Learning of Anxiety Sensitivity and Anxiety Symptoms in Youth

by

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ABSTRACT

Anxiety sensitivity (AS; the fear of anxiety-related bodily sensations) has been earmarked as a significant risk factor in the development and maintenance of pathological anxiety in adults and children. Given the potential implications of heightened AS, recent research has focused on investigating the etiology and developmental course of elevated AS; however, most of this work has been conducted with adults and is retrospective in nature. Data from college students show that early anxiety-related learning experiences may be a primary source of heightened AS levels, but it remains unclear whether AS in children is linked to their learning experiences (i.e., parental reinforcement, modeling, punishment, and/or transmission of information about anxiety-related behaviors). Based on AS theory and its iterations, an emerging theoretical model was developed to aid further exploration of the putative causes and consequences of heightened AS levels. Using a sample of 70 clinic-referred youth (ages 6 to 16 years old; 51.4% Hispanic/Latino), the present study sought to further explicate the role of learning in the development of AS and anxiety symptoms. Results suggest that childhood learning experiences may be an important precursor to heightened AS levels and, subsequently, increased experiences of anxiety symptoms. Findings also indicate that some youth may be more vulnerable to anxiety-related learning experiences and suggest that culture may play a role in the relations among learning, AS, and anxiety symptoms.

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INTRODUCTION

Anxiety disorders are among the most common psychiatric problems in children and adolescents with lifetime prevalence rates reaching nearly 10% (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003) and a median age of onset of about 11 years old, much younger than that of most other psychiatric disorders (Kessler et al., 2005). In addition, this psychiatric condition is debilitating and chronic (Keller et al., 1992). For instance, pathological anxiety is linked to functional impairment in terms of school performance and peer relationships (e.g., Mychailyszyn, Mendez & Kendell, 2010; Strauss & Last, 1990). High anxiety levels in childhood also have been shown to lead to the early initiation of the use of alcohol, tobacco, and other illicit drugs (e.g., Hayatbakhsh et al., 2007; Kaplow, Curran, Angold, & Costello, 2001; Marmoronstein, White, Loeber, & Stouthamer-Loeber, 2010). Moreover, the negative effects of childhood anxiety often persist leading to poor adjustment in adulthood such as the development of depression (Pine et al., 1998).

Conceptually, pathological anxiety is thought to be a tripartite construct that includes negative cognitions, somatic/physiological hyperarousal, and behavioral avoidance (Barlow, 2002; Barlow, Allen, & Choate, 2004; Lang, 1968). A plethora of empirical studies provide support for this tripartite model and there are some data delineating mechanisms that underlie the development of pathological anxiety. For instance, both expectancy theory and anxiety sensitivity theory are used to guide research which investigates the mechanisms of anxiety disorder development. Expectancy theory proposes that feelings of fear, worry,

and panic arise from a person's expectations of and sensitivities to a feared object or situation (Reiss, 1991). In terms of sensitivities, anxiety sensitivity has been earmarked as a significant risk factor for the development of pathological anxiety in adults (e.g., Olatunji & Wolitzky-Taylor, 2009; Schmidt, Zvolensky, & Maner, 2006) and also children (e.g., Hayward et al., 1997; Rabian, Peterson, Richters, & Jensen, 1993; Weems, Costa, Watts, Taylor, & Cannon, 2007). Building on expectancy theory and anxiety sensitivity theory, the present thesis proposes an emerging explanatory model for the development of anxiety sensitivity in youth that involves the child's learning experiences. Below, the thesis begins with a brief overview of expectancy theory and anxiety sensitivity. Subsequently, the thesis presents a brief overview of the empirical research literature on anxiety sensitivity and learning in adults followed by a review of the anxiety sensitivity and learning research literature in youth. Then, the thesis describes an emerging theoretical model on the learning of anxiety sensitivity in youth, an overview of the proposed thesis study, a presentation of results, and concludes with a discussion of the findings and the potential implications.

Expectancy Theory and Anxiety Sensitivity

According to Reiss' (1991) expectancy theory, an individual's experience of anxiety is a function of their expectations of and sensitivities to a feared object or situation. Expectations refer to an individual's tendency to anticipate negative outcomes when faced with a feared object or situation (e.g., "I expect my classmates will laugh at me"). Sensitivities refer to the reasons an individual has for fearing the object or situation (e.g., "I would be so embarrassed if my

classmates laughed at me"). Reiss's theory classifies these expectancies and sensitivities into three fundamental fears: fear of injury/illness, fear of negative evaluation, and fear of anxiety (also known as anxiety sensitivity) (see Figure 1). These fundamental fears are distinct from common fears because they are inherently aversive to most people and provide a rational motive for the development of common fears (Reiss, 1991; Taylor, 1995). To illustrate, an individual might be afraid to fly on an airplane (common fear) because they expect the plane will crash and they will die (fundamental fear). However, a person's fear of dying (fundamental fear) cannot be logically reduced to a fear of flying (common fear). Expectancy theory posits that individuals who have fundamental fears will develop a fear of any situation in which they expect that they may be injured, negatively appraised by others, or become anxious (Reiss, 1991). Individual variability in these fundamental fears is proposed to be associated with the number of objects/situations feared and the degree of anxiety experienced. In this regard, as fearfulness of illness/injury, negative evaluation, and anxiety sensations increase so does the number of common fears and intensity of anxiety symptoms (Reiss, 1991). In research studies, these fundamental fears have been shown to be factorially distinct and uniquely related to fear categories in adults (i.e., blood-injury fears, animal fears, social fears, agoraphobia; Taylor, 1993) and data supports aspects of expectancy theory as described. As depicted in Figure 1 (below), expectancy theory proposes that all three fundamental fears serve to motivate individuals to respond in fearful ways to objects or events that are anxiety/fear provoking.

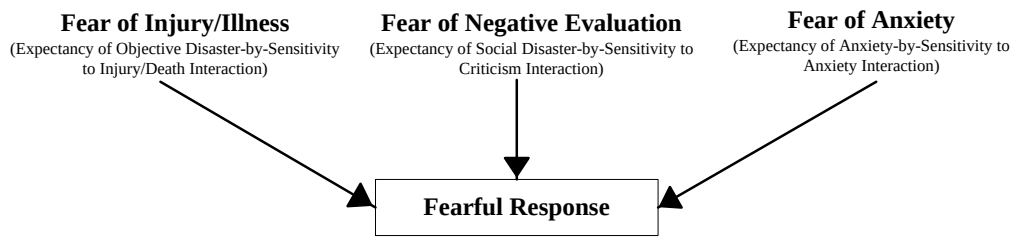

Figure 1. Reiss's Expectancy Model (based on Reiss's equation for the expectancy model for fear; Reiss, 1991)

Research examining the above described theoretical relation between fundamental fears and anxious responding has been relatively scarce and somewhat inconsistent. For example, using a sample of college students with a self-reported fear of enclosed spaces, Valentiner, Telch, Ilai, and Hehmsoth (1993) found that danger expectancy, anxiety expectancy, and the interaction between anxiety expectancy and anxiety sensitivity significantly predicted avoidance behaviors but not physiological reactivity or self-reported fearfulness. Additional studies have shown interactions between expectancies and sensitivities to be in the opposite direction to that suggested by Reiss's theory (i.e., expectancy and sensitivity were found to be negatively correlated; Schoenberger, Kirsh, & Rosengard, 1991; Telch & Harrington, 1994).

Alternatively, studies specifically examining the fundamental fear of anxiety sensitivity have consistently shown a positive association with anxious symptoms. A recent meta-analysis (Naragon-Gainey, 2010) of studies published between 1985, when anxiety sensitivity was first introduced, and March 2009 revealed that mean anxiety sensitivity levels for individuals with anxiety disorders were significantly higher than the anxiety sensitivity levels for individuals in a

normative community sample. Additional analyses showed panic, generalized anxiety disorder, and posttraumatic stress disorder to be the most strongly associated with anxiety sensitivity (Naragon-Gainey, 2010). Similarly, high anxiety sensitivity has been linked to anxiety disorder symptoms in clinical (e.g., Rabian et al., 1993) and nonclinical (e.g., McLaughlin, Stewart and Taylor, 2007) samples of youth. In addition to its relation to disorders, anxiety sensitivity has been shown to be connected to specific anxiety symptoms in both children (e.g., cognitive symptoms: Marin, Rey, Nichols-Lopez, & Silverman, 2008; somatic symptoms: Muris & Meesters, 2004, avoidance; Wilson & Hayward, 2006) and adults (e.g., cognitive symptoms: Teachman, 2005; somatic symptoms: Drahovzal, Stewart, & Sullivan, 2006; Keogh, Barlow, Mounce, & Bond, 2006; avoidance: Hayward & Wilson, 2007; Gregor & Zvolensky, 2008).

Given the link between anxiety sensitivity and anxiety, a cyclical relation between anxiety sensitivity and the experience of anxiety symptoms has been proposed. In this cycle, a fear of experiencing bodily sensations (anxiety sensitivity) produces anxiety, which increases the occurrence and severity of these sensations, which, in turn, intensifies the anxiety symptoms experienced (Pollack et al., 2002). This interaction between anxiety sensitivity and anxiety symptoms and disorders suggests that a deeper understanding of anxiety sensitivity may serve to elucidate the developmental processes underlying anxiety.

Despite the potential implications of anxiety sensitivity for the development and maintenance of anxiety, little is known about the origins of heightened anxiety sensitivity levels. Elevated anxiety sensitivity may be rooted

in information processing biases, genetics, or biology but these causes are inconsistently supported by research (McNally, 1999; Stein & Rapee, 1999). There is a growing body of evidence, however, that points to early learning experiences as a primary source of elevated anxiety sensitivity. Below, this evidence is reviewed in detail.

Anxiety Sensitivity and Learning in Adults

As described earlier, anxiety sensitivity has been conceptualized as a fear of anxiety-related bodily sensations (Reiss & McNally, 1985). More specifically, anxiety sensitivity can be defined as negative interpretations of physiological reactions that are experienced in anxiety-inducing situations. This broad "fear of fear" is believed to be a multifaceted construct consisting of (1) physical concerns, (2) mental incapacitation concerns, and (3) social concerns (Lilienfeld, Turner, & Jacob, 1993; Taylor, Rabian & Federoff, 1999; Zinbarg, Mohlman, & Hong, 1999). As such, high levels of anxiety sensitivity signify a fear that experiencing anxiety will cause severe and negative consequences that are physical, psychological, and/or social in nature. While there is a paucity of research on the roots of heightened anxiety sensitivity, learning history has been indicated as possible precursor. Learning history has been conceptualized as reflecting the degree to which sick-role behaviors are learned via reinforcement, modeling, punishment, and/or transmission of information (Whitehead, Busch, Heller, & Costa, 1986). Because elevated anxiety sensitivity levels are thought to leave individuals vulnerable to the development of anxiety, a closer examination

of the developmental processes that may lead to heightened anxiety sensitivity is warranted.

The genesis of the learning history literature can be traced back to research by Whitehead, Busch, Heller, and Costa (1986). This study was the first to investigate the contribution of learning histories to the adulthood experience of illness by examining the encouragement and modeling of menstrual sick-role behaviors in nursing students. In order to study the learning processes related to these sick-role behaviors, Whitehead and colleagues created the Menstrual History Questionnaire (MHQ; Whitehead et al., 1986). These self-reports of encouragement and modeling of sick-role behaviors in childhood were found to be significantly correlated with frequency and severity of symptoms in adulthood. Interestingly, results of this study provided evidence for specificity in the relation of childhood learning experiences to adulthood symptoms: Learning experiences related to menstrual cycle symptoms were correlated more highly with later gynecological symptoms while learning experiences related to cold sick-role behaviors were more highly correlated to later nongynecological illness symptoms. These findings provided initial support for the idea that childhood learning experiences play a role in the somatic complaints and illness behaviors exhibited in adulthood.

Following this original research, a series of studies were conducted to explore the potential contribution of early learning experiences surrounding sick-role behaviors to the adult experience of anxiety. The first study to examine such a relationship was conducted by Ehlers (1993). Based on learning theory

research, Ehlers hypothesized that individuals diagnosed with panic disorder would have more learning experiences in which panic symptoms and sick-role behaviors were encouraged than would a healthy control group. Individuals with other anxiety disorders also were recruited for the study to consider whether the influences of learning experiences were specific to panic or anxiety more generally. The sample consisted of 301 individuals, ages 18 to 78 years old. One hundred and twenty one of the participants had a diagnosis of panic disorder; 86 had infrequent panic attacks; 38 had a non-panic anxiety disorder (i.e. simple phobia, social anxiety disorder, generalized anxiety disorder); and 61 had no diagnosis (based on DSM-III-R criteria).

For this study, Ehlers (1993) developed a modified version of the MHQ (Whitehead et al., 1986) to target somatic symptoms relevant to panic disorder (i.e., racing heartbeat, dizziness, shortness of breath, and strong nausea). The revised measure, titled the Learning History Questionnaire (LHQ; Ehlers, 1993), included 15 items designed to assess the frequency with which family members encouraged sick-role behaviors in relation to the experience of panic symptoms (6 items), encouraged sick-role behaviors in relation to cold symptoms (4 items), and modeled sick-role behaviors when suffering from panic symptoms (5 items). Modeling of sick-role behavior for cold symptoms was assessed using an open-ended question asking whether a family member had had a chronic illness before the respondent was 15 years old. Participants were similarly asked about the frequency of uncontrolled behavior of household members in this same time period. In addition to the LHQ, participants completed the Bodily Sensations

Questionnaire (BSQ) and the Agoraphobia Cognitions Questionnaire (ACQ) to assess 'fear of fear' (Chambless, Caputo, Bright, & Gallagher, 1984) and the Mobility Inventory (MI; Chambless, Caputo, Jasin, Gracely, & Williams, 1985) to assess avoidance.

Analysis of data showed significant group differences across diagnoses on all of the LHQ scales except the encouragement of sick-role/colds scale. Further analysis of significant group differences revealed that all anxiety groups scored higher than the non-diagnosed group on the encouragement of sick-role/panic symptoms scale. Moreover, participants diagnosed with panic disorder and those with occasional panic attacks reported more parental modeling of sick-role behaviors when experiencing panic symptoms and a higher number of household members with chronic illness than the control group. Participants with other anxiety disorders were similar to the control group on these scales suggesting a specific link between panic and the observation of sick-role behaviors. As the first to examine learning history and anxiety, Ehlers' study provided foundational evidence for the influence of early learning experiences on the development of anxiety symptoms and disorders.

Watt, Stewart, and Cox (1998) built upon the exploratory study of Ehlers (1993) and examined the association between learning history experiences and the development of anxiety sensitivity. Watt and colleagues hypothesized that individuals with high levels of anxiety sensitivity would report a higher incidence of parental encouragement and modeling of sick-role behavior associated with anxiety symptoms, but not cold symptoms. In this study, 551 undergraduate

students (*M* age = 20.9 years old) from two universities were divided into three subgroups (high anxiety sensitivity, moderate anxiety sensitivity, and low anxiety sensitivity) based on scores on the Anxiety Sensitivity Index (ASI; Peterson and Reiss, 1992). Briefly, this 16-item measure asked respondents to indicate the degree to which they believed that anxiety symptoms are precursors to aversive consequences. Individuals in the high anxiety sensitivity group (n = 88) were selected because they scored at least one standard deviation above the sample mean on the ASI (M = 33.1, SD = 6.4). The low anxiety sensitivity group (n = 88) consisted of individuals who scored at least one standard deviation below the sample mean on the ASI (M = 6.3, SD = 2.3) and the moderate anxiety sensitivity group (n = 112) consisted of a participants who scored within .25 standard deviations from the sample mean (M = 17.9, SD = 1.4).

Participants completed an expanded version of the LHQ (Ehlers, 1993) consisting of 66 questions designed to assess learning experiences prior to the age of eighteen years old. On the sick-role experiences/anxiety symptoms scale, respondents answered questions concerning the frequency with which anxiety-related bodily symptoms were reinforced and punished as well as questions related to verbal transmission that anxiety symptoms are dangerous. Similar questions regarding the observation of consequences of parental anxiety symptoms were answered to assess the observation of parental sick-role/anxiety symptoms. Like the past version, this expanded LHQ also included items assessing the participants' experiences in relation to cold symptoms, frequency of parental uncontrolled behavior, and the number of chronically ill family members.

A parallel measure was completed independently by the participant's parents (n = 90). Internal consistencies were calculated for each of the multi-item LHQ scales using the total student sample (N = 545). Alpha levels ranged from .90 to .92, indicating internal consistency. In addition to the ASI and LHQ, participants completed the Panic Attack Questionnaire- Revised (PAQ-R; Cox, Norton, & Swinson, 1992) to assess any history of panic attacks.

Results indicated that LHQ scores varied significantly across groups. When compared to the low anxiety sensitivity participants, high anxiety sensitivity participants reported significantly more learning experiences of parental encouragement of sick-role behaviors related to both cold and anxiety symptoms and more observation of parental sick-role behavior related to anxiety. Similarly, when compared to the moderate anxiety sensitivity group, the high anxiety sensitivity participants reported significantly more parental encouragement of sick-role behaviors related to both cold and anxiety symptoms and more frequent observation of parental sick-role behavior related to anxiety (trend level). This analysis of learning experiences and panic symptoms supported the previously found specificity of the association such that those with a history of panic scored higher on scales assessing learning experiences related to anxiety, but not cold symptoms. Multiple regression analyses showed that scores on four of the LHQ scales (not the chronically ill household members item) significantly predicted student ASI scores. These findings suggest that there may be differential learning pathways that lead to the development of panic disorders and heightened anxiety sensitivity. Whereas individuals who experience panic

attacks have learning histories related to anxiety symptoms specifically, development and maintenance of anxiety sensitivity might be the result of learning related to bodily sensations more generally (i.e., anxiety and cold related).

Watt and Stewart (2000) set out to replicate and extend their findings concerning childhood learning experiences and the development and maintenance of anxiety sensitivity (Watt et al., 1998). This second study examined three hypotheses: First, it was hypothesized that elevated anxiety sensitivity levels would be associated with more learning experiences related to both arousal reactive (anxiety-related) and arousal non-reactive somatic symptoms than low anxiety sensitivity levels; second, it was hypothesized that those with higher reports of hypochondriacal concerns would report more learning experiences related to arousal non-reactive, but not arousal reactive symptoms compared to individuals with low reports of hypochondriacal concerns; third, it was hypothesized that anxiety sensitivity would serve as a partial mediator in the association of childhood learning experiences and hypochondriacal concerns in young adulthood.

In order to examine these hypotheses, 197 undergraduate students (*M age* = 21.9 years old) completed the Learning History Questionnaire-Revised (LHQ-R; Watt & Stewart, 2000), which was expanded from previous versions (Watt et al., 1998). The LHQ-R was designed to assess learning experiences not only for anxiety-related (arousal reactive) symptoms but also for a wide variety of arousal non-reactive symptoms such as pains, lumps, stomach problems, and tiredness.

Responses to the 42-item LHQ-R yielded four subscale scores indicating experiences of encouragement in regards to arousal reactive symptoms, experiences of encouragement in regards to arousal non-reactive symptoms, observations of parental arousal reactive symptoms, and observations of parental arousal non-reactive symptoms. Eighty-two participants' parents completed a modified version of the LHQ-R in order to test validity of the measure. Evidence for internal consistency (α = .91 to .96) and validity ($r = 0.34$, $p < 0.01$ for Observation/Arousal Non-Reactive; $r = 0.31$, $p < 0.01$ for Experience/ Arousal Non-Reactive; $r = 0.23$, $p < 0.05$ for Observation/Arousal Reactive; and $r = 0.21$, $p < 0.05$ for Experience/Arousal Reactive, respectively) was found for all the LHQ-R scales. In addition to the LHQ-R, participants completed the 16-item Anxiety Sensitivity Index (ASI; Peterson and Reiss, 1992) to measure the degree to which they believed anxiety symptoms to be precursors of harmful outcomes. Participants also completed the 20-item State-Trait Anxiety Inventory-Trait Scale (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) to assess general feelings of anxiety and the 29-item Illness Attitudes Scale (IAS; Kellner, 1987) to measure attitude, beliefs, and concerns surrounding hypochondriasis and abnormal illness behavior.

As hypothesized, childhood learning experiences surrounding both arousal reactive (anxiety-related) and arousal non-reactive somatic symptoms were associated with heightened anxiety sensitivity. Specifically, instrumental learning (parental encouragement) and vicarious learning (modeling) predicted anxiety sensitivity. Contrary to the hypothesis, which predicted a specified link,

hypochondriacal concerns were related to learning history experiences in the same way as anxiety sensitivity. Moreover, regression analyses provided support for the hypothesis that anxiety sensitivity partially mediated the learning history-hypochondriacal concerns relation. These findings offer further support for the importance of learning history in the development of anxiety sensitivity and poor mental health outcomes.

Stewart and colleagues (2001) were interested in further examining the causal pathway from childhood learning history to anxiety sensitivity to anxious symptoms. It was hypothesized that anxiety sensitivity would play a mediating role in the association of learning experiences and panic attacks. To examine this mediation, 478 college students (*M age* = 21 years old) completed the Learning History Questionnaire- Third Version (LHQ-III) (an expanded version of the LHQ-R previously used by Watt & Stewart, 2000). This 108-item version has five scales designed to measure: (1) the encouragement of colds; (2) the encouragement of aches and pains; (3) the encouragement of rashes; (4) the encouragement of anxiety; and (5) the modeling of anxiety. All LHQ-III scales were found to have acceptable levels of internal consistency (α = .72 to .92). In addition to the LHQ-III, participants completed the 36-item Anxiety Sensitivity Index-Revised (ASI-R; Cox, Taylor, Borger, Fuentes, & Ross, 1996) and the Panic Attack Questionnaire- Revised (PAQ-R; Cox, Norton, & Swinson, 1992) to assess the number of panic attacks experienced in the past year.

Findings were generally consistent with previous research such that learning experiences specific to arousal reactive somatic symptoms directly

influenced panic attack frequency. Moreover, learning experiences related to both arousal reactive and arousal non-reactive somatic symptoms impacted anxiety sensitivity levels. A direct effect of anxiety sensitivity on panic frequency over and above the direct influences of learning history was found using structural equation modeling. These results serve as initial evidence for a potential mediated causal pathway from childhood learning experiences to adulthood panic attacks.

The potential for childhood learning experience to increase risk for panic was further supported by Leen-Feldner and colleagues' (2008) examination of the association between the encouragement and modeling of anxiety-related somatic symptoms and increased arousal in response to a commonly used physiological stressor task called the CO_2 challenge. In this study, 93 individuals (*M age* = 23.4 years old) from a university-based subject pool were asked to complete the LHQ-III (Stewart et al., 2001) to assess instrumental learning surrounding arousal reactive and arousal non-reactive somatic symptoms and vicarious learning related to arousal reactive symptoms. In addition the LHQ-III, participants completed the Anxiety Sensitivity Index (ASI; Reiss, Peterson, Gursky, & McNally, 1986). Response to the CO_2 challenge was measured using three scales: (1) the Subjective Units of Distress Scale (SUDS; Wolpe, 1958) to evaluate anxiety levels in response to the task; (2) the Diagnostic Sensations Questionnaire (DSQ; Sanderson, Rapee, & Barlow, 1988, 1989) to evaluate cognitive and physical symptoms associated with panic attacks in response to the task; and (3)

the Self-Assessment Manikin (SAM; Lang, 1980) to evaluate affective responding to the task in terms of valence and arousal.

Consistent with previous research, regression analyses showed that parental encouragement of arousal reactive somatic symptoms related positively to anxious reactivity, panic symptom intensity, and degree of negative affect valence and arousal in response to the biological challenge. On the other hand, observational learning experiences in regards to anxiety-related somatic symptoms were not related to challenge response. Similar to the findings of Watt, Stewart, and Cox (1998), these results suggest that different types of learning may have differential influence on the likelihood of anxious responding. Specifically, instrumental learning may be a more robust predictor of anxious reactions than observational learning.

The association between childhood learning experiences and anxiety was further investigated in Watt and colleagues' study (2008), which hypothesized that illness/injury sensitivity would be related to learning experiences surrounding somatic symptoms specifically concerning aches and pains, while anxiety sensitivity would be related to learning experiences surrounding general somatic symptoms (both anxiety-related and aches and pains). For this study, 192 undergraduate students (*M age* = 19.4 years old) were asked to complete the Learning History Questionnaire-IV (LHQ-IV) consisting of six-subscales, four of which were of interest in the study (i.e., subscales addressing the encouragement of anxiety symptoms (22 items), the observation of anxiety symptoms (20 items), the encouragement of pain symptoms (22 items), and the observation of pain

symptoms (20 items)). Internal consistency estimates for the four scales ranged from .87 to .96. In addition to the LHQ-IV, participants completed the Anxiety Sensitivity Index (ASI; Peterson and Reiss, 1992) and reported on injury and illness sensitivity using the 11-item Illness Sensitivity Index (ISI; Carleton, Park, & Asmundson, 2006).

Results indicated that childhood learning experiences were related to both anxiety sensitivity and injury/illness sensitivity (Watt, O'Connor, Stewart, Moon, & Terry, 2008). More specifically, parental encouragement and modeling of anxiety-related somatic symptoms as well as more general somatic sensations (e.g., headaches, stomachaches, muscle cramps) were positively related to higher rates of anxiety sensitivity. The development of illness/injury sensitivity, on the other hand, was specifically linked to learning experiences surrounding sick-role behaviors related to aches and pains. These findings are consistent with previous research showing specificity in the link between childhood learning experiences and subsequent sensitivity to anxiety.

Overall, the literature on anxiety sensitivity and learning in adults provides preliminary support for the hypothesis that childhood learning experiences may play an influential role in the development of heightened anxiety sensitivity and subsequent anxiety. However, all of these studies relied on retrospective reports of childhood experiences of learning among adult samples (mostly college students). A primary limitation of using adult samples to study early experiences is increased likelihood of biased or distorted reports of childhood events. For example, adult participants with high anxiety sensitivity may selectively

remember events from their childhood that they believe explain their fear of anxiety symptoms while similar events are likely to be forgotten or dismissed by adults within the normal range of anxiety sensitivity (McNally, 2002). Gathering information from youth about learning experiences will provide a more accurate portrayal of the type and amount of learning that occurs in childhood and will also allow for the examination of hypotheses about the developmental course of anxiety.

Anxiety Sensitivity and Learning in Children

Muris, Merckelbach, and Meesters (2001) and Muris and Meesters (2004) are the only two studies to examine the link between learning experiences and anxiety sensitivity in youth. Their first study used a sample of 52 Dutch adolescents between 12 and 14 years old (*M age* = 12.3 years old). For this investigation, the research group created a 69-question Learning Experiences Interview (LEI; Muris et al., 2001) based on the expanded version of the LHQ (Watt et al., 1998). Similar to the LHQ, the LEI has three subscales: (1) parental reinforcement of and transmission of information about pain symptoms, (2) parental reinforcement of and transmission of information about anxiety symptoms, and (3) parental reinforcement of and transmission of information of other's somatic symptoms. All three LEI scales were found to have internal consistency (α = .60 to .86). In addition to the LEI, the adolescents also were asked to complete the 18-item Child Anxiety Sensitivity Index (CASI; Silverman, Fleisig, Rabian, & Peterson, 1991) as a measure of fear of anxiety symptoms. The child version of the Diagnostic Interview Schedule for Children (DISC) was

also administered to assess symptoms of panic disorder, social phobia, separation anxiety disorder and generalized anxiety disorder.

Correlations showed that only verbal transmission of concerns that somatic symptoms (both anxiety and pain related) are harmful was significantly associated with anxiety sensitivity. No such relationship was found for observational learning and anxiety sensitivity. As predicted, anxiety sensitivity scores were significantly correlated with anxiety symptoms, as measured by the DISC. On the other hand, no direct relation was found between learning experiences and anxiety symptom scores. These results suggest that learning experiences play a role in the development of anxiety sensitivity, which, in turn, may increase vulnerability to anxiety disorders. However, this connection is not specific: Learning experiences concerning both anxiety related and pain related somatic symptoms correlated with anxiety sensitivity.

Muris and Meesters (2004) continued this line of research by examining the association among learning experiences and anxiety vulnerability factors (i.e., trait anxiety and anxiety sensitivity) as well as somatic symptoms. It was hypothesized that higher levels of illness-encouraging learning experiences in childhood along with trait anxiety and anxiety sensitivity would be linked to heightened intensity of somatization. A modified version of the LEI (Muris et al., 2001) was administered to 190 Dutch children ages 8 to 13 years old (*M age* = 10.6 years old). The interview consisted of two parts, the first of which included 20 items to assess learning experiences (i.e., parental reinforcement and parental transmission of information) in relation to pain symptoms. The second part

included 20 items to assess learning experiences in relation to other somatic symptoms commonly related to anxiety (i.e., heart beating fast, nausea, shortness of breath, dizziness). LEI scales were found to have internal consistency coefficients ranging from .64 to .76.

In addition to the LEI, participants completed the 35-item Children's Somatization Inventory (CSI; Garber, Walker, & Zeman, 1991) to assess occurrence of somatization symptoms. Chronic symptoms of anxiety were measured using the 20-item State-Trait Anxiety Inventory for Children (STAI-C; Spielberger, 1973) and fear of anxiety related symptoms was assessed with the CASI (Silverman et al., 1991). Correlations indicated that anxiety sensitivity, trait anxiety, and, to a lesser extent, parental transmission of the idea that anxiety related somatic symptoms are dangerous were all linked to greater somatization. Regression analyses showed that anxiety sensitivity, trait anxiety, and learning experiences together accounted for 41.9% of the variance of somatization scores. The current findings serve as preliminary evidence that anxiety vulnerability factors, including parental transmission of anxiety, are linked to somatization symptoms in children. In conjunction with the findings of Muris, Merckelbach, and Meesters (2001), this research offers an important extension of the previously reviewed research on the relation of childhood learning and anxiety by focusing on the relation among learning, anxiety sensitivity and anxiety in child and adolescent samples.

Evaluative Summary of the Literature on Anxiety Sensitivity and Learning

The literature on learning history and anxiety provides a basic understanding of the potential link between childhood learning experiences, heightened anxiety sensitivity, and anxiety symptoms. Additional research is needed, however, to explicate the processes underlying these associations for several reasons. First, the study of the etiology and developmental course of elevated anxiety sensitivity is in its infancy. To date, the vast majority of research on anxiety sensitivity has focused on heightened anxiety sensitivity as a risk factor for the development of anxiety symptoms and anxiety disorders (e.g., Naragon-Gainey, 2010; Rabian et al., 1993). Research has only recently begun to uncover the specific processes (e.g., learning experiences) that lead to increased levels of anxiety sensitivity. A second reason for more research on this topic is that most of the existing studies on learning history and anxiety have relied on adult samples and are therefore retrospective in nature. Studies conducted with children and adolescents allow examination of the developmental processes underlying anxiety sensitivity and anxiety as they are unfolding. Finally, current research has only examined childhood learning experiences surrounding very specific physiological hyperarousal symptoms (i.e., racing heartbeat, dizziness, shortness of breath, and strong nausea). Given that anxiety sensitivity is conceptualized as negative interpretations of any physiological reaction to anxiety-provoking situations (Reiss & McNally, 1985), learning experiences concerning both a wider range of physiological symptoms and anxiety-related

cognitions may also contribute to further the understanding the development of heightened anxiety sensitivity and therefore the etiology of pathological anxiety.

Emerging Theoretical Model: Learning of Anxiety Sensitivity and Symptoms in Youth

Building on past published anxiety sensitivity theory and research on the etiology of anxiety disorders, this thesis proposes a basic model to aid further exploration of the putative causes and consequences of heightened anxiety sensitivity levels. The model is shown in Figure 2 (below) and focuses on anxiety-related learning experiences, anxiety sensitivity, and anxiety symptoms. The x-axis of the model depicts time whereas the y-axis depicts the frequency and/or severity of the main variables of interest. The model defines learning experiences as the application of learning paradigms to physiological reactivity and negative cognitions. In this thesis, the term learning paradigms denotes positive reinforcement, negative reinforcement, modeling, information transfer, and punishment. The model's operational definition of anxiety sensitivity is consistent with the conceptualizations put forth by Reiss and McNally (McNally, 2002; Reiss, 1991; Reiss & McNally, 1985). Namely, anxiety sensitivity is the fear of anxiety-related bodily sensations, which arise from beliefs that the sensations have harmful personal consequences. Also consistent with past theory, anxiety (and its symptoms) is operationalized according to the tripartite structure proposed by Lang (1968) and developed by Barlow (2002) and Barlow et al. (2004) (i.e., negative cognitions, somatic/physiological hyperarousal, and behavioral avoidance).

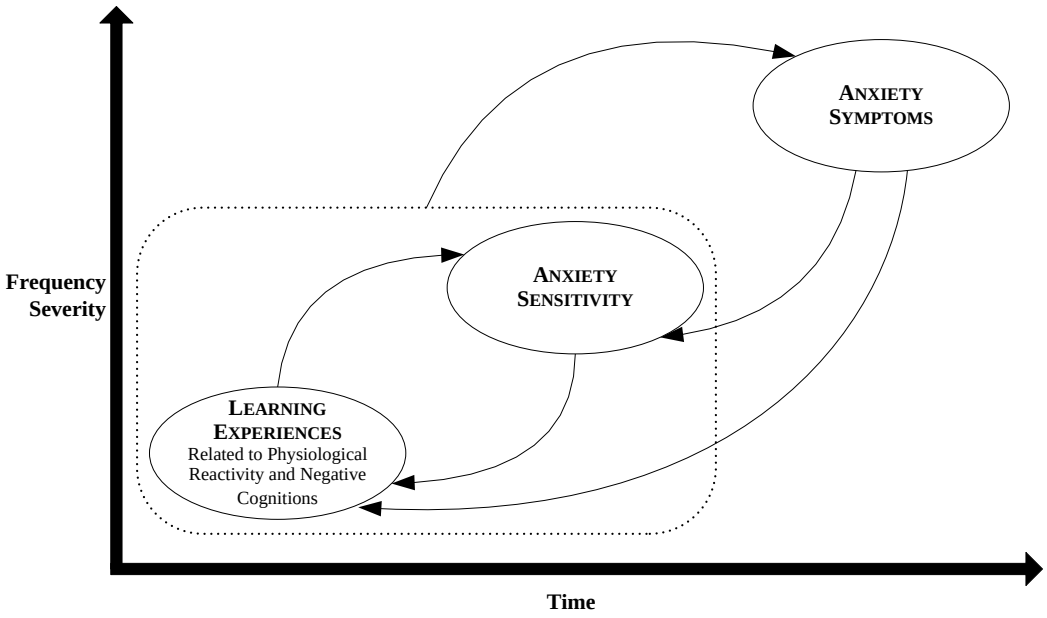

Figure 2. Emerging Theoretical Model: Learning of Anxiety Sensitivity and Symptoms in Youth

Broadly, the model proposes that anxiety-related learning experiences and anxiety sensitivity interact and create the occasion for the development and maintenance of anxiety symptoms over time. The dynamic interactions among these three variables of interest are thought to work together as a process which leads to the development of anxiety. When it comes to learning experiences, the model proposes that physiological reactivity and negative cognitions are subject to learning paradigms. The model goes on to suggest that these anxiety-related learning paradigms foster the development of anxiety sensitivity. In turn, the dynamic relations between anxiety-related learning experiences and anxiety sensitivity also contribute to the development of anxiety symptoms. In the model, the reciprocal nature of the associations among learning experiences and anxiety sensitivity, and anxiety symptoms and the former are consistent with feedback

loops where the output variable(s) is fed back into the system as an input variable(s) thereby promoting cyclical relations.

As proposed, learning experiences related to physiological reactivity and negative cognitions may create the occasion for changes in the level of sensitivity to these types of anxious reactions (whether or not prompted by feared stimuli or anxiety provoking situations). For example, reinforcement of physiological reactivity in response to a feared stimulus may serve to increase the frequency and severity of the physiological arousal in similar situations. In addition, reinforcement also may create the occasion for this type of arousal (whether or not cued by fear) to be interpreted as threatening or anxiety provoking. Consequently, the association between physiological reactivity and anxiety sensitivity may be conditioned. Furthermore, according to the model, elevations in anxiety sensitivity could result in increased frequency and severity of physiological reactivity and negative cognitions. In turn, the increased presence of physiological reactivity and negative cognitions may create the occasion for additional learning experiences to take place. And, these additional learning experiences may result in changes to anxiety sensitivity levels. In short, as the frequency of learning experiences increase and influence anxiety sensitivity levels, the feedback loop is maintained.

In terms of the development of anxiety, the model proposes that the severity of symptoms is influenced by the learning experiences-anxiety sensitivity feedback loop. That is, the cyclical relation between the frequency of anxiety-related learning experiences and the severity of anxiety sensitivity may escalate

and intensify over time, thus serving to increase the severity of anxiety symptoms. For example, as previously noted, the reinforcement of physiological reactivity increases the frequency of somatic arousal as well as sensitivity to these anxiety-related sensations. In turn, the model suggests that this interaction between learning experiences and anxiety sensitivity may lead to increases in the intensity of anxiety symptoms. As a result of the amplified experience of anxiety symptoms, there may be more opportunities for physiological arousal and negative cognitions to be conditioned. In addition, increases in the severity of anxiety symptoms may elevate levels of anxiety sensitivity. Individuals who are sensitive to anxious reactions, for instance, may interpret an increase in symptom severity as evidence that negative interpretations of bodily sensations are accurate, thus reinforcing the fear of fear and further amplifying the severity of anxiety sensitivity. The increased severity of symptoms is fed back into the learning experiences-anxiety sensitivity system and further facilitates the development of anxiety symptoms.

The dynamic nature of this model suggests that the relations among these variables develop over time. That is, the interactions among learning experiences, anxiety sensitivity, and anxiety symptoms are proposed to gradually change over the course of development. The model also proposes that time is a space which facilitates the progressive changes in the learning experience-anxiety sensitivity system, thus giving rise to increased/decreased severity of anxiety symptoms. While some anxiety-related learning paradigms may evoke momentary changes in children's fear of anxiety, recurrent learning experiences are likely to result in

significant and stable increases in anxiety sensitivity. As such, the progressive nature of the proposed model not only allows for the consideration of the evolution the relations among the main variables of interest, but also provides a framework in which to examine the course of anxiety symptom development and maintenance.

Current Thesis Study

The emerging theoretical model described above offers a foundational framework and guides three research questions that were examined in the present thesis study. As such, the thesis study will extend knowledge about the development of anxiety symptoms and anxiety sensitivity by investigating the role of childhood learning experiences. The examination of the relations among these variables is important as it can help advance the understanding of anxiety disorder development in youth. By focusing on a sample of children and adolescents referred for excessive fear and anxiety, this study makes several unique contributions to the literature. First, as noted above, most of the research in this area has focused on adults (e.g., Watt et al., 1998; Watt & Stewart, 2000); only two studies have been conducted with youth and both have examined these variables in non-clinic referred samples of school-aged children (i.e., Muris & Meesters, 2004; Muris et al., 2001). Using a sample of children also offers the opportunity to examine the relations among learning experiences, anxiety sensitivity, and anxiety as they occur, rather than retrospectively (as it was done in the studies that included adult samples). Second, using a sample of clinic-referred children is important because these data are more likely to characterize

the development of pathological levels of anxiety as opposed to non-pathological anxiety, thereby contributing to the understanding of theory about clinical levels of anxiety and fear. Third, exploring the relations among these variables in youth with clinical levels of fear and worry may assist in the development and/or refinement of theory about the prevention of anxiety disorders in children. For example, if learning experiences are found to be related to anxiety sensitivity (a known risk factor for anxiety) and anxiety symptoms, then efforts to address learning experiences might have utility in preventive interventions. Similarly, data about these relations can help advance the refinement of evidence-based treatment "packages" for childhood anxiety (Silverman, Pina, & Viswesvaran, 2008).

Using the emerging theoretical model as a guide, the purpose of the present thesis study was to further explicate the role of learning in the development of anxiety sensitivity and anxiety symptoms in a sample of youth referred for anxiety. The first aim of the thesis was to evaluate the relation between anxiety sensitivity and anxiety symptoms. As previously described, the literature consistently links heightened anxiety sensitivity to anxiety disorders and symptoms in both adults and youth. As such, it was hypothesized that a significant positive correlation would be found between youth's self-reported levels of anxiety sensitivity and anxiety symptoms.

The second aim of the thesis study was to examine the relation among learning experiences, anxiety sensitivity, and anxiety symptoms in the current sample of youth. Based on past research and the proposed emerging theory, it

was hypothesized that there will be a significant positive prediction of anxiety symptoms from learning experiences and anxiety sensitivity.

The third (and final) aim of the proposed study was exploratory in nature. The thesis examined whether the frequency of learning experiences and the severity of anxiety sensitivity differentially predicted anxiety symptom severity. These analyses were viewed as exploratory because there is very little research examining the predictive ability of the interaction between learning and anxiety sensitivity and the sample size for this study was relatively small. Nonetheless, it was hypothesized that the extent to which the frequency of learning experiences influence the severity of anxiety symptoms would vary depending on the severity of anxiety sensitivity. Specifically, it was predicted that learning experiences would be a stronger predictor of symptoms when the severity of anxiety sensitivity was low.

In examining these three aims, the current study considered child age, sex, and ethnicity. When it comes to age, Chorpita and Daleiden (2000) found that the nonautonomic facets of anxiety sensitivity (i.e., mental incapacitation concerns and social concerns) were less predictive of concurrent levels of anxiety severity for children (ages 7 to 11 years old) than for adolescents (ages 12 to 17 years old). These age-related differences in anxiety sensitivity were interpreted as an indication that younger children may lack the necessary cognitive abilities to make attributions about the introceptive cues that underlie anxiety sensitivity. On the other hand, a study by Weems, Hammon-Laurence, Silverman, and Ginsburg (1998) found no significant differences between age groups on anxiety

sensitivity levels suggesting that anxiety sensitivity is a salient construct for youth of all ages. Based on findings from Chorpita and Daleiden (2000) and Weems et al. (1998), predictions made about age are tentative; it is possible that levels of anxiety sensitivity may be higher for older youth in the present study. In addition, anxiety sensitivity levels may vary by ethnicity (i.e., Caucasian versus Hispanic/Latino). Specifically, on the disease concerns facet of anxiety sensitivity, Hispanic/Latino score higher than Caucasian youth (e.g., Pina & Silverman, 2004; Weems, Hayward, Killen, & Taylor, 2002). As such, Hispanic/Latino youth in the present study could show greater anxiety sensitivity levels than Caucasians. Turning to child sex, data suggest that girls report higher childhood anxiety sensitivity levels than boys in community samples (e.g., Weems et al., 2007); however, in clinical samples anxiety sensitivity levels are comparable across child sex (e.g., Marin et al., 2008). Since participant children in the current study are clinic-referred, a significant association between child sex and anxiety sensitivity was not expected but will nevertheless be tested.

METHODS

Participants

Data for this study was drawn from a sample of 70 youth (ages 7 to 16 years old) referred to a child anxiety disorders research clinic. Participants were referred by school counselors (n = 42), mental health professionals/pediatricians (n = 13), or self-referred (n = 15) due to difficulties with excessive fear and/or anxiety. The mean age of the child participants was 9.99 years old (SD = 2.62)

and 48.6% were girls (*n* = 34). Approximately, 51.4% of mothers reported the child's family background as Hispanic/Latino (*n* = 36) and the remainder reported their family background as White/Caucasian (*n* = 34). Sixty-three percent of mothers (*n* = 44) reported annual family income. Based on these families, annual income ranged from $5,000 to $180,000 with 25% of families reporting a yearly income below $25,000 (*n* = 11), 43.2% between $25,001 and $75,000 (*n* = 19), and 31.8% above $75,000 (*n* = 14).

Measures

The *Negative Affect Self-Statement Questionnaire* (NASSQ; Ronan, Kendall, & Rowe, 1994) is designed to assess the frequency with which children have anxious or depressive thoughts about themselves. The 14-item questionnaire asks children to report the occurrence of negative self-statements over the past week (e.g. "*I am very nervous*", "*I was afraid I would make a fool of myself*", "*I thought my world was coming to an end*") using a 5-point scale (1 = *not at all*, 2 = *sometimes*, 3 = *fairly often*, 4 = *often*, 5 = *all the time*). The NASSQ has been found to have high test-retest reliability using a 2-week retest interval (*r* = .96). Construct validity for the NASSQ has been demonstrated via significant correlations with the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978; *r* = .68 to .73), the State-Trait Anxiety Inventory for Children- Trait (STAIC-T; Spielberger, 1973; *r* = .68 to .73), and the Children's Depression Inventory (CDI; Kovacs, 1981; *r* = .60 to .66) (Ronan et al., 1994). The internal consistency (alpha) coefficient for the NASSQ was .92 for the current sample.

The *Physiological Hyperarousal Scale for Children* (PH-C; Laurent, Catanzaro, & Joiner, 1995, 2004) is designed to assess the occurrence of physiological symptoms of anxiety (e.g., "*heart pounding*", "*tight muscles*"). Using a 5-point rating scale (1 = *very slightly or not at all*, 2 = *a little*, 3 = *moderately*, 4 = *quite a bit*, 5 = *extremely*), children indicate how often they experienced each of the somatic symptoms during the last two weeks. Laurent et al. (2004) found acceptable concurrent validity for this measure demonstrated by significant correlations between the PH-C score and RCMAS-Physiological Anxiety scale (r = .56), Children's Psychosomatic Checklist Frequency and Intensity scales (CPC; Wisniewski, Naglieri, & Mulick, 1988; r = .64, .59), and the Positive and Negative Affect Scale for Children- Negative Affectivity scale (PANAS-C; Laurent et al., 1999; Laurent, Potter, & Catanzaro, 2004; r = .64). Corrected item-total correlations for the items ranged from .37 to .66 and a coefficient alpha of .87 was found (Laurent, Schmidt, Catanzaro, Joiner & Kelley, 1998). The internal consistency (alpha) coefficient for the PH-C was .90 for the current sample.

The *Learning History Questionnaire* (LHQ; Ehlers, 1993) is designed to assess learning experiences related to symptoms of anxiety. Ehlers (1993) reported internal reliability estimates (Cronbach's alpha) of .78 for the 'Encouragement of Sick-Role/Panic Symptoms' scale and .84 for the 'Modeling of Sick Role/Panic Symptoms' scale. An expanded version of the LHQ with subscales designed to examine the encouragement of anxiety symptoms and the modeling of anxiety symptoms reported internal consistencies of .92 for both

scales (Watt et al., 1998). Satisfactory convergent validity has also been found through significant positive correlations between parent and child reports on LHQ: Experience/Anxiety (designed to reflect the frequency of experiencing anxiety symptoms in childhood and also receiving special attention or instructions to take care of themselves; $r = 0.26$, $p < 0.01$) and Observation/Anxiety (designed to reflect the frequency with which parents or other household members took special care of themselves or obtained special attention when experiencing anxiety symptoms; $r = 0.35$, $p < .005$) (Watt et al., 1998).

For this study, the LHQ was modified to be administered to children. The 19-item questionnaire is designed to assess learning experiences surrounding anxiety symptoms (e.g. *"… do you skip your school work, homework, or jobs around the house?*", *"…do you get special things. Like special foods or presents?*") using a 3-point scale (0 = *none*, 1 = *some*, 2 = *a lot).* A learning history score reflects the degree to which parents or anyone close to the child reinforces, models, punishes and transmits information about anxiety-related symptoms for each of the symptom areas of interest. Because not all individuals report the same number of anxiety symptoms, a composite score is created in order to compare participants according to their experiences. This composite learning history score is determined by multiplying the frequency of anxiety symptoms (for this study, NASSQ scores and PH-C scores were used) with the mean frequency of the LHQ experiences (Ehlers, 1993). For the current sample, internal consistency (alpha) coefficients for the LHQ were .92 and .90 for the NASSQ and PH-C, respectively.

The *Childhood Anxiety Sensitivity Index* (CASI; Silverman et al., 1991) is an 18-item measure designed to assess the degree to which youth believe that feelings of anxiety are linked with aversive or negative consequences (e.g. "*It scares me when I feel like I am going to throw up*"; "*When I am afraid, I worry that I might be crazy*"). Youth report the extent to which they agree with each statement based on a three-point scale (1 = *none*, 2 = *some*, 3 = *a lot*). Responses are summed to create scores ranging from 18 to 54, with higher scores indicative of higher levels of anxiety sensitivity (AS). Previous research has found the CASI to be psychometrically sound. For example, internal consistency (alpha) coefficients of .87 and test-retest reliability rates using a 2-week retest interval of .79 were reported for clinical samples (Silverman et al., 1991). In terms of validity, Weems et al. (1998) found the CASI to have incremental validity such that scores predicted variance in trait anxiety that was not predicted by other measures (i.e., RCMAS and Fear Survey Schedule for Children-Revised; FSSC-R; Ollendick, 1983). The internal consistency (alpha) coefficient for the CASI was .92 for the current sample.

The *Revised Children's Manifest Anxiety Scale* (RCMAS; Reynolds & Richmond, 1978) is designed to assess children's experiences of anxiety symptoms clustered around three factor scales: Physiological Symptoms, Worry/Oversensitivity, Social Concern/Concentration. Using a Yes/No response format, children indicate whether or not 28 statements (e.g., *"My hands feel sweaty", "I worry about what is going to happen", and "A lot of people are against me"*) are true for them. The RCMAS has been found to have satisfactory

psychometric properties. Pela and Reynolds (1982) reported test-retest reliability rates of .98 using a 3-week retest interval. Factor analytic studies have been generally consistent in reporting a three-factor structure for the Total Anxiety scale suggesting high construct validity (Reynolds & Paget, 1981; Reynolds & Richmond, 1979; Scholwinski & Reynolds, 1985). The internal consistency (alpha) coefficient for the RCMAS was .90 for the current sample.

Procedure

Before participation in the study, all parents provided informed consent and youth completed informed assent forms. Youth were then administered the questionnaires by a trained research assistant. To ensure understanding, questions were read aloud to younger children and older children and adolescents were monitored as the questionnaires were completed. Consistent with previous uses of the Learning History Questionnaire, respondents were first asked to report on the frequency of anxiety symptoms (for this study, anxious or depressive cognitions and somatic symptoms). If symptoms were reported as occurring often or a lot, the respondents were then asked to complete the Learning History Questionnaire.

RESULTS

Preliminary Analyses

Outlier Analyses: Regression diagnostics were conducted to identify and evaluate outliers. DFFITs were examined to explore how each case influences the overall regression equation whereas DFBETAs were examined as a more specific

indicator of how each case affects each regression coefficient. Because the sample size for this study is small to moderate, a cutoff of less than one was used (Cohen, Cohen, West, & Aiken, 2003). Diagnostic analyses indicated that all values for DFFITs and DFBETAs were below one. As such, none of the cases appear to substantially influence the regression of the predictors on the measure of anxiety symptoms, no outliers were identified, and the sample remained intact.

Missingness Analyses: A survey of missingness showed that less than 1% of data were missing (i.e., 9 participants had 1-item missing on measures of negative cognitions, physiological hyperarousal, anxiety-related learning experiences, AS, or anxiety symptoms). Missingness was tested for bias by creating a dummy variable for each case (i.e., 1 = missing, 0 = not missing), which was then correlated with sociodemographic variables (i.e., age, sex, ethnicity, and family income) and the clinical child measures (i.e., negative cognitions, physiological hyperarousal, anxiety-related learning experiences, AS, and anxiety symptoms). Results showed that missingness was not significantly correlated with any of the variables in the data set; therefore, data can be assumed to be missing completely at random (Allison, 2002). Scale scores were then calculated by averaging items across all available data.

Descriptive Statistics: Table 1 shows the percentage, mean, standard deviation, range, and normality statistics corresponding to the variables examined in this study. The proposed variables were examined for normality by evaluating skewness and kurtosis. As suggested by West, Finch, and Curran (1995), the limits for normally distributed variables that would not sufficiently bias the

analyses have skewness values less than 2 and kurtosis values less than 7. Using these criteria, all variables were found to be within the normal range of acceptability.

To further explore sample characteristics, a series of descriptive analyses were conducted. Chi-square tests for independence were used to explore any potential sample biases along child characteristics. As shown in Table 2, chi-square tests revealed that there were more boys in the high income level and more girls in the low income level [x^2 (2, n = 44) = 7.00, p = .03, phi = .40]. Results from these analyses also revealed that there were more Hispanic/Latino youth in the low income levels and more Caucasians in the high income levels [x^2 (2, n = 44) = 20.99, p = .001, phi = .69]. It should be noted that the sex by income finding is probably a sample characteristic or an artifact of the small cell sizes for these analyses. On the other hand, the finding that Hispanic/Latinos are overrepresented in low income levels is consistent with past research (e.g., DeNavas-Walt, Proctor, & Smith, 2010) and as such was carefully considered in the primary analyses and interpretations.

Additional tests focusing on the sample characteristics also were conducted. More specifically, independent samples t-tests were used to compare clinical variable mean score differences across sex, ethnicity, and age (younger: 6 to 9 years old; older: 10 to 16 years old) (see Table 3). As shown, learning experiences scores were significantly greater for Hispanic/Latino youth (M = 39.66, SD =37.57) than Caucasian youth (M = 22.11, SD = 36.50) [t (68) =1.98, p = .05]; the magnitude of the differences in the means (mean difference = 17.55)

was almost moderate (eta squared = .05) and almost half a standard deviation. To explore this relation further, three types of item-level exploratory analyses were conducted. First, correlations were calculated between each anxiety-related learning experience (at the item level) and ethnicity (Hispanic/Latino = 1). Second, frequency counts of each learning experience item endorsement were evaluated for each ethnic group. Third, t-tests were used to assess mean score differences on learning experience (at the item level) with ethnicity as the quasi-independent variable. Across all three methods, two learning experiences were identified as possibly being the most meaningful for Hispanic/Latino youth compared to Caucasian youth: (a) "being taken to the doctor and feeling glad about it" and (b) "getting special attention/spending dedicated time with parents," both when feeling overly anxious. Specifically, being of Hispanic/Latino background was associated with higher reports of being taken to the doctor and feeling glad about it when having negative cognitions (r = .26, p = .03); 22% (8/36) of Hispanic/Latino youth reported having this learning experience "a lot" with a mean score on this item being significantly greater for Hispanic/Latino than Caucasian youth [t (55.97) = 2.01, p = .05]. Similarly, being of Hispanic/Latino background was associated with higher reports of getting special attention/spending dedicated time with parents when having negative cognitions (r =.32, p = .01) and experiencing physiological symptoms of anxiety (r = .28, p = .02); 31% (11/36) of Hispanic/Latino youth reported having this learning experience "a lot" when they had negative cognitions and 28% (10/36) of Hispanic/Latino youth reported having this learning experience "a lot" when they

had physiological symptoms of anxiety. In terms of means, the learning experience scores for Hispanic/Latino youth were greater than those for their Caucasian counterparts, both when they had negative cognitions [t (52.77) = 2.80, p = .01] and physiological symptoms of anxiety [t (45.27) = 3.06, p < .01].

Primary Analyses

In conceptualizing the primary analyses for the thesis, findings from the descriptive statistics analyses were carefully considered. More specifically, income level was found to vary by ethnicity and sex; as such, analyses of covariance were used to explore sex and ethnicity differences on the clinical variables while controlling for income level. Results from these analyses show no significant differences between Hispanic/Latino and Caucasian youth on any of the clinical variables after adjusting for income level [i.e., learning experiences: F (1, 41) = .25, p = .62; AS: F (1, 41) = .57, p = .46; anxiety symptoms: F (1, 41) = .81, p = .02]. In terms of sex, there were no significant differences but trends emerged. That is, marginally significant differences between boys and girls on AS scores [i.e., girls reported higher AS scores; F (1, 41) = 3.14, p = .08, partial eta squared = .07] and learning experiences scores [i.e., girls reported more learning experiences; F (1, 41) = 2.84, p = .10, partial eta squared = .07] were found. No significant differences emerged between boys and girls on anxiety symptoms [F (1, 41) = 1.67, p = .20]. In light of the previous and these additional findings, the role of sex and ethnicity in the analyses were carefully considered. Following recommendations from Miller and Chapman (2001), it is possible that significant relations between income and other child characteristics (e.g.,

ethnicity) reflect some meaningful and substantive difference on levels of anxiety. For example, Hispanic/Latino youth show higher anxiety levels, including physiological symptoms of anxiety, than their Caucasian counterparts (e.g., Pina & Silverman, 2004; Varela, Weems, Berman, Hensley, & Rodreguez de Bernal, 2007). Since Hispanic/Latino youth are typically overrepresented in the low income groups, and poverty is associated with greater adversity, Hispanic youths' anxiety may result, at least in part, from exposure to poverty-related adversity. Therefore, removing variance due to socioeconomic status could mask important aspects of pathological anxiety in Hispanic/Latino youth. In other words, considering ethnicity in the absence of its contextual factors (low income) may possibly result in a biased estimation (under-estimation) of the relations of interest in this study with this subsample. Similarly, data show sex differences in the prevalence of anxiety (including anxiety disorders) as well as the experience of anxiety symptoms in girls versus boys. Adolescent girls, for instance, are more likely than their male peers to meet criteria for a current or lifetime anxiety disorder diagnosis (e.g., Lewinsohn, Gotlib, Lewinsohn, Seeley & Allen, 1998). However, certain types of anxiety disorders are more common in boys than girls. Obsessive compulsive disorder, for example, has been shown to be more prevalent in boys (e.g., Castle, Deale, & Marks, 1995) perhaps due to gender-specific neurogenetic factors (e.g., Wang et al., 2005). Moreover, in community samples, girls show higher anxiety levels than boys whereas this pattern is typically absent in clinic-referred samples (see Silverman & Carter, 2006). Therefore, removing variance due to child sex also could mask the influence of

anxiety and related clinical variables on the focal variables possibly resulting in a biased estimation of the relations of interest herein. Building on this rationale, ethnicity, sex, and SES were not treated as covariates in the primary analyses. However, it also is important to avoid "pathologizing" a particular ethnic group (Hispanic/Latinos) or sex group (girls). As such, primary analyses also were conducted with sex, SES, and ethnicity as covariates and findings from those analyses were also reported below, when varied from the general non-covariation approach.

The Relation among Learning Experiences, Anxiety Sensitivity, and Anxiety Symptoms. Correlation coefficients among the main child clinical variables of interest (i.e., learning experiences, AS, and anxiety symptoms) are presented in Table 4. As shown, statistically significant correlations were found among learning experiences, AS, and anxiety symptoms (*r*s ranged from .67 to .80, $p < .01$). Following the recommendations of Kazdin (1995), highly correlated measures ($r > .85$) were eliminated from subsequent analyses to reduce redundancy. In the current study, physiological reactivity and negative cognitions were highly corrected with learning experiences ($r = .90$, $p < .01$ and $r = .89$, $p < .01$, respectively) probably because these two variables contribute to the calculation of the learning experiences score.

Building on the above results, partial correlations among learning experiences, AS, and anxiety symptoms were explored and are reported in Table 5. Results from these partial correlations showed that when child sociodemographic characteristics (i.e., child age, sex, ethnicity, family income)

were partialled out, all relations among the primary clinical child variables remained statistically significant (*r*s ranged from .60 to .79, $p < .01$). When child clinical variables were partialled out, two main findings of interest emerged. First, the correlation between learning experiences and anxiety symptoms (controlling for AS) did not reach statistical significance. Second, the correlation between learning experiences and AS (controlling for anxiety symptoms) remained statistically significant. These patterns of relations are consistent with the theory proposed in the thesis. Figure 3 illustrates the pattern of correlations shown in Table 5.

Predicting Anxiety Symptoms. Regression analyses were used to evaluate the association from anxiety-related learning experiences and AS to anxiety symptoms. First, anxiety-related learning experiences and AS were simultaneously regressed on the measure of anxiety symptoms. Results from this regression model revealed that anxiety-related learning experiences and AS explained a significant portion of the variance in anxiety symptom levels [$R^2 = .63$, $F(2, 67) = 56.89$, $p = .001$]. Second, centered scores on learning experiences, AS, and the interaction between these two variables were simultaneously regressed on the measure of anxiety symptoms. This model was used to examine the interaction between learning experiences and AS as a predictor of anxiety symptoms. Results showed that anxiety-related learning experiences, AS, and the interaction between learning and AS explained a significant proportion of variance in anxiety symptom levels [$R^2 = .65$, $F(3, 66) = 40.41$, $p = .001$].

To follow-up on these findings, additional analyses focused on evaluating simple slopes. and three simple regression analyses were used to explore whether learning experiences differentially contributed to the prediction of anxiety symptom levels for individuals with different degrees of AS. Results showed that the relation between learning experiences and anxiety symptoms appeared to be strongest when the severity of AS was low (see Figure 3). That is, when AS level is 1 SD below the mean, the simple slope of learning experiences on anxiety symptoms is marginally significant ($b_3 = .06$, $t = 1.77$, $p = .08$). At mean levels of AS, the simple slope of learning experiences on anxiety symptoms reaches trend level significance ($b_3 = .03$, $t = 1.28$, $p = .20$). Lastly, when AS level is 1 SD above the mean, the simple slope of learning experiences on anxiety symptoms is not statistically significant ($b_3 = .01$, $t = .29$, $p = .77$). Results from these primary analyses with sex, ethnicity, and income included as covariates did not vary in patterns of statistical significance.

When these models were explored for the Caucasian sample only, a more similar than different pattern of results emerged (Figure 5). That is, when AS level is 1 SD below the mean, the simple slope of learning experiences on anxiety symptoms remained marginally significant ($b_3 = .59$, $t = 1.94$, $p = .06$); at mean levels of AS, the simple slope of learning experiences on anxiety symptoms reaches the marginally significant level ($b_3 = .44$, $t = 1.89$, $p = .07$), and when AS level is 1 SD above the mean, the simple slope of learning experiences on anxiety symptoms reaches trend level significance ($b_3 = .29$, $t = 1.54$, $p = .13$). On the other hand, a somewhat different pattern of results emerges for the

Hispanic/Latino sample (Figure 6). When AS level is 1 SD below the mean, the simple slope of learning experiences on anxiety symptoms remained marginally significant (b_3 = .49, t = 1.83, p = .08) and at mean levels of AS, the simple slope of learning experiences on anxiety symptoms is not statistically significant (b_3 = .00, t = -.001, p = 1.0). For Hispanic/Latinos only, when AS level is 1 SD above the mean, the simple slope of learning experiences on anxiety symptoms is statistically significant and negatively related to anxiety (b_3 = -.49, t = -2.17, p = .04).

DISCUSSION

The current thesis study explored the role of childhood learning experiences in the development of anxiety sensitivity and anxiety symptoms in a sample of clinic referred youth. To guide this study, a theoretical model of the causes and consequences of heightened anxiety sensitivity levels in youth was developed, based on past anxiety sensitivity theory and research (Figure 2). Broadly, the model proposes that physiological and cognitive symptoms of anxiety are subject to learning paradigms and these anxiety-related learning experiences may serve to elevate anxiety sensitivity levels. In turn, the dynamic association between learning and anxiety sensitivity may contribute, in part, to the development of anxiety symptoms. Findings from the current study provide some preliminary support for this emerging model, such that key expected relations among learning experiences, anxiety sensitivity, and anxiety symptoms were found. Findings also revealed potentially meaningful variations in the relations

among the focal variables for Caucasian versus Hispanic/Latino youth. No variations as a function of child age and sex were found.

Relations among Learning Experiences, Anxiety Sensitivity, and Anxiety Symptoms

The positive association between anxiety sensitivity and anxiety symptoms has been widely studied and supported. Reiss's (1985, 1991) expectancy theory was the first to suggest that a heightened fear of anxiety (i.e., anxiety sensitivity) may lead to increases in fearful/anxious responding and since then numerous research studies have found this connection in both children and adults (e.g., Rabian et al., 1993; Schmidt et al., 2006). Given this link, research has recently begun to focus on factors that may lead to heightened anxiety sensitivity levels and, subsequently, increases in anxiety symptoms. There is a small but growing body of research that suggests that anxiety-related learning experiences may play an influential role in this process (e.g., Watt and colleagues, 1998, 2000, 2001).

Consistent with the anxiety sensitivity literature and the proposed model, this study found that higher levels of anxiety sensitivity were related to higher levels of anxiety symptoms in youth. In addition, and as theorized herein, anxiety-related learning experiences were related to both anxiety sensitivity and anxiety symptom levels in youth. A closer examination of this finding showed that the link between learning experiences and anxiety symptoms attenuated when anxiety sensitivity was considered, while the association between learning experiences and anxiety sensitivity remained significant regardless of the anxiety

symptom levels detected. In other words, learning experiences may be exerting indirect influences on anxiety symptom level via their direct effect on anxiety sensitivity. Since anxiety sensitivity is known to be a powerful predictor of anxiety, this is not surprising. As such, these findings further our understanding of the development of anxiety by showing that anxiety sensitivity appears to be an important factor in the link between anxiety-related learning experiences and anxiety symptom levels.

Predicting Anxiety Symptom Levels from Learning Experiences and Anxiety Sensitivity

The found association from anxiety-related learning experiences and anxiety sensitivity to anxiety symptoms provides additional support for the emerging theoretical model proposed in this thesis. More specifically, when considered together, anxiety-related learning experiences and anxiety sensitivity levels accounted for approximately sixty three percent of the variance in anxiety symptoms (the remaining variance may be accounted for by other social, behavioral, and/or neurobiological mechanisms). That is, greater learning experiences and greater anxiety sensitivity levels were predictive of more anxiety symptoms. When the interaction between learning and anxiety sensitivity also was included in the prediction, the two predictors accounted for sixty five percent of the variance in anxiety symptom levels. It also was found that for youth with low levels of anxiety sensitivity having more anxiety-related learning experiences was linked to higher levels of anxiety symptoms, but for youth with high anxiety sensitivity, the frequency of learning experiences had little influence on anxiety

symptom levels. The differential contribution of learning experiences to the prediction of anxiety symptoms suggests that the relation between learning and anxiety may be at least partially mediated by anxiety sensitivity. This notion has been indicated in previous research using adult samples (e.g., Stewart et al., 2001; Watt & Stewart, 2000) and warrants further examination in youth populations as it has clear implications for understanding the development of anxiety. Based on this finding and building off of previous research and theory, it is possible that youth with a heightened sensitivity to anxious sensations are already prone to experience more symptoms of anxiety regardless of learning experiences. Conversely, youth with low levels of anxiety sensitivity may be especially sensitive to the influence of anxiety-related learning experiences. For example, a child with low anxiety sensitivity and few anxiety-related learning experiences is likely to have few anxiety symptoms whereas a child with low anxiety sensitivity but many anxiety-related learning experiences is likely to have a higher level of anxiety symptoms. Put simply, anxiety sensitivity may partially explain (mediate) the influence of learning experiences on anxiety symptoms. This interpretation is consistent with the work of Weems et al. (2002) which examined the stability of anxiety sensitivity in a community sample of adolescents and found that those with stable high or escalating anxiety sensitivity pathways reported more panic attacks than those with stable low anxiety sensitivity pathways. Thus it seems that, overtime, increased exposure to anxiety-related learning experiences may escalate youth anxiety sensitivity levels and, consequently, symptom levels.

Overall, current findings are consistent with the theoretical model proposed and suggest that the interplay between learning experiences linked to symptoms of anxiety (i.e., physiological reactivity and negative cognitions) and levels of sensitivity to anxious reactions may lead to the experience of more frequent and severe anxiety symptoms. It also is important to note that these findings appear to be robust across certain child characteristics measured and tested in this study. That is, when the potential influence of sex and age were considered as covariates in the models, the patterns of significant findings remained the same.

Ethnic Differences in the Prediction of Anxiety Symptoms

Interestingly, when the relations among learning experiences, anxiety sensitivity, and anxiety symptoms were examined separately by ethnicity, the prediction of anxiety symptoms was quite different for Hispanic/Latino youth compared to Caucasian youth. The findings for Hispanic/Latino youth are contrary to the pattern found for Caucasian youth as well as this study's predictions. That is, for Caucasian youth, low to average levels of anxiety sensitivity and greater anxiety-related learning experiences were found to be associated with higher levels of anxiety symptoms. However, for Hispanic/Latino youth, high levels of anxiety sensitivity and more anxiety-related learning experiences was found to be associated with lower levels of anxiety symptoms. This finding for Hispanic/Latino youth can be interpreted in several ways. First, it is possible that the learning experiences assumed to be related to anxiety serve as a buffer to anxiety rather than an exacerbating factor. More specifically, in the

current study, two anxiety-related learning experiences were identified as possibly being the most meaningful for Hispanic/Latino youth compared to Caucasian youth: (1) "being taken to the doctor and feeling glad about it" and (2) "getting special attention/spending dedicated time with parents," both when feeling overly anxious. Whereas these experiences are typically considered to be rewarding and/or reinforcing of anxious behaviors, they may in fact help to lessen feelings of anxiety/fear associated with elevated anxiety sensitivity levels (especially if medical testing results are null). Consequently, among Hispanic/Latino youth, these types of learning experiences may actually serve to alleviate symptoms of anxiety rather than intensify them. It should be noted, however, that this alleviation of symptoms may be temporary and, overtime being taken to the doctor or receiving extra attention from parents could lead to an increased sense that the experience of anxiety symptoms is worrisome. Another possible explanation of the ethnic differences in the current study is that there might be an overall weaker association between anxiety sensitivity and anxiety symptoms for Hispanic/Latino youth compared to Caucasian youth. Some have suggested this could result from emotion-related socialization processes typical of Hispanic/Latino culture. Generally speaking, Varela et al. (2007) suggest that a heightened fear of anxiety could be more normative in Hispanic/Latino than Anglo culture. The implication is that anxiety sensitivity may be less of a risk factor for anxiety among Hispanic/Latinos than among Caucasians. More specifically, Hispanic/Latino culture places a greater stigma on mental illness (e.g., Urdaneta, Saldana, & Winkler, 1995) which in turn increases the likelihood

for distress to be experienced inwardly and expressed via physical or somatic symptoms (e.g., Canino, Rubio-Stipec, Canino, & Escobar, 1997). This cultural emphasis on self-control, emotional restraint, and compliance with social norms may place value on the internalization of emotion thereby fostering a decreased ability to process emotions as well as an underdeveloped skill set to cope with negative emotions (Mesquita & Walker, 2003; Varela et al., 2007). Conceptually, this could result in uneasiness or fear concerning feelings of anxiety or in other words, increases in anxiety sensitivity without the expected link to anxiety symptoms especially if other protective factors are at play (e.g., *familismo* support). Although the findings of the current study do not suggest a differential prediction of anxiety symptom level from anxiety sensitivity, this study's results do indicate that there may be important cultural differences in the relations among learning, anxiety sensitivity, and anxiety symptoms. As such, further exploring the complex role culture may play in the development of anxiety is warranted.

Limitations

A number of limitations are noteworthy when interpreting results. First, this study's sample size is relatively small. Having a small sample size often places restrictions on the ability to detect small effects and it is possible that some of the null relations found in this research are related to sample size. However, several statistically significant relations were found in the present study and those appear to be strong and consistent with previously published empirical research. Second, the current sample consisted of children referred for anxiety and thus conclusions cannot be made regarding the pre-onset development phase of

anxious symptoms. Nonetheless, findings provide useful information about the potential role of learning experiences and anxiety sensitivity on the development of pathological anxiety levels. Third, approximately half of the participants were ethnic minorities with most reporting Mexican-origin backgrounds. Since there are within group differences in people of Hispanic/Latino origin, findings should not be generalized to other groups (e.g., Puerto Ricans, Cubans). Future studies could advance knowledge of the processes that lead to pathological anxiety by focusing on other specific segments of the Hispanic/Latino population and by considering culturally relevant factors such as acculturation and/or cultural orientation.

A fourth and important limitation of this study is its non-longitudinal design. The cross-sectional nature of the data reduces the ability to make inferences about causal links among learning, anxiety sensitivity, and anxiety symptoms. However, this study provides valuable information regarding the relations among these variables and sets the stage for future research into causal relations. Fifth, the present study relied on a single and broad measure of anxiety which may have limited utility for fully understanding the role of learning and anxiety sensitivity in the development of specific anxiety disorders (i.e., panic, generalized anxiety disorder; Naragon-Gainey, 2010). Along these lines, this study relied on self-report measures that can be subject to reporter bias. However, youth tend to be the best reporters of their own internalizing states (Achenbach, McConaughy, & Howell, 1987; De los Reyes & Kazdin 2004) compared to parents, siblings, peers, and teachers. Since this study focused on anxiety (an

internal state) using the child as the primary reporter is adequate although it would be interesting to learn whether these findings replicate when other measurement and sources are used.

Summary and Conclusions

Despite theoretical and empirical evidence suggesting the role anxiety sensitivity plays in the development and maintenance of anxiety, research examining the origins of anxiety sensitivity is relatively scant. The present study sought to extend knowledge about the development of anxiety sensitivity and anxiety symptoms by examining the role of learning experiences during childhood (past work has largely focused on college students). Findings were consistent with previous retrospective studies (e.g., Watt and colleagues, 1998, 2000, 2001) and suggested that learning experiences may be an important precursor to heightened anxiety sensitivity levels and, subsequently, increased experiences of anxiety symptoms. The current study also uniquely extended knowledge about the potential causes and consequences of elevated anxiety sensitivity in two important ways. First, the study considered differential effects of learning experiences on anxiety symptoms given varying levels of anxiety sensitivity. To this end, findings indicated that youth with low levels of anxiety sensitivity may be more vulnerable to anxiety-related learning experiences such that there are significant increases in anxiety symptom level. Secondly, the present study examined these processes as a function of child characteristics with significant differences emerging for Hispanic/Latino compared to Caucasians. That is, Hispanic/Latino youth with elevated anxiety sensitivity and more anxiety-related

learning experiences seem to have fewer anxiety symptoms while the opposite is true for Caucasian youth. In all, the current study provided a more detailed assessment of the role of learning in the development of heightened anxiety sensitivity than that reported in past research and findings appear to be robust.

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Table 1

Descriptive Statistics for Sociodemographic and Child Clinical Variables

	%	*M*	*SD*	*Range*	*Skewness*	*Kurtosis*
Sex (Female)	48.6	---	---	---	---	---
Ethnicity (Hispanic)	51.4	---	---	---	---	---
Age (in years)	---	9.99	2.62	7 to 16	.77	-.29
Family Income	---	$57,337	$41,839	$5,000 to $180,000	1.27	1.36
Physiological Reactivity	---	33.19	13.48	18 to 67	.73	-.69
Negative Cognitions	---	26.89	12.09	13 to 70	1.16	1.18
Learning Experiences	---	31.14	37.83	0 to 155	1.11	.31
Anxiety Sensitivity	---	28.36	8.75	18 to 54	.92	.46
Anxiety Symptom Levels	---	12.07	7.58	0 to 28	.15	-1.05

Note. Physiological Reactivity = Physiological Hyperarousal Scale for Children (PH-C; Laurent, Catanzaro, & Joiner, 1995); Negative Cognitions = Negative Affect and Self Statement Questionnaire (NASSQ; Ronan, Kendall, & Rowe, 1994); Learning Experiences = Learning History Questionnaire (LHQ; Ehlers, 1993); Anxiety Sensitivity = Child Anxiety Sensitivity Index (CASI; Silverman et al., 1991); Anxiety Symptom Levels = Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978).

Table 2

Chi- Square Analysis: Distribution of Family Income, Sex, and Ethnicity by Child Characteristics

	Sex		Ethnicity		Age	
	Male	Female	Hispanic/ Latino	Caucasian	Younger (6-9 yrs. old)	Older (10-16 yrs. old)
Family Income:						
$25,000 or less	2	9	10	1	8	3
$25,001 – 75,001	9	10	9	10	14	5
Over $75,000	10	4	0	14	11	3
	$x^2(2, n = 44) = 7.00$*		$x^2(2, n = 44) = 20.99$**		$x^2(2, n = 44) = .14$	
Sex:						
Male	--	--	17	19	19	17
Female			19	15	16	18
			$x^2(1, n = 70) = .53$		$x^2(1, n = 70) = .17$	
Ethnicity:						
Hispanic/Latino	--	--	--	--	19	17
Caucasian					16	18
					$x^2(1, n = 70) = 1.00$	

Note. * $p < .05$, ** $p < .01$

Table 3

T-Test Results for Mean Differences in Clinical Variables across Sex, Ethnicity, and Age

	Sex				Ethnicity				Age			
	Male (*N* = 36)		Female (*N* = 34)		Hispanic/Latino (*N* = 36)		Caucasian (*N* = 34)		Younger (6-9 yrs. old) (n=35)		Older (10-16 yrs. old) (n=35)	
	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*	Mean	*SD*
Learning Experiences	26.00	39.35	36.57	35.94	39.66_{a}	37.57	22.11_{a}	36.50	31.59	42.31	30.68	33.38
Anxiety Sensitivity	26.69	8.06	30.12	9.28	28.78	8.28	27.91	9.32	28.31	10.09	28.40	7.32
Anxiety Symptoms	11.36	7.49	12.82	7.71	12.61	7.48	11.50	7.75	11.74	7.29	12.40	7.95

Note. Means with the same subscripts are significantly different at $p < .05$ based on independent samples t-tests.

Table 4

Correlations of Child Clinical Variables

	1	2	3
1. Learning Experiences	---		
2. Anxiety Sensitivity	.80**	---	
3. Anxiety Symptom Levels	.67**	.79**	---

Note. Learning Experiences = Learning History Questionnaire related to PH-C and NASSQ (LHQ; Ehlers, 1993); Anxiety Sensitivity = Child Anxiety Sensitivity Index (CASI; Silverman et al., 1991); Anxiety Symptom Level = Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1978).

**$p < .01$

Table 5

Partial Correlations of Child Clinical Variables

	Set of Variables Partialled Out								
	Child Characteristics			Clinical Variables			Child Characteristics and Clinical Variables		
	1	2	3	1	2	3	1	2	3
1. Learning Experiences	--			--			--		
2. Anxiety Sensitivity	.60**	--		.61**	--		.60**	--	
3. Anxiety Symptom Level	.66**	.79**	--	.08	.58**	--	.08	.58**	--

Note. Child Characteristics = Age, Sex, Ethnicity, and Family Income; *Clinical Variables* = Learning Experiences (LHQ; Ehlers, 1993), Anxiety Sensitivity (CASI; Silverman et al., 1991) and Anxiety Symptom Level (RCMAS; Reynolds & Richmond, 1978).

**$p < .01$

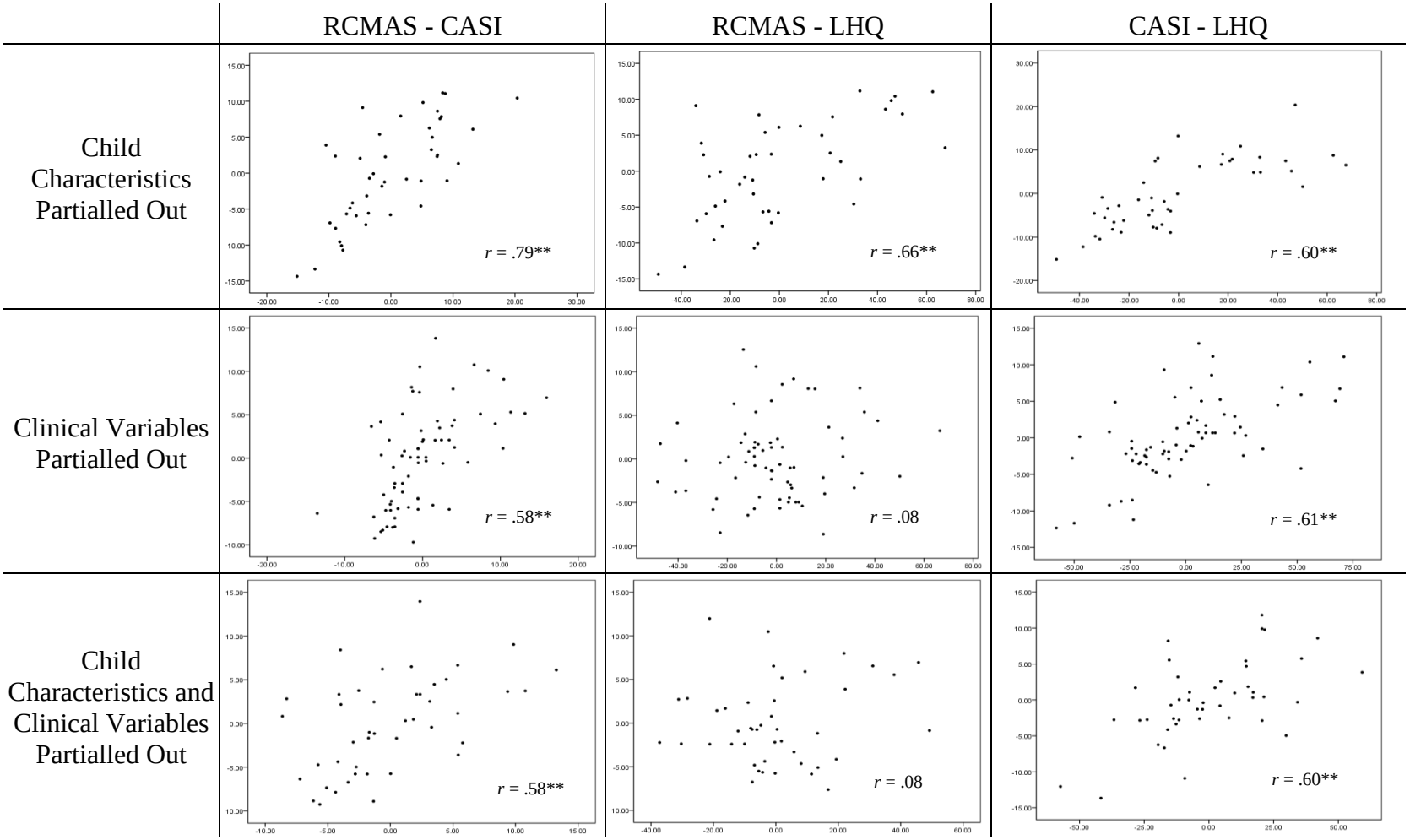

Figure 3. Partial Plots of Child Clinical Variables. All partial correlations are significant at the $p < .01$ level except for the partial correlations between RCMAS-LHQ when child characteristics and clinical variables are partialled out.

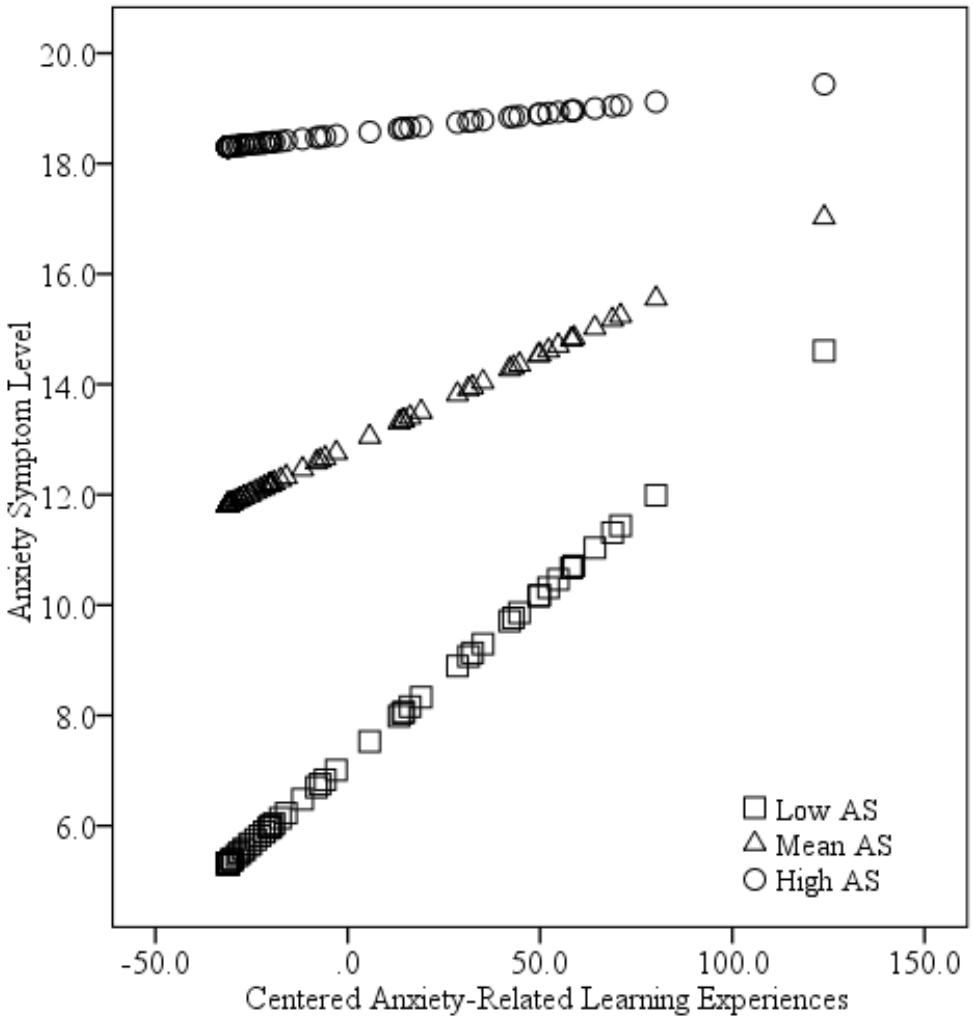

Figure 4. Simple Regressions of Learning Experiences on Anxiety Symptom Level at Different Levels of Anxiety Sensitivity. At low levels of AS, the simple slope of learning experiences on anxiety symptoms is marginally significant.

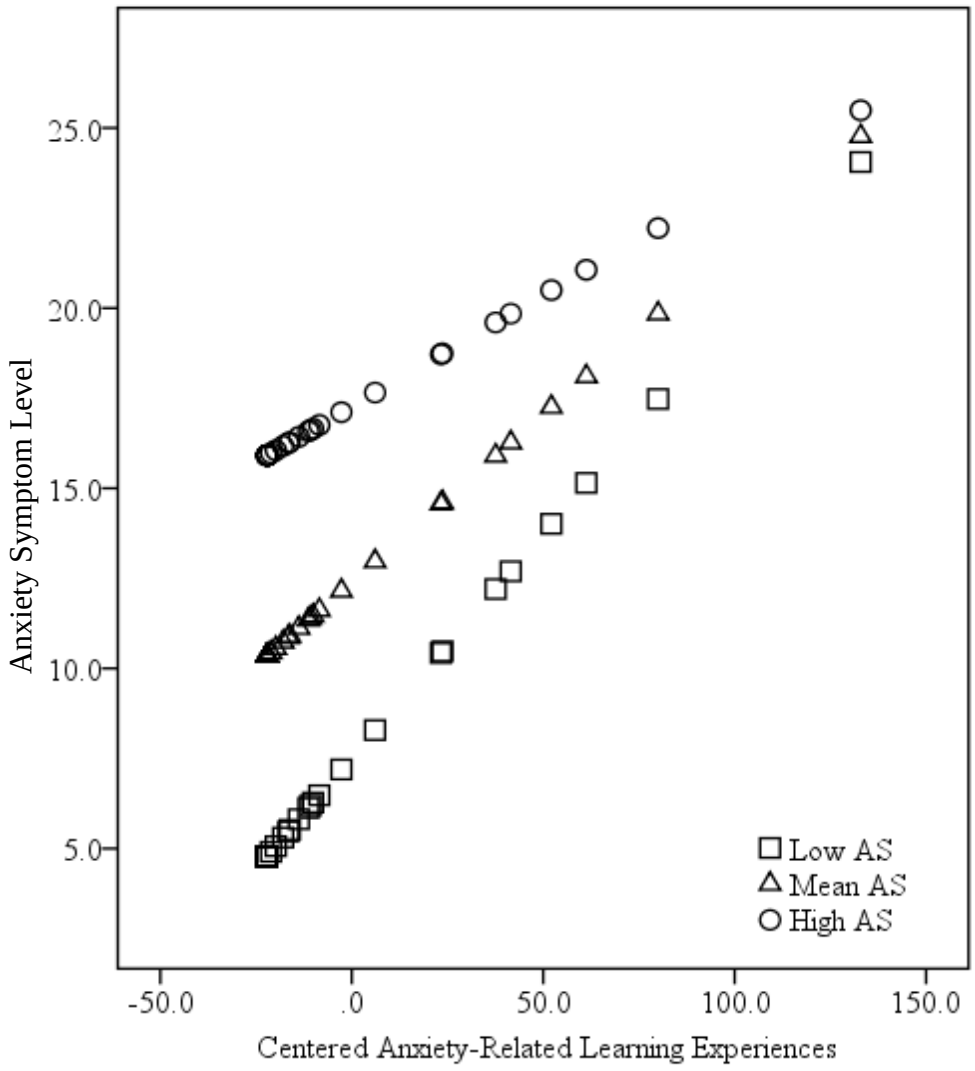

Figure 5. Simple Regressions of Learning Experiences on Anxiety Symptom Level at Different Levels of Anxiety Sensitivity for the Caucasian Sample Only. At low and mean levels of AS, the simple slope of learning experiences on anxiety symptoms is marginally significant.

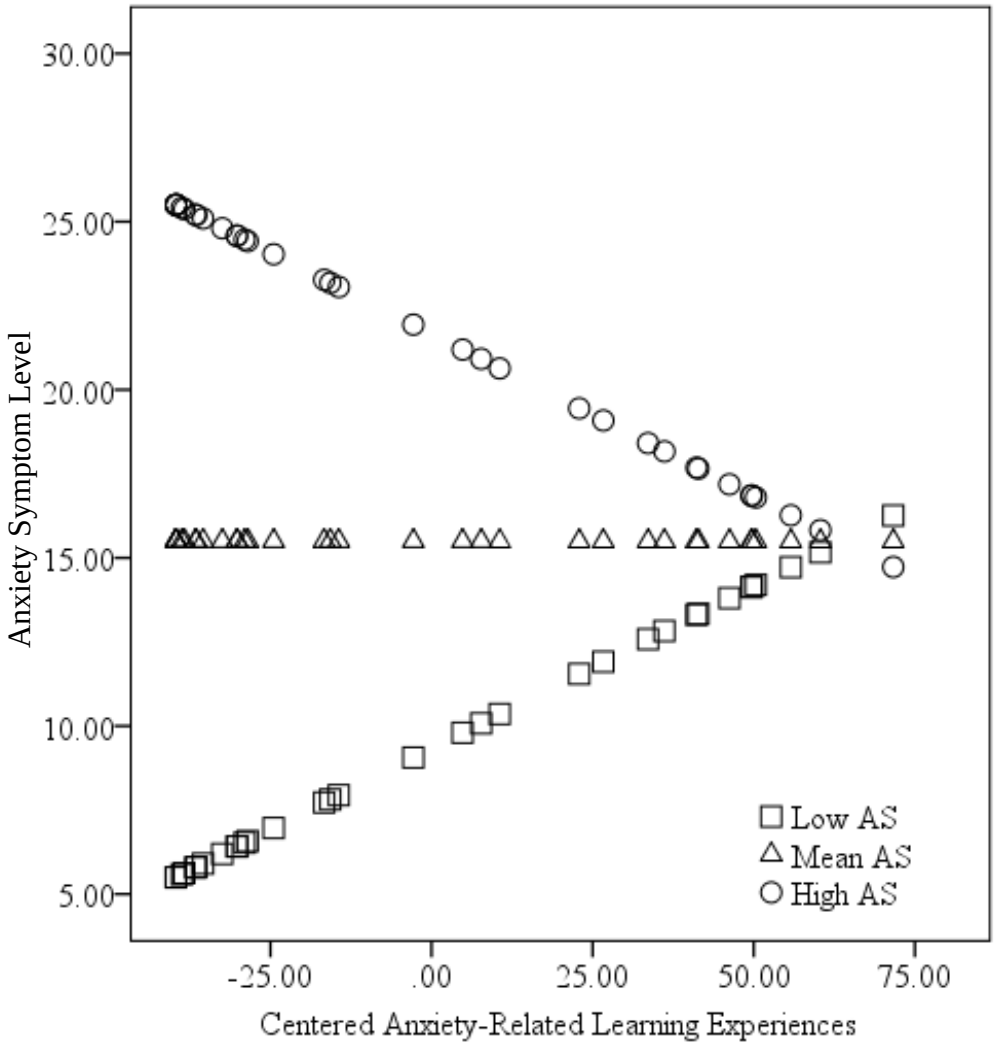

Figure 6. Simple Regressions of Learning Experiences on Anxiety Symptom Level at Different Levels of Anxiety Sensitivity for the Hispanic/Latino Sample Only. At low levels of AS, the simple slope of learning experiences on anxiety symptoms is marginally significant. At high levels of AS, the simple slope of learning experiences on anxiety symptoms is statistically significant.

APPENDIX A

NEGATIVE AFFECT SELF-STATEMENT QUESTIONNAIRE

Negative Affect Self-Statement Questionnaire

Listed below are some thoughts that sometimes pop into children's heads. Please read each thought and mark, how often, if at all, the thoughts came into your mind over the past week. Please read each item carefully, and then circle your answer on the sheet in the following way: 1 = not at all, 2 = sometimes, 3 = fairly often, 4 = often, and 5 = all the time.

	Not at All	Some-times	Fairly often	Often	All the Time
1. I thought my world was coming to an end.	1	2	3	4	5
2. I thought I would fail.	1	2	3	4	5
3. I feel like I am going to die.	1	2	3	4	5
4. I usually do something stupid.	1	2	3	4	5
5. I can't do anything right.	1	2	3	4	5
6. I felt weak like I am going to faint.	1	2	3	4	5
7. I am very nervous.	1	2	3	4	5
8. Life is terrible.	1	2	3	4	5
9. I feel like something was dying inside of me.	1	2	3	4	5
10. I feel like my heart is in my throat.	1	2	3	4	5
11. What is wrong with me?	1	2	3	4	5
12. Nobody cares anymore.	1	2	3	4	5
13. I was afraid I would make a fool of myself.	1	2	3	4	5
14. I am not as good as my parents want me to be.	1	2	3	4	5

APPENDIX B

PHYSIOLOGICAL HYPERAROUSAL SCALE FOR CHILDREN

Physiological Hyperarousal Scale for Children

Please circle the number that best describes how often you have felt or experienced the following during the last two weeks.

	Very slightly or not at all	A little	Moderately	Quite a bit	Extremely
1. Dry mouth	1	2	3	4	5
2. Sweaty hands/palms	1	2	3	4	5
3. Tingling (like pins and needles)	1	2	3	4	5
4. Blushing	1	2	3	4	5
5. Shaky	1	2	3	4	5
6. Stomach ache	1	2	3	4	5
7. Cold flashes/chills	1	2	3	4	5
8. Dizzy	1	2	3	4	5
9. Heart pounding	1	2	3	4	5
10. Sweating when you are not hot	1	2	3	4	5
11. Can't catch your breath	1	2	3	4	5
12. Feeling of choking	1	2	3	4	5
13. Hot flashes	1	2	3	4	5
14. Numbness (like your foot's asleep)	1	2	3	4	5
15. Pain in your chest	1	2	3	4	5
16. Feeling like throwing up	1	2	3	4	5
17. Tight muscles	1	2	3	4	5
18. Can't sit still	1	2	3	4	5

APPENDIX C

LEARNING HISTORY QUESTIONNAIRE FOR THE NEGATIVE AFFECT SELF-STATEMENT QUESTIONNAIRE

Learning History Questionnaire for the Negative Affect Self-Statement Questionnaire

Assessor: Identify and highlight the statements answered on the "NASSQ" checklist as "Often" or "All the time." Then read the instructions below while pointing at the items the child answered "Often" or "All the time" to:

1) I thought my world was coming to an end.
2) I thought I would fail.
3) I feel like I am going to die
4) I usually do something stupid
5) I can't do anything right
6) I felt weak like I am going to faint
7) I am very nervous
8) Life is terrible
9) I feel like something was dying inside of me
10) I feel like my heart is in my throat
11) What is wrong with me?
12) Nobody cares anymore
13) I was afraid I would make a fool of myself
14) I am not as good as my parents want me to be

I want to ask you whether certain things happen to you when you have these feelings. Please use one of these three words: "None", "Some", or "A Lot" to answer the questions I am going to read.

WHEN YOU THINK ABOUT (1), (2), (3)….

Learning Questions	None	Some	A Lot
1. . . . do you skip your schoolwork, homework, or jobs around the house?	____	____	____
2. . . . do you get special things. Like special foods or presents?	____	____	____
3. . . . do you skip physical activities. Like sports, soccer, or running?	____	____	____
4. . . . do you skip activities with family or friends. Like birthday parties?	____	____	____
5. . . . do you get to do things that you are usually not allowed to do. Like watching TV for a really long time or staying up late at night?	____	____	____
6. . . . do your parents or anyone close to you tell you that they worry about you feeling this way?	____	____	____
7. . . . do your parents or anyone close to you take you to see a doctor and you are glad about it?	____	____	____
8. . . . do your parents or anyone close to you give you medicine and you are glad about it?	____	____	____
9. . . . do your parents or anyone close to you seem scared or nervous about how you are feeling?	____	____	____
10. . . . do your parents or anyone close to you tell you that you can get really sick because you feel this way?	____	____	____

Learning Questions	None	Some	A Lot
11. . . . do your parents seem as if they do not care about you feeling this way?	____	____	____
12. . . . have you noticed that your parents or anyone close to you worry when they feel these things too?	____	____	____
13. . . . do your parents or anyone close to you make you feel it is your fault that you feel this way?	____	____	____
14. . . . have you noticed that your parents or anyone else close to you act as if they are going to get really sick when they are feeling these things too?	____	____	____
15. . . . do your parents or anyone close to you tell you that you need to be careful when you feel this way because you may lose control?	____	____	____
16. . . . do your parents or anyone close to you tell you that something bad may happen to you when you feel this way?	____	____	____
17. . . . do you feel alone when you feel this way?	____	____	____
18. . . . do you get special attention or get to spend special time with your parents or anyone close to you. Like play games, or do a special activity with them	____	____	____
19. . . . do you skip medical appointments to which you do not want to go?	____	____	____

APPENDIX D

LEARNING HISTORY QUESTIONNAIRE FOR THE PHYSIOLOGICAL HYPERAROUSAL SCALE

Learning History Questionnaire for the Physiological Hyperarousal Scale for Children

Assessor: Identify and highlight the statements answered on the "NASSQ" checklist as "Often" or "All the time." Then read the instructions below while pointing at the items the child answered "Often" or "All the time" to:

1) Dry mouth
2) Sweaty hands/palms
3) Tingling (like pins and needles)
4) Blushing
5) Shaky
6) Stomachache
7) Cold flashes/chills
8) Dizzy
9) Heart pounding
10) Sweating when you are not hot
11) Can't catch your breath
12) Feeling of choking
13) Hot flashes
14) Numbness (like your foot is asleep)
15) Pain in your chest
16) Feeling like throwing up
17) Tight muscles
18) Can't sit still

I want to ask you whether certain things happen to you when you have these feelings. Please use one of these three words: "None", "Some", or "A Lot" to answer the questions I am going to read.

WHEN YOU THINK ABOUT (1), (2), (3)….

Learning Questions	None	Some	A Lot
1. . . . do you skip your schoolwork, homework, or jobs around the house?	____	____	____
2. . . . do you get special things. Like special foods or presents?	____	____	____
3. . . . do you skip physical activities. Like sports, soccer, or running?	____	____	____
4. . . . do you skip activities with family or friends. Like birthday parties?	____	____	____
5. . . . do you get to do things that you are usually not allowed to do. Like watching TV for a really long time or staying up late at night?	____	____	____
6. . . . do your parents or anyone close to you tell you that they worry about you feeling this way?	____	____	____
7. . . . do your parents or anyone close to you take you to see a doctor and you are glad about it?	____	____	____
8. . . . do your parents or anyone close to you give you medicine and you are glad about it?	____	____	____
9. . . . do your parents or anyone close to you seem scared or nervous about how you are feeling?	____	____	____
10. . . . do your parents or anyone close to you tell you that you can get really sick because you feel this way?	____	____	____

Learning Questions	None	Some	A Lot
11. . . . do your parents seem as if they do not care about you feeling this way?	____	____	____
12. . . . have you noticed that your parents or anyone close to you worry when they feel these things too?	____	____	____
13. . . . do your parents or anyone close to you make you feel it is your fault that you feel this way?	____	____	____
14. . . . have you noticed that your parents or anyone else close to you act as if they are going to get really sick when they are feeling these things too?	____	____	____
15. . . . do your parents or anyone close to you tell you that you need to be careful when you feel this way because you may lose control?	____	____	____
16. . . . do your parents or anyone close to you tell you that something bad may happen to you when you feel this way?	____	____	____
17. . . . do you feel alone when you feel this way?	____	____	____
18. . . . do you get special attention or get to spend special time with your parents or anyone close to you. Like play games, or do a special activity with them	____	____	____
19. . . . do you skip medical appointments to which you do not want to go?	____	____	____

APPENDIX E

CHILDHOOD ANXIETY SENSITIVITY INDEX

Childhood Anxiety Sensitivity Index

DIRECTIONS: A number of statements which boys and girls use to describe themselves are given below. Read each statement carefully and put an X on the line in front of the words that describe you. There are no right or wrong answers. Remember, find the words that best describe you.

1. I don't want other people to know when I feel afraid. ___ None ___Some ___A lot

2. When I cannot keep my mind on my schoolwork I worry that I might be going crazy. ___ None ___Some ___A lot

3. It scares me when I feel "shaky." ___ None ___Some ___A lot

4. It scares me when I feel like I am going to faint. ___ None ___Some ___A lot

5. It is important for me to stay in control of my feelings. ___ None ___Some ___A lot

6. It scares me when my heart beats fast. ___ None ___Some ___A lot

7. It embarrasses me when my stomach growls (makes noise). ___ None ___Some ___A lot

8. It scares me when I feel like I am going to throw up. ___ None ___Some ___A lot

9. When I notice that my heart is beating fast, I worry that there might be something wrong with me. ___ None ___Some ___A lot

10. It scares me when I have trouble getting my breath. ___ None ___Some ___A lot

11. When my stomach hurts, I worry that I might be really sick. ___ None ___Some ___A lot

12. It scares me when I can't keep my mind on my schoolwork. ___ None ___Some ___A lot

13. Other kids can tell when I feel shaky. ___ None ___Some ___A lot

14. Unusual feelings in my body scare me. ___ None ___Some ___A lot

15. When I am afraid, I worry that I might be crazy. ___ None ___Some ___A lot

16. It scares me when I feel nervous. ___ None ___Some ___A lot

17. I don't like to let my feelings show. ___ None ___Some ___A lot

18. Funny feelings in my body scare me. ___ None ___Some ___A lot

APPENDIX F

REVISED CHILDREN'S MANIFEST ANXIETY SCALE

Revised Children's Manifest Anxiety Scale

Instructions: Read each question carefully. Put a circle around the word YES if you think it is true about you. Put a circle around the word NO if you think it is not true about you.

1.	I have trouble making up my mind.	yes	no
2.	I get nervous when things do not go the right way.	yes	no
3.	Others seem to do things easier than I can.	yes	no
4.	I like everyone I know.	yes	no
5.	Often I have trouble getting my breath.	yes	no
6.	I worry a lot of the time.	yes	no
7.	I am afraid of a lot of things.	yes	no
8.	I am always kind.	yes	no
9.	I get mad easily.	yes	no
10.	I worry about what my parents will say to me.	yes	no
11.	I feel that others do not like the way I do things.	yes	no
12.	I always have good manners.	yes	no
13.	It is hard for me to get to sleep at night.	yes	no
14.	I worry about what other people think about me.	yes	no
15.	I feel alone even when there are people with me.	yes	no
16.	I am always good.	yes	no
17.	Often I feel sick in my stomach.	yes	no
18.	My feelings get hurt easily.	yes	no
19.	My hands feel sweaty.	yes	no
20.	I am always nice to everyone.	yes	no
21.	I am tired a lot.	yes	no
22.	I worry about what is going to happen.	yes	no
23.	Other children are happier than I.	yes	no
24.	I tell the truth every single time.	yes	no
25.	I have bad dreams.	yes	no
26.	My feelings get hurt easily when I am fussed at.	yes	no
27.	I feel someone will tell me I do things the wrong way.	yes	no
28.	I never get angry.	yes	no
29.	I wake up scared some of the time.	yes	no
30.	I worry when I go to bed at night.	yes	no
31.	It is hard for me to keep my mind on my schoolwork.	yes	no
32.	I never say things I shouldn't.	yes	no
33.	I wiggle in my seat a lot.	yes	no
34.	I am nervous.	yes	no
35.	A lot of people are against me.	yes	no
36.	I never lie.	yes	no
37.	I often worry about something bad happening to me.	yes	no