiety and Defensiveness scores consistently demonstrating strong temporal stability. Overall, the reliability estimates indicated that the Total Anxiety, Worry/Social Anxiety, Physiological Anxiety, and Defensiveness scores demonstrate adequate internal

consistency reliability as well as temporal stability among children with specific learning disabilities.

Finally, the study attempted to determine whether children with specific learning disabilities experience significantly higher levels of general anxiety than non-referred children, and whether female students with specific learning disabilities experience significantly higher levels of general anxiety than male students with specific learning disabilities, as measured by the RCMAS-2. Because the RCMAS-2 scores did not demonstrate factorial invariance across the specific learning disability subsample and the full reference subsample, it is unclear whether the scores of the specific learning disability subsample are actually measuring the construct of anxiety, therefore, precluding the comparison of levels of anxiety across students with and without specific learning disabilities and subgroups of students with specific learning disabilities.

Overall, while the RCMAS-2 scores did demonstrate some evidence of reliability and validity among children with specific learning disabilities, these results were found with regard to a three-factor structure, and not the five-factor structure proposed by Reynolds and Richmond (2008b). Therefore, it is unclear at this time whether the RCMAS-2 is an appropriate instrument for children with specific learning disabilities. Additional studies are necessary to collect further information about the scale's psychometric properties when used with this population.

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# APPENDIX A

## HSC-L Letter of Approval

KU RESEARCH & GRADUATE STUDIES
The University of Kansas

2/3/2011
HSCL #19026

Jennifer Raad
520 South 2nd St., Apt. #703
Springfield, IL 62701

The Human Subjects Committee Lawrence has received your response to its full IRB review of your research project,

19026 Raad/Lowe (PRE) Validation of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Scores for Children with Learning Disabilities

and found that it complied with policies established by the University for protection of human subjects in research. The subjects will be at minimal risk. Unless renewed, approval lapses one year after approval date.

The Office for Human Research Protections requires that your consent form must include the note of HSCL approval and expiration date, which has been entered on the consent form sent back to you with this approval.

1. At designated intervals until the project is completed, a Project Status Report must be returned to the HSCL office.
2. Any significant change in the experimental procedure as described should be reviewed by this Committee prior to altering the project.
3. Notify HSCL about any new investigators not named in original application. Note that new investigators must take the online tutorial at http://www.rcr.ku.edu/hscl/hsp_tutorial/000.shtml.
4. Any injury to a subject because of the research procedure must be reported to the Committee immediately.
5. When signed consent documents are required, the primary investigator must retain the signed consent documents for at least three years past completion of the research activity. If you use a signed consent form, provide a copy of the consent form to subjects at the time of consent.
6. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.

Please inform HSCL when this project is terminated. You must also provide HSCL with an annual status report to maintain HSCL approval. Unless renewed, approval lapses one year after approval date. If your project receives funding which requests an annual update approval, you must request this from HSCL one month prior to the annual update. Thanks for your cooperation. If you have any questions, please contact me.

Sincerely,

Mary Denning
Coordinator
Human Subjects Committee - Lawrence

cc: Patricia Lowe

# APPENDIX B

## HSC-L Letter of Approval
## (Renewal)

KU RESEARCH & GRADUATE STUDIES
The University of Kansas

1/26/2012
HSCL #19026

Jennifer Raad
520 South 2nd St., Apt. #703
Springfield, IL 62701

The Human Subjects Committee Lawrence Campus reviewed your research update application for project

19026 Raad/Lowe (PRE) Validation of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Scores for Children with Learning Disabilities

and approved this project update through an expedited review process according to 45 CFR 46.110 (b)(2) minor changes (or no changes) in a previously approved project. Your project has continued approval to 2/3/2013. Approximately one month prior to 2/3/2013, HSCL will send to you a Status Report request, which will be necessary for you to complete in order to obtain continued approval for the next twelve months. Please note that you must stop data gathering if you do not receive continued HSCL approval.

Please use the HSCL "approval stamp" on your consent forms. Just cut and paste. You may resize and reshape the text to fit your documents.

**Approved by the Human Subjects Committee University of Kansas, Lawrence Campus (HSCL) on 2/9/2012. Approval expires one year from 2/3/2012. HSCL# 19026**

If you complete your project before the renewal date, please notify HSCL. Thank you for providing HSCL with update information.

Sincerely,

Stephanie Dyson Elms
HSCL Coordinator

cc: Patricia Lowe

# APPENDIX C

School District/Superintendent
Letter and Research Request

Dear [*Superintendent Name*]:

I am writing to request your permission to conduct research within the [*School District Name*]. I am a doctoral student in school psychology at the University of Kansas, and am currently completing my pre-doctoral internship in Springfield, Illinois. The present research is being conducted as part of a doctoral dissertation through the University of Kansas, and has been approved by the University of Kansas Human Subjects Committee-Lawrence Campus (HSC-L #19026).

Please find the enclosed information which describes the nature, purpose, procedure, and anticipated benefits of the research. If you should have any additional questions, please do not hesitate to contact me or my faculty supervisor (Dr. Patricia Lowe) using the contact information enclosed with this letter.

Thank you very much for your time and consideration, and I look forward to your response!

Sincerely,

Jennifer M. Raad

Jennifer M. Raad, Ed.S.
School Psychology Doctoral Student
1485 Falcon Valley Heights #301
Colorado Springs, CO 80921
Phone: (785) 312-4467
Email: jraad@ku.edu

Request to Conduct Research
in the [*School District Name*]

**Title of Research:**

Validation of the *Revised Children's Manifest Anxiety Scale, Second Edition* (*RCMAS-2*) Scores for Children with Specific Learning Disabilities

**Name of Researchers:**

Jennifer M. Raad, Ed.S.; Patricia A. Lowe, Ph.D.; Jamie McGovern

**Primary Researcher:**

Jennifer M. Raad, Ed.S.
School Psychology Doctoral Student
1485 Falcon Valley Heights #301
Colorado Springs, CO 80921
Phone: (785) 312-4467
Email: jraad@ku.edu

**Supervising Faculty Member:**

Patricia A. Lowe, Ph.D.
Assistant Professor of School Psychology
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Phone: (785) 864-9710
Email: tlowe@ku.edu

**Approval from the University of Kansas:**

This research project has been approved by the University of Kansas Human Subjects Committee-Lawrence Campus (HSC-L #19026). The Department of Psychology and Research in Education at the University of Kansas supports the practice of protection for human subjects participating in research. Additional questions or concerns about participants' rights may be directed in writing to the HSC-L, University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, by email to Mary Denning at mdenning@ku.edu, or by phone at (785) 864-7429 or (785) 864-7385.

**Nature of Research:**

This research is being conducted as part of a doctoral dissertation, in partial fulfillment of the requirements for the degree of Doctor of Philosophy in School Psychology, through the Department of Psychology and Research in Education at the University of Kansas. This research is being conducted by Jennifer M. Raad, a doctoral-level graduate student in School Psychology at the University of Kansas, and supervised by Dr. Patricia A. Lowe, Associate Professor of School Psychology at the University of Kansas.

**Purpose of Research:**

Anxiety is a major concern for children and adolescents today. Anxiety interferes with student learning and academic performance, and is associated with peer relationship difficulties. Students with learning difficulties are at an increased risk for anxiety, which can result from difficult or stressful experiences at school, and also can interfere with their ability to learn new information, form positive relationships with teachers and peers, and feel confident in their abilities.

This research examines the quality of the *Revised Children's Manifest Anxiety Scale, 2nd Edition* (*RCMAS-2*), a newly-revised anxiety measure of general anxiety for use with elementary and secondary school students, ages 6-19. This research will examine the factor structure, reliability, and validity of the RCMAS-2 scores among students with learning disabilities, in order to help establish whether this new measure of anxiety used in schools throughout the U.S. is appropriate for use among students with learning difficulties. A better understanding of the measures that can effectively be used to measure anxiety among students with learning difficulties can help school psychologists, counselors, and teachers more accurately identify the presence of anxiety among students with learning difficulties. This research will also help determine whether students with learning difficulties experience significantly higher or lower levels of anxiety than the general population. This information can help school personnel and mental health professionals better understand the effects of anxiety among students with learning difficulties, develop

effective strategies to prevent or reduce anxiety in these students, and determine the most effective ways to support students with learning difficulties both academically and emotionally.

**Description of Participants:**

Approximately 200 students from grades 3-12 (approximately 8-19 years of age) will be invited to participate. Participants will be recruited from public school districts, and meet the educational criteria and receive special education services for a "specific learning disability."

**Research Procedure:**

Students will be invited to complete a set of four self-report measures which ask about common emotional and behavioral difficulties, including anxiety. Students will also be asked to complete a short demographic information sheet, which will gather information about each student's gender, age, ethnicity, and grade level.

First, public school districts will be invited to participate in the study. If approved, permission to gather information from students will then be sought from building principals. If approved by building principals, the researchers will schedule two testing dates with the building principal and school staff. In order to respect and protect the privacy of students and families, direct access to students' educational records (for the purpose of identifying eligible students) will not be requested. Instead, school personnel will be asked to identify students who receive special education services for a specific learning disability through educational records. Then, teachers will then be asked to send an information letter and two copies of an informed consent form home with each identified student. Students/families will be asked to return one signed consent form while keeping the other copy for their records, if they would like to participate in the study. Only students who return a signed consent form will be allowed to participate in the study.

Students will complete the measures (within the student's school and during school hours) over the course of two sessions. Both sessions will be conducted either in a group setting or on an individual basis, depending on the structure and circumstances of the student's academic schedule. The sessions are expected to take approximately 15-25 minutes each to complete. The testing dates will be scheduled in close consultation with school administrators and staff, so as to minimize any potential impact on students' instructional time. All questionnaires will be administered in person by one of the primary researchers within the school building and during school hours.

On the date of the first scheduled testing session, a researcher will begin by reading the child/adolescent assent form to the students, request oral assent, and then give each student who has orally assented to participate two measures to complete (the *RCMAS-2* and one of the additional measures) as well as the demographic information sheet. The same procedures will be used in the second testing session, during which the student will again complete the *RCMAS-2*, as well as the remaining measure not completed in the first session.

Finally, in order to obtain more information regarding the potential differences in procedures used to identify children with specific learning disabilities, school principals will be asked to describe briefly in one or two sentences the identification procedures used in their buildings (e.g., standardized cognitive and academic assessment, response-to-intervention process, etc.).

**Anticipated Benefits of Research:**

Although participants will not directly benefit from this project, it is expected that information gathered through this study will indirectly benefit children and adolescents in several ways. Specifically, this study will determine whether a new measure of anxiety is appropriate for use among students with learning difficulties. A better understanding of the measures that can effectively be used to measure anxiety among students with learning difficulties can help school personnel and mental health professionals more accurately identify the presence of anxiety among students with learning difficulties.

In addition, this study will help determine whether students with learning difficulties experience significantly higher or lower levels of anxiety than the general population. This information can help school personnel and mental health professionals better understand the effects of anxiety among students with learning difficulties, develop effective strategies to prevent or reduce anxiety in these students, and

determine the most effective ways to support students with learning difficulties both academically and emotionally.

Finally, at the conclusion of the project, a summary of the research findings as well as a list of strategies will be given to your school district based on the findings that will hopefully be helpful in preventing or reducing anxiety among students with learning difficulties.

**Protection of Students' Rights:**

Students' responses will be kept in strict confidence and his or her name will not be associated with the results. To protect confidentiality of the students, no names will be used in the project; rather, all forms will be identified using code numbers. A list of code numbers and associated names (used to match each participant with his/her code number when the retest is done on the RCMAS-2 during the second session) will be kept in a locked file cabinet, located in one of the primary researcher's offices. The list will be destroyed at the end of the project. Data and consent forms will be kept in a separate locked file cabinet, also located in one of the primary researcher's offices. Students' identifiable information will not be shared unless required by law or with parents' written permission.

Furthermore, participation is strictly voluntary, and parents will be advised that they may decline to sign the consent form, thereby declining to allow their child/adolescent to participate in the study. In addition, students and parents will be advised that they may withdraw from the project at any time without penalty, and that withdrawing from the study will not affect the student's relationship with his or her school, the services it may provide to the student or student's family, or the University of Kansas. If a student withdraws, his or her information will not be used in the project.

**Compensation:**

Students and families will not receive any financial incentive or compensation to participate in this research.

**Disclosure of Financial Interests:**

None of the authors has any financial or commercial interests to disclose.

**Materials:**

The following materials will be used in the research study, and are enclosed for your consideration:

- *Parent/Guardian Information Letter:* One copy of the Parent/Guardian Information Letter will be distributed to parents of children who receive special education services for a learning disability. The letter explains the purpose, procedures, safeguards, and expected benefits of the project.
- *Parent/Guardian Informed Consent Form:* Two copies of the Parent/Guardian Information Letter will be distributed to parents of children who receive special education services for a learning disability. The letter explains the purpose, procedures, safeguards, and expected benefits of the project. Parents will be instructed to return one copy of the consent form (if they would like their child to participate) and keep one copy for their records.
- *Child/Adolescent Assent Script:* Prior to beginning any data collection, oral assent will be sought from all students for whom parental consent to participate has been received. Only students who provide oral assent to participate will be included within the study.
- *"All About Me":* This short self-report survey is intended to collect demographic information from each participant, including the student's gender, age, ethnicity, and grade level. This will help determine the extent to which the results of the study can be applied to other students with similar demographic characteristic.
- *Institutional Approval Letter:* Letter from the University of Kansas Human Subjects Committee-Lawrence Campus approving the research project and procedures (HSC-L Approval #19026).
- *Faculty Advisor Approval Letter:* Letter from Patricia A. Lowe, Ph.D., faculty advisor and dissertation committee chair, approving the research project and procedures.

The following self-report surveys/questionnaires will also be used in the research study. Electronic copies of the surveys/questionnaire are not available, but I would be happy to provide hard copies via US Postal Mail upon request.

- *Revised Children's Manifest Anxiety Scale, 2nd Edition RCMAS-2):* The RCMAS-2 is a self-report measure of chronic, manifest (trait) anxiety. Developed for use with children, ages 6 to19 years, the RCMAS-2 may be administered in an individual or group format. Children are asked to read each item on the scale, and indicate their response using a "yes/no" format. The RCMAS-2 will be completed by all students, as it is appropriate for use with all ages and grade-levels included in this study. The research will help determine whether the RCMAS-2 is a valid and reliable instrument for use with children with learning disabilities. The RCMAS-2 will be administered during both sessions, in order to assess the reliability of the scores when used with children with learning disabilities.
- *Behavior Assessment System for Children, Self-Report of Personality (BASC-2-SRP):* The BASC-2-SRP is a multidimensional self-report measure designed for use with children and adolescents, ages 8-21. The BASC-2-SRP assesses multiple aspects of an individual's emotional, behavioral, and social functioning. Several versions of the BASC-2-SRP are available depending on the child's age, including a child form (BASC-2-SRP-C) and an adolescent form (BASC-2-SRP-A). Students who are 8 through 11 years of age will complete the BASC-2-SRP-C, while students who are 12 to 19 years of age will complete the BASC-2-SRP-A. The BASC-2-SRP contains several subscales related to anxiety, and it is expected that children who demonstrate high levels of anxiety on the BASC-2-SRP will also demonstrate high levels of anxiety on the RCMAS-2. Therefore, the BASC-2-SRP will be used to assess the extent to which the RCMAS-2 scores are valid when used with children with learning disabilities.
- *State-Trait Anxiety Inventory for Children (STAI-C):* The State-Trait Anxiety Inventory for Children is a self-report measure used to assess both state and trait anxiety symptoms in children. The STAI-C will be administered to all students enrolled in grades 3 through 8. It is expected that children who demonstrate high levels of anxiety on the STAI-C Trait Scale will also demonstrate high levels of anxiety on the RCMAS-2. Therefore, the STAI-C will be used to assess the extent to which the RCMAS-2 scores are valid when used with children with learning disabilities.
- *State-Trait Anxiety Inventory, Form Y (STAI-Y):* The State-Trait Anxiety Inventory, Form Y is a self-report measure used to assess both state and trait anxiety symptoms in adolescents and adults. The STAI-Y will be administered to students enrolled in grades 9 through 12. It is expected that students who demonstrate high levels of anxiety on the STAI-Y Trait Scale will also demonstrate high levels of anxiety on the RCMAS-2. Therefore, the STAI-Y will be used to assess the extent to which the RCMAS-2 scores are valid when used with adolescents with learning disabilities.

# APPENDIX D

School Building/Principal
Letter and Research Request

Dear [*Principal Name*],

I am writing to request your permission to invite your students to participate in a research project. I am an advanced graduate student at the University of Kansas, and currently completing my doctoral degree in school psychology. This research is being conducted as part of my doctoral dissertation through the University of Kansas, and is supervised by Dr. Patricia A. Lowe, Associate Professor and Director of Training of the School Psychology program at the University of Kansas. **My project has been approved by the University of Kansas Human Subjects Committee-Lawrence Campus (HSC-L #19026), as well as [*Superintendent Name*] for the [*School District Name*].**

This project examines the quality of a new anxiety questionnaire for use with elementary and secondary school students. Anxiety is a major concern for children and adolescents today and it interferes with students' learning, academic performance, high stakes testing, and the formation and establishment of peer relationships. Students with learning disabilities are at an increased risk for anxiety, which can interfere with their ability to learn new information, form positive relationships with teachers and peers, and feel confident in their abilities. This study will help school and mental health professionals better understand anxiety and find effective ways to detect anxiety in students with learning disabilities, and hopefully develop effective strategies to prevent or reduce anxiety in these students. Finally, at the conclusion of the project, a summary of the research findings as well as a list of strategies will be given to your school district based on the findings that will hopefully be helpful in preventing or reducing anxiety among students with learning disabilities.

I would like to request your permission to invite students with learning disabilities in your school building (grades 3 and higher) to participate in this project. The project would involve students completing four questionnaires, which ask about several types of commonly experienced behaviors and emotions, including anxiety. Questionnaires would be administered at school over the course of two sessions, approximately 2-4 weeks apart, at the times and dates most convenient to you and your staff. The first session and second session will take about 15-25 minutes each. I will also collect general information, including students' age, gender, grade level, and ethnicity.

I am also committed to protecting the rights and privacy of students and families. Students' responses on the questionnaires completed will be kept in strict confidence and code numbers instead of students' names will be used in the study. To further protect students' privacy, I will not request access to students' educational records; rather, I will ask school staff to identify students who are eligible to participate in the study (i.e., students with learning disabilities). In addition, prior to administering questionnaires, parent consent forms will be sent home with each eligible student. Only students who return a signed parent consent form will be included in the study. Participation is strictly voluntary, and students may withdraw from the project at any time without penalty.

If you would like to participate in this important project, or would like more information, please contact Jennifer Raad via phone (785-312-4467) or email (jraad@ku.edu). Thank you for your time and consideration, and I look forward to your response.

Sincerely,

Jennifer M. Raad

Patricia A. Lowe

Jennifer M. Raad, Ed.S.
School Psychology Doctoral Student
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Email: jraad@ku.edu

Patricia A. Lowe, Ph.D.
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Phone: (785) 864-9710
Email: tlowe@ku.edu

# APPENDIX E

Parent/Guardian
Informational Letter

Dear Parents,

Anxiety is a major concern for children and adolescents today. Anxiety interferes with student learning and academic performance, and is associated with peer relationship difficulties. Students with learning difficulties are at an increased risk for anxiety, which can result from difficult or stressful experiences at school, and also can interfere with their ability to learn new information, form positive relationships with teachers and peers, and feel confident in their abilities.

Our project examines the quality of a new anxiety questionnaire for use with elementary and secondary school students. We are interested in studying anxiety so that we can better understand anxiety in students with learning difficulties, find effective ways to detect anxiety in students with learning difficulties, and hopefully develop effective strategies to prevent or reduce anxiety in these students.

We would like to invite your child/adolescent to participate in our project. The project would involve your child/adolescent completing four questionnaires, which ask about several types of commonly experienced behaviors and emotions, including anxiety. Your child will complete the questionnaires over the course of two sessions, approximately 2-4 weeks apart. The first session and second session will take about 15-25 minutes each. We will also collect general information about your child/adolescent, including your child/adolescent's age, gender, grade, and ethnicity.

Your school principal has agreed to allow students to participate in the project, although as parents, we must have your permission too. If you choose to allow your child/adolescent to participate in the project, the questionnaires will be administered at school in a group format at a time and date designated by the school principal and staff. All of your child/adolescent's responses on the questionnaires will be kept in strict confidence and his or her name will not be associated with the results. Participation is strictly voluntary, and your child/adolescent may withdraw from the project at any time without penalty. If your child/adolescent withdraws, his or her information will not be used in the project.

If you would like your child/adolescent to be involved in this important project, please read and sign the attached consent form and return it to your child/adolescent's classroom teacher. Please keep one copy of the consent form for yourself. If you would like additional information concerning this project before or after it is completed, please feel free to contact us by phone or mail. Our contact information is listed below.

This project has been approved by the University of Kansas Human Subjects Committee-Lawrence (HSC-L), school/school district, and school principal. If you have any additional questions about your rights as a participant, you may call (785) 864-7429 or (785) 864-7385, write to the HSC-L, University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or email Mary Denning at mdenning@ku.edu.

Thank you for your time and we look forward to your child/adolescent's participation in the project.

Sincerely,

Jennifer M. Raad, Ed.S.
School Psychology Doctoral Student
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road,634 JRP Hall
Lawrence, KS 66045
Email: jraad@ku.edu

Patricia A. Lowe, Ph.D.
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Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Phone: (785) 864-9710
Email: tlowe@ku.edu

# APPENDIX F

## Parent/Guardian
## Informed Consent Form

Approved by the Human Subjects Committee University of Kansas, Lawrence Campus (HSCL) on 2/9/2012. Approval expires one year from 2/3/2012. HSCL #19026

CONSENT FORM

Validation of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Scores for Children with Learning Disabilities

INTRODUCTION

The following information is provided for you to decide whether you wish for your child to participate in the present study. You may refuse to sign this form and not allow your child to participate in this study. You should be aware that even if you agree to allow your child to participate, your child is free to withdraw at any time. The Department of Psychology and Research in Education at the University of Kansas supports the practice of protection for human subjects participating in research.

PURPOSE OF THE PROJECT

Your school's principal has agreed to take part in an important project that will help us learn more about anxiety in students with learning difficulties. Anxiety is a big concern for children and adolescents today, and can interfere with their learning, confidence, and relationships with teachers and classmates. Students with learning difficulties may feel even more anxious than other students. This project will try out a new anxiety questionnaire that can help us better recognize when students with and without learning difficulties are feeling anxious. By understanding more about anxiety, we can find useful ways to prevent or reduce anxiety.

PROCEDURES

The project will ask your child to complete four questionnaires about common feelings and behaviors, including anxiety. Your child will complete the questionnaires during two sessions, approximately 2-4 weeks apart. Each session will take about 20-30 minutes each, and will take place at school during the school day. General information about your child's age, gender, grade, and ethnicity will also be collected.

CONFIDENTIALITY

All of your child's responses on the questionnaires will be kept in strict confidence and his or her name will not be associated with any results. Instead, we will use a "code number" to keep track of responses. Your child's name will never be shared unless required by law or with your written permission.

RISKS AND BENEFITS

Although your child will not receive anything by helping with this project, we hope that this project will help all children and adolescents in schools. This study will help us decide whether a new anxiety questionnaire is useful for students with and without learning difficulties. This can help us understand and recognize anxiety among students, so school personnel can help students cope better with anxiety. Also, when the project is over, we will create a list of strategies for your child's school to help prevent or reduce anxiety in students.

The questionnaires ask about common thoughts, feelings, and behaviors, so there is a small chance that your child may feel a little uncomfortable when reading the questionnaire. However, these feelings are expected to be minimal, and probably not more than what might be experienced in everyday life. If your child experiences discomfort during or after completing the questionnaires, which is highly unlikely, please contact your child's school counselor, or contact us directly using the contact information at the end of this letter.

WITHDRAWING FROM THE PROJECT

Permission to use and disclose your child's information remains in effect indefinitely. If you do not want the information obtained in this project to be used in future projects, please contact us using the contact information at the end of this letter.

Your child's participation in this project is completely voluntary. That means you or your child can withdraw from this project at any time without penalty. Your child may stop answering the questionnaires at any time, for any reason. If that happens, your child's information will not be used in the analyses and results of the project. If you would like to withdraw your child from this project at any time during or after the project, please contact Jennifer Raad or Dr. Lowe by phone, mail, or email using the contact information provided at the end of this letter.

PARTICIPATING IN THE PROJECT

If you would like to allow your child to be involved in this important project, please read and sign this consent form and return it to your child's classroom teacher by the due date. **One extra copy of the consent form is provided for you to keep for yourself.**

You are not required to sign this consent form and you may refuse to do so without affecting your right to any services you are receiving or may receive from the University of Kansas or to participate in any programs or events of the University of Kansas. However, if you refuse to sign, your child cannot participate in this study.

QUESTIONS ABOUT PARTICIPATION

If you would like additional information about this project now or after it is completed, please contact Jennifer Raad or Dr. Lowe by phone, mail, or email using the contact information provided below.

This project has been approved by the University of Kansas Human Subjects Committee-Lawrence (HSC-L), your child's school district, and your child's school principal. If you have any additional questions about your rights as a participant, you may call (785) 864-7429, write to the HSC-L, University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or send an email to hscl@ku.edu.

Thank you for your time and we look forward to working with your child!

Sincerely,

Jennifer M. Raad

Jennifer M. Raad, Ed.S.
School Psychology Doctoral Student
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Email: jraad@ku.edu

Patricia A. Lowe

Patricia A. Lowe, Ph.D.
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Phone: (785) 864-9710
Email: tlowe@ku.edu

Validation of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Scores for Children with Learning Disabilities

CONSENT TO PARTICIPATE

If you would like your child/adolescent to be involved in this important project, please sign this consent form and return it to your child/adolescent's classroom teacher by the date below. Please keep one copy of the consent form for yourself.

By signing your name below, you agree that you have read the description of the project, have received a copy of this consent form to keep, and agree to allow your child/adolescent to participate in the project.

_____
Child/Adolescent's Name (*please print clearly*)

_____ _____
Signature of Parent/Guardian Date

*****Please return your consent form by: _____**

# APPENDIX G

## Adolescent
## Informational Letter

Dear Student,

Anxiety is a major concern for children and adolescents today. Anxiety can interfere with learning, academic performance, and relationships with teachers and classmates. Our project examines the quality of a new anxiety questionnaire for use with elementary and secondary school students. We are interested in studying anxiety so that we can better understand anxiety in students with and without learning difficulties, find effective ways to detect anxiety in students, and hopefully develop effective strategies to prevent or reduce anxiety in all students.

We would like to invite you to take part in our project. The project would involve completing four questionnaires. These questionnaires ask about common behaviors and emotions, including anxiety. You will be asked to complete the questionnaires during two sessions, approximately 2-4 weeks apart. The first session and second session will take about 15-25 minutes each. We will also collect general information, such as your age, gender, grade, and ethnicity.

Your school principal has agreed to allow students to take part in the project but we need your permission too. If you choose to take part in the project, the questionnaires will be administered at school in a group format at a time and date determined by the school principal and staff. All of your responses on the questionnaires will be kept in strict confidence and your name will not be associated with the results. Participation is strictly voluntary, and you may withdraw from the project at any time without penalty. If you withdraw, your information will not be used in the project.

If you would like to take part in this important project, please read and sign the attached consent form and return it to your classroom teacher. Please keep one copy of the consent form for yourself. If you would like additional information concerning this project before or after it is completed, please feel free to contact us by phone or mail. Our contact information is listed below.

This project has been approved by the University of Kansas Human Subjects Committee-Lawrence (HSC-L), school/school district, and school principal. If you have any additional questions about your rights as a participant, you may call (785) 864-7429 or (785) 864-7385, write to the HSC-L, University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or email Mary Denning at mdenning@ku.edu.

Thank you for your time and we look forward to your participation in the project.

Sincerely,

Jennifer M. Raad

Patricia A. Lowe

Jennifer M. Raad, Ed.S.
School Psychology Doctoral Student
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road,634 JRP Hall
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Email: jraad@ku.edu

Patricia A. Lowe, Ph.D.
University of Kansas
Dept. of Psychology and Research in Education
1122 West Campus Road, 634 JRP Hall
Lawrence, KS 66045
Phone: (785) 864-9710
Email: tlowe@ku.edu

# APPENDIX H

## Adolescent
## Informed Consent Form

CONSENT FORM

Validation of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Scores for Children with Learning Disabilities

INTRODUCTION

The Department of Psychology and Research in Education at the University of Kansas supports the practice of protection for human subjects participating in research. The following information is provided to help you decide whether you want to participate in this project. You may refuse to sign this form and not participate in this study. You should be aware that even if you agree to participate, you are free to withdraw at any time.

PURPOSE OF THE PROJECT

We would like to invite you to take part in our project. We want to find out more about anxiety in children and adolescents, and how it affects their ability to learn. Anxiety is a big concern for children and adolescents today, and can interfere with their learning, academic performance, and relationships with teachers and classmates. Our project examines the quality of a new anxiety questionnaire for children and adolescents with and without learning difficulties. This project will help us understand anxiety better and find useful ways to measure and prevent or reduce anxiety in all students.

PROCEDURE

The project will involve completing four questionnaires, which ask about common feelings and behaviors, including anxiety. You will be asked to complete the questionnaires during two sessions, approximately 2-4 weeks apart. Each session will take about 15-25 minutes. We will also collect general information about your age, gender, grade, and ethnicity. Your school's principal has agreed to allow students to take part in the project, and will decide the date and time that the questionnaires will be completed at your school.

CONFIDENTIALITY

All of your responses on the questionnaires will be kept in strict confidence and your name will not be associated with any research findings. Instead, your information will be identified by a code number only. Your identifiable information will not be shared unless required by law or with your written permission.

RISKS AND BENEFITS

Although you will not receive anything by taking part in this project, we hope that this project will help children and adolescents. Specifically, this project will help us decide whether a new measure of anxiety is useful for students with and without learning difficulties. Being able to understand and measure anxiety among students can help researchers and school staff identify anxiety in students, and help students cope better with anxiety. Also, when the project is over, we will create a list of strategies for your school that may help students and teachers prevent or reduce anxiety in students.

The questionnaires ask about common thoughts, feelings, and behaviors, so there is a small chance that you may feel uncomfortable with some of the questions. However, these feelings are expected to be minimal, and probably not more than what you might experience in everyday life. If you feel uncomfortable or would like information about counseling, please contact your school counselor or contact us directly using the contact information at the end of this letter.

WITHDRAWING FROM THE PROJECT

When you sign this consent form, you are allowing us to use your information for other research projects we may have in the future. If your information is used in future research projects, your name will not be associated with any research findings. If you do not want your information used in future research studies, please contact us using the contact information at the end of this letter.

Your participation in this project is completely voluntary, which means it is your choice. It is okay if you want to withdraw from this project at any time. If you want to stop, your information will not be used in this project. If you would like to withdraw from this project during or after the project, please contact Jennifer Raad or Dr. Lowe by phone, mail, or email using the contact information provided at the end of this letter.

PARTICIPATING IN THE PROJECT

If you would like to take part in this important project, please sign this consent form and return it to your classroom teacher. Please keep one copy of the consent form for yourself.

You do not have to sign this consent form. If you do not sign this consent form, or if you decide to withdraw from this project, it will not affect your relationship with your school, the services it may provide to you, or the University of Kansas. However, if you refuse to sign, you cannot take part in this project.

QUESTIONS ABOUT PARTICIPATION

If you would like more information about this project, please feel free to contact us by phone, mail, or email using the contact information below.

This project has been approved by the University of Kansas Human Subjects Committee-Lawrence (HSC-L), school/school district, and school principal. If you have any additional questions about your rights as a participant, you may call (785) 864-7429 or (785) 864-7385, write to the HSC-L, University of Kansas, 2385 Irving Hill Road, Lawrence, Kansas 66045-7563, or email Mary Denning at mdenning@ku.edu.

Thank you for your time and we look forward to your participation in the project.

Sincerely,

Jennifer M. Raad

Patricia A. Lowe

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Validation of the Revised Children's Manifest Anxiety Scale, Second Edition (RCMAS-2) Scores for Children with Learning Disabilities

CONSENT TO PARTICIPATE

If you would like to take part in this important project, please read and sign this consent form and return it to your classroom teacher by the date below. Please keep one copy of the consent form for yourself.

By signing your name below, you acknowledge that you are at least 18 years old, and have received a copy of this consent form to keep. You also agree that you have read the description of the project and agree to participate in the project.

_____
Your Name (*please print clearly*)

_____ _____
Your Signature Date

*****Please return your consent form by: _____**

# APPENDIX I

## Child/Adolescent
## Assent Script

(To be read to students less than 18 years of age)

You are invited to help us find out more about how children and teenagers feel. Children and teenagers have many different types of feelings and emotions. We are interested in finding out more about your feelings and emotions, so we would like you to answer some questions on paper. It will take you about 25-30 minutes today. After you finish these questions, we will come back in 2 to 4 weeks with some more questions, which will take about 15-25 minutes to answer. Your answers to these questions will help us better understand the way children and teenagers feel, and hopefully come up with ways for us to help them feel better about themselves.

Your help with this project is voluntary, which means it is up to you. If you don't feel like answering the questions, you don't have to, and you can stop answering the questions any time and that will be all right. If you decide to stop, we won't use any of your information. Your name will not be used in the project. We will use numbers instead of your name. This way, no one except you will know how you answered the questions.

I will be happy to answer any questions you may have now or when we are finished. Do you have any questions? Do you want to take part in this project?

# APPENDIX J

## Demographic Information Form:
## Elementary Version

"All About Me"

Please tell me about yourself. There are no "right" or "wrong" answers. Please read each question, and circle ***one*** response.

*Example*: What is your favorite color? *Red* *Blue*

1) Are you a boy or a girl?

   *Boy* *Girl*

2) How old are you?

   *7* *8* *9* *10* *11* *12* *13* *14*

3) What is your race / ethnicity?

   *African American* *White/Caucasian* *Hispanic/Latino*

   *Native American* *Asian/Pacific Islander* *Other*

4) What grade are you in?

   *4th* *5th* *6th* *7th* *8th*

# APPENDIX K

## Demographic Information Form:
## Secondary Version

"All About Me"

Please tell me about yourself. There are no "right" or "wrong" answers. Please read each question, and circle ***one*** response.

*Example*: What is your favorite color? *Red* *Blue*

1) What is your gender?

   *Male* *Female*

2) What is your age?

   *10* *11* *12* *13* *14* *15* *16* *17* *18* *19* *20* *21*

3) What is your race / ethnicity?

   *African American* *White/Caucasian* *Hispanic/Latino*

   *Native American* *Asian/Pacific Islander* *Other*

4) What grade are you in?

   *9th* *10th* *11th* *12th*

# APPENDIX L

Tables

Table 1

*Demographic Characteristics of the Specific Learning Disability Subsample (n = 178)*

| Characteristic | Specific Learning Disability Subsample | |
|---|---|---|
| | N | % |
| Gender | | |
| Male | 106 | 59.55 |
| Female | 72 | 40.45 |
| Age | | |
| 8 | 9 | 5.06 |
| 9 | 37 | 20.79 |
| 10 | 35 | 19.66 |
| 11 | 23 | 12.92 |
| 12 | 29 | 16.29 |
| 13 | 16 | 8.99 |
| 14 | 8 | 4.49 |
| 15 | 10 | 5.62 |
| 16 | 4 | 2.25 |
| 17 | 6 | 3.37 |
| 18 | 1 | 0.56 |
| Grade | | |
| 3 | 34 | 19.10 |
| 4 | 40 | 22.47 |
| 5 | 28 | 15.73 |
| 6 | 29 | 16.29 |
| 7 | 15 | 8.43 |
| 8 | 10 | 5.62 |
| 9 | 9 | 5.06 |
| 10 | 4 | 2.25 |
| 11 | 8 | 4.49 |
| 12 | 1 | 0.56 |
| Race/Ethnicity | | |
| White/Caucasian | 131 | 73.60 |
| Black/African American | 13 | 7.30 |
| Hispanic/Latino | 10 | 5.62 |
| Asian/Pacific Islander | 2 | 1.12 |
| Native American | 7 | 3.93 |
| Multiple | 6 | 3.37 |
| Other | 9 | 5.06 |

Table 2

*Comparison of Demographic Characteristics of the Specific Learning Disability (n = 178) and Full Reference (n = 3086) Subsamples and the 2011 U.S. Census Population Estimates for Children and Adolescents*[1]

| Characteristic | Specific Learning Disabilities % | Full Reference % | General Population % |
|---|---|---|---|
| Gender | | | |
| Male | 59.55 | 48.7 | 51.2 |
| Female | 40.45 | 51.3 | 48.8 |
| Race/Ethnicity | | | |
| White/Caucasian | 73.60 | 47.2 | 68.6 |
| Black/African American | 7.30 | 28.3 | 14.4 |
| Hispanic/Latino | 5.62 | 16.0 | n/a[2] |
| Asian/Pacific Islander | 1.12 | 3.9 | 4.4 |
| Native American | 3.93 | 1.5 | 0.2 |
| Multiple | 3.37 | 0.0 | 5.1 |
| Other | 5.06 | 2.6 | 6.2 |
| Missing | 0.00 | 0.5 | 0.0 |

[1] U.S. Census population estimates for gender reflect children and adolescents ages 8 through 18 years, while U.S. Census population estimates for race/ethnicity reflect children and adolescents ages 5 through 17 years.

[2] In contrast to previous U.S. censuses, the 2010 U.S. Census considered 'Hispanic or Latino Origin' to be a reference to an individual's culture, "heritage, nationality group, lineage, or country of birth" (Humes, Jones, & Ramirez, 2011, p. 2), rather than a category denoting ethnicity or race. Therefore, 'Hispanic or Latino Origin' was not reported as one of the six racial categories included on the 2010 U.S. Census.

Table 3

*Initial Eigenvalues for the Specific Learning Disability Subsample (n = 170), Full Reference Subsample (n = 3,086), and Combined Sample (n = 3,256)*

| Factor | Initial Eigenvalues | | |
|---|---|---|---|
| | Combined Sample | Specific Learning Disability Subsample | Full Reference Subsample |
| 1 | 7.39 | 11.06 | 7.22 |
| 2 | 2.86 | 3.89 | 2.87 |
| 3 | 1.88 | 2.13 | 1.91 |
| 4 | 1.65 | 1.82 | 1.65 |
| 5 | 1.29 | 1.69 | 1.27 |
| 6 | 1.17 | 1.57 | 1.18 |
| 7 | 1.10 | 1.40 | 1.11 |
| 8 | 1.06 | 1.29 | 1.07 |
| 9 | 1.04 | 1.24 | 1.04 |
| 10 | 0.98 | 1.21 | 1.00 |
| 11 | 0.97 | 1.12 | 0.98 |
| 12 | 0.96 | 1.11 | 0.96 |
| 13 | 0.95 | 1.08 | 0.95 |
| 14 | 0.95 | 1.02 | 0.94 |
| 15 | 0.91 | 0.96 | 0.92 |
| 16 | 0.91 | 0.90 | 0.91 |
| 17 | 0.89 | 0.88 | 0.89 |
| 18 | 0.86 | 0.85 | 0.87 |
| 19 | 0.86 | 0.82 | 0.87 |
| 20 | 0.84 | 0.80 | 0.85 |
| 21 | 0.84 | 0.74 | 0.84 |
| 22 | 0.81 | 0.73 | 0.81 |
| 23 | 0.80 | 0.70 | 0.81 |
| 24 | 0.80 | 0.66 | 0.80 |
| 25 | 0.78 | 0.66 | 0.78 |
| 26 | 0.77 | 0.60 | 0.78 |
| 27 | 0.76 | 0.55 | 0.77 |
| 28 | 0.75 | 0.54 | 0.76 |
| 29 | 0.74 | 0.52 | 0.74 |
| 30 | 0.72 | 0.51 | 0.73 |
| 31 | 0.71 | 0.50 | 0.72 |
| 32 | 0.71 | 0.48 | 0.71 |
| 33 | 0.70 | 0.46 | 0.70 |
| 34 | 0.68 | 0.43 | 0.69 |
| 35 | 0.68 | 0.40 | 0.68 |
| 36 | 0.67 | 0.39 | 0.67 |
| 37 | 0.66 | 0.37 | 0.66 |

Table 3 (continued)

| Factor | Initial Eigenvalues | | |
|---|---|---|---|
| | Combined Sample | Specific Learning Disability Subsample | Full Reference Subsample |
| 38 | 0.65 | 0.35 | 0.64 |
| 39 | 0.63 | 0.32 | 0.63 |
| 40 | 0.62 | 0.31 | 0.63 |
| 41 | 0.61 | 0.30 | 0.62 |
| 42 | 0.60 | 0.28 | 0.59 |
| 43 | 0.59 | 0.25 | 0.59 |
| 44 | 0.58 | 0.24 | 0.57 |
| 45 | 0.56 | 0.22 | 0.56 |
| 46 | 0.55 | 0.19 | 0.55 |
| 47 | 0.54 | 0.19 | 0.54 |
| 48 | 0.52 | 0.16 | 0.52 |
| 49 | 0.48 | 0.14 | 0.48 |

Table 4

*Real and Random (i.e., Mean) Eigenvalues for the Specific Learning Disability Subsample (n = 178), Full Reference Subsample (n = 3,086), and Combined Sample (n = 3,264)*

| | Eigenvalues | | | | | |
|---|---|---|---|---|---|---|
| | Combined Sample | | Specific Learning Disability Subsample | | Full Reference Subsample | |
| Factor | Real | Random | Real | Random | Real | Random |
| 1 | 7.388 | 1.241 | 11.063 | 2.197 | 7.218 | 1.248 |
| 2 | 2.858 | 1.219 | 3.889 | 2.066 | 2.869 | 1.225 |
| 3 | 1.877 | 1.202 | 2.127 | 1.965 | 1.905 | 1.208 |
| 4 | 1.654 | 1.188 | 1.818 | 1.883 | 1.649 | 1.194 |
| 5 | 1.287 | 1.176 | 1.691 | 1.809 | 1.272 | 1.180 |
| 6 | 1.169 | 1.163 | 1.568 | 1.743 | 1.177 | 1.168 |
| 7 | 1.104 | 1.152 | 1.401 | 1.680 | 1.107 | 1.156 |
| 8 | 1.062 | 1.142 | 1.286 | 1.623 | 1.068 | 1.146 |
| 9 | 1.039 | 1.132 | 1.237 | 1.567 | 1.039 | 1.135 |
| 10 | 0.979 | 1.122 | 1.212 | 1.514 | 0.997 | 1.125 |
| 11 | 0.968 | 1.112 | 1.117 | 1.464 | 0.981 | 1.115 |
| 12 | 0.961 | 1.103 | 1.109 | 1.416 | 0.958 | 1.106 |
| 13 | 0.950 | 1.094 | 1.076 | 1.369 | 0.950 | 1.096 |
| 14 | 0.945 | 1.085 | 1.016 | 1.323 | 0.939 | 1.087 |
| 15 | 0.914 | 1.076 | 0.962 | 1.281 | 0.920 | 1.078 |
| 16 | 0.905 | 1.067 | 0.901 | 1.240 | 0.905 | 1.069 |
| 17 | 0.887 | 1.059 | 0.876 | 1.199 | 0.893 | 1.061 |
| 18 | 0.864 | 1.051 | 0.854 | 1.159 | 0.870 | 1.052 |
| 19 | 0.856 | 1.043 | 0.822 | 1.121 | 0.869 | 1.044 |
| 20 | 0.843 | 1.034 | 0.797 | 1.083 | 0.848 | 1.035 |
| 21 | 0.838 | 1.026 | 0.740 | 1.048 | 0.838 | 1.027 |
| 22 | 0.808 | 1.019 | 0.730 | 1.013 | 0.812 | 1.019 |
| 23 | 0.801 | 1.011 | 0.700 | 0.978 | 0.810 | 1.011 |
| 24 | 0.795 | 1.003 | 0.664 | 0.944 | 0.796 | 1.003 |
| 25 | 0.778 | 0.995 | 0.655 | 0.912 | 0.784 | 0.995 |
| 26 | 0.770 | 0.987 | 0.597 | 0.879 | 0.776 | 0.987 |
| 27 | 0.760 | 0.980 | 0.547 | 0.848 | 0.767 | 0.979 |
| 28 | 0.748 | 0.972 | 0.544 | 0.817 | 0.755 | 0.971 |
| 29 | 0.737 | 0.965 | 0.524 | 0.787 | 0.736 | 0.964 |
| 30 | 0.724 | 0.957 | 0.509 | 0.758 | 0.726 | 0.956 |
| 31 | 0.712 | 0.949 | 0.498 | 0.729 | 0.719 | 0.948 |
| 32 | 0.710 | 0.941 | 0.483 | 0.701 | 0.713 | 0.940 |
| 33 | 0.703 | 0.934 | 0.460 | 0.672 | 0.703 | 0.932 |
| 34 | 0.683 | 0.926 | 0.426 | 0.645 | 0.694 | 0.924 |
| 35 | 0.677 | 0.918 | 0.398 | 0.619 | 0.681 | 0.916 |
| 36 | 0.668 | 0.910 | 0.391 | 0.592 | 0.670 | 0.908 |
| 37 | 0.656 | 0.903 | 0.371 | 0.566 | 0.656 | 0.900 |

Table 4 (continued)

| | Eigenvalues | | | | | |
|---|---|---|---|---|---|---|
| | Combined Sample | | Specific Learning Disability Subsample | | Full Reference Subsample | |
| | Real | Random | Real | Random | Real | Random |
| 38 | 0.652 | 0.895 | 0.352 | 0.540 | 0.642 | 0.892 |
| 39 | 0.630 | 0.887 | 0.322 | 0.514 | 0.634 | 0.883 |
| 40 | 0.619 | 0.878 | 0.311 | 0.488 | 0.625 | 0.875 |
| 41 | 0.613 | 0.870 | 0.299 | 0.464 | 0.616 | 0.867 |
| 42 | 0.595 | 0.862 | 0.278 | 0.440 | 0.594 | 0.858 |
| 43 | 0.588 | 0.853 | 0.245 | 0.414 | 0.585 | 0.848 |
| 44 | 0.575 | 0.844 | 0.237 | 0.389 | 0.574 | 0.839 |
| 45 | 0.563 | 0.834 | 0.216 | 0.364 | 0.562 | 0.829 |
| 46 | 0.554 | 0.824 | 0.193 | 0.338 | 0.553 | 0.819 |
| 47 | 0.541 | 0.813 | 0.188 | 0.311 | 0.539 | 0.808 |
| 48 | 0.518 | 0.800 | 0.160 | 0.282 | 0.524 | 0.795 |
| 49 | 0.476 | 0.785 | 0.136 | 0.249 | 0.479 | 0.779 |

Table 5

*Results of Velicer's Minimum Average Partial (MAP) Test for the Specific Learning Disability Subsample (n = 178), Full Reference Subsample (n = 3,086), and Combined Sample (n = 3,264)*

| Step | Squared Partial Correlations | | |
|---|---|---|---|
| | Combined Sample | Specific Learning Disability Subsample | Full Reference Subsample |
| 0 | .021 | .053 | .020 |
| 1 | .004 | .013 | .004 |
| 2 | .003 | .010 | .003 |
| 3 | .003[a] | .009[a] | .003[a] |
| 4 | .003 | .009 | .003 |
| 5 | .003 | .010 | .003 |
| 6 | .004 | .010 | .004 |
| 7 | .004 | .010 | .004 |
| 8 | .005 | .010 | .005 |
| 9 | .006 | .011 | .006 |
| 10 | .006 | .011 | .006 |
| 11 | .007 | .012 | .007 |
| 12 | .008 | .013 | .008 |
| 13 | .008 | .013 | .008 |
| 14 | .009 | .014 | .009 |
| 15 | .010 | .015 | .010 |
| 16 | .011 | .016 | .011 |
| 17 | .012 | .017 | .012 |
| 18 | .014 | .018 | .013 |
| 19 | .015 | .019 | .015 |
| 20 | .016 | .021 | .016 |
| 21 | .017 | .022 | .017 |
| 22 | .019 | .023 | .019 |
| 23 | .020 | .025 | .020 |
| 24 | .022 | .027 | .022 |
| 25 | .024 | .029 | .024 |
| 26 | .026 | .031 | .026 |
| 27 | .029 | .033 | .029 |
| 28 | .031 | .036 | .031 |
| 29 | .034 | .039 | .034 |
| 30 | .037 | .042 | .037 |
| 31 | .041 | .046 | .041 |
| 32 | .045 | .049 | .045 |
| 33 | .050 | .052 | .050 |
| 34 | .055 | .057 | .055 |
| 35 | .061 | .062 | .061 |
| 36 | .068 | .069 | .068 |
| 37 | .076 | .075 | .075 |

Table 5 (continued)

| Step | Squared Partial Correlations | | |
|---|---|---|---|
| | Combined Sample | Specific Learning Disability Subsample | Full Reference Subsample |
| 38 | .085 | .083 | .084 |
| 39 | .095 | .093 | .095 |
| 40 | .108 | .103 | .107 |
| 41 | .123 | .120 | .122 |
| 42 | .143 | .139 | .143 |
| 43 | .175 | .160 | .168 |
| 44 | .194 | .199 | .206 |
| 45 | .245 | .246 | .244 |
| 46 | .335 | .333 | .339 |
| 47 | .516 | .497 | .518 |
| 48 | 1.000 | 1.000 | 1.000 |

[a] Exact values for the combined sample, specific learning disability subsample, and full reference subsample are .002900, .009352, and .002895, respectively. These values occurred at Step 3, and represent the smallest squared partial correlations.

Table 6

*Factor Pattern Coefficients for the Five-Factor Promax Solution for the RCMAS-2 Scores Among the Combined Sample (n = 3,256) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Pattern Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 10 | **.65** | -.06 | -.07 | -.16 | .04 | .65 |
| 4 | **.63** | -.07 | -.07 | -.10 | .05 | .64 |
| 6 | **.61** | -.01 | -.05 | -.03 | -.05 | .67 |
| 26 | **.51** | -.01 | -.01 | .15 | -.07 | .61 |
| 17 | **.51** | -.10 | .10 | .15 | -.01 | .58 |
| 49 | **.48** | -.12 | -.01 | .08 | .16 | .52 |
| 9 | **.41** | .07 | -.01 | .07 | .02 | .48 |
| 45 | **.41** | .13 | .01 | -.21 | -.07 | .49 |
| 32 | **.41** | -.15 | .07 | .25 | .17 | .44 |
| 3 | **.36** | .21 | .03 | .06 | -.04 | .45 |
| 30 | **.35** | .17 | .07 | .02 | -.04 | .43 |
| 8 | **.32** | .06 | .00 | .02 | .21 | .36 |
| 22 | **.27** | .16 | -.05 | .07 | .07 | .32 |
| 21 | **.25** | .12 | .02 | .17 | .01 | .31 |
| 2 | **.24** | .20 | .03 | -.06 | .16 | .30 |
| 28 | **.22** | .21 | -.05 | -.17 | -.01 | .27 |
| 18 | **.20** | .17 | .04 | -.04 | .07 | .25 |
| 5 | -.10 | **.47** | .02 | -.12 | .05 | -.12 |
| 34 | -.13 | **.45** | .02 | .11 | .04 | -.16 |
| 42 | .12 | **.43** | -.01 | -.06 | -.07 | .21 |
| 1 | .07 | **.42** | .05 | -.02 | -.07 | .12 |
| 25 | -.05 | **.40** | .04 | .15 | .01 | -.06 |
| 43 | -.16 | **.39** | -.10 | .13 | .15 | -.21 |
| 7 | .20 | **.38** | .03 | .01 | -.17 | .33 |
| 15 | .03 | **.36** | .03 | -.14 | .04 | .05 |
| 39 | .15 | **.36** | .06 | .15 | -.21 | .27 |
| 47 | .11 | **.35** | -.11 | -.15 | -.03 | .14 |
| 46 | -.04 | **.35** | -.03 | -.01 | .03 | -.07 |
| 20 | -.07 | **.35** | -.10 | .10 | -.02 | -.09 |
| 16 | .14 | **.31** | .02 | .06 | .03 | .21 |
| 27 | .15 | **.29** | -.05 | -.08 | .06 | .19 |
| 36 | .09 | **.21** | -.14 | .03 | .16 | .05 |
| 31 | .13 | **.17** | -.02 | -.05 | .04 | .18 |

Table 6 (continued)

| Item No. | Factor Pattern Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 33 | -.01 | .02 | **.64** | -.05 | -.06 | .01 |
| 19 | -.03 | -.05 | **.62** | -.02 | .03 | -.04 |
| 29 | .01 | -.05 | **.57** | -.14 | .06 | .00 |
| 24 | -.04 | -.04 | **.55** | .09 | -.04 | -.05 |
| 14 | .03 | .02 | **.40** | -.10 | -.01 | .02 |
| 38 | -.02 | .10 | **.37** | -.28 | .05 | -.02 |
| 40 | .00 | -.02 | -.03 | **.48** | -.08 | .01 |
| 48 | .05 | -.10 | -.14 | **.46** | -.07 | .07 |
| 44 | -.02 | .05 | -.14 | **.38** | .02 | -.03 |
| 12 | .09 | .10 | .11 | **.34** | .09 | .12 |
| 11 | -.06 | .21 | .06 | **.26** | .23 | -.10 |
| 35 | .22 | .23 | .06 | **.25** | -.01 | .29 |
| 23 | .05 | -.08 | -.01 | .00 | **.60** | .03 |
| 37 | .12 | .00 | .04 | -.14 | **.43** | .11 |
| 41 | .19 | .05 | -.02 | -.10 | **.35** | .19 |
| 13 | .11 | .05 | .01 | .07 | **.26** | .05 |
| Trace | 3.76 | 2.96 | 1.96 | 1.42 | 1.26 | 4.75 |
| Post-Rotation Variance (%) | 33 | 26 | 17 | 12 | 11 | 42 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Defensiveness 1, Factor IV = Defensiveness 2, Factor V = Social Anxiety

Table 7

*Factor Structure Coefficients for the Five-Factor Varimax Solution for the RCMAS-2 Scores Among the Combined Sample (n = 3,256) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Structure Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 10 | **.57** | .17 | .02 | -.15 | .14 | .61 |
| 4 | **.55** | .15 | .01 | -.10 | .15 | .59 |
| 6 | **.53** | .18 | .02 | -.03 | .07 | .60 |
| 49 | **.44** | .09 | .03 | .09 | .22 | .49 |
| 26 | **.44** | .17 | .04 | .15 | .04 | .54 |
| 17 | **.44** | .10 | .14 | .15 | .08 | .52 |
| 9 | **.41** | .22 | .03 | .08 | .11 | .47 |
| 32 | **.40** | .07 | .09 | .26 | .23 | .43 |
| 45 | **.40** | .24 | .08 | -.20 | .03 | .47 |
| 3 | **.39** | .31 | .07 | .08 | .07 | .47 |
| 8 | **.38** | .21 | .04 | .05 | .26 | .41 |
| 30 | **.37** | .27 | .11 | .03 | .06 | .45 |
| 2 | **.35** | .30 | .07 | -.03 | .22 | .38 |
| 22 | **.32** | .26 | -.02 | .09 | .14 | .36 |
| 21 | **.28** | .21 | .04 | .18 | .09 | .34 |
| 18 | **.27** | .24 | .07 | -.02 | .13 | .31 |
| 28 | **.26** | **.26** | -.01 | -.15 | .06 | .31 |
| 42 | .23 | **.42** | .02 | -.04 | .03 | .30 |
| 5 | .09 | **.40** | .04 | -.09 | .09 | .06 |
| 1 | .19 | **.39** | .07 | .00 | .02 | .23 |
| 7 | .26 | **.38** | .07 | .03 | -.05 | .36 |
| 34 | .06 | **.38** | .00 | .14 | .09 | .02 |
| 25 | .11 | **.36** | .03 | .18 | .07 | .09 |
| 39 | .21 | **.35** | .07 | .15 | -.09 | .30 |
| 16 | .26 | **.35** | .03 | .09 | .11 | .30 |
| 43 | .04 | **.34** | -.13 | .17 | .17 | -.02 |
| 47 | .19 | **.34** | -.07 | -.12 | .04 | .22 |
| 15 | .17 | **.34** | .06 | -.11 | .09 | .17 |
| 27 | .25 | **.33** | -.01 | -.05 | .12 | .28 |
| 46 | .09 | **.31** | -.03 | .02 | .08 | .07 |
| 35 | .29 | **.30** | .07 | .26 | .09 | .34 |
| 20 | .05 | **.30** | -.11 | .12 | .03 | .03 |
| 36 | .19 | **.25** | -.13 | .06 | .20 | .16 |

Table 7 (continued)

| Item No. | Factor Structure Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 31 | .19 | **.21** | .01 | -.04 | .08 | .22 |
| 33 | .05 | .02 | **.64** | -.06 | -.04 | .07 |
| 19 | .04 | -.03 | **.61** | -.02 | .03 | .03 |
| 29 | .08 | -.02 | **.58** | -.14 | .06 | .07 |
| 24 | .01 | -.03 | **.53** | .08 | -.03 | .00 |
| 14 | .08 | .04 | **.41** | -.09 | .01 | .07 |
| 38 | .08 | .09 | **.40** | -.27 | .05 | .07 |
| 40 | -.02 | .00 | -.08 | **.47** | -.05 | -.01 |
| 48 | -.02 | -.06 | -.19 | **.44** | -.05 | .01 |
| 44 | .00 | .06 | -.19 | **.38** | .04 | -.01 |
| 12 | .18 | .18 | .08 | **.35** | .14 | .19 |
| 11 | .12 | .24 | .03 | **.30** | .25 | .07 |
| 23 | .22 | .07 | -.01 | .05 | **.54** | .16 |
| 37 | .26 | .13 | .06 | -.10 | **.41** | .23 |
| 41 | .30 | .18 | .00 | -.05 | **.36** | .29 |
| 13 | .21 | .15 | .01 | .10 | **.27** | .16 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Defensiveness 1, Factor IV = Defensiveness 2, Factor V = Social Anxiety

Table 8

*Factor Pattern Coefficients for the Five-Factor Promax Solution for the RCMAS-2 Scores Among the Full Reference Subsample (n = 3,086) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Pattern Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 10 | **.64** | -.06 | -.07 | -.17 | .05 | .63 |
| 6 | **.62** | -.02 | -.05 | -.04 | -.06 | .68 |
| 4 | **.61** | -.07 | -.05 | -.10 | .07 | .60 |
| 49 | **.50** | -.13 | -.02 | .10 | .12 | .55 |
| 26 | **.49** | -.01 | .00 | .14 | -.09 | .61 |
| 17 | **.47** | -.09 | .12 | .15 | .00 | .55 |
| 9 | **.43** | .06 | -.01 | .07 | -.02 | .50 |
| 45 | **.43** | .11 | .00 | -.23 | -.07 | .49 |
| 32 | **.39** | -.14 | .07 | .28 | .15 | .43 |
| 3 | **.38** | .19 | .02 | .06 | -.05 | .48 |
| 30 | **.34** | .16 | .08 | .02 | -.04 | .43 |
| 8 | **.33** | .05 | -.01 | .04 | .19 | .37 |
| 2 | **.26** | .20 | .01 | -.05 | .16 | .31 |
| 22 | **.26** | .16 | -.05 | .08 | .05 | .31 |
| 21 | **.24** | .11 | .02 | .17 | .02 | .31 |
| 18 | **.18** | .16 | .05 | -.03 | .08 | .23 |
| 5 | -.11 | **.47** | .03 | -.12 | .08 | -.15 |
| 34 | -.12 | **.44** | .02 | .13 | .00 | -.13 |
| 1 | .07 | **.41** | .06 | -.02 | -.07 | .12 |
| 42 | .15 | **.41** | -.02 | -.07 | -.07 | .25 |
| 43 | -.15 | **.41** | -.11 | .17 | .09 | -.19 |
| 25 | -.03 | **.38** | .04 | .18 | -.01 | -.02 |
| 7 | .21 | **.36** | .02 | .00 | -.16 | .035 |
| 46 | -.05 | **.35** | -.04 | .00 | .04 | -.08 |
| 47 | .10 | **.35** | -.11 | -.15 | -.02 | .10 |
| 15 | .05 | **.35** | .03 | -.14 | .05 | .05 |
| 20 | -.07 | **.34** | -.09 | .11 | -.02 | -.10 |
| 39 | .16 | **.33** | .07 | .14 | -.20 | .29 |
| 16 | .14 | **.30** | .02 | .07 | .03 | .21 |
| 27 | .16 | **.28** | -.04 | -.07 | .05 | .20 |
| 36 | .09 | **.22** | -.14 | .05 | .14 | .04 |
| 28 | .20 | **.21** | -.04 | -.17 | .01 | .23 |

Table 8 (continued)

| Item No. | Factor Pattern Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 31 | .14 | **.16** | -.01 | -.05 | .05 | .16 |
| 33 | -.02 | .02 | **.63** | -.04 | -.05 | .01 |
| 19 | -.03 | -.06 | **.61** | .01 | .02 | -.03 |
| 29 | .01 | -.06 | **.57** | -.12 | .08 | -.01 |
| 24 | -.04 | -.05 | **.55** | .11 | -.05 | -.04 |
| 14 | .04 | .02 | **.38** | -.09 | .00 | .02 |
| 38 | -.01 | .11 | **.36** | -.29 | .07 | -.03 |
| 40 | -.03 | -.02 | -.01 | **.49** | -.03 | -.03 |
| 48 | .06 | -.12 | -.16 | **.44** | -.06 | .09 |
| 44 | -.01 | .06 | -.18 | **.39** | .02 | -.02 |
| 12 | .09 | .10 | .10 | **.37** | .07 | .13 |
| 11 | -.05 | .22 | .06 | **.31** | .18 | -.07 |
| 35 | .21 | .22 | .07 | **.26** | -.04 | .30 |
| 23 | .03 | -.06 | .00 | .07 | **.58** | .00 |
| 37 | .09 | .01 | .05 | -.09 | **.46** | .05 |
| 41 | .20 | .05 | -.03 | -.05 | **.33** | .18 |
| 13 | .11 | .07 | .00 | .12 | **.23** | .05 |
| Trace | 3.72 | 2.83 | 1.92 | 1.55 | 1.15 | 4.66 |
| Post-Rotation Variance (%) | 33 | 25 | 17 | 14 | 10 | 42 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Defensiveness 1, Factor IV = Defensiveness 2, Factor V = Social Anxiety

Table 9

*Factor Structure Coefficients for the Five-Factor Varimax Solution for the RCMAS-2 Scores Among the Full Reference Subsample (n = 3,086) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Structure Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 10 | **.56** | .16 | .02 | -.13 | .15 | .59 |
| 4 | **.55** | .15 | .03 | -.07 | .17 | .57 |
| 6 | **.53** | .18 | .03 | -.02 | .05 | .61 |
| 49 | **.45** | .08 | .02 | .12 | .18 | .51 |
| 26 | **.42** | .15 | .04 | .16 | .01 | .53 |
| 17 | **.42** | .09 | .15 | .17 | .08 | .50 |
| 9 | **.41** | .21 | .04 | .10 | .08 | .48 |
| 3 | **.40** | .30 | .07 | .09 | .05 | .49 |
| 45 | **.40** | .22 | .08 | -.20 | .03 | .46 |
| 8 | **.39** | .20 | .03 | .08 | .25 | .42 |
| 32 | **.38** | .06 | .08 | .29 | .20 | .42 |
| 30 | **.37** | .26 | .12 | .05 | .05 | .44 |
| 2 | **.36** | .30 | .06 | -.01 | .22 | .39 |
| 22 | **.31** | .25 | -.02 | .11 | .12 | .35 |
| 21 | **.28** | .20 | .04 | .19 | .08 | .33 |
| 18 | **.26** | .23 | .08 | .00 | .14 | .29 |
| 28 | **.25** | **.25** | .01 | -.14 | .08 | .27 |
| 42 | .25 | **.41** | .02 | -.04 | .03 | .32 |
| 5 | .09 | **.40** | .05 | -.08 | .12 | .05 |
| 1 | .20 | **.39** | .09 | .01 | .01 | .23 |
| 34 | .06 | **.37** | .00 | .16 | .05 | .03 |
| 7 | .27 | **.37** | .07 | .03 | -.05 | .37 |
| 25 | .12 | **.35** | .03 | .20 | .04 | .12 |
| 43 | .03 | **.35** | -.13 | .20 | .12 | -.02 |
| 16 | .25 | **.34** | .04 | .10 | .10 | .30 |
| 15 | .18 | **.34** | .06 | -.11 | .10 | .17 |
| 39 | .21 | **.33** | .08 | .16 | -.10 | .31 |
| 47 | .18 | **.33** | -.06 | -.12 | .04 | .19 |
| 27 | .26 | **.32** | .00 | -.03 | .12 | .28 |
| 46 | .09 | **.32** | -.03 | .03 | .08 | .06 |
| 35 | .28 | **.29** | .07 | .28 | .05 | .34 |
| 20 | .04 | **.29** | -.09 | .13 | .02 | .02 |

Table 9 (continued)

| Item No. | Factor Structure Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 36 | .19 | **.26** | -.13 | .09 | .18 | .16 |
| 31 | .19 | **.20** | .02 | -.03 | .09 | .21 |
| 33 | .06 | .03 | **.62** | -.05 | -.03 | .07 |
| 19 | .04 | -.03 | **.60** | -.01 | .01 | .03 |
| 29 | .08 | -.02 | **.57** | -.12 | .07 | .07 |
| 24 | .01 | -.03 | **.52** | .09 | -.05 | .01 |
| 14 | .09 | .05 | **.40** | -.09 | .02 | .08 |
| 38 | .09 | .11 | **.39** | -.27 | .08 | .07 |
| 40 | -.02 | .00 | -.07 | **.48** | -.03 | -.02 |
| 48 | .00 | -.07 | -.21 | **.43** | -.05 | .02 |
| 44 | .01 | .07 | -.23 | **.39** | .03 | .00 |
| 12 | .17 | .16 | .07 | **.38** | .10 | .19 |
| 11 | .12 | .24 | .02 | **.33** | .20 | .08 |
| 23 | .21 | .07 | -.01 | .10 | **.53** | .15 |
| 37 | .24 | .12 | .06 | -.06 | **.44** | .19 |
| 41 | .31 | .17 | .00 | -.02 | **.34** | .28 |
| 13 | .21 | .15 | .00 | .14 | **.24** | .16 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Defensiveness 1, Factor IV = Defensiveness 2, Factor V = Social Anxiety

Table 10

*Factor Pattern Coefficients for the Three-Factor Promax Solution for the RCMAS-2 Scores Among Students with Specific Learning Disabilities (n = 170) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Pattern Coefficients | | | General Anxiety |
|---|---|---|---|---|
| | I | II | III | |
| 6 | **.77** | -.21 | -.14 | .77 |
| 10 | **.75** | .00 | -.03 | .75 |
| 26 | **.75** | .03 | -.02 | .75 |
| 17 | **.70** | -.05 | .04 | .72 |
| 32 | **.67** | -.15 | .08 | .72 |
| 4 | **.63** | -.06 | -.16 | .65 |
| 49 | **.51** | .02 | -.05 | .59 |
| 37 | **.47** | .18 | .11 | .54 |
| 22 | **.47** | .26 | -.03 | .53 |
| 30 | **.45** | .20 | .09 | .52 |
| 9 | **.44** | .19 | -.13 | .50 |
| 35 | **.42** | .36 | .05 | .47 |
| 41 | **.41** | .20 | -.01 | .46 |
| 48 | **-.40** | **.40** | .37 | -.43 |
| 45 | **.39** | .31 | .22 | .46 |
| 23 | **.38** | .11 | -.04 | .47 |
| 18 | **.38** | .25 | .07 | .43 |
| 21 | **.33** | .16 | -.01 | .35 |
| 13 | **.32** | -.05 | -.15 | .40 |
| 8 | **.31** | .27 | .11 | .38 |
| 36 | **.29** | .10 | -.18 | .33 |
| 46 | **.28** | .06 | -.06 | .33 |
| 11 | **.22** | .19 | -.04 | .27 |
| 39 | -.09 | **.53** | -.09 | -.11 |
| 20 | -.03 | **.51** | -.25 | -.01 |
| 25 | -.11 | **.49** | -.02 | -.15 |
| 5 | -.12 | **.45** | -.05 | -.15 |
| 42 | .07 | **.44** | .00 | .08 |
| 16 | .29 | **.40** | -.01 | .35 |
| 3 | .16 | **.40** | .08 | .19 |
| 28 | .21 | **.39** | -.08 | .27 |
| 34 | .18 | **.37** | -.09 | .20 |

Table 10 (continued)

| Item No. | Factor Pattern Coefficients | | | General Anxiety |
|---|---|---|---|---|
| | I | II | III | |
| 7 | .18 | **.37** | .11 | .22 |
| 27 | .22 | **.35** | -.07 | .27 |
| 47 | **.34** | **.34** | .00 | .39 |
| 43 | .16 | **.33** | -.19 | .19 |
| 12 | .25 | **.32** | .15 | .30 |
| 31 | .07 | **.30** | -.08 | .09 |
| 2 | .28 | **.30** | .28 | .34 |
| 1 | .13 | **.28** | -.09 | .13 |
| 15 | .14 | **.27** | .08 | .14 |
| 33 | .18 | -.32 | **.72** | .16 |
| 29 | .01 | -.05 | **.69** | .02 |
| 38 | -.15 | .13 | **.66** | -.12 |
| 19 | .19 | -.19 | **.64** | .20 |
| 24 | .04 | -.08 | **.57** | .07 |
| 14 | .00 | -.18 | **.52** | -.00 |
| 44 | -.23 | .18 | **.46** | -.25 |
| 40 | -.26 | .08 | **.32** | -.30 |
| Trace | 6.92 | 4.76 | 3.46 | 7.98 |
| Post-Rotation Variance (%) | 46 | 31 | 23 | 53 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry/Social Anxiety, Factor II = Physiological Anxiety, Factor III = Defensiveness

Table 11

*Factor Structure Coefficients for the Three-Factor Varimax Solution for the RCMAS-2 Scores Among Students with Specific Learning Disabilities (n = 170) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Structure Coefficients | | | General Anxiety |
|---|---|---|---|---|
| | I | II | III | |
| 26 | **.72** | .26 | -.07 | .73 |
| 10 | **.71** | .23 | -.08 | .73 |
| 6 | **.66** | .05 | -.18 | .68 |
| 17 | **.64** | .16 | .00 | .67 |
| 32 | **.59** | .06 | .05 | .64 |
| 4 | **.57** | .14 | -.20 | .61 |
| 22 | **.53** | .39 | -.07 | .57 |
| 35 | **.51** | .47 | .00 | .55 |
| 37 | **.51** | .31 | .07 | .55 |
| 49 | **.49** | .18 | -.09 | .55 |
| 30 | **.49** | .33 | .04 | .54 |
| 45 | **.48** | .40 | .18 | .52 |
| 9 | **.47** | .32 | -.17 | .52 |
| 41 | **.45** | .31 | -.05 | .49 |
| 18 | **.44** | .35 | .04 | .48 |
| 47 | **.43** | **.43** | -.04 | .46 |
| 23 | **.40** | .22 | -.07 | .46 |
| 8 | **.38** | .34 | .07 | .43 |
| 2 | **.37** | .36 | .25 | .40 |
| 21 | **.36** | .26 | -.04 | .39 |
| 36 | **.31** | .19 | -.20 | .34 |
| 46 | **.29** | .15 | -.08 | .32 |
| 13 | **.28** | .05 | -.17 | .35 |
| 11 | **.27** | .25 | -.07 | .30 |
| 20 | .13 | **.48** | -.27 | .14 |
| 39 | .08 | **.48** | -.12 | .06 |
| 16 | .41 | **.47** | -.05 | .44 |
| 28 | .33 | **.44** | -.12 | .36 |
| 42 | .21 | **.43** | -.03 | .21 |
| 25 | .06 | **.43** | -.04 | .02 |
| 3 | .28 | **.42** | .05 | .30 |
| 34 | .29 | **.41** | -.13 | .30 |

Table 11 (continued)

| Item No. | Factor Structure Coefficients | | | General Anxiety |
|---|---|---|---|---|
| | I | II | III | |
| 27 | .32 | **.40** | -.10 | .35 |
| 5 | .04 | **.40** | -.06 | .00 |
| 7 | .29 | **.39** | .08 | .31 |
| 43 | .25 | **.37** | -.22 | .27 |
| 12 | .34 | **.37** | .11 | .37 |
| 1 | .21 | **.31** | -.11 | .21 |
| 31 | .16 | **.31** | -.10 | .17 |
| 15 | .22 | **.30** | .06 | .22 |
| 33 | .08 | -.27 | **.72** | .07 |
| 29 | .00 | -.07 | **.69** | .00 |
| 38 | -.09 | .05 | **.66** | -.09 |
| 19 | .12 | -.15 | **.64** | .14 |
| 24 | .02 | -.09 | **.57** | .04 |
| 14 | -.05 | -.19 | **.53** | -.05 |
| 44 | -.16 | .08 | **.46** | -.18 |
| 48 | -.25 | .24 | **.37** | -.28 |
| 40 | -.21 | -.02 | **.33** | -.25 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry/Social Anxiety, Factor II = Physiological Anxiety, Factor III = Defensiveness

Table 12

*Factor Pattern Coefficients for the Five-Factor Promax Solution for the RCMAS-2 Scores Among Students with Specific Learning Disabilities (n = 170) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Pattern Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 17 | **.89** | -.04 | -.24 | .04 | .15 | .86 |
| 10 | **.77** | -.06 | .02 | -.01 | .14 | .76 |
| 4 | **.69** | -.04 | -.11 | -.11 | .23 | .71 |
| 26 | **.61** | -.03 | .20 | .04 | .15 | .61 |
| 45 | **.58** | .12 | .01 | .06 | -.21 | .68 |
| 6 | **.57** | -.26 | .25 | -.03 | .23 | .55 |
| 28 | **.55** | .19 | -.14 | -.29 | -.18 | .65 |
| 32 | **.50** | -.06 | .08 | .21 | .23 | .53 |
| 47 | **.49** | .18 | .02 | -.12 | -.11 | .57 |
| 30 | **.46** | .19 | .01 | .09 | .05 | .54 |
| 22 | **.44** | .02 | .29 | -.10 | -.08 | .51 |
| 37 | **.44** | .07 | .15 | .08 | -.03 | .52 |
| 18 | **.40** | .26 | -.02 | .08 | .05 | .47 |
| 35 | **.40** | .21 | .20 | .00 | -.05 | .45 |
| 2 | **.30** | .12 | .19 | .17 | -.21 | .36 |
| 8 | **.27** | .07 | **.27** | .03 | -.13 | .35 |
| 13 | **.22** | -.05 | .10 | -.07 | .15 | .27 |
| 39 | .09 | **.64** | -.27 | -.13 | .02 | .14 |
| 20 | -.17 | **.59** | .11 | -.15 | .15 | -.14 |
| 25 | -.02 | **.52** | -.09 | -.06 | -.03 | -.02 |
| 42 | .07 | **.50** | -.03 | .02 | .04 | .10 |
| 7 | .13 | **.42** | .02 | .14 | .03 | .17 |
| 34 | .02 | **.41** | .16 | .00 | .13 | .01 |
| 5 | -.01 | **.39** | -.02 | -.11 | -.09 | .00 |
| 16 | .30 | **.39** | .02 | -.01 | .05 | .37 |
| 21 | .12 | **.35** | .06 | .16 | .26 | .10 |
| 31 | -.01 | **.27** | .14 | -.06 | .03 | -.02 |
| 12 | .11 | **.26** | .23 | .16 | -.03 | .13 |
| 3 | .18 | **.24** | .17 | .00 | -.14 | .22 |
| 23 | -.01 | -.19 | **.75** | -.01 | -.06 | .03 |
| 41 | .12 | -.08 | **.63** | -.01 | -.07 | .14 |
| 43 | -.10 | .14 | **.50** | -.17 | -.01 | -.11 |

Table 12 (continued)

| Item No. | Factor Pattern Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 11 | -.17 | .16 | **.49** | .09 | .11 | -.24 |
| 49 | .19 | -.09 | **.48** | .05 | .11 | .21 |
| 36 | .13 | -.18 | **.46** | -.21 | -.06 | .15 |
| 9 | .16 | .11 | **.40** | -.03 | .14 | .17 |
| 15 | .00 | .17 | **.28** | .07 | -.08 | -.05 |
| 27 | .17 | .17 | **.26** | -.12 | -.08 | .22 |
| 1 | .11 | .08 | **.24** | -.16 | -.11 | .13 |
| 33 | .01 | -.14 | .01 | **.78** | -.06 | -.01 |
| 19 | .03 | -.04 | .02 | **.69** | -.06 | .04 |
| 14 | -.18 | .09 | -.06 | **.65** | .05 | -.21 |
| 29 | .17 | -.09 | -.12 | **.51** | -.34 | .19 |
| 24 | .08 | -.06 | -.06 | **.48** | -.21 | .11 |
| 48 | -.31 | .15 | .21 | .13 | **-.52** | -.29 |
| 44 | .06 | .00 | -.11 | .19 | **-.47** | .11 |
| 38 | .00 | .00 | .00 | .43 | **-.45** | .04 |
| 40 | -.10 | -.10 | .03 | .12 | **-.38** | -.10 |
| 46 | .09 | .33 | -.05 | .15 | **.35** | .06 |
| Trace | 5.61 | 3.64 | 3.40 | 3.04 | 1.85 | 6.68 |
| Post-Rotation Variance (%) | 32 | 21 | 19 | 17 | 11 | 38 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Social Anxiety, Factor IV = Defensiveness 1, Factor V = Defensiveness 2

Table 13

*Factor Structure Coefficients for the Five-Factor Varimax Solution for the RCMAS-2 Scores Among Students with Specific Learning Disabilities (n = 170) and the First Principal (General Anxiety) Coefficients*

| Item No. | Factor Structure Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 17 | **.72** | .15 | .04 | .03 | .16 | .74 |
| 10 | **.69** | .17 | .23 | -.04 | .18 | .72 |
| 26 | **.61** | .20 | .35 | -.01 | .20 | .64 |
| 4 | **.58** | .12 | .10 | -.14 | .24 | .63 |
| 45 | **.57** | .29 | .19 | .08 | -.18 | .65 |
| 6 | **.53** | -.02 | .33 | -.08 | .28 | .55 |
| 28 | **.51** | .32 | .07 | -.27 | -.16 | .59 |
| 22 | **.50** | .23 | .38 | -.11 | -.02 | .56 |
| 47 | **.50** | .32 | .20 | -.12 | -.07 | .57 |
| 35 | **.48** | .37 | .34 | -.02 | .00 | .53 |
| 30 | **.47** | .31 | .19 | .06 | .08 | .54 |
| 37 | **.47** | .23 | .27 | .06 | .02 | .54 |
| 32 | **.47** | .09 | .21 | .16 | .25 | .51 |
| 18 | **.43** | .34 | .16 | .05 | .08 | .49 |
| 2 | **.37** | .25 | .27 | .18 | -.16 | .42 |
| 8 | **.36** | .22 | .32 | .02 | -.08 | .41 |
| 13 | **.22** | .04 | .14 | -.10 | .17 | .26 |
| 39 | .16 | **.55** | -.05 | -.14 | .02 | .19 |
| 20 | .03 | **.53** | .20 | -.21 | .19 | .04 |
| 42 | .19 | **.47** | .12 | -.01 | .06 | .21 |
| 25 | .09 | **.46** | .04 | -.07 | -.02 | .09 |
| 16 | .39 | **.45** | .20 | -.04 | .08 | .44 |
| 7 | .24 | **.43** | .16 | .11 | .06 | .27 |
| 34 | .18 | **.43** | .26 | -.05 | .17 | .17 |
| 5 | .08 | **.36** | .07 | -.12 | -.07 | .09 |
| 21 | .22 | **.36** | .18 | .10 | .28 | .21 |
| 12 | .25 | **.33** | .30 | .13 | .01 | .27 |
| 3 | .28 | **.33** | .26 | -.01 | -.09 | .32 |
| 31 | .11 | **.29** | .19 | -.08 | .06 | .10 |
| 23 | .20 | .03 | **.62** | -.04 | .03 | .21 |
| 41 | .30 | .13 | **.57** | -.04 | .01 | .31 |
| 49 | .31 | .09 | **.46** | .00 | .17 | .33 |

Table 13 (continued)

| Item No. | Factor Structure Coefficients | | | | | General Anxiety |
|---|---|---|---|---|---|---|
| | I | II | III | IV | V | |
| 43 | .11 | .25 | **.46** | -.21 | .06 | .10 |
| 11 | .05 | .22 | **.43** | .03 | .17 | .00 |
| 9 | .30 | .25 | **.43** | -.09 | .20 | .32 |
| 36 | .23 | .01 | **.40** | -.23 | .00 | .24 |
| 27 | .29 | .28 | **.32** | -.14 | -.02 | .32 |
| 15 | .14 | .23 | **.29** | .06 | -.03 | .11 |
| 1 | .20 | .18 | **.26** | -.17 | -.06 | .22 |
| 33 | -.02 | -.16 | -.04 | **.79** | -.08 | -.03 |
| 19 | .04 | -.05 | .01 | **.70** | -.07 | .03 |
| 14 | -.16 | -.02 | -.09 | **.65** | .02 | -.18 |
| 29 | .10 | -.08 | -.10 | **.57** | -.36 | .11 |
| 24 | .05 | -.06 | -.06 | **.52** | -.22 | .06 |
| 38 | .01 | -.01 | -.03 | **.50** | -.45 | .03 |
| 48 | -.17 | .12 | .11 | .19 | **-.49** | -.18 |
| 44 | .03 | -.01 | -.10 | .27 | **-.48** | .06 |
| 40 | -.10 | -.11 | -.05 | .18 | **-.38** | -.11 |
| 46 | .15 | .30 | .07 | .09 | **.35** | .13 |

*Note:* Highest factor loading coefficient is in boldface. Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Social Anxiety, Factor IV = Defensiveness 1, Factor V = Defensiveness 2

Table 14

*Coefficients of Congruence ($r_c$) and Salient Variable Similarity Index (s) Values for the Five-Factor Promax and Varimax Solutions for the Specific Learning Disability Subsample (n = 170) and Full Reference Subsample (n = 3,086)*

| | Factors | | | | |
|---|---|---|---|---|---|
| | I | II | III | IV | V |
| Promax Solution | | | | | |
| $r_c$ | .86 | .82 | .86 | -.10 | .62 |
| *s* | .69** | .64** | .92** | -.27 | .25 |
| Varimax Solution | | | | | |
| $r_c$ | .94 | .92 | .81 | -.01 | .79 |
| *s* | .89** | .77** | .86** | -.12 | .32* |

*Note:* Factor I = Worry, Factor II = Physiological Anxiety, Factor III = Defensiveness 1, Factor IV = Defensiveness 2, Factor V = Social Anxiety
*p < .05,** p < .01.

Table 15

*Correlation Coefficients Between the Revised Children's Manifest Anxiety Scale, 2nd Edition (RCMAS-2) Scores and the Scores of the State/Trait Anxiety Inventory for Children (STAI-C), State/Trait Anxiety Inventory, Form Y (STAI-Y), Behavior Assessment System for Children, 2nd Edition, Self Report of Personality, Child Form (BASC-2-SRP-C) , and Behavior Assessment System for Children, 2nd Edition, Self Report of Personality, Adolescent Form (BASC-2-SRP-A) Among Students with Specific Learning Disabilities*

| | RCMAS-2 | | | |
|---|---|---|---|---|
| Instrument/Scale | Total Anxiety | Worry/Social Anxiety | Physiological Anxiety | Defensiveness |
| BASC-2-SRP-A Internalizing Problems (*n* = 73) | .79 | .69 | .82 | -.33 |
| BASC-2-SRP-A Anxiety (*n* = 73) | .78 | .70 | .79 | -.18 |
| BASC-2-SRP-A Emotional Symptoms Index (*n* = 73) | .76 | .68 | .77 | -.31 |
| STAI-C Trait Anxiety (*n* = 137) | .74 | .73 | .64 | -.07 |
| BASC-2-SRP-C Anxiety (*n* = 99) | .72 | .68 | .66 | -.23 |
| BASC-2-SRP-C Internalizing Problems (*n* = 98) | .72 | .67 | .66 | -.26 |
| BASC-2-SRP-C Emotional Symptoms Index (*n* = 98) | .69 | .64 | .63 | -.30 |
| BASC-2-SRP-A Sense of Inadequacy (*n* = 73) | .66 | .63 | .62 | -.26 |
| BASC-2-SRP-C Sense of Inadequacy (*n* = 99) | .60 | .58 | .53 | -.20 |
| BASC-2-SRP-C Depression (*n* = 98) | .59 | .54 | .56 | -.18 |
| STAI-Y Trait Anxiety (*n* = 21) | .57 | .39 | .69 | -.72 |
| BASC-2-SRP-A Depression (*n* = 73) | .55 | .44 | .62 | -.23 |
| STAI-C State Anxiety (*n* = 137) | .47 | .46 | .41 | -.21 |
| STAI-Y State Anxiety (*n* = 21) | .27 | .19 | .33 | -.44 |

Table 15 (continued)

| Instrument/Scale | RCMAS-2 | | | |
|---|---|---|---|---|
| | Total Anxiety | Worry/Social Anxiety | Physiological Anxiety | Defensiveness |
| BASC-2-SRP-C Self-Reliance (*n* = 99) | -.29 | -.25 | -.28 | .35 |
| BASC-2-SRP-A Self-Reliance (*n* = 73) | -.30 | -.24 | -.34 | .18 |
| BASC-2-SRP-C Self-Esteem (*n* = 99) | -.48 | -.44 | -.45 | .27 |
| BASC-2-SRP-A Self-Esteem (*n* = 73) | -.58 | -.54 | -.56 | .27 |

*Note:* Correlation coefficients ranging from .00 – .19 = very weak, .20 – .39 = weak, .40 – .69 = moderate, .70 – . 89 = strong, and .90 – 1.00 = very strong.

Table 16

*Factor Pattern Coefficients for Selected Scales and Subscales of the Revised Children's Manifest Anxiety Scale, 2nd Edition (RCMAS-2), State/Trait Anxiety Inventory for Children (STAI-C), and Behavior Assessment System for Children, 2nd Edition, Self Report of Personality, Child Form (BASC-2-SRP-C) Among Students with Specific Learning Disabilities (n = 90)*

| | Factor Pattern Coefficients |
|---|---|
| Subscale | I |
| STAI-C Trait Anxiety | .83 |
| RCMAS-2 Worry/Social Anxiety | .80 |
| BASC-2-SRP-C Sense of Inadequacy | .77 |
| BASC-2-SRP-C Depression | .76 |
| RCMAS-2 Physiological Anxiety | .71 |
| STAI-C State Anxiety | .61 |
| BASC-2-SRP-C Self-Reliance | -.36 |
| Trace | 3.51 |
| Post-Rotation Variance | 1.00 |

*Note:* Highest factor loading coefficient is in boldface.

Table 17

*Coefficient Alphas (α) and the 95% Confidence Intervals (CI) for the RCMAS-2 Scores Among Students with Specific Learning Disabilities*

| Factor | α | 95% CI | CI Width |
|---|---|---|---|
| Worry/Social Anxiety (*n* = 173) | .89 | .87 - .91 | .05 |
| Physiological Anxiety (*n* = 174) | .84 | .80 - .87 | .07 |
| Defensiveness (*n* = 177) | .80 | .75 - .84 | .09 |
| Total Anxiety (*n* = 170) | .92 | .91 - .94 | .03 |

Note: Coefficient alphas that meet or exceed .70 are considered indicators of adequate reliability.

Table 18

*Means (M), Standard Deviations (SD), Paired Samples t-Tests (t), Effect Sizes (d), Test Score Stability Coefficients (r), and Intraclass Correlation Coefficients (ICC) for the RCMAS-2 Scores Among Students with Specific Learning Disabilities*

| | *Time 1* | *Time 2* | | | | |
|---|---|---|---|---|---|---|
| Factor Scale | *M (SD)* | *M (SD)* | *T* | *d* | *r* | ICC |
| Worry/Social Anxiety | 10.74 (6.03) | 9.28 (6.57) | 4.37** | 0.35 | .79 | .89 |
| Physiological Anxiety | 6.93 (4.44) | 6.43 (4.83) | 1.92 | 0.15 | .76 | .84 |
| Defensiveness | 4.23 (2.44) | 4.06 (2.36) | 1.14 | 0.09 | .71 | .80 |
| Total Anxiety | 17.66 (9.79) | 15.70 (10.75) | 3.75** | 0.30 | .80 | .92 |

*Note:* Coefficient coefficients that meet or exceed .70 are considered indicators of adequate test score stability. Cohen's *d* effect sizes of 0.20 are considered *small*, effect sizes of 0.50 are considered *medium*, and effect sizes ranging from 0.80 or higher are considered *large*.
* $p < .05$, ** $p < .01$.

# APPENDIX M

Figures

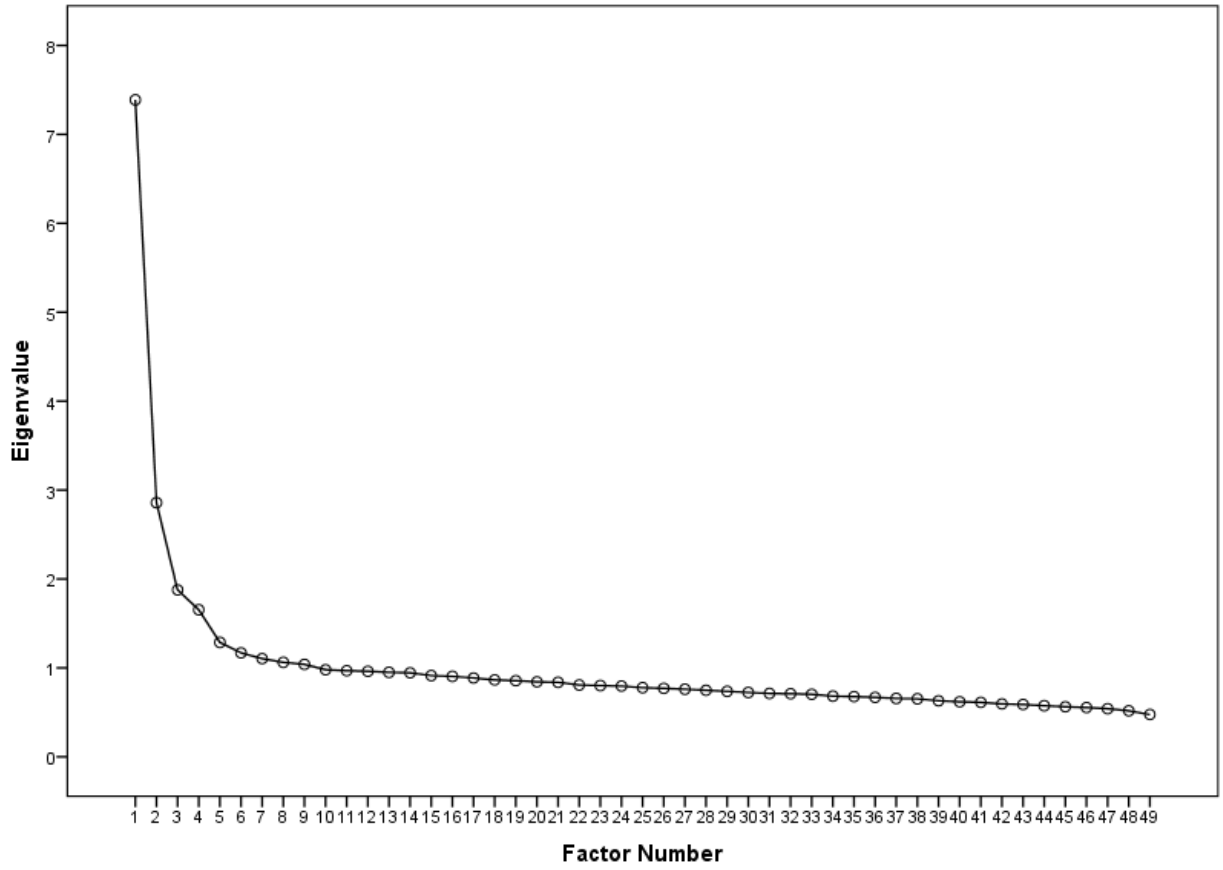


*Figure 1.* Scree plot for the combined sample.

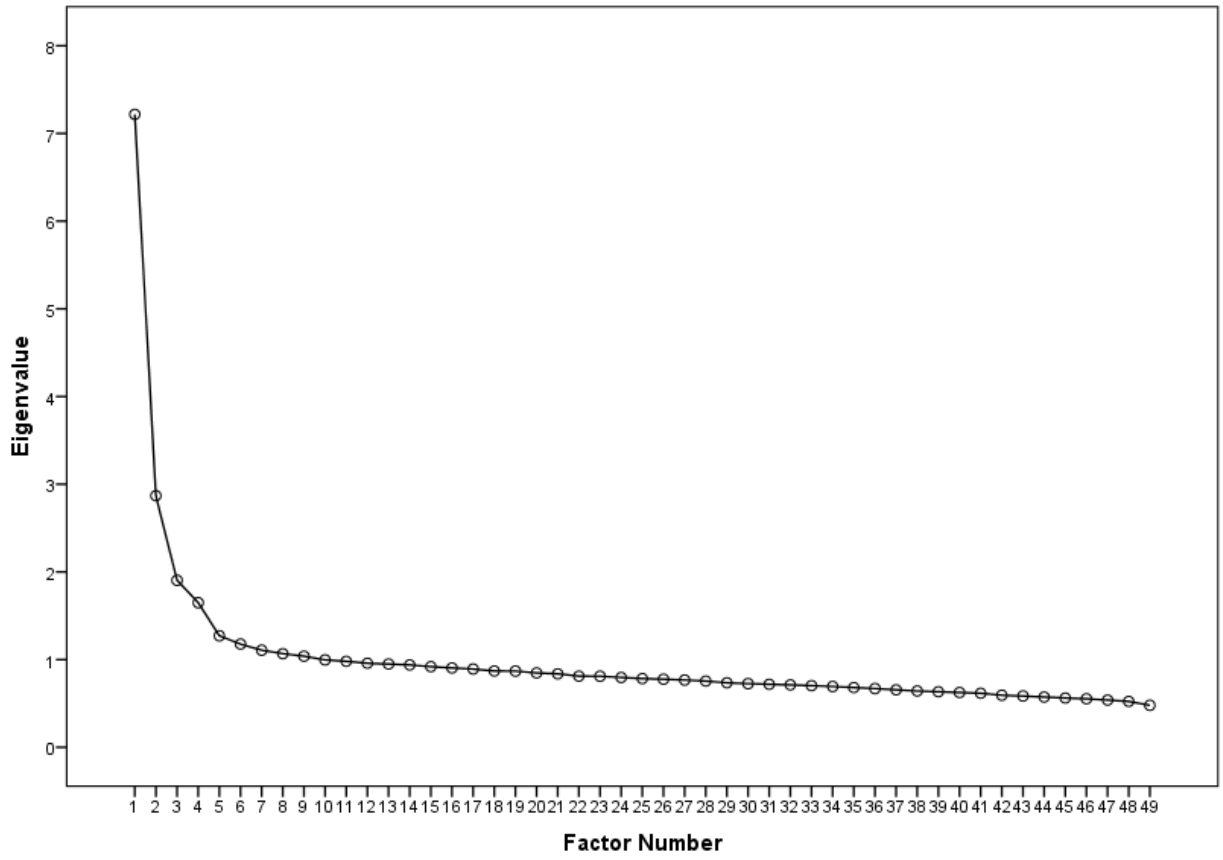


*Figure 2.* Scree plot for the full reference subsample.

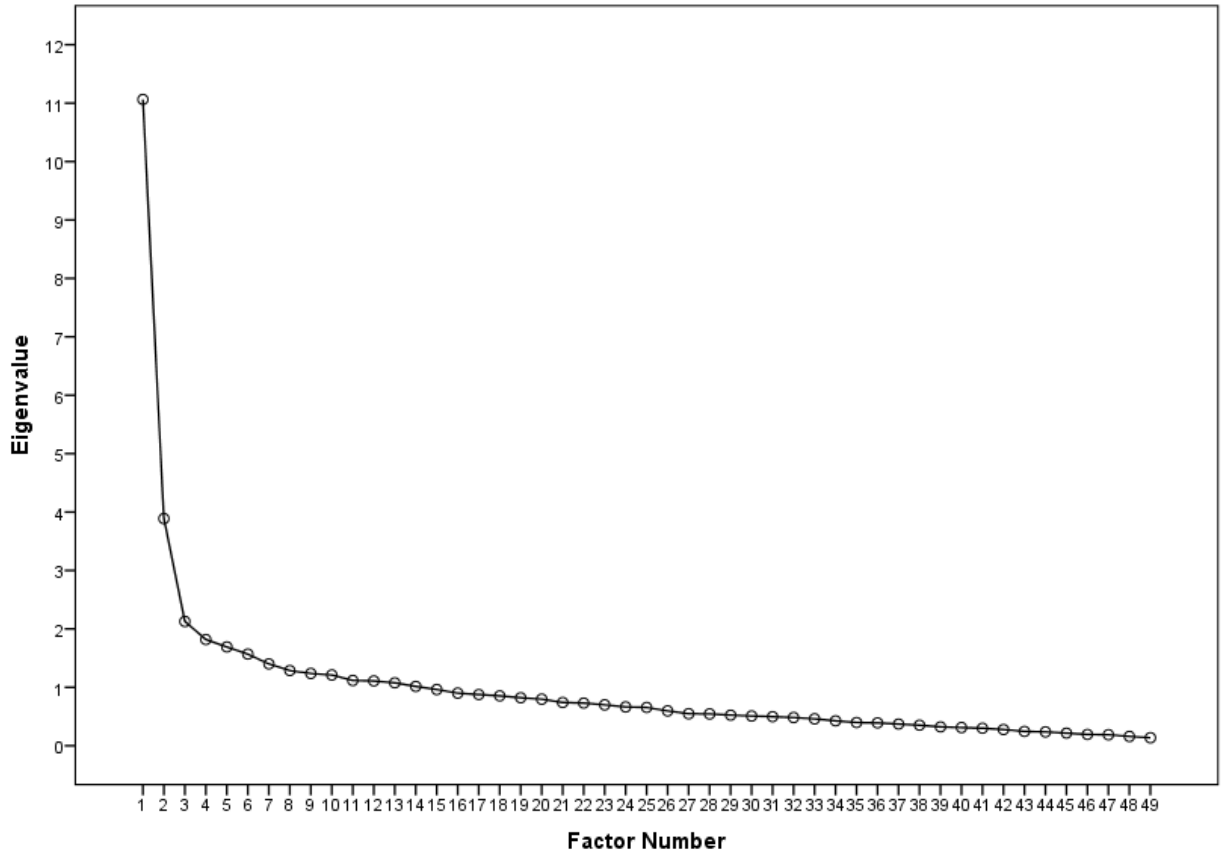


*Figure 3.* Scree plot for the specific learning disability subsample.