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An Examination of Racial Differences in Anxiety Disorder Symptom Structure and Trajectories among Pre-Adolescent Female Youth

Cynthia Altman

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AN EXAMINATION OF RACIAL DIFFERENCES IN
ANXIETY DISORDER SYMPTOM STRUCTURE AND TRAJECTORIES
AMONG PRE-ADOLESCENT FEMALE YOUTH

A Dissertation

Submitted to the School of Education

Department of Counseling, Psychology, and Special Education

Duquesne University

In partial fulfillment of the requirements for
the degree of Doctor of Philosophy

By

Cynthia L. Altman

December 2009

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Cynthia L. Altman

2009

DUQUESNE UNIVERSITY
SCHOOL OF EDUCATION
Department of Counseling, Psychology, and Special Education

Dissertation

Submitted in partial fulfillment of the requirements
for the degree
Doctor of Philosophy (Ph.D.)

School Psychology Doctoral Program

Presented by:

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August 27, 2009

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IN ANXIETY DISORDER SYMPTOM STRUCTURE AND TRAJECTORIES
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ABSTRACT

AN EXAMINATION OF RACIAL DIFFERENCES IN ANXIETY DISORDER SYMPTOM STRUCTURE AND TRAJECTORIES AMONG PRE-ADOLESCENT FEMALE YOUTH

By

Cynthia L. Altman

December 2009

Dissertation supervised by: Tammy L. Hughes, Ph.D.

Although the experience of anxiety among children and adolescents is well documented in the literature, relatively little empirical study has focused on this topic. Existing research is essentially void of studies into gender-specific aspects of anxiety development and maintenance or race-based differences in anxiety symptomatology. The current study sought to fill this gap by examining racial differences in anxiety disorder symptom structure and trajectories among pre-adolescent female youth. Symptom structure was examined among a sample of 570 girls (252 European American, 318 African American) who completed the Screen for Child Anxiety Related Emotional Disorders (SCARED) at nine years of age ($M = 9.63$, $SD = .33$). Results of a confirmatory factor analysis (CFA) suggested that a five factor structure of the SCARED described the data reasonably well for both European American and African American

girls, but that individual items may group differently on the five factors depending on race. Trajectories of anxiety disorder symptoms were assessed among 556 girls (241 European American, 315 African American), on the basis of self-report data obtained via the SCARED over a period of four years, beginning when girls were age nine ($M = 9.63$, $SD = .33$). When the overall sample was considered, findings indicated that all five anxiety disorder types assessed (generalized anxiety, panic, school phobia, separation anxiety, social phobia) decreased from age 9-12. Race-based differences in trajectories were evidenced, in that African American girls demonstrated higher initial symptoms levels than their European American counterparts across anxiety subtypes, and had differential rates of growth over time. Results are discussed in the context of existing literature, with practical and research-based implications woven throughout.

DEDICATION

This dissertation is dedicated to my parents, Duane and Joyce, and my sister, Lori, for their consistent support throughout my educational endeavors. I would surely not be where I am today without all three of them. This document is also dedicated to Jason Page who, despite coming into my life during the later stages of this work, provided unconditional encouragement and support, believed in me, and constantly pushed me to be my best, the combination of which was integral to completion of this project.

ACKNOWLEDGEMENT

I have long been a proponent of the saying, “The best way out of a problem is through it.” I can no longer remember when or where I first heard this, but I can think of few areas of my life where it is as applicable as with regard to dissertation. What the quote admittedly lacks, at least from my perspective, is reference to those who offer support as problems are worked through and sometimes provide a needed “push” to initiate the work through process. I spent a number of years avoiding earnest work on this dissertation, only to realize what was perhaps obvious to those around me: that no amount of procrastination or excuse making was going to make the task somehow disappear, much less make it any simpler. I am indebted to many people who assisted me throughout the labor intensive (and sometimes emotionally charged) process of completing a dissertation.

First and foremost, I would like to express sincere gratitude to the members of my dissertation committee, whose combined efforts undoubtedly made completion of this project possible. The chair of my committee, Dr. Tammy Hughes, provided expert guidance along the way, along with a high degree of support and encouragement throughout. She offered “reality checks” when I needed them most and utterly refused to give up on me, even though there were times I surely gave her reason to. Her professionalism, intellect, and dedicated mentorship are truly admirable, and something that I hope to emulate in my own career.

My other committee members were likewise integral to the completion of this dissertation, contributed to its quality, and served as valued professional role models. Dr.

Alison Hipwell, from the Pittsburgh Girls Study (PGS), consistently offered timely and useful feedback, asked thought-provoking questions, and routinely challenged me to think more deeply about this project. She maintained a positive and supportive attitude throughout its duration, which made more of a difference than I suspect she is aware. Dr. Laura Crothers provided unmatched attention to detail, unwavering support, and reassurance when I needed it most. My own scholarly writing was greatly shaped by Dr. Crothers's example and leadership throughout my graduate career and for that, I am truly grateful. Dr. Launcelot Brown fostered my understanding of statistical concepts by sharing his knowledge of statistics, explaining ideas plainly, and answering questions in a thoughtful manner. He displayed marked flexibility in learning about concepts with which he was not familiar and agreeing to continue serving as an active member of my committee during his sabbatical year.

Completing this dissertation would also not have been possible without the support of multiple individuals from Duquesne University. Dr. James Schreiber willingly shared his expertise regarding the conduct and interpretation of the analyses carried out for this dissertation through countless email exchanges and telephone conversations. Although he did not serve as a formal member of my committee, the degree of assistance that he provided certainly made him worthy of "honorary membership" thereof. Dr. Schreiber's willingness to assist was deeply appreciated and will not soon be forgotten. Audrey Czwalga, assistant to the director of the school psychology program, astounded me throughout the process with her organization and efficiency, and consistent willingness to "go the extra mile" for me (and other students). Her myriad contributions and support do not go unnoticed, and are sincerely appreciated. My fellow cohort

members provided unending friendship and support throughout our coursework and internship year, despite geographical distance between us. I feel blessed to have met each one of them and look forward to continuing to develop our relationships well into the future.

I would be remiss if I did not thank the principal investigators at the PGS who allowed me access to the data used in this project, and to the PGS staff who aided in the preparation of the data used. I am extremely grateful for being afforded the opportunity to work at the PGS as a practicum student for a period of three years. Throughout that time, I gained much valuable knowledge into the development of psychopathology among young females, and learned a lot about the day-to-day operation of a large longitudinal investigation. I am particularly thankful to Deena Battista, PGS statistician, who answered what may have seemed like never-ending data related questions, in a consistently thoughtful manner. Her responses were crucial to my understanding of PGS data and accurate interpretation of results of analyses incorporating it.

Finally, I am grateful to the entire staff of the Boys Town Outpatient Behavioral Pediatric and Family Services Clinic who believed in me and consistently urged me to forge ahead, despite frequently overwhelming (and debilitating) levels of anxiety. I am especially appreciative for my internship supervisor, Dr. Connie Schnoes, for her gentle prodding and pushing along the way. She served as one of my primary cheerleaders when progress was made, no matter how small, and routinely helped me to re-gain focus on the desired goal. My fellow interns at Boys Town also played a role in the successful completion of this dissertation, by providing encouragement; necessary fun, humor, and distraction; and simply refusing to allow me to be consumed by dissertation work.

Each of the above-mentioned individuals holds a special place in my heart, and has been influential in helping me to achieve the goal of dissertation completion. I am deeply appreciative of their support throughout this journey, and undoubtedly could not have reached this point without all of them.

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CHAPTER I

INTRODUCTION

Anxiety is frequently cited as one of the most common mental health concerns experienced by children and adolescents (e.g., Morris & March, 2004; Woodruff-Borden & Leyfer, 2006), yet has only recently captured the attention of the research community. As such, relatively little is documented about the development and manifestation of anxiety among youth, or the long term impact of anxiety-related difficulties on children and adolescents.

Developmental theorists posit that fear, worry, and anxiety are normative among children and adolescents, especially during periods of transition and in response to perceived danger or threat (American Academy of Child and Adolescent Psychiatry [AACAP], 2007). The particular form that anxiety takes is presumed to change as youth age, with separation-related concerns predominating for young children (Weems & Costa, 2005) and social anxieties more characteristic as youth approach adolescence (Evans et al., 2005b; Weems & Costa, 2005). Studies examining trajectories of anxiety over time, whether in relation to specific subtypes of anxiety or anxiety more globally, are notably absent from the literature. Many studies of youth anxiety have utilized clinic-based samples of youth, spanned a limited age range, and been of short duration, collectively precluding the understanding of normative developmental trends.

Knowledge of typical patterns of anxiety development and manifestation is necessary to guide the timing and format of prevention, early intervention, and/or treatment programs targeting anxiety problems among youth. Increased insight into such trends would aid in the identification of when children and adolescents are most

vulnerable, and inform how to structure environments (e.g., schools) in a manner likely to minimize potential detrimental effects of anxiety on youth outcomes.

Prior investigations have linked youth anxiety with a host of adverse outcomes in the short term, including lowered academic achievement (Wood, 2006), difficulty in peer relationships (Chansky & Kendall, 1997), and increased risk of developing depression (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Child and adolescent anxiety is also related to anxiety in adulthood (Saavedra & Silverman, 2002), and adults who struggle with anxiety frequently date the onset of their symptoms to childhood or adolescence (Kendall & Ollendick, 2004). The experience of anxiety has the potential to undermine multiple facets of youth development, even when symptoms exist at a threshold below that required for formal diagnosis of an anxiety disorder (AACAP, 2007).

Significance of the Problem

Girls have been found to be more anxious and fearful than boys across contexts (e.g., Zahn-Waxler & Polanichka, 2004). Rates of anxiety disorders also tend to be higher among females than males from childhood onward (Zahn-Waxler, Crick, Shirtcliff, & Woods, 2006), with the overall risk of developing anxiety seemingly increasing over time for girls (Hale, Raaijmakers, Muris, van Hoof, & Meeus, 2008). Despite this, gender-specific trends in childhood anxiety have historically not been well-studied (Vasey & Ollendick, 2000), leading to many unanswered questions regarding differential prevalence rates, clinical presentation, and etiological variables. Investigations of anxiety exclusively among female youth are seemingly non-existent in the literature; when gender-specific findings are considered, it is in the context of larger studies involving

both boys and girls. A particularly limited body of research attending to potentially unique rates of prevalence, symptom expression, and developmental trends in anxiety among female youth from ethnic minority backgrounds exists at present.

Hayward and Sanborn (2002) maintain that gender-related differences in the experience of internalizing forms of psychopathology (e.g., anxiety) occur most typically during the early adolescent years, frequently coinciding with pubertal onset and suggesting that a dynamic interplay between biological (e.g., hormones) and psychosocial (e.g., societal expectations) factors is at work. Puberty may represent the developmental period when gender diversion in presentation of anxiety and anxiety-related disorders becomes apparent. Illustrative of this, numerous researchers (e.g., Zahn-Waxler et al., 2006) report that girls who struggle with anxiety are more likely than boys to present with somatic complaints, a finding that has been observed empirically among both European American and African American samples of youth (Kingery, Ginsburg, & Alfano, 2007).

It has also been suggested that anxiety-related disturbances have a greater functional impact among girls and women than boys and men (Christophersen & Mortweet, 2001). Hypothesized explanations for girls' increased propensity to develop anxiety and be impacted by it functionally abound in the literature. These include, although are not limited to, ineffective strategies for coping when distressed (Byrne, 2000); low self-esteem (O'hannessian, Lerner, Lerner, & von Eye, 1999); and definitional, theoretical, and/or methodological artifacts of existing studies of youth anxiety (Mackinaw-Koons & Vasey, 2000).

Nevertheless, if puberty is viewed as a period when female youth are at increased risk for the experience of internalized forms of distress, it may be an optimal phase of development in which to focus early intervention and/or treatment efforts. It likewise points to the seeming timeliness of studying girls beginning prior to the onset of puberty (i.e., during the pre-adolescent years), since this may be the developmental period with the greatest potential for effective preventive measures targeting anxiety-related disturbances. Research devoted to youth anxiety also commonly centers on the adolescent years, thereby precluding firm knowledge of what occurs prior to that phase of development.

A greater understanding of developmental trends in anxiety solely among young girls would permit the establishment of prevention and treatment-oriented approaches sensitive to the unique needs of this population. Specifically, examining anxiety trajectories would provide insight into which symptom types predominate at various points in female development, which could have important implications for both the timing and structure of interventions for anxiety-related disturbances among girls. Further, knowledge of normative trends in levels of anxiety and manifestation thereof among young females may have important diagnostic implications (e.g., that a higher symptom threshold be required for diagnosis of anxiety-related disturbances in girls).

Consideration of race-specific developmental trends could prove particularly useful, as existing studies tend to give little credence to potentially unique aspects of anxiety based on race. In other domains of psychopathology (e.g., depression), it is more widely documented that presenting symptoms and help-seeking behavior may be impacted by race. Sen (2004) reported, for instance, that adolescents from minority

backgrounds were more likely to suffer from depressed mood and less apt to seek help in dealing with their concerns than were their majority (i.e., non-Hispanic and white) counterparts. Associated levels of functional impairment may also differ by race (e.g., minority youth who suffer from depression may be more prone to engage in self-harming behavior than those from majority groups, particularly if assistance is not sought; Sen, 2004). In the absence of further empirical work to examine potential race-based differences in psychopathological symptoms, racially-sensitive and relevant approaches to treatment cannot be developed.

Theoretical Basis

Although definitions offered in the literature vary somewhat, anxiety is typically viewed as a global construct characterized broadly by apprehension and anticipation (Silverman & Carter, 2006). Symptoms are believed to be experienced in response to a real or perceived threat to the physical or psychological well-being of a person (Dobson, 1985), and are present across numerous domains of functioning (e.g., behavioral, cognitive, emotional, physiological, social; Dobson, 1985; Silverman & Carter, 2006). Anxiety is more commonly conceptualized as presented in the latest edition of the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR*; American Psychiatric Association, 2000), wherein distinct subtypes (e.g., generalized anxiety, separation anxiety), each with a unique complement of symptoms, are described.

There is presently no single, unified, widely agreed upon theory regarding the development of anxiety, whether at sub-threshold levels or those characteristic of disorder. The development of anxiety is generally perceived as complex, involving an interplay of innate vulnerability (e.g., behaviorally-inhibited temperamental style) and

environmental influence (e.g., modeling; Christophersen & Mortweet, 2001; Ginsburg, Siqueland, Masia-Warner, & Hedtke, 2004), consistent with a diathesis-stress viewpoint. A number of variables in both the biological (e.g., early pubertal maturation) and environmental realms (e.g., socialization practices) are viewed as particularly salient to the development and maintenance of anxiety among young females (Silverman & Carter, 2006), whereas countless others are believed to exert a similar impact on the development of anxiety in boys and girls. For youth of both genders, multiple causal factors, rather than any single contributory variable, are believed to be at work (Muris, 2006).

As stated above, the general contention among developmental theorists is that the experience of anxiety symptoms in childhood and adolescence is normative, despite differential presentation as youth age and become more emotionally, socially, and cognitively sophisticated. For instance, as the autonomy and self-reliance of toddlers and preschool-aged children gradually increase, they come to realize the degree to which they remain dependent on parents or other attachment figures; it is normative for them to possess concerns regarding separation from these individuals since this may threaten their basic sense of safety and security (Weems & Costa, 2005).

Anxiety surrounding issues such as death and danger predominates during the later stages of childhood and pre-adolescence, as youth develop the capacity to think about more abstract concepts (e.g., morality) than they were previously able (Weems & Costa, 2005). The adolescent years are frequently consumed with anxiety regarding social matters, likely attributable to youths' increased social understanding, the heightened importance assumed by the peer group during adolescence, and/or exposure to new circumstances (e.g., substance use) amongst one's peers (Evans et al., 2005b;

Weems & Costa, 2005). Consideration of developmental expectedness, symptom persistence, and functional impact typically guides differentiation of normative experiences of anxiety from those deemed pathological (e.g., Christophersen & Mortweet, 2001).

Weems (2008) and others have theorized that individual trajectories of anxiety can be classified into one of several categories: 1) stable low (characterized by a consistently minimal or low degree of anxiety symptoms evidenced over time), 2) stable high (characterized by consistently elevated levels of anxiety over time), 3) increasing (characterized by initial low symptom levels that gradually increase and remain elevated with time), and 4) decreasing (characterized by initial elevations in anxiety symptom level, followed by a decline and leveling off with time). Those with “fluctuating” levels of anxiety are also occasionally described, to accommodate cases with no consistent pattern of stability or change over time (Weems, 2008). Such theorized trajectory classes have seldom been subjected to empirical scrutiny, so evidence of their practical utility remains limited; at the very least, they represent a useful conceptual heuristic. Because this form of categorization has typically been applied to global levels of anxiety, it is presently unclear if it can apply to individual subtypes of anxiety-related disturbance as well.

Support for trajectory classes such as the above is derived most frequently from studies of externalizing forms of psychopathology (e.g., conduct problems, delinquency); study of the applicability of these classes to internalizing phenomena (e.g., anxiety, depression) has been comparatively limited. The hypotheses put forth by Weems (2008) and others may be founded on the assumption that similar trajectories would be

evidenced among those with internalizing and externalizing forms of distress, rather than a firm theoretical foundation. The extent to which such theorized trajectories would hold across age groups is likewise unclear.

Empirical Basis

Although available research findings largely support the above-mentioned developmental differences in the manifestation of anxiety, the overwhelming majority of these works are cross-sectional in nature or are conducted over a limited span of time, precluding elucidation of longitudinal trajectories of anxiety. Much of the literature makes use of clinical samples, which limits knowledge of normative patterns in the expression of anxiety among children and adolescents based in the community (Hale et al., 2008). Researchers also tend to assess anxiety in a diffuse manner or to focus on a single variant in their investigations, rather than examine multiple subtypes in the confines of a single study.

Hale and co-authors (2008) conducted the only known, published study of developmental trajectories of anxiety disorder symptoms among a sample of adolescents from the general population. They assessed male and female youth from the Netherlands over a period of five years, observing a slight decrease in symptoms associated with separation anxiety disorder, panic disorder, and school anxiety, along with relative stability in social phobia symptoms, in two separate cohorts of boys and girls, ages 12 and 16 at the first wave of measurement (Hale et al., 2008).

The only gender-specific finding to emerge from these analyses related to generalized anxiety symptoms in girls. Specifically, symptoms of generalized anxiety in female youth increased from age 12 until mid-adolescence (i.e., approximately 15-16

years of age), with elevated levels maintained subsequently, whereas a decline in symptoms was evidenced over time among males (Hale et al., 2008). Hughes and colleagues (2006) obtained similar findings in a preliminary longitudinal investigation of anxiety (globally) among several cohorts of boys in an urban, community-based sample from the United States. These researchers found that anxiety peaked around the age of 11, with a steady decline thereafter, before essentially leveling off by the time boys reached 16 or 17 years of age (Hughes et al., 2006). In the absence of additional study into trajectories of anxiety among young boys and girls, it is difficult to predict what gender-specific outcomes would be with any degree of certitude, highlighting the timeliness of gender-based research in this topical area.

Problem Statement

The purpose of the current study is to document the development of various anxiety disorders (e.g., generalized anxiety disorder, social phobia) among a sample of pre-adolescent female youth (ages 9-12) from the community. Developmental trajectories of anxiety disorder symptoms were examined and compared among European American and African American girls. Anxiety disorder symptom structure was also evaluated and compared in European American and African American girls in the sample. This study reflects a unique contribution to the literature in its exclusive focus on girls and initiation of assessment prior to adolescence.

Research Questions and Hypotheses

The current investigation seeks to answer the following specific questions in relation to trajectories of anxiety-related symptoms among young females. Because there is little empirical work in this area to guide hypothesis generation, analyses are

undertaken primarily for exploratory purposes. To the extent possible, speculations are based on a combination of available research findings and developmental theory.

Research Question # 1

Are there differences in the structure of anxiety disorder symptoms among European American and African American female youth at age nine?

Hypothesis # 1

Investigation of the structure of anxiety disorder symptoms among girls from various racial groups is intended to be exploratory in nature, as prior empirical results in this area are mixed. For instance, Hale, Raaijmakers, Muris, and Meeus (2005) found evidence to suggest that anxiety disorder symptom structure is parallel among samples of international youth from the general population, regardless of age, gender, or ethnicity. Birmaher and colleagues (1997) likewise found support for comparable race-based symptom structure among an outpatient sample of male and female youth. Boyd and colleagues (2003), in contrast, assessed African American youth based in the community, obtaining results that caused them to question the experience of separation anxiety and school phobia (supported empirically among European American children and adolescents) among African American youth.

Research Question # 2

What does the developmental trajectory of symptoms of: a) generalized anxiety disorder, b) panic disorder, c) school phobia, d) separation anxiety disorder, and e) social phobia among female youth look like over time?

Hypothesis # 2

Generalized anxiety disorder. On the basis of gender-specific findings obtained by Hale and colleagues (2008), it is hypothesized that symptoms of generalized anxiety disorder will increase gradually from age nine onward, reaching their highest point in early adolescence (i.e., age 12).

Panic disorder. Given that onset of panic disorder is rare prior to adolescence or adulthood, it is hypothesized that levels of panic disorder symptoms will remain relatively low over the course of study. If elevated symptom levels are observed, it is assumed that this will occur among girls at the oldest age of assessment (i.e., age 12).

School phobia. It is presumed that the experience of school-related anxieties will remain low for the duration of the data collection period. It is believed that by age nine (the first time point at which data are utilized), youth are sufficiently familiar with school and comfortable with its structure that high levels of anxiety will not be experienced. From a developmental standpoint, it would be expected that anxiety levels may be highest at introduction to school (i.e., kindergarten/first grade) and perhaps times of transition (e.g., promotion from elementary to middle school). A slight increase in school phobia symptoms around age 11 or 12 may therefore be observed, coinciding with when most youth in the sample likely move from elementary to middle school.

Separation anxiety disorder. In line with normative developmental expectations and empirical findings regarding the predominance of separation fears early in life, it is hypothesized that separation anxiety disorder symptoms will remain low over the course of the study. Symptoms are first assessed during middle childhood (i.e., age nine), a

phase of development when separation-related concerns are likely to dissipate in light of youth's increasing independence.

Social phobia. Based on normative developmental theory, it is hypothesized that symptoms of social phobia will gradually increase from age nine until girls reach early adolescence (i.e., age 12), at which time it is assumed that they will be their highest. This is consistent with findings obtained in an investigation conducted by Gullone and colleagues (2001), wherein self-reported social anxiety symptoms increased over a three year period among a sample of children and adolescents ranging in age from seven to 18 at study inception.

Research Question # 3

Are there differences in the developmental trajectories of anxiety disorder symptoms among European American and African American female youth ages 9-12?

Hypothesis # 3

Based on literature to suggest that other internalizing forms of psychopathology (e.g., depression) are more common among minority youth (e.g., Sen, 2004), it is hypothesized that African American youth will evidence a higher degree of symptoms than the European American facet of the sample. It is believed that the overall shape of anxiety disorder symptom trajectories will be similar across races.

CHAPTER II

LITERATURE REVIEW

Anxiety is frequently cited as one of the most common mental health concerns experienced by children and adolescents (e.g., Morris & March, 2004; Woodruff-Borden & Leyfer, 2006), yet has only recently captured the attention of the research community. Relatively little is documented in the literature at the present time about the development and manifestation of anxiety among youth, or the long-term impact of anxiety-related difficulties on children and adolescents. Prior investigations have linked youth anxiety with a host of adverse outcomes in the short term, including lowered academic achievement (Wood, 2006), difficulty in peer relationships (Chansky & Kendall, 1997), and increased risk of developing depression (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). Child and adolescent anxiety is also related to anxiety in adulthood (Saavedra & Silverman, 2002), and adults who struggle with anxiety frequently date the onset of their symptoms to childhood or adolescence (Kendall & Ollendick, 2004).

Girls have been found to be more anxious and fearful than boys across contexts (e.g., Zahn-Waxler & Polanichka, 2004), and the overall risk of developing anxiety tends to increase over time for girls, whereas it remains fairly stable for boys from late childhood or early adolescence onward (Hale, Raaijmakers, Muris, van Hoof, & Meeus, 2008). Rates of anxiety disorders also tend to be higher among females than males from childhood forward (Zahn-Waxler, Crick, Shirtcliff, & Woods, 2006). It is surprising that in light of this, gender-specific trends in childhood anxiety have historically not been well-studied (Vasey & Ollendick, 2000), leading to many unanswered questions regarding differential prevalence rates, clinical presentation, and etiological variables.

Investigations of anxiety exclusively among female youth are notably absent from the literature; when gender-specific findings are considered, it is in the context of larger studies involving both boys and girls. A greater understanding of developmental trends in anxiety solely among young girls would permit the establishment of prevention and treatment-oriented approaches sensitive to the unique needs of this population.

The following historical, theoretical, and empirical information is intended to summarize the state of the research pertaining to anxiety among children and adolescents, and among female youth specifically. It is also meant to provide background information relevant to the current study and serve as a foundation for understanding its rationale.

Definition of Anxiety

Although both broad and narrow definitions of anxiety have been offered in the literature, researchers tend to agree that anxiety is comprised of several different symptom types. Dobson (1985), for instance, viewed anxiety as a state that affects an individual's affect, behavior, cognition, and physiology, and is experienced in response to a real or perceived threat to one's physical or psychological well-being. Silverman and Carter (2006) contend likewise, defining anxiety as a global construct characterized broadly by apprehension and anticipation, with an array of associated symptoms across numerous domains of functioning. These authors categorize anxious symptoms as one of three types: behavioral (e.g., avoidance), cognitive (e.g., the belief that one will be made fun of), or physiological (e.g., rapid heart rate; Silverman & Carter, 2006).

Weems (2008) views anxiety among youth in a similar, albeit slightly more complex, manner, describing primary and secondary features of anxiety. He states that primary, or core, features characterize anxiety in a broad sense and encompass general

symptoms (e.g., increased sweat production, withdrawal) in the behavioral, cognitive, and/or physiological domains. Secondary features of anxiety disturbance, according to Weems (2008), are those that are characteristic of specific anxiety disorders (e.g., intense concerns of an interpersonal nature among individuals with social phobia). The conceptualizations of these and other researchers make clear that anxiety is a complex phenomenon, one not easily amenable to a unidimensional definition, particularly as experienced by children.

Researchers interested in anxiety among children and adolescents commonly approach the subject in accordance with the view put forth by the American Psychiatric Association (2000) in the *Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR)*, a widely-known and well-researched system for the classification of psychopathology. This system describes different subtypes of anxiety, each with a unique complement of symptoms, from which individuals may suffer, rather than adopts a unitary, undifferentiated perspective of this construct. The *DSM-IV-TR* diagnoses most relevant to anxiety in youth are briefly summarized below, with child-specific symptoms and gender differences highlighted throughout. Not all of the disorders presented were assessed or otherwise dealt with further in the current study.

Diagnoses

Generalized anxiety disorder. Generalized anxiety disorder (GAD) is diagnosed in youth when only one symptom (of a possible six) of excessive anxiety and worry is exhibited for a period of at least six months. Among those with GAD, feelings of anxiety are not tied to any particular stimulus, but rather are more free-floating and present across a variety of situational contexts (American Psychiatric Association, 2000). Anxiety of

this form is viewed as undifferentiated and difficult for the sufferer to control (Christophersen & Mortweet, 2001).

Overanxious disorder (OAD) of childhood, a diagnostic entity included in prior versions of the *DSM*, was subsumed under GAD in the current edition of the text. Bittner and colleagues (2007) maintain that retention of OAD as a diagnostic entity may have been appropriate because it was intended for children and adolescents, whereas GAD better reflects a generalized form of anxiety in the adult population. This raises the possibility that existing criteria for GAD are not sufficient to identify youth who suffer from a general variant of anxiety, creating the potential for diagnostic misidentification.

Children with diagnoses of GAD frequently experience restlessness, fatigue, irritability, and difficulty concentrating; concerns about quality of performance and personal competence are also often paramount (American Psychiatric Association, 2000). Additionally, young sufferers of GAD tend to be perfectionistic, have a high need for the approval of others, actively seek reassurance, and worry about “adult” issues such as war and other large-scale catastrophic events. Evidence garnered from both clinical and epidemiological studies suggests that GAD is more common among females than males (American Psychiatric Association, 2000). Girls who suffer from GAD may be more likely to subsequently develop substance use problems than their male counterparts (e.g., Bittner et al., 2007), helping to build a case for the importance of preventive and early intervention efforts with female youth who present with anxiety-related concerns.

Obsessive-compulsive disorder. Individuals who suffer from obsessive-compulsive disorder (OCD) are often plagued by recurrent obsessive thoughts (e.g., fear of contamination) that are intrusive and generally experienced as outside of the person’s

control. Compulsive behavior patterns (e.g., repeated hand-washing) tend to represent the individual's attempt to reduce the experience of anxiety and neutralize, ignore, or suppress distressing thoughts (American Psychiatric Association, 2000). It frequently becomes more difficult for sufferers to resist engaging in these behaviors with time, as yielding to compulsions is negatively reinforcing (i.e., is associated with reduced distress) and thereby increases the likelihood of engagement in compulsive acts. Formal diagnosis of OCD is justified when symptoms consume more than one hour per day and are associated with adverse impact on one's day-to-day functioning (American Psychiatric Association, 2000).

Cases of childhood-onset OCD are relatively rare, as the disorder more often surfaces during adolescence or early adulthood. Youth who suffer from the disorder typically do not recognize that their obsessions or compulsions are excessive or unreasonable, as their emerging cognitive capacities may preclude them from making objective evaluations of their thoughts and behaviors (American Psychiatric Association, 2000). Children and adolescents do not generally request help independently or present for treatment on their own accord; assistance is more commonly sought by parents of young people with OCD. Childhood-onset cases of OCD occur more frequently among boys than girls, whereas rates of occurrence are more comparable in males and females during adulthood (American Psychiatric Association, 2000).

Panic disorder. Panic disorder has two primary features believed to be present among both youth and adults who are afflicted. First, those who suffer from the disorder must have experienced recurrent, unexpected panic attacks (characterized by physiological indicators such as accelerated heart rate, increased sweat production, and

dizziness). Additionally, in the month (or more) following one (or multiple) of these attacks, affected individuals must express persistent concern about the potential for having additional attacks and/or worry about the implications of the attacks (e.g., heart attack, death; American Psychiatric Association, 2000). Available data overwhelmingly suggests that panic disorder is more commonly experienced by females than males.

Posttraumatic stress disorder. Posttraumatic stress disorder (PTSD) is associated with the experience of or exposure to a traumatic event (e.g., assault, natural disaster), followed by re-experiencing of the event (e.g., via dreams, flashbacks, or repetitive play), persistent avoidance of stimuli related to the trauma, and/or hyper-arousal (e.g., exaggerated startle response) for a duration of at least one month (American Psychiatric Association, 2000). Those afflicted with PTSD may also present with symptoms of under-arousal (e.g., feelings of “numbness”), particularly in the period of time closely following the trauma. Children who suffer from PTSD often find it difficult to envision the future and are more likely than their adult counterparts to exhibit varied symptoms of a physical nature (e.g., headaches, stomachaches). Available data suggests that PTSD can occur during any period of development, with symptoms tending to emerge within three months of an experienced trauma (American Psychiatric Association, 2000).

Separation anxiety disorder. Separation anxiety disorder (SAD) is the only anxiety disorder in the *DSM-IV-TR* system that is specific to children and adolescents. Other *DSM-IV-TR* anxiety disorder diagnoses are assumed, by and large, to be experienced by children, adolescents, and adults and to manifest similarly across the lifespan. SAD is characterized by a pattern of inappropriate and excessive anxiety concerning real or anticipated separation from those to whom a child is attached, with

onset prior to the age of 18 and persistence of symptoms for a minimum duration of four weeks. Symptoms commonly evidenced by youth who present with SAD include clinginess, the experience of nightmares with separation-related themes, reluctance to leave the caregiver's presence, and somatic complaints (American Psychiatric Association, 2000).

To date, a consistent pattern of gender differences in the prevalence of SAD has not been evidenced. Based upon work conducted with clinical samples, the disorder appears to be experienced equally among males and females, whereas the results of epidemiological studies suggest that SAD occurs with greater frequency among females (American Psychiatric Association, 2000). It has been noted, however, that male sufferers of SAD are typically more likely than their female counterparts to deny their concerns pertaining to separation (American Psychiatric Association, 2000), and so may be less likely to present for treatment and come to the attention of the research community.

Social phobia. Symptoms of social phobia bear much similarity to those associated with specific phobia (discussed below), except that anxiety and fear are restricted to social or performance situations, generally those in which one has concerns of embarrassing oneself or being evaluated negatively by others. In order for children to receive a formal diagnosis of social phobia, the propensity to develop age-appropriate social relationships must be evidenced, and anxiety must occur in peer settings, not just contexts in which adults are present (American Psychiatric Association, 2000). Existing findings regarding gender differences in rates of social phobia are mixed. Although data from epidemiological and community-based samples indicates that females are afflicted more often than males, data derived from clinical samples suggests gender dispersion of

the disorder to be more equitable (American Psychiatric Association, 2000). Numerous researchers (e.g., Albano & Krain, 2005) contend that social anxieties, even non-clinical variants, commonly occur among children and adolescents, particularly girls.

Specific phobia. In contrast to GAD, a diagnosis of specific phobia necessitates that anxiety and fear be tied to a particular object (e.g., snakes) or situation (e.g., flying), instead of being more global in nature. Specific phobia is generally accompanied by attempted avoidance of the feared stimulus, anxious anticipation if the feared object is to be faced, and marked distress in the presence of the object of one's fear (American Psychiatric Association, 2000). It is uncommon for youth to recognize that the nature and content of their worries are excessive or unreasonable, making them less likely than adults to report their distress. Data recorded in the *DSM-IV-TR* indicates that specific phobias afflict females nearly twice as often as males across the lifespan; women outnumber men regardless of the particular type of phobia under consideration (American Psychiatric Association, 2000).

Criticisms of the DSM-IV-TR Approach

Despite widespread usage of the *DSM-IV-TR* system in research and clinical work with youth, numerous criticisms have been leveled at this approach to conceptualizing and diagnosing anxiety disorders in children and adolescents. First and foremost, treatment of how the presentation of anxiety disorders may differ among children and adolescents as compared to adults is extremely brief. Given the vast developmental differences between young children and adults (in particular), as well as the myriad and rapid changes that occur during childhood, disorders likely manifest in disparate ways across development (Angold & Egger, 2004), potentially warranting separate criteria for

the diagnosis of anxiety disorders in different age groups. Gullone, King, and Ollendick (2001) echo a similar sentiment, maintaining that adult models of anxiety may not be applicable to youth.

Concern has also been raised that common symptoms of GAD often overlap with symptoms of other *DSM-IV-TR* anxiety disorders, particularly among children. This has led some to assert that GAD may be over-diagnosed in this population (American Psychiatric Association, 2000), or that anxiety in youngsters may best be viewed as a single, global construct. The empirical support for the latter contention has been mixed, with some researchers obtaining results to suggest that anxiety among youth is best conceptualized as one-dimensional (e.g., Ferdinand, van Lang, Ormel, & Verhulst, 2006) and others concluding that child and adolescent anxiety is comprised of distinct problem dimensions (e.g., Spence, 1997). Commonly employed assessment instruments reflect this dichotomy, as some (e.g., Achenbach scales; Achenbach & Rescorla, 2001; Behavior Assessment System for Children, Second Edition [BASC-2]; Reynolds & Kamphaus, 2004) examine anxiety from a global vantage, while others (e.g., Multidimensional Anxiety Scale for Children [MASC]; March, 1997; Screen for Child Anxiety Related Emotional Disorders [SCARED]; Birmaher et al., 1997) assess for the presence of disorder-specific symptoms. Discrepant empirical findings may be attributable to methodological differences across studies (e.g., in terms of sample composition, instrumentation, and analytic procedures) or reflect the limited amount of study in this area, precluding the ability to summarize findings with any degree of certitude.

The challenge of accurate diagnosis is intensified because many symptoms of anxiety in children and adolescents bear much similarity to the symptoms of other

common childhood disorders (e.g., difficulty concentrating, which may be a symptom of attention-deficit/hyperactivity disorder; irritability, which may be associated with oppositional defiant disorder). Perhaps the greatest area of related debate has been whether depression and anxiety are truly distinct phenomena in children, or whether they are better thought of as a single, broad internalizing construct in this population. Zahn-Waxler and colleagues (2006) point out that especially high rates of co-occurrence of anxiety disorders and mood disorders in female youth have been noted in the literature.

Further, evidence suggests that anxiety manifests somewhat differently in males and females across the lifespan (e.g., Silverman & Carter, 2006). Modification of the existing diagnostic system could aid clinicians in gender-sensitive diagnostic decision making, perhaps by requiring that a different number or threshold of symptoms be present for formal diagnosis of an anxiety-related disorder on the basis of one's gender. The complexity of this issue is increased when female youth of ethnic minority backgrounds are considered, as data regarding prevalence, manifestation, and effective treatment of anxiety among those with diverse demographic profiles are virtually non-existent, in general as well as in girls specifically (Silverman & Carter, 2006).

Prevalence of Youth Anxiety

Researchers interested in the prevalence of anxiety disorders seek to clarify the total number of cases of disorder within a given population at a specific time; estimates are often expressed as a percentage of individuals in the population of interest. The majority of existing studies into the prevalence of anxiety disorders base estimates upon criteria from earlier editions of the *DSM*, rather than the one currently in use (Silverman & Carter, 2006). Available evidence overwhelmingly suggests, however, that girls and

women have higher rates of anxiety disorders than boys and men (Evans et al., 2005a), with the degree of disparity varying depending on the particular disorder under consideration and often differing markedly from study to study (Somers, Goldner, Waraich, & Hsu, 2006). Some (e.g., Hale et al., 2008) have suggested that girls' overall risk for experiencing anxiety increases from late childhood through mid-adolescence (at least), whereas it remains fairly stable for boys from late childhood or early adolescence onward. Studies of prevalence prior to the adolescent years are rare; thus, little is presently known about the extent that anxiety plagues younger youth.

Empirical Estimates

Prevalence rates of youth anxiety can vary widely, likely attributable to methodological variation (e.g., assessment techniques, criteria required for diagnosis) between studies. Estimates reported in the literature nonetheless suggest that anxiety is a relatively common phenomenon among community-based children and adolescents. Rates are often based on the assessment of "any anxiety disorder" (or of anxiety as a global construct), rather than specific subtypes of anxiety disturbance (Costello, Egger, & Angold, 2005).

Reported prevalence rates of anxiety among youth from the community frequently hover around 15% or 20% when assessment occurs over a period of three to six months, a seemingly common practice among researchers. For instance, in an early examination into the prevalence of anxiety, Kashani and Orvaschel (1988) found that approximately 17% of a sample of adolescents derived from the general population met criteria for diagnosis of an anxiety disorder over six months. Bittner and colleagues (2007) found likewise among a sample of community-based youth aged 9, 11, and 13 years at intake

and followed through age 19, that roughly 16% of participants met criteria for any anxiety disorder at some point during the study period.

The prevalence of individual anxiety disorders among youth appears to vary as a function of age (Christophersen & Mortweet, 2001). Age trends are evidenced with relative consistency across studies, such that the prevalence rates of certain disorders (e.g., separation anxiety disorder) decrease across childhood and adolescence, while others (e.g., social phobia) increase or remain stable (Costello et al., 2003). For instance, among a sample of youth from the general population, Bittner and colleagues (2007) found that prevalence rates of all anxiety disorders assessed increased with time, except for separation anxiety disorder, which decreased from childhood to adolescence (conceptualized by these researchers as 9-12 and 13-19, respectively). Specific phobia and social phobia represented exceptions to this general rule, in that prevalence remained relatively stable from childhood (ages 9-12) onward (through at least age 19, the final age at which youth were assessed). Roughly 30% of the individuals included in the Bittner et al. (2007) study who met diagnostic criteria for an anxiety disorder did so at more than one assessment, even though the particular disorder that individuals suffered from may have varied from one time point to the next.

Breakdown of the prevalence of anxiety by gender is a relatively uncommon practice in existing empirical work. Available gender-based estimates suggest, however, that females consistently experience higher rates of anxiety than males, with the size of disparity depending on the disorder under consideration. Somers et al. (2006) reviewed the literature on anxiety prevalence among adults and pooled results across studies, finding that just under 11% of women suffered from anxiety during a one year period,

while between 16% and 17% were afflicted with an anxiety disorder at some point during the course of their lifetime. Prevalence estimates of anxiety among ethnic minority girls and women are virtually absent from the literature (Silverman & Carter, 2006), and it is presently unclear the impact that cultural variables (e.g., role of women in the family, societal expectations for females) may have on the experience of anxiety among female individuals from these populations.

Complicating Variables

A number of factors should be taken into consideration when interpreting the findings of existing studies into the prevalence of anxiety. For instance, estimates may differ notably depending on whether or not impairment, in addition to symptom threshold being met, is required for diagnosis. Evans and colleagues (2005a) maintain that prevalence rates would potentially decline by up to two-thirds if both symptoms and impairment in everyday functioning were necessary for diagnosis, suggesting that existing findings may serve to over-estimate the experience of anxiety. This general sentiment is supported empirically by the work of Romano, Tremblay, Vitaro, Zoccolillo, and Pagani (2001), who found that among a community sample of adolescents, roughly 22% met diagnostic criteria for an anxiety disorder, whereas only about 9% had the requisite number of symptoms for diagnosis, as well as resultant functional impairment. These results were based upon youth-reported anxiety symptoms; similar findings were obtained using parent report.

It could also be argued that available prevalence estimates are too conservative, given that anxiety can result in impaired functioning even when present at sub-threshold levels (American Academy of Child and Adolescent Psychiatry [AACAP], 2007),

particularly if left untreated (Chavira, Stein, Bailey, & Stein, 2004). The seeming commonality of anxiety is also impacted by the duration of time during which symptom presence is considered (e.g., estimates tend to be lower during three month than one year periods, or lower during one year periods than over the lifespan; Evans et al., 2005a).

Of particular relevance to studies among youth, utilization of assessment tools designed for adults generally results in higher rates of prevalence among children than when youth-oriented measures are employed (Evans et al., 2005a). Rates are also legitimately higher in clinic-based samples, and cannot readily be applied to youth who reside in the community. Gender differences in prevalence may be particularly skewed when clinical samples are employed, given that boys are less likely than girls to present for treatment (Evans et al., 2005a). Further, prevalence rates of anxiety disturbance among girls from ethnic minority backgrounds are lacking in the literature; the few existing studies that have examined anxiety among minority populations have made use of samples composed of adults rather than children or adolescents (Silverman & Carter, 2006), so results may not be readily generalized to the latter populations.

Incidence of Youth Anxiety

Incidence refers to the extent of occurrence of a given phenomenon, and is generally expressed as the number of new cases of a particular disorder in a given population during a specified period of time. Research into the incidence of anxiety, particularly among children and adolescents, is essentially absent from the available literature. Somers et al. (2006) note that investigation into the incidence of various anxiety disorders among adults is likewise a rarity. Although not dealt with further

herein, this clearly represents an area that needs to be addressed in the literature, particularly that pertaining to child and adolescent populations.

Normative Development

Agreement that anxiety is a normative phenomenon at certain ages and stages of development tends to be widespread, suggesting that mere presence of anxious symptoms is not necessarily indicative of current or future risk of disorder (Bell-Dolan, Last, & Strauss, 1990). Varied accounts of how to differentiate normative from pathological levels of anxiety have been offered, with factors such as symptom persistence and degree of functional impairment often primary (Christophersen & Mortweet, 2001). Continued experience of symptoms beyond the period in which they are developmentally expected is likewise generally considered in determining if formal diagnosis of an anxiety disorder is warranted. Evans and colleagues (2005a) add that one's ability to recover from anxious episodes and remain relatively free of anxiety in the absence of provocation are worthy of consideration.

The predominant manner in which anxiety manifests as youth age is seemingly associated with the developmental tasks and challenges that arise at certain stages of development. For instance, separation-related concerns tend to predominate among young children who, despite undergoing processes of autonomy and individuation, remain dependent upon caregivers to ensure that a number of fundamental needs (e.g., safety) are met (Weems & Costa, 2005). As the capacity for formal operational thought emerges in the later stages of childhood and pre-adolescence, youth become more aware of mortality and broader world concerns, leading to the common experience of anxiety related to death and danger befalling oneself or loved ones. As the peer group assumes

greater importance as youth age, anxiety related to social acceptance and evaluation frequently occurs, most notably during the adolescent years (Weems & Costa, 2005). First-time exposure to particular circumstances within the culture of the peer group (e.g., sexual activity, drug use) may increase the propensity for adolescents to develop difficulties related to anxiety (Evans et al., 2005b). For many children and adolescents, anxiety may be a more transient phenomenon than in adults (Gullone et al., 2001).

Even when present at sub-threshold (i.e., not formally diagnosable) levels, anxiety can have a potentially debilitating impact on youth development. Young people plagued with anxiety may be at risk for a number of negative outcomes in the short term, such as academic underachievement (Wood, 2006) and peer relationship difficulties (Chansky & Kendall, 1997). Experiencing an episode of marked anxiety during childhood or adolescence appears to increase the likelihood of recurrence later in development (Keller et al., 1992); likewise, anxiety in childhood and adolescence has been associated with anxiety in adulthood (Saavedra & Silverman, 2002). Childhood anxiety has also been found predictive of the subsequent development of varied mental health concerns (e.g., depression, conduct problems; Bittner et al., 2007). The findings of these outcome studies, although correlative (and therefore not indicative of causal relationships), underscore the importance of understanding the phenomenon of anxiety among youth, particularly how it develops, to allow for the creation of early intervention and treatment programs that address the variables most commonly implicated.

Risk Factors for the Development of Anxiety

There is general consensus in the literature that a complex interaction of individual and environmental variables influences the development of anxiety disorders

in youth (e.g., Christophersen & Mortweet, 2001; Ginsburg, Siqueland, Masia-Warner, & Hedtke, 2004). It is commonly asserted that anxiety stems from a temperamentally-based vulnerability; environmental circumstances serve to increase or decrease the risk that this innate susceptibility is manifested. It is likewise commonly asserted that the development of anxiety implicates multiple causal influences, rather than a single contributory variable (e.g., Muris, 2006). The effective treatment of anxiety necessitates knowledge of the factors implicated in the development and maintenance of disorder and addressing those that seem most salient to the individual, likely requiring a multi-faceted intervention approach.

The ensuing discussion centers on a number of variables that have previously been implicated in the development of anxiety among children and adolescents. Given that the list of potential such variables is a long one, preference is accorded to those factors that are seemingly most salient to the development of anxiety among female youth. Those discussed most frequently in the child and adolescent literature are likewise given priority.

Biological Variables

Temperament. Behavioral inhibition, a temperamental style marked by a child's tendency to be timid, withdrawn, and fearful in novel/unfamiliar circumstances has consistently been studied in relation to the development of anxiety disorders among youth (Warren, 2004). Numerous researchers (e.g., Warren, 2004; Zahn-Waxler et al., 2006) report that the link between a behaviorally-inhibited temperament and subsequent development of anxiety-related difficulties is relatively strong and well-supported by available empirical evidence. Albano and Krain (2005) indicate that behaviorally-

inhibited girls seem particularly vulnerable to anxiety disorder development, yet it is presently unclear whether behavioral inhibition serves as a general risk factor for the development of anxiety, or poses a risk that is somewhat unique to girls (Silverman & Carter, 2006). It most likely exerts an impact, although perhaps to a differing degree, on the development of anxiety among youth of both genders.

Despite a seeming abundance of available evidence implicating behavioral inhibition in the development of anxiety disorders, the precise role of inhibition in the development of these conditions is not yet well understood. Rapee (2002) conceptualizes behavioral inhibition, in essence, as an avoidant style of coping. Such an avoidant style, he contends, is a central characteristic associated with anxiety in older individuals, and may thus serve as a risk factor for the later development of anxiety disorders when evidenced in early childhood (Rapee, 2002). Timidity may limit the exposure (whether due to individual decision-making or externally-imposed constraints) that inhibited youth have to potential anxiety-arousing stimuli and deter independent efforts to cope with such objects and events.

Negative affectivity. Ferdinand, Dieleman, Ormel, and Verhulst (2007), as well as others, view negative affectivity as a general vulnerability factor for anxiety and other forms of internalizing distress (e.g., depression). This has led some (e.g., Achenbach and Rescorla, 2001) to purport that certain internalizing states (namely anxiety and depression) are essentially indistinguishable in youth. Negative affectivity is commonly construed as a temperamentally- (and hence biologically-) based propensity to exhibit negative affective states that influences the manner in which one engages with the environment (e.g., exercising extreme caution in social relationships and/or isolating

oneself due to concern that one is being evaluated negatively by others; Ferdinand et al., 2007). Watson (1999, 2005) maintains that all anxiety-related disorders share a higher order dimension of negative affect, with unique facets (e.g., target of anxiety) characterizing individual disorders. If negative affectivity is indeed a “higher order factor” of this variety, it may help to explain consistency in anxiety, even if form and predominant symptoms change over time (Ferdinand et al., 2007).

Puberty. Although the same finding has not been supported empirically among boys, early pubertal maturation has previously been associated with increased risk for developing an anxiety disorder among female youth. Numerous plausible explanations for this linkage could be asserted. It may be, for instance, that early-maturing girls are faced with a variety of stressors (e.g., peer teasing, attention from members of the opposite sex) before they are emotionally or cognitively prepared to handle them (Silverman & Carter, 2006). Girls who mature before their peers may also feel embarrassed and/or self-conscious of their changing bodies, and develop concerns regarding how others, particularly those within the peer group, may react to these changes. Because it is normative for pre-adolescent and adolescent females to afford high importance to “belonging,” they may view early pubertal maturation as a potential threat to their social status; jeopardy to one’s social standing could well evoke feelings of anxiety among this population.

Ge and colleagues (2003) raise two additional explanations for the association between puberty and the development of psychopathology, although their discussion centers on depression. First, they contend that youth who mature later than their peers are at increased risk of experiencing distress, in much the same way as their early-maturing

counterparts. Second, they assert that puberty itself is a stressful transition, one understandably associated with increased levels of emotional disturbance (Ge et al., 2003). With regard to depression at least, these authors acknowledge that the greatest degree of empirical support presently exists for the contention that early pubertal development is related to the experience of psychopathological symptoms among female youth. Specifically, they found early-maturing African American girls to evidence higher levels of depressive symptoms than their on-time or late-maturing peers in both the fifth and seventh grades (Ge et al., 2003).

Social Variables

Much learning occurs within a social context. One way in which learning has been implicated in the development of anxiety among youth is via observational means, occurring initially within the home, and at later stages of development, expanding to include peer, school, and community contexts. Through their interactions with and observations of others, children learn much (primarily through implicit means) about when to be anxious and how to express fear in anxiety-arousing situations. As children age and their access to potential models becomes more varied, they have the opportunity to learn (whether to their benefit or their detriment) more diverse ways of responding to and coping with anxiety (Zahn-Waxler et al., 2006). Potentially salient family, peer, and broader social variables believed to impact anxiety development in youth are briefly discussed below.

Family relationships. Numerous factors related to the family context, particularly the parent-child relationship, are suspected to have an influence on children's development of anxiety. For instance, parent-child attachment patterns and the closely

related coordination of parent-infant interactions seem to play a pivotal role. For children who develop secure attachment bonds, caregiver responsiveness effectively soothes their distress, and affords a basic sense of safety and security, as well as certainty that one's needs will be met (Craske & Waters, 2005). In the context of an insecure attachment relationship, in contrast, such comfort, security, and provision of basic needs are generally not present, which may result in an increased proclivity for the youngster to develop anxiety.

As another example, much prior study has revealed that an over-involved, controlling parenting style is associated with the development of anxiety disorders among youth, although the reason for this linkage is not entirely clear. Craske and Waters (2005) speculate that exposure to such parenting practices leads children to feel as though they possess limited control over the events that occur in their lives, while also promulgating the notion that the world is an unsafe place, either of which may increase children's levels of anxiety. An alternative explanation could be that temperamentally anxious children indirectly elicit controlling, over-bearing behavior from their parents. Parents may be enticed to over-involve themselves in an anxious child's life in an effort to prevent or reduce the child's distress (as well as perhaps their own). Because this seemingly reinforces the child's notion that the world is a frightening and dangerous place, it likely serves to increase levels of anxiety, especially among those who are vulnerable (Manassis, Hudson, Webb, & Albano, 2004). Such explanations are consistent with the notion of bi-directionality in the caregiver-child relationship, such that parenting style and caregiver characteristics influence child behavior and emotionality (both of

which may be a function of temperament, at least in part), and vice versa (Clark, Kochanska, & Ready, 2000).

Parents who suffer from anxiety disorders themselves may be more likely than non-anxious parents to employ practices consistent with the above, since they generally view the world as an unsafe place, and feel that it is their duty to protect their child (in addition to themselves) from the dangers of society (Ginsburg et al., 2004). Maternal psychopathology may have an especially adverse impact, perhaps via transmission of biological or genetic risk, modeling of anxious behaviors, and/or parental unavailability (because the mother is so caught up with her own anxieties that she is unable to attend to and adequately meet the needs of the child). The latter may lead to a disrupted attachment relationship, as well as negative expectations for future social relationships and deficits in the emotion regulation capacities of the child (Sterba, Prinstein, & Cox, 2007).

Peer relationships. Loss within the peer group (e.g., via a romantic break-up or the ending of a friendship) may be associated with the development of anxiety among female youth more readily than would be expected among males due to the highly interpersonal orientation commonly assumed by young girls (Albano & Krain, 2005). Girls also tend to rely more heavily on their social networks for emotional support and intimacy than do boys, so any disruption or “shift” within their social circles may be a significant cause of stress, and increase the propensity for anxiety development (Albano & Krain, 2005). Peer group affiliation is a contributor to adolescent females’ emerging sense of self, consistent with Erik Erikson’s (1963) contention that the key task of the adolescent years is the formation of one’s identity. Lack of (or limited) social ties may

undermine girls' sense of self and reduce their self-esteem; this may increase vulnerability for a host of developmental difficulties, such as anxiety.

Socialization practices. Within both broad (e.g., society) and narrow (e.g., home) social contexts, boys are both permitted and encouraged to explore their physical environments to a far greater extent than are girls from the time that they are very young. As a result, young males have a far greater number of opportunities than do their female peers to master the unfamiliar, and to become comfortable and safe in varied social circumstances. Because girls' explorative behavior is more frequently discouraged and their attempts at exploration often curtailed (Zahn-Waxler et al., 2006), they may be primed to develop timidity, fear, and anxiety. Fearfulness is similarly often accepted and encouraged (both explicitly and implicitly) among girls across contexts, whereas anger, assertion, and various forms of misbehavior are more generally promoted in boys. Messages such as these are propounded by the society and culture in which girls are raised, seemingly leaving them in a vulnerable position for the development of problems with insecurity, fearfulness, and anxiety (Zahn-Waxler et al., 2006).

Silverman and Carter (2006) maintain a related sentiment, perceiving one's gender role orientation (developed, at least in part, as a result of social environmental circumstances) as influencing vulnerability to anxiety development. They contend that those with a feminine orientation, regardless of actual gender, are more likely to experience problems related to anxiety than are those with a more masculine identity. The precise reasons for this proposed linkage are unclear and are primarily speculative. One potential explanation is that a male gender role is associated with assertion and a tendency to express emotions via instrumental means (e.g., fighting), whereas those with

a feminine identity are more passive and likely to internalize emotions (Silverman & Carter, 2006). An empirical linkage between gender role orientation and experience of anxiety symptoms has been demonstrated in both European American and African American samples of youth (Palapattu, Kingery, & Ginsburg, 2006), including those drawn from non-clinical populations (Muris, Meesters, & Knoop, 2005). Differences in anxiety symptomology based on gender role orientation typically exceed those that would be expected based on individuals' actual gender alone (Palapattu et al., 2006).

Cognitive Variables

Cognitive biases. Those who approach anxiety in children from a cognitive perspective contend that anxiety does not result from the mere occurrence of an event. Rather, they believe that a child's expectations and interpretations of a given event are also important contributing factors (Sweeney & Pine, 2004); anxiety and other forms of psychopathology are often explained as arising from negative or faulty ways of thinking (Weems, Berman, Silverman, & Saavedra, 2001). Specific cognitively-oriented biases that have been implicated in the etiology of children's anxiety include: judgment biases (e.g., a negative perception of one's coping abilities), memory biases (e.g., disproportionate recall of negative events), and attentional biases (e.g., focus on potentially threatening stimuli in a field of neutral or non-threatening stimuli; Weems & Watts, 2005).

Available evidence suggests that anxious youth are more likely than their non-anxious counterparts to judge situations, especially those that are ambiguous, as dangerous or threatening. These individuals may fail to search for evidence that would suggest the contrary, and are likely to ignore any evidence that, even when clearly

present, would seemingly contradict their original belief (Daleiden & Vasey, 1997). Children who struggle with anxiety also tend to underestimate their ability to cope with perceived danger more so than those who are non-anxious (Silverman & Dick-Niederhauser, 2004). Muris (2006) contends that in addition to being potentially implicated in the development of anxiety among youth, cognitive biases (specifically, perception of threat in ambiguous circumstances) may play a vital role in the maintenance of anxiety over time.

Anxiety sensitivity. Research indicates that women are often more sensitive to the physiological correlates of anxiety (e.g., increased heart rate, shortness of breath) than are men (Silverman & Carter, 2006). They are also more apt to interpret these sensations as having severe adverse physical, psychological, and/or social consequences. When physiological symptoms are experienced, women are more likely than their male counterparts to perceive that something adverse may be happening to them (e.g., suffering from a heart attack), which increases their level of distress and fuels their anxiety (Silverman & Carter, 2006), setting a perpetual cycle in motion.

Attributional style. Among youth whose histories are marred by a series of negative life events that are (or at least appear to be) outside of their control, there may be increased vulnerability to anxiety development (Silverman & Carter, 2006). The propensity to develop anxiety-related disturbance is particularly strong when paired with an attributional style in which external, unstable, and uncontrollable forces are given more credence by an individual than those of an internal, stable, and controllable nature. Silverman and Carter (2006) assert that girls and women are more likely than boys and men to view life situations as lying outside of their control, and perceive their own

behaviors (e.g., attempts at coping) as having limited impact on the circumstances in their environment.

Comorbidity

Defined simply, comorbidity refers to the co-occurrence of at least two phenomena, generally in reference to diseases of a medical nature or psychological disorders. Numerous types of comorbidity have been described in the literature. Homotypic comorbidity is used to describe continuity in a particular phenomenon over time, with little or no change in form or presentation (e.g., an adolescent who struggles with bouts of depression continues to do so in adulthood). Heterotypic comorbidity, by contrast, suggests continuity of disorder over time, with changes in form and overall manifestation of pathology (e.g., a young child who suffers from anxiety problems develops conduct disorder in adolescence; Angold, Costello, & Erkanli, 1999). Concurrent comorbidity refers to the simultaneous presence of multiple disorders for at least a brief period of time (on and off-set do not necessarily coincide). Successive comorbidity, on the other hand, is indicative of disorder occurrence in a consecutive fashion (i.e., with no periods of overlap; Angold et al., 1999).

Anxiety-Anxiety Comorbidity

Among children and adolescents diagnosed with anxiety disorders, the most common comorbid disorder is another form of anxiety-related disturbance (Christophersen & Mortweet, 2001). Variant of comorbidity (i.e., homotypic versus heterotypic, concurrent versus successive) is seldom specified in the literature, however (Costello et al., 2005). Bittner and colleagues (2007) obtained evidence of homotypic comorbidity, as 20%-43% of children in their sample who met criteria for one anxiety

disorder met criteria for another at the same time point. An earlier study revealed similar findings, with roughly 19% of high school youth studied presenting with intra-anxiety comorbidity, an association that was particularly strong among females (Lewinsohn, Zinbarg, Seeley, Lewinsohn, & Sack, 1997).

Empirical estimates of comorbidity may vary depending, at least in part, on the nature of the sample employed (e.g., comorbidity may be more prominent among clinical than community-based samples; Angold et al., 1999), leading some (e.g., Ferdinand et al., 2006) to suggest that distinction between anxiety disorders may not be useful among youth from the general population. Others (e.g., Costello et al., 2005) argue an opposing perspective, that high levels of comorbidity among anxiety disorders, as found in clinical samples of youth, are mirrored in samples based in the community.

Ferdinand and colleagues (2007) found evidence for both homotypic and heterotypic comorbidity of anxiety symptoms over a two year course of study with community-based youth aged 10 to 12 years at first assessment. Homotypic comorbidity was relatively high for separation anxiety disorder, social phobia, and panic disorder among girls, whereas it was low for generalized anxiety. The authors suggest that the symptoms of the former may occur independently and represent distinct classes of disorder in youth, whereas symptoms of the latter are more apt to occur in conjunction with other disorder symptoms (Ferdinand et al., 2007; Ferdinand, Dieleman, Ormel, & Verhulst, 2008). They conclude that anxiety subtypes are at least partially distinct among youth and that as a result, it is vital that assessment instruments tap more than just a single dimension of anxiety (as is commonplace) and that differential methods of intervention be applied, depending on predominating symptom type. It is acknowledged,

however, that several similar overall modes of treatment (e.g., application of cognitive behavioral techniques) may be effective for anxiety of varied types (Ferdinand et al., 2007).

Angold and colleagues (1999) raise the possibility that the presence of high rates of comorbidity among anxiety disorders is suggestive of a problem with existing classification systems, rather than a meaningful association between the disorders under consideration. They acknowledge that symptom overlap is likely and perhaps expected (e.g., youth with generalized anxiety disorder and social phobia may both present with rapid heart rate); existing diagnostic criteria do not seemingly provide sufficient information on how to meaningfully differentiate between various diagnoses. Because much comorbidity research has involved boys, relatively little is presently known about diagnostic overlap and distinguishing characteristics of disorders among girls (Angold et al., 1999), raising uncertainty about the applicability of current diagnostic schemes to this population.

Anxiety-Depression Comorbidity

A fair amount of research has focused on the co-occurrence of symptoms of anxiety and depression among youth, and the ability to distinguish these conditions in children and adolescents has long been debated. Investigations in this area frequently make use of the tripartite model, first proposed by Clark and Watson (1991). These authors purport that anxiety is characterized generally by heightened physiological arousal (e.g., increased alertness, rapidly activated startle response), whereas depression is characterized by low levels of positive affect. Negative affectivity (described earlier), the third variable in the model, offers a potential explanation for the co-occurrence of

anxiety and depressive disorders, in that it is perceived as a factor common to both forms of psychopathology (Clark & Watson, 1991).

More often than reporting empirical estimates of anxiety-depression comorbidity, researchers offer potential explanations for seemingly high rates of co-occurrence. For instance, Eley and Stevenson (1999) suggest that highly correlated methods of assessing anxiety and depressive symptoms may play a role, and that increased specificity in measurement techniques may diminish over-inflated rates of disorder overlap. It could also be the case that anxiety and depression share common etiological variables and/or that the presence of one disorder increases the likelihood that the other will develop (Seligman & Ollendick, 1998).

Some (e.g., Cole, Truglio, & Peeke, 1997) hypothesize that anxiety and depression cannot be meaningfully differentiated until adolescence or adulthood, and are best reflected as a unified construct among younger children. The ability to distinguish these conditions may also be related to severity of pathology, as Gurley, Cohen, Pine, and Brook (1996) provide empirical evidence to suggest that discrimination occurs more readily when symptoms are severe than when they are mild or occur at sub-threshold levels. Lambert and colleagues (2004) suggest that ethnicity and social context may be additional factors worthy of consideration; they failed to find convincing evidence of separate anxiety and mood dimensions among a community-based sample of youth in an urban setting. Reconciliation of these issues is critical, however, in that comorbidity has implications for severity of functional impairment and course of disorder, as well as the approach to treatment that is taken (Seligman & Ollendick, 1998).

Gender and the Study of Psychopathology

Although gender differences in psychopathology are frequently discussed in the literature, gender-specific findings in this domain are seemingly poorly understood. The general contention is that a complex interaction of innate and environmental variables is likely responsible for disparate prevalence rates and manifestation of disorder by gender (Zahn-Waxler et al., 2006). Such differences may suggest that existing approaches to intervention can be expected to have differential effectiveness for boys and men versus girls and women. They also highlight the apparent importance, although infrequently considered in practice, of tailoring prevention and treatment approaches on the basis of gender (Zahn-Waxler et al., 2006).

According to Hayward and Sanborn (2002), gender differences in the experience of internalizing forms of psychopathology (e.g., anxiety) occur most notably during the early adolescent years, often coinciding with the onset of puberty. These authors attribute such observations to the interplay of biological (e.g., hormones) and psychosocial (e.g., societal expectations) factors that exert a salient influence on youth at this stage of development. They note that pubertal development itself, in a physical sense, may affect female youth from ethnic minority groups differently than it does girls from majority groups (e.g., increased body fat may not have as negative a connotation for ethnic minority youth as it tends to for their majority counterparts); the assumption that puberty impacts girls similarly across ethnicities is therefore erroneous (Hayward & Sanborn, 2002). Regardless, puberty may represent a time when female youth, in particular, are at increased risk for the experience of internalized forms of distress, suggesting that it may

be an optimal period of development to focus prevention, early intervention, and/or treatment efforts.

It is widely documented that females experience anxiety-related disturbances more frequently than do males, beginning in childhood or early adolescence (e.g., Bosquet & Egeland, 2006; Zahn-Waxler et al., 2006) and continuing into adulthood. Presentation of anxiety and its disorders may also occur somewhat differently in males and females. For instance, numerous researchers (e.g., Zahn-Waxler et al., 2006) report that girls afflicted with anxiety are more likely than their male counterparts to present with complaints of a somatic nature; this has been observed in both European American and African American samples of youth (Kingery, Ginsburg, & Alfano, 2007). Christophersen and Mortweet (2001) contend that in addition to being a more persistent and uniquely manifesting phenomenon among females, anxiety has a greater impact (e.g., is associated with more impaired functioning) for girls and women than it does for boys and men.

Although precise reasons for the above disparities are unclear, Byrne (2000) speculates that observed rates differ because boys possess coping strategies that more effectively reduce their levels of anxiety than do girls. A more popular notion offered in the literature is that males generally possess higher levels of self-esteem than their female counterparts (Byrne, 2000; Ohannessian, Lerner, Lerner, & von Eye, 1999), which could both protect them against the development of anxiety and influence how it is dealt with when experienced. An additional possibility meriting consideration is that gender differences in anxiety research are an artifact of definitional, theoretical, or more general methodological problems in existing studies (Mackinaw-Koons & Vasey, 2000).

Race and the Study of Psychopathology

Remarkably little empirical work has centered on race-based differences in the prevalence, development, and manifestation of psychopathology. Available data suggests that at least in some cases (e.g., depression), race may impact the likelihood that one will develop psychopathological symptoms and influence presenting concerns. For instance, Sen (2004) reported that adolescents from all minority groups are more apt to suffer from depressed mood than their majority (i.e., non-Hispanic and white) counterparts. Race may also play a role in one's acknowledgement that a problem exists, willingness to seek help (e.g., African American and Asian individuals tend not to seek assistance for mental health concerns), and outcomes (e.g., increased self-harm and suicidal behavior, perhaps due to resistance to pursue help; Sen, 2004). Racial and cultural background could similarly impact the manner in which minority youth interpret and respond to assessments of psychopathology; existing instruments may not be sufficiently reflective of how psychopathology manifests in non-majority populations. In order for racially-sensitive and relevant approaches to treatment to be developed, it is paramount that future study in this general domain is undertaken.

With regard to anxiety specifically, the available literature is essentially void of estimates of prevalence among ethnic minority girls and women (Silverman & Carter, 2006), and the potential impact of cultural variables on the experience of anxiety among female individuals from these populations is presently unclear. Some (e.g., Last & Perrin, 1993) contend that European American and African American youth, at least those who seek treatment for anxiety, are more alike in presentation than they are different; the most noteworthy difference, according to these researchers, is that African Americans tend to

present with less severe symptoms than their European American counterparts. Others (e.g., Boyd, Ginsburg, Lambert, Cooley, & Campbell, 2003) have obtained empirical support that seemingly counters this notion, finding somewhat of a unique structure of symptoms among a sample of African American youth based in the community (i.e., not all *DSM-IV* subtypes evidenced among European American children and adolescents were evidenced). The Boyd et al. (2003) investigation possessed a number of methodological limitations (e.g., removal of more than half of the SCARED items in analyses) that should be taken into consideration in the interpretation of these results, however.

Kingery and colleagues (2007) reported somatic complaints as an additional domain related to anxiety in which racially-based differences lie. Although somatic symptoms are seemingly common among female youth of both European American and African American descent who present with anxiety-related concerns, their impact may be adverse among the latter population. Among a sample of African American adolescents based in the community who were in ninth through twelfth grades when assessed, these researchers found somatic symptoms to be positively correlated with severity of anxious symptoms and negatively correlated with perceived competence. This relationship was especially strong among girls in the study, suggesting that complaints of a somatic nature may pose as a semi-unique risk factor for the development of anxiety among African American female youth (Kingery et al., 2007). Only additional empirical work in this area will clarify distinct prevalence rates, symptom structure, and developmental course of anxiety among youth (and female youth more specifically) from ethnic minority backgrounds.

Development of Anxiety Pathology

At present, there exists no single, unified theory of development that can seemingly do justice to the complex phenomenon of anxiety. The most comprehensive theories that have been purported tend to be consistent with a diathesis-stress point of view, which takes into account the compendium of innate and environmental factors that may be implicated in the development of anxiety in a pathological form (i.e., that beyond which is developmentally normative, in some capacity). Diathesis refers to an inborn trait or vulnerability (e.g., inhibited temperament, early pubertal maturation) that increases the likelihood that one may experience anxiety-related difficulties, particularly when faced with (and thereby “activated” by) varied environmental stressors (e.g., loss within the family or peer group). A parallel idea, that biologically-based individual differences are mediated by environmental risk factors in the development of anxiety (and depression) among adolescent girls has been supported in prior empirical investigations (e.g., Silberg, Rutter, Neale, & Eaves, 2001). The particular combination of innate and situational variables implicated in the development of anxiety pathology is unique to the individual; the extent of environmental impact necessary for biological vulnerabilities to manifest symptomatically likewise varies from one person to the next.

Developmental Trajectory Research

Loeber (1991) defines a developmental pathway as a “common pattern of development shared by a group of individuals” (p. 98). Trajectories of development are ascertained by repeated assessments of the same subjects over time, and specify the sequence and timing of behavioral continuity and change (Nagin, 1999). Trajectory-based research allows for the determination of different pathways that may lead to the same

outcome (i.e., equifinality), or similar pathways that lead to disparate outcomes (i.e., multifinality; Loeber, 1991). The logistical barriers (e.g., necessary time and financial resources) associated with conducting such research may prevent, or at least deter, researchers from pursuing this general line of work. The “push” for more advanced, person-centered statistical methodology (e.g., latent growth modeling; Weems, 2008) to be employed in trajectory-oriented research (over less technically complex, more familiar, group-focused analyses) may likewise hold back researchers who lack advanced statistical knowledge or are resistant to learning more contemporary analytic methods.

Investigations of developmental pathways often employ clinic-based samples and are most commonly done in reference to the emergence of disorder; seldom do such examinations make use of samples of individuals based in the community. The latter is arguably necessary, however, in order to further the current understanding of what is a normative developmental experience, with regard to the particular phenomenon under study. Such knowledge is crucial to differentiating normal from pathological experience of symptoms, and could therefore have profound implications for how various forms of psychopathology are defined, diagnosed, and assessed. Studies of trajectories of anxiety, especially among child and adolescent populations, are almost wholly absent from the available literature.

Theorized Trajectories of Anxiety

Weems (2008) offers what is perhaps the most recent conceptualization of trajectories of anxiety disorder symptoms, although many before him espoused similar views. This author theorizes that anxiety in childhood is classifiable into one of four trajectory classes: 1) stable low levels of anxiety (characterized by a consistent absent or

minimal experience of symptoms over time), 2) stable high levels of anxiety (characterized by a consistent elevation in anxiety, even if predominant symptoms vary with time), 3) increasers (characterized by low initial anxiety levels that increase and remain elevated with time), and 4) decreasers (characterized by initial elevations in anxiety level, with decrease and leveling off over time). Classes of “fluctuators” are occasionally added to encompass those whose anxiety demonstrates no consistent pattern of stability or change over time (Weems, 2008). This sort of general categorization is typically applied to global levels of anxiety; it is presently unclear if it can be hypothesized to apply to individual subtypes of anxiety-related disturbance as well.

Empirical support for trajectory classes such as the above has been obtained in prior investigations of various types of psychopathology, most frequently those of an externalizing nature (e.g., conduct problems, delinquency). Investigations into the applicability of these classes to internalizing phenomena (e.g., anxiety, depression) have heretofore been limited; Weems (2008) and others may therefore base their hypotheses on the assumption that similar trajectories would be obtained among those with internalizing and externalizing forms of distress. A true theoretical underpinning for this conceptualization, as it pertains to anxiety and other internalizing forms of psychopathology, admittedly seems to be lacking at the present time. There is further uncertainty as to whether, as well as to what extent, such theorized trajectories would hold across age (e.g., be observed in children, adolescents, and adults).

Empirically-Derived Trajectories of Anxiety

The empirical literature base pertaining to trajectories of anxiety among children and adolescents is a remarkably small one. The handful of existing studies in this domain

varies to such a great extent (e.g., in terms of sample characteristics and methodology employed) that comparison between investigations is an essentially meaningless endeavor. This is arguably an important area for future research so that a more cohesive picture of anxiety symptom trajectories among youth can emerge, and serve as a guidepost for the structure of prevention and intervention efforts targeting anxiety-related difficulties among young people.

Sterba et al. (2007) analyzed maternal reported internalizing symptoms among a sample of children as part of a larger longitudinal investigation of early development. Youth were assessed at yearly intervals from the age of two through age eleven. These researchers obtained support for three distinct trajectory classes of internalizing distress, conceptually similar to those theorized by Weems (2008). Specifically, youth were categorized as falling into one of the following categories on the basis of data obtained: 1) elevated-stable trajectory (children who evidenced heightened levels of internalized distress across the age range, with little variation; 13% of boys, 21% of girls), 2) decreasing/increasing trajectory (children whose internalizing symptoms decreased from ages two to six, and then increased to age eleven; 22% of boys, 10% of girls), and 3) low trajectory (children who consistently evidenced low levels of internalized distress throughout the assessment period; 65% of boys, 69% of girls). The overall shape of boys' and girls' trajectories was similar, even though girls tended to endorse a greater number of symptoms than did boys (Sterba et al., 2007).

These findings are limited, however, in that the study authors considered internalizing symptoms broadly (i.e., anxiety and depression were combined into a single construct), precluding differentiation of syndrome-specific trajectories of symptoms

(Sterba et al., 2007). They also relied solely on maternal report for assessment of internalizing symptoms, a practice that is somewhat suspect since internalizing symptoms do not necessarily manifest in an observable manner, and may therefore go undetected by those in a sufferer's environment. Inter-rater agreement tends to be higher when symptoms of an externalizing nature are assessed; utilizing data provided by others in a child's environment may therefore be more widely accepted in this context.

In a preliminary investigation of global levels of anxiety among a community-based sample of male youth assessed yearly, Hughes and colleagues (2006) found evidence of a bimodal distribution, with anxiety peaking at the ages of five and eleven, and a seeming decline thereafter (participants were followed through late adolescence/early adulthood). These results were consistent with reports that anxiety is often detected in middle childhood (e.g., Bernstein, Borchardt, & Perwein, 1996), but inconsistent with the notion (based on a comprehensive review of the literature) that anxious symptoms increase during the adolescent years (Kovacs & Devlin, 1998). These findings may have been impacted by analytic procedures (e.g., the trajectory was based on mean anxiety scores created from a combination of child, parent, and teacher report), as well as assessment of anxiety as a global construct.

Gullone and co-authors (2001) conducted a shorter term investigation, wherein self-reported anxiety was assessed among a sample of 68 Australian children and adolescents, aged seven through 18 at study inception, over a three year period (youth were assessed only twice, once at study initiation and again three years later). Results suggested that youth-reported symptoms of anxiety tend to decrease over time, both when overall anxiety levels and specific subtypes (except for social-related anxiety) are

considered. These authors found symptom decline to be particularly noteworthy among girls and those in the later stages of childhood and early adolescence (ages 10-14) in their sample (Gullone et al., 2001). Findings should be considered with the caution that youth were not assessed at regular intervals; what occurred during the three year interim is based on speculation more so than empirical backing. Also, a relatively small number of youth, comprising a broad age range, were included in the study, which places limits on the ability to generalize results to any larger population.

Hale and co-authors (2008) conducted the only known, published study of developmental trajectories of specific anxiety disorder symptoms among a population-based sample of male and female adolescents. They assessed two cohorts of youth, ages 12 and 16 at first assessment, from the Netherlands over a span of five years, observing a slight decrease in symptoms associated with separation anxiety disorder, panic disorder, and school anxiety over time, along with relative stability in social phobia symptoms, among both boys and girls (Hale et al., 2008). The findings obtained by these researchers are consistent with developmental expectations for separation and school-related anxieties (i.e., a decrease with age), as well as the notion that social anxiety is a commonly experienced phenomenon among adolescents (i.e., levels remained stable across the study period, which encompassed adolescent years only).

The only gender-specific finding of the investigation conducted by Hale and colleagues (2008) pertained to generalized anxiety symptoms in girls. Specifically, symptoms of generalized anxiety among adolescent female youth increased with time and peaked in early adolescence, with elevated levels maintained subsequently, whereas a decline in symptoms was evidenced over time among males (Hale et al., 2008); the latter

bears similarity to the findings of the Hughes et al. (2006) study. In the absence of additional examination of trajectories of anxiety among young boys and girls, it is difficult to predict what gender-specific outcomes would be with any degree of certitude, highlighting the timeliness of gender-based research in this topical area.

Limitations of Existing Research

As aforementioned, the experience of anxiety among children and adolescents has only come to the attention of the research community in recent years. Investigations into trajectories of anxiety symptoms, particularly among youth, are in their infancy, so relatively little is presently known about developmental trends and variability of anxiety in this population. Gender-specific findings and studies are virtually non-existent in the literature, which is somewhat surprising in light of evidence to suggest that girls and women suffer from anxiety-related disturbances at higher rates than boys and men (e.g., Evans et al., 2005a), and that anxiety among females may be associated with greater functional impairment than among males (e.g., Christophersen & Mortweet, 2001).

A number of limitations characterize many of the existing studies into anxiety among youth. For instance, longitudinal, community-based examinations of symptoms across childhood and adolescence are rare. Many studies of this sort assess anxiety among adolescents only (Bittner et al., 2007), precluding knowledge of symptom consistency and change over time, or adolescent outcomes potentially associated with anxiety in childhood. Large numbers of studies pertaining to anxiety focus on adults, and thus little is presently known about developmental patterns of anxiety in children and adolescents. Understanding of how (and when) anxiety manifests during youth development has noteworthy implications for both the timing and structure of prevention

and early intervention efforts targeting anxiety disorder symptoms. Many investigations of this variety are also of short duration (generally five years or less; e.g., Hale et al., 2008), further limiting the ability to draw firm conclusions regarding manifestation of anxiety over time. Evidence attesting to the expression of anxiety among female youth from ethnic minority backgrounds is particularly lacking in the available literature (Silverman & Carter, 2006).

Studies of child and adolescent anxiety frequently employ clinic-based samples of youth; generalization of findings to those from the general population is therefore questionable (Hale et al., 2008). It is perhaps not surprising then, that although anxiety is perceived as a normal facet of development, the empirical literature has not generally treated it as such (Gullone et al., 2001). Investigators frequently take a disorder-centered view of anxiety among young people, and may neglect to consider that mere symptom presence and disorder do not automatically equate. Additionally, researchers commonly employ somewhat dated statistical methodology that permits only group-focused analysis, whereas more contemporary approaches (e.g., latent growth modeling) would allow for person-centered analyses. The latter is perceived as particularly useful for the documentation of trajectories of experienced symptoms over time (Weems, 2008).

CHAPTER III

METHODOLOGY

As presented in chapters one and two, the empirical literature is essentially void of studies into the experience of anxiety among children and adolescents from the general population; the preponderance of research has focused on clinic-based samples of youth. This precludes researchers and practitioners alike from gaining insight into normative trends in anxiety development and manifestation, which in turn limits the ability to structure prevention and treatment approaches sensitive to the unique needs of this population. Limited examination of gender-specific findings related to anxiety symptom presentation likewise characterizes the available literature, and serves as an additional barrier to the creation of developmentally relevant prevention and intervention programs targeting symptoms of anxiety.

The current study makes use of data gathered as part of a larger investigation into the development of various forms of psychopathology (e.g., anxiety, conduct problems, depression), and potential correlates thereof, among a sample of female youth based in the community. Following a brief description of the broader study from which data was obtained, methodology for the current study is outlined. This discussion encompasses information related to study participants, assessment measures, research design, and procedures, as well as data analysis techniques appropriate to answer the specific research questions posed herein.

Pittsburgh Girls Study

The Pittsburgh Girls Study (PGS) is a four-cohort, community-based longitudinal investigation into the development of psychopathology among a sample of girls recruited

from the inner city of Pittsburgh, Pennsylvania (Loeber et al., 2002). Researchers assess for the presence of co-occurring problems (e.g., substance use) among girls in the sample as well. Data are routinely collected, as described below, from multiple informants (i.e., child, parent/caregiver, teacher) to promote a cohesive picture of youth functioning and permit comparison of behavior across settings. Funding for this initiative has been provided by the National Institute of Mental Health (NIMH), National Institute on Drug Abuse (NIDA), and Office of Juvenile Justice and Delinquency Prevention (OJJDP). Dr. Rolf Loeber serves as the principal investigator for both the NIMH and NIDA grants.

Participants

The PGS sample consists of 2,451 female youth who were five through eight years of age at study inception. Girls were recruited from 103,238 households located in the city of Pittsburgh. Disadvantaged neighborhoods were oversampled, such that all homes in the 23 lowest income neighborhoods were targeted, whereas 50% of those in the remaining 66 neighborhoods were. Specifically, 40.9% ($n = 1,003$) of girls in the PGS sample lived in the lower income neighborhoods, while the remaining 59.1% ($n = 1,448$) resided in higher income neighborhoods. This compares with proportions of 27.6% and 72.4%, respectively, garnered from U.S. Census data gathered in the year 2000. Public databases (e.g., post office records) were used to identify each address in the lower and higher income neighborhoods; study recruiters visited all homes and asked if there were any girls within the specified age range (i.e., 5-8) residing there. This resulted in a pool of 3,118 potential study participants.

Exclusionary criteria were met by 15 youth (e.g., child suffered from a serious developmental delay, mother was unable to speak English), while an additional 110 were

regarded as ineligible to participate for reasons such as family relocation. The whereabouts of another 117 families became unknown between identification of homes and follow-up, despite extensive search efforts by members of the PGS research team. Also, one eligible child passed away prior to study onset. Of the 2,875 remaining potential participants, 2,451 agreed to participate in the first phase of data collection, reflecting 85.3% of eligible girls and their families.

All conduct related to the PGS was approved by the institutional review board (IRB) at the University of Pittsburgh. Written caregiver consent and verbal child assent were obtained by the PGS research team, and potential risks and benefits of study participation, participant rights, and overall intent of the research were described. The current study was also subjected to review by the IRB at Duquesne University, and was granted approval by this entity. All data was provided by the PGS in the form of a de-identified data set.

Participants in the PGS comprised four cohorts of girls; at the time of first interview, 588 were age five, 630 were age six, 611 were age seven, and 622 were age eight. The current study makes use of data from the cohort of girls aged eight years ($N = 622$) at the outset of the study. Seven phases of data are presently available for analysis, collected when girls were ages eight through 14. The present study utilizes data collected annually, beginning when girls were nine years of age and commencing when girls were 12. First year data were omitted because girls did not begin self-reporting on the constructs of interest (i.e., anxiety) until the age of nine; eight-year-old data were therefore not included so that a consistent informant was utilized. To promote consistency across conduct of analyses, data collected when girls were 13 and 14 years of

age were likewise not incorporated because items contributing to two subscales of the SCARED (the assessment tool for anxiety that is used herein), school phobia and separation anxiety, were not administered beyond the age of 12. Researchers at the PGS decided to cease administration of these subscale items due to concerns about participant burden and perception that separation and school-related anxieties are infrequently experienced among adolescent girls (or are at least less common than general, panic, and social anxiety symptoms).

Although parent-reported data were available at all ages 8-14, youth-reported data were employed due to the perception that youth are accurate reporters of internalizing distress, given that symptoms are subjective and not necessarily observable by others. The practice of youth self-reporting appears to become increasingly common in the later stages of childhood and early adolescence, presumably for a number of reasons. Langley, Bergman, and Piacentini (2002), for instance, assert that younger children may neglect to recognize the degree of impairment associated with their symptoms, or the extent to which symptoms interfere with daily functioning. The emerging cognitive capacities of the very young may likewise preclude them from understanding symptoms and being able to communicate their distress (Langley et al., 2002). Genyue and Xiaopan (2006) add that young children tend to have limited awareness of simultaneous experiences (e.g., that multiple, and often conflicting, emotions can be felt concurrently), and generally have difficulty with self-presentation skills (e.g., the ability to describe one's internal state). Given that the current study made use of data collected beyond the early-middle childhood years, girls' self-reported data was perceived as credible.

The total PGS sample (i.e., all four cohorts combined) was comprised of 52.4% of African American female youth, 40.8% of European American girls, and another 6.8% who identified themselves as being of mixed or other race. Girls' primary caregivers were mostly female (in 93% of cases), and most often (greater than 92%) the biological parent. Approximately 40% of participating girls resided in homes headed by a single caretaker. Roughly 17% of caregivers completed less than 12 years of formal schooling. These variables were distributed comparably in each of the four cohorts.

Participant attrition rates have been low over the course of the PGS. In the most recent phase of data collection incorporated in the current study, gathered during year five, 92.5% of the original cohort was retained (based on youth-reported data). Participant attrition may be attributable to diverse circumstances, such as youth (or caregiver) refusal to participate, inability of research team members to make contact with girls (or families), or participant death.

Handling of Missing Data

Research Question # 1

For the analyses relevant to the first research question in the current study, cases with complete missing data (i.e., no data for any of the 41 items of the SCARED, administered when girls were approximately nine years of age) were removed from the data set. This resulted in deletion of 20 cases (reducing $N = 602$); data were missing primarily because youth and/or their caregivers refused to participate in data collection during the referenced year of the study. Another 31 girls of non-African American, minority background (multiracial or Asian) were excluded to permit comparison between the largest two racial groups, European American and African American (producing $N =$

571). An additional single case was deleted from the data set because race for the participant was not reported.

The resulting sample size, used for all analyses associated with the first research question, was 570. The sample was comprised of 44.2% of European American girls ($n = 252$) and 55.8% of girls of African American race ($n = 318$). Girls were an average of nine years of age ($M = 9.63$, $SD = .33$) at the time of assessment. Of the retained cases, none had more than one-third of items missing; those with missing data seldom had more than 1-2 items omitted. Unanswered values were imputed using maximum likelihood estimation (MLE), the rationale for which is described below.

Research Questions # 2 and # 3

Girls were retained for trajectory analyses if they had at least three years of data for the constructs of interest (i.e., individual subtypes of anxiety). Those who failed to meet this criterion were deleted prior to conducting statistical analyses, reducing the size of the sample by 35 ($N = 587$); reasons for missing data were not specified in the data set provided to the researcher of the current study. Another 30 girls of non-African American, minority background (multiracial or Asian) were excluded from analyses, again to permit comparison between the largest two racial groups, European American and African American (leading to $N = 557$). A single case was deleted because participant race was not reported.

The resulting sample, used for all analyses associated with the second and third research questions, was comprised of 556 girls, who were roughly nine years of age ($M = 9.63$, $SD = .33$) at the time of first data collection. The group included 43.3% of

girls who were European American ($n = 241$), with the remaining 56.7% of African American race ($n = 315$).

For girls in the final sample whose data included missing values (for anxiety disorder subtypes), imputation by means of MLE was employed. This was selected over the available alternatives for a number of reasons. First, MLE is based on the assumption that data is missing at random (MAR), whereas others are based on the premise that data is missing completely at random (MCAR; Garson, 2008). The former approach allows for the possibility that subjects with particular characteristics (e.g., African American race) are more likely to have data missing than others (e.g., those of European American descent). Garson (2008) contends that it is more common and realistic for researchers to have data that is MAR than MCAR. McKnight and colleagues (2007) encourage caution, however, as it is perhaps most likely in statistical practice that missing data cannot be neatly classified as per a single mechanism.

Second, MLE ensures that sample size remains constant across observations, such that the same complement of cases has full data at each data collection point in an investigation (Garson, 2008). This criterion is virtually impossible to meet when assessments occur over an extended period of time (i.e., in longitudinal research), thereby increasing the likelihood that sample sizes would be unequal in analyses undertaken in such examinations. Utilizing unequal sample sizes is particularly undesirable when structural equation modeling methodology is employed, and may prevent the generation of a solution altogether in this context (Garson, 2008). Third and finally, MLE produces smaller standard errors than available alternatives.

Measures

Anxiety Subtypes

The Screen for Child Anxiety Related Emotional Disorders (SCARED) was designed to serve as a screening tool for anxiety disorder symptoms among children and adolescents aged 9-18, on the basis of either youth or parent report (Birmaher et al., 1997). The original intent of the scale was to aid in the identification of specific anxiety disorders among clinic-based samples of youth. It has subsequently been perceived as useful for differentiating between clinical and subclinical levels of anxiety and distinguishing between anxiety disorders, in combination with relevant data gathered through other means (e.g., interviews, behavioral observations; Christophersen & Mortweet, 2001). Although assessment is inherently based on symptom presence alone (impairment is not directly evaluated by the scale), the SCARED may also be beneficial for monitoring treatment progress and symptom remittance.

The SCARED is viewed as unique among measures of youth anxiety for a number of reasons. For instance, it permits the assessment of specific types of anxiety, rather than anxiety more globally. It is also a pure measure of anxiety, whereas anxiety is frequently included as part of a broader “internalizing disorder” construct on other youth assessments (Christophersen & Mortweet, 2001). Creators of the SCARED excluded items assessing symptoms also characteristic of depression from the final version (Birmaher et al., 1997); the SCARED may therefore lend itself more readily to pointed intervention planning than available alternatives. Further, the SCARED was developed specifically to assess anxiety among children and adolescents, while others may be adapted from adult versions of anxiety scales (Christophersen & Mortweet, 2001),

leading to questions regarding the developmental appropriateness and/or relevance of scale items to youth.

The SCARED consists of five empirically-derived subscales (general anxiety, panic/somatic, school phobia, separation anxiety, social phobia), analogous to their *DSM-IV* (American Psychiatric Association, 1994) counterparts (except for school phobia, which has not as yet been included in this diagnostic manual). Calculation of a total anxiety score, based on responses to all subscales combined, is also permitted (Birmaher et al., 1997). The original scale consisted of 38 items; a 41-item version, containing three additional items to assess social anxiety, has since been created as well. A 66-item version includes several factors (e.g., reflecting symptoms of obsessive-compulsive disorder and posttraumatic stress disorder) not previously evaluated.

The PGS (and the current study) utilizes the 41-item version of the SCARED, with several minor modifications. For example, qualitative descriptors of numeric response options were changed slightly (e.g., 1 = *somewhat true* or sometimes true, 2 = *very true* or often true) to clarify their meaning for participating youth. The SCARED is also administered orally by PGS interviewers, whereas it is generally read silently and completed independently in research and clinic-based contexts. Administering items aloud is perceived as useful, particularly for younger girls, to ensure that they are comprehended and to provide youth with opportunities to seek clarification from the examiner.

Respondents rate each of the 41 SCARED items using a three-point Likert-type scale, based on the degree to which statements are believed to be true for them (0 = not true, hardly ever true; 1 = sometimes true; 2 = true, often true). Selected responses for

each subscale are summed, with possible score ranges for each scale as follows: general anxiety (0-18), panic/somatic (0-26), school phobia (0-8), separation anxiety (0-16), social phobia (0-14), and total anxiety (0-82). Higher scores are reflective of greater symptom presence than lower ones.

Evidence of Psychometric Adequacy

Reliability. Research pertaining to reliability of the SCARED most frequently involves assessment of its test-retest and/or inter-rater consistency. Because SCARED data derived from a single informant (i.e., youth) were utilized in the present study, consideration of the latter is not undertaken herein. It suffices to say for the current purpose that numerous researchers (e.g., Birmaher et al., 1997) have found evidence of moderate parent-child agreement in reporting anxious symptoms via the SCARED. Evidence of relative score stability over time (i.e., test-retest reliability) is of greater interest in the current study since youth were assessed repeatedly over the course of the investigation.

Among a sample of outpatient youth, Birmaher and colleagues (1997) reported high correlations between scores on multiple assessments, using the 38-item version of the SCARED. Children in the study completed the SCARED a median five weeks after initial assessment, with 79% completing follow-up within eight weeks (range = 4 days – 15 weeks). Intraclass correlations for individual factors ranged from .70 to .90. Study authors failed to detail their findings further, in that they did not report correlations separately for each subscale, nor did they specify which subscales had the intraclass correlations that anchored the range of values (i.e., .70 and .90). They did indicate, however, that results did not differ when youth who completed the SCARED before and

after five weeks were compared, and than no differences based on age or gender were observed (Birmaher et al., 1997). Fluctuation in scores over the course of the current study may be expected, in light of developmentally normative shifts in predominant manifestations of anxiety (e.g., separation concerns among young children, social anxieties among adolescents; Weems & Costa, 2005). Test-retest stability is therefore not addressed further herein.

Validity. Investigations into the factor structure (i.e., construct validity) of the SCARED are plentiful in the available literature. Such research was first undertaken by creators of the SCARED, who concluded, based on a principal components analysis with varimax rotation, that a five factor solution best fit the data obtained from a sample of outpatient youth assessed with the 38-item version of the scale (Birmaher et al., 1997). This structure demonstrated good internal consistency, with reported coefficient alpha values ranging from .74 to .89 and low correlations between individual factors (.17-.30) observed, supportive of the notion that subtypes of anxiety can be distinguished among pre-adolescent and adolescent youth. Of further note, no differences in factor structure were observed, on the basis of child report, with regard to race (Birmaher et al., 1997).

When subjected to analysis by scale developers, the 41-item version of the SCARED yielded additional support for a five factor structure, when completed by a sample of outpatient youth. Coefficient alpha values for individual factors ranged from a low of .78 to a high of .87, suggestive of good internal consistency (Birmaher et al., 1999), and analogous to findings from earlier research (e.g., Birmaher et al., 1997) with the 38-item version. The three items added when the 41-item version of the SCARED was created loaded as expected (i.e., on the social phobia factor; Birmaher et al., 1999).

Study authors cautioned readers that findings with regard to factor structure of the SCARED may differ among youth based in the community, since to the point when their research was conducted, validity studies were confined to clinically-oriented samples (Birmaher et al., 1999).

Numerous recent studies have produced empirical support for a five factor structure of the SCARED in samples of international youth from the general population. Hale, Raaijmakers, Muris, and Meeus (2005), for instance, found overwhelming evidence to suggest that a five factor structure best fit the data they obtained from an early-middle adolescent age group. This was true in both the sample at large, as well as the various age, gender, and ethnic groups assessed (Hale et al., 2005). Ogliari and colleagues (2006) found more modest support for a five factor structure among a sample of non-psychiatrically ill, Italian-born twins. These researchers questioned only the validity of the school phobia factor, in light of a modest coefficient alpha value (.54) associated with this subscale. Discarding this factor in favor of a four factor solution provided an improved overall fit to the data in this particular investigation (Ogliari et al., 2006).

More modest empirical backing for the five factor structure of the SCARED has been obtained among a sample of African American high school youth based in the community. With multiple criteria used to determine best fitting structure (e.g., examination of scree plot, eigenvalues, and item loadings), Boyd and colleagues (2003) reported that a three factor model provided a better fit to their data than others tested. Item loadings were similar to those in prior investigations (e.g., Birmaher et al., 1997), except that separation anxiety and school phobia factors did not seemingly emerge; 21 total items failed to load on any factor with any strength (Boyd et al., 2003). The authors

explained that findings may have been influenced by several sample-related variables (e.g., youth completed assessments at school; those with separation or school-related concerns may be truant) and/or signify failure of *DSM-IV* criteria to accurately reflect the experience of anxiety among African American children and adolescents. These findings are nonetheless of potential relevance to the current investigation, in light of the preponderance of African American female youth included in the PGS sample. The structure obtained by Boyd et al. (2003) is not subjected to empirical scrutiny in the current investigation due to concerns about the methodology employed by these authors (e.g., removal of more than half of SCARED items for analyses) and consequently, inability to meaningfully compare fit of a three factor model with others tested in the present study.

Empirical evidence attesting to the convergent and discriminative properties of the SCARED can also be found in the literature. With regard to the former, Birmaher et al. (1997, 1999) report substantial correlations between the SCARED and numerous traditional measures of youth anxiety (e.g., Revised Children's Manifest Anxiety Scale [RCMAS]). Muris and colleagues (1998) add that the SCARED is related, at least to the RCMAS, in a theoretically meaningful way, not purely a statistical one. Monga et al. (2000) found SCARED scores to correlate more strongly with the internalizing factor of the Child Behavior Checklist (CBCL) than the externalizing factor, as would be expected (due to the categorization of anxiety as an internalized form of distress), providing additional support for the convergence afforded by the scale.

Birmaher and co-authors (1997, 1999) obtained support for the divergent validity of the SCARED as well. Specifically, among samples of outpatient youth, they found that

children with and without anxiety disorders could be differentiated on the basis of SCARED scores (Birmaher et al., 1997; Birmaher et al., 1999). Monga et al. (2000) assessed a sample of youth referred to a mood and anxiety disorders clinic, finding that youth with anxiety disorder diagnoses scored significantly higher ($p < .05$) on the SCARED than those with depression or disruptive behavior disorders only. Much existing evidence of the convergent and divergent properties of the SCARED is derived from clinic-based samples of youth, highlighting the need for studies of this sort among children and adolescents from the community. Neither convergent nor divergent validity were assessed in the present study because they are not directly relevant to the research questions posed, and no other assessments of anxiety symptoms (or other forms of psychopathology) were included.

Research Design

The current study employs data collected as part of a larger longitudinal investigation. This research is non-experimental in nature, in that variables (i.e., independent variables) are not manipulated in order to observe the effect that they have on other variables (i.e., dependent variables). This longitudinal research was undertaken to be primarily descriptive with regard to the development of anxiety among female children and adolescents. The non-random manner in which participants in this research were solicited has been described previously. For purposes of the current research, the specific constructs (i.e., subtypes of anxiety) assessed are defined consistent with their *DSM-IV-TR* counterparts.

As is the case with any form of empirical research, a number of potential threats to the validity of the results (e.g., the ability to generalize them outside the sample) in the

present study exist. For instance, in any investigation where assessments occur over time, historical events that occur outside the confines of the study may impact participant responses in a way not anticipated by the researcher (and that are entirely outside of the researcher's control; McMillan & Schumaker, 2006). Relevant to the current research, if a large-scale school shooting occurred during the course of the study, participants may have reported increased school-related anxieties (and perhaps heightened anxiety more generally) around the time of the event. Participant attrition also has the potential to be problematic in longitudinal work, especially when loss occurs in some systematic fashion (e.g., African American individuals drop out with greater frequency than those who are European American; McMillan & Schumaker, 2006).

Results of studies that occur over a period of time may likewise be influenced by participant familiarity with measurement techniques, since the same tools are generally used repeatedly (McMillan & Schumaker, 2006). Mere exposure to or experience with an assessment may bias future responses (e.g., performance on a measure of academic achievement may improve over time due to familiarity of questions asked); this is often guarded against by administration of different versions of the same measure at various data collection points. This is unlikely to pose a significant threat in the current study since participants were encouraged to respond in ways reflective of how they have been feeling *lately* (thus, how they previously responded is of seemingly little relevance). Maturation of participating individuals in longitudinal work may have an additional impact on responses (McMillan & Schumaker, 2006), occasionally in ways not expected by the researcher. In the present research, it is possible that youth accounts of anxiety

symptoms may become more accurate over time due to girls' increased insight into the nature of their internal state.

Further, the results obtained in the current study may be impacted by the oversampling of girls from low income neighborhoods, since the percentage thereof (in the sample) do not align with those in the general population of interest, as per census data obtained at study outset. Most notably, this would affect the ability of findings to be generalized to groups outside the particular sample under investigation; it would be important that extrapolation occur only with this caution in mind.

Procedure

The PGS includes annual data collection from girls, primary caregivers, teachers, and interviewers on a number of assessments relevant to mental health, conduct, and day-to-day functioning. Trained female interviewers conduct all assessments, aided by a laptop computer, with participating youth and their caregivers separately; teacher measures are delivered to schools and returned directly to members of the PGS research team upon completion. Child and caregiver interviews occur at the home of the participating youth/family, and are approximately 2-3 hours in duration. Interviewers are required to complete 24 hours of class-based instruction, engage in a mock interview session with supervisory staff, and be observed in the field before being permitted to conduct interviews independently. Performance is evaluated after roughly one month and on an ongoing basis thereafter, in order to identify and remedy areas of potential concern in a timely fashion (and to minimize their impact on data integrity).

The current study incorporates data obtained via youth self-report only, from girls in the cohort of eight-year-olds at study initiation ($N = 622$). The researcher had no direct

involvement in the procurement of data, as it was provided by the PGS. The measure selected represents only a subset of those actually administered during each phase of data collection. It was chosen for use in this study because the data it provides allows the research questions posed herein to be answered.

The child-report version of the SCARED was first administered to participating youth at the age of nine, and was repeated at yearly intervals thereafter. Although phase ten of PGS data collection is presently underway, the current investigation makes use of data gathered during years two (when girls were age nine) through five (when girls were age 12). Trajectories of general anxiety, panic/somatic, school phobia, separation anxiety, and social phobia symptoms were examined across the entire 9-12 year age span. The total anxiety scale of the SCARED was not incorporated in the present study due to at least preliminary empirical evidence to suggest that anxiety subtypes can be meaningfully separated among pre-adolescents/adolescents from the general population (e.g., Ferdinand, Dieleman, Ormel, & Verhulst, 2007; Ferdinand, Dieleman, Ormel, & Verhulst, 2008).

Data Analysis

Before undertaking statistical analyses relevant to the research questions posed, a number of preliminary analyses were conducted. With the data used for analyses pertaining to the first research question ($N = 570$), the internal consistency of the SCARED subscales was evaluated and Cronbach's alpha coefficients were calculated. These values were obtained for the entire sample, as well as separately for girls of European American ($n = 252$) and African American ($n = 318$) race. Alpha coefficients

were not reported for the complete SCARED (i.e., all 41 items) since the SCARED total score was not incorporated into any analyses in the present investigation.

Additional preliminary statistics were derived using the data needed to address the second and third research questions ($N = 556$). A number of descriptive statistics (specifically, frequencies and percentages) were calculated for the demographic variables of race (European American or African American), poverty (receipt of public assistance, such as WIC, food stamps, or welfare, or not), and parenting status (single parent or cohabiting with a spouse or partner), based on data obtained at study inception. Correlations between SCARED subscale scores were likewise assessed during the first year of the current study (i.e., when girls were age nine) among the combined sample.

All analyses directly related to the first and second research questions posed herein were conducted using LISREL 8.80 (Jöreskog & Sörbom, 2006) with maximum likelihood estimation. Those pertaining to the third research question were performed using EQS, version 6.1 (Bentler, 2005) because problems (i.e., covariance matrices were not positive definite, and so models would not run) were encountered when attempts were made to run these analyses using LISREL. EQS is less sensitive to intricacies of data (e.g., limited range of possible values for the race variable controlled for in analyses for research question three) and thus permitted models to run. Preliminary analyses were carried out and descriptive statistics were calculated using version 12.0 of the Statistical Package for the Social Sciences (SPSS, 2003) due to its greater ease of use for this purpose than either of the aforementioned.

The specific research questions of interest in the current study are restated below, along with the associated hypotheses. The statistical analyses selected to answer these questions are also briefly described.

Research Question # 1

Are there differences in the structure of anxiety disorder symptoms among European American and African American female youth at age nine?

Hypothesis # 1

Investigation of the structure of anxiety disorder symptoms among girls from various racial groups is intended to be exploratory in nature, as prior empirical results in this area are mixed. For instance, Hale, Raaijmakers, Muris, and Meeus (2005) found evidence to suggest that anxiety disorder symptom structure is parallel among samples of international youth from the general population, regardless of age, gender, or ethnicity. Birmaher and colleagues (1997) likewise found support for comparable race-based symptom structure among an outpatient sample of male and female youth. Boyd and colleagues (2003), in contrast, assessed African American youth based in the community, obtaining results that caused them to question the experience of separation anxiety and school phobia (supported empirically among European American children and adolescents) among African American youth.

Statistical Analysis for Research Question # 1

Prior to conducting the analyses directly necessary to answer the first research question, the best fitting structure of the SCARED to the data used herein was determined via confirmatory factor analysis (CFA). CFA is intended to assess how well specified relationships between individual scale items and latent (i.e., unmeasured) factors are

supported in a sample. Confirmatory analytic techniques were selected over those associated with exploratory factor analysis (EFA) because there were a number of theoretically or empirically driven models of anxiety disorder symptom structure that could be tested. EFA is more commonplace when no prior assumptions about the data are held, aside from an unspecified relationship between observed items and latent factors. In addition to lacking a theoretical or empirical underpinning, EFA (and other exploratory statistical procedures) generally lacks criteria for objective interpretation, such that diverse conclusions could be reached by multiple parties analyzing the same data (Mulaik, 1987).

When conducting a CFA, it is recommended that at least two items comprise each factor; a minimum of three is more commonly suggested (Kline, 2005). This was achieved in the current study, in that the smallest number of items per factor in any of the models described below was four (for the school phobia construct in the five factor model first described). This recommendation also tends to be less critical as sample size increases (Kline, 2005); the size of the sample in the present study is sufficiently large that again, concerns such as this are minimal.

In the current study, the ability of three different factor structures to explain the relationship of individual SCARED items to latent factors was assessed. Each structure was based on theoretical grounds or results of prior empirical study. These three models, along with rationale for examining them, were:

1. A five factor model, wherein the 41 items of the SCARED loaded onto factors believed to reflect generalized anxiety (9 items), panic/somatic (13 items), school phobia (4 items), separation anxiety (8 items), and social phobia (7

items), as supported empirically by the work of SCARED authors (e.g., Birmaher et al., 1997) and others (e.g., Hale et al., 2005). This structure is also consistent with *DSM*-defined anxiety disorder categories, as intended when the measure was created.

2. A one factor model, wherein the 41 items of the SCARED loaded on a single factor reflective of anxiety in a broad sense. Assessment of this structure was undertaken in light of controversy and lack of empirical consistency in whether anxiety among youth is best conceptualized as one-dimensional (e.g., Ferdinand, van Lang, Ormel, & Verhulst, 2006), or if child and adolescent anxiety is comprised of distinct problem dimensions (e.g., Spence, 1997) analogous to those evidenced in adults.
3. A five factor model, with each of the 41 SCARED items randomly assigned to one of five factors, with the aid of an online random number generator. This was done to refute or lend support to the notion that one of the above-described models best fit the data. It is expected that overall fit of a model generated in a random fashion would be poor since no theoretical or empirical basis is used to assign individual items to factors.

The assessment of overall model fit (for each of the individual models above) to the data was based on multiple fit indices (e.g., comparative fit index [CFI], root mean square error of approximation [RMSEA]). Higher CFI values signify better fit than do lower ones, with values of approximately .90 (or above) desirable (Kline, 2005). RMSEA is often referred to as a “badness of fit” index, in that low values are suggestive of good model fit. Values $\leq .05$ are preferable; anything between .05 and .08 is typically viewed

as reasonable (Kline, 2005). These guidelines were utilized in the interpretation of results in the present study.

Comparison of fit across models was based on examination of the Akaike information criterion (AIC) values associated with each model. The AIC facilitates selection among competing non-hierarchical models (i.e., models that are not subsets of one another) estimated with the same data (Kline, 2005); global indices such as the CFI and RMSEA are not appropriate for this purpose. The model with the lowest AIC value is generally regarded as the best fitting among competing models (Kline, 2005). It is pertinent, however, that CFA models not be accepted or rejected solely on the basis of statistical grounds. Argument for the adequacy of a proposed model can (and perhaps should) be strengthened by incorporation of theory, professional judgment, and/or persuasion (Reise, Widaman, & Pugh, 1993).

Using the best fitting model on the basis of the above, the first research question, pertaining to racial differences in anxiety disorder symptom structure, was answered via a multi-group analysis (also referred to as multi-sample CFA). Multi-group analysis is employed as an assessment of measurement invariance, that is, whether or not the same latent factors/constructs are assessed in different groups (when the same instrument is completed). In the current investigation, this amounted to determining if the 41 items of the SCARED measure the five factors of generalized anxiety, panic/somatic, school phobia, separation anxiety, and social phobia in the same manner in European American and African American girls. In the event that group membership is found to moderate the relationship between items and factors, concerns about construct bias arise (Kline, 2005).

Carrying out a multi-group analysis necessitated undertaking several steps, each of which is briefly described (including overall intent) below:

1. Separate analyses – The first stage of a multi-group analysis fits a hypothesized model to each group that is being compared separately. In the present study, the five factor structure of the SCARED was examined among separate samples of European American and African American girls, and the overall fit was assessed. Differences in individual item loadings on the latent factors was also examined for a possible indication that a particular item (or subset thereof) may function differently in girls in these two racial groups.

2. Invariance – The second step of the multi-group analysis involved assessment of two types of invariance, configural and weak (defined below). Researchers who utilize structural equation methodology, as employed herein, are often interested in empirically determining if parameters of the model (e.g., factor structure) tested are invariant across groups (e.g., gender, race; Scientific Software International [SSI], n.d.). Assessment of these forms of invariance permitted conclusions to be drawn in the current study about the extent to which the SCARED assessed anxiety disorder symptoms in a similar manner in European American and African American girls. The two types of invariance of interest in the present investigation, along with a basic description of each, were:

a. Configural invariance suggests that the model of interest fits (i.e., is the same) across groups, but that unknown parameters of the model differ from one group to the next (SSI, n.d.). When the multiple group model

is run, parallel structures are tested, except that variance of all latent factors, covariance of pairs of latent factors, and item error variances are set free for one of the groups (done in the African American subset of girls in the current study). Conclusions are based upon examination of the chi-square test statistic produced when the multiple group model is run. Small chi square values (and large, non-statistically significant associated p values) are suggestive of configural invariance (SSI, n.d.).

- b. Weak invariance requires that slightly more stringent criteria be met and is more difficult to attain in empirical work. This type of invariance is present when the model of interest fits (i.e., is the same) across groups (as with configural invariance), and loadings of individual items onto latent factors are identical from one group to the next (SSI, n.d.). Running a multiple group model of this sort essentially forces item factor loadings to be equivalent across groups, and provides an index of overall fit. Here again, weak invariance is indicated by small chi-square values produced when the model is run (and an associated large, non statistically significant p value; SSI, n.d.).

Two additional and increasingly more rigorous types of invariance, strong and complete, were not assessed in the current study due to difficulty meeting the associated criteria in empirical investigations and the perception that neither would likely be obtained in the present work.

Research Question # 2

What does the developmental trajectory of symptoms of: a) generalized anxiety disorder, b) panic disorder, c) school phobia, d) separation anxiety disorder, and e) social phobia among female youth look like over time?

Hypothesis # 2

Generalized anxiety disorder. On the basis of gender-specific findings obtained by Hale and colleagues (2008), it is hypothesized that symptoms of generalized anxiety disorder will increase gradually from age nine onward, reaching their highest point in early adolescence (i.e., age 12).

Panic disorder. Given that onset of panic disorder is rare prior to adolescence or adulthood, it is hypothesized that levels of panic disorder symptoms will remain relatively low over the course of study. If elevated symptom levels are observed, it is assumed that this will occur among girls at the oldest age of assessment (i.e., age 12).

School phobia. It is presumed that the experience of school-related anxieties will remain low for the duration of the data collection period. It is believed that by age nine (the first time point at which data are utilized), youth are sufficiently familiar with school and comfortable with its structure that high levels of anxiety will not be experienced. From a developmental standpoint, it would be expected that anxiety levels may be highest at introduction to school (i.e., kindergarten/first grade) and perhaps times of transition (e.g., promotion from elementary to middle school). A slight increase in school phobia symptoms around age 11 or 12 may therefore be observed, coinciding with when most youth in the sample likely move from elementary to middle school.

Separation anxiety disorder. In line with normative developmental expectations and empirical findings regarding the predominance of separation fears early in life, it is hypothesized that separation anxiety disorder symptoms will remain low over the course of the study. Symptoms are first assessed during middle childhood (i.e., age nine), a phase of development when separation-related concerns are likely to dissipate in light of youth's increasing independence.

Social phobia. Based on normative developmental theory, it is hypothesized that symptoms of social phobia will gradually increase from age nine until girls reach early adolescence (i.e., age 12), at which time it is assumed that they will be their highest. This is consistent with findings obtained in an investigation conducted by Gullone and colleagues (2001), wherein self-reported social anxiety symptoms increased over a three year period among a sample of children and adolescents ranging in age from seven to 18 at study inception.

Statistical Analysis for Research Question # 2

Each facet of the second research question (i.e., pertaining to the examination of individual anxiety disorder symptom trajectories) was answered via application of latent growth modeling (LGM) techniques. LGM, a form of structural equation modeling, is one available method for analyzing longitudinal data; it permits description of developmental patterns and examination of change across time (Acock & Li, n.d.; Burchinal, Nelson, & Poe, 2006). It is preferred over more traditional statistical techniques (e.g., repeated measures analysis of variance [ANOVA] or multivariate analysis of variance [MANOVA]) because it permits simultaneous estimation of relationships between variables that may serve as independent variables in one

relationship and as dependent variables in another (Kline, 2005). LGM also allows for testing of different growth patterns (e.g., those following linear, quadratic, or cubic trajectories) and determining how well each model describes a given data set (Hale et al., 2008).

Perhaps the primary drawback of this approach is a slight reduction in power compared to alternative methods (Burchinal et al., 2006). With a sample size as large as the one in the current study, however, statistical power is not generally a concern (i.e., it is sufficient to detect differences where present). According to Burchinal and colleagues (2006), overall similar conclusions are drawn when diverse approaches to analyzing longitudinal data are undertaken, even though logistics of these techniques may differ somewhat.

Employing LGM methodology necessitates that several assumptions be met. First, the variables assessed should be continuous in nature and measured at a minimum of three points in time (Kline, 2005). Second, the same assessment technique must be utilized at each data collection point, so that variables are being measured in a consistent way throughout the duration of a study (Kline, 2005). Third, it is important that data be time-structured, simply meaning that all study participants should be assessed at each time point (intervals between measurements do not necessarily have to be equal, however; Burchinal et al., 2006; Kline, 2005). All were achieved in the context of the present study. The broader assumptions, common to many analytic approaches, of variable normality (i.e., variables follow roughly symmetric, unimodal distributions) and independence of observations likewise apply to LGM techniques.

In the current study, how well a given trajectory fit the data was assessed via examination of multiple fit indices, namely the CFI (described earlier) and Tucker-Lewis index (TLI; also referred to as non-normed fit index [NNFI]). Much like the CFI, possible values of the TLI range from zero to one, with values of .95 and above generally viewed as indicative of good model fit. Growth was also described in terms of trajectory intercept (i.e., reflective of initial symptom level, that at time of first data collection) and slope (indicative of the average rate and direction of growth; Acock & Li, n.d.).

Research Question # 3

Are there differences in the developmental trajectories of anxiety disorder symptoms among European American and African American female youth ages 9-12?

Hypothesis # 3

Based on literature to suggest that other internalizing forms of psychopathology (e.g., depression) are more common among minority youth (e.g., Sen, 2004), it is hypothesized that African American youth will evidence a higher degree of symptoms than the European American facet of the sample. It is believed that the overall shape of anxiety disorder symptom trajectories will be similar across races.

Statistical Analysis for Research Question # 3

The analyses relevant to the third research question are essentially parallel to those pertaining to the second research question, and thus much of the foregoing discussion applies. The prime difference between the analyses for these two questions was that the race variable (with girls divided into European American and African American groups only) was controlled for in the LGM for research question three. To use

SEM terminology, an LGM was run on the entire sample of girls ($N = 556$), including race as a covariate (often referred to as MIMIC).

This methodology simplifies the analysis of group differences (e.g., by race) considerably, by including the difference variable as an exogenous predictor (also referred to as a time-invariant covariate, since the value does not change with time and therefore only needs to be assessed once; Kline, 2005) in the context of a single analysis, and allowing for the possibility that this variable accounts for between-individual variation in the estimate of model intercept and slope values (Preacher, Wichman, MacCallum, & Briggs, 2008). Advantages of this approach include that the overall sample need not be divided into groups, and that time-invariant covariates that are nominal or continuous can be incorporated (Preacher et al., 2008). Within the context of the present study, these analyses permitted identification of whether or not differences in anxiety disorder symptom trajectories existed based on race, but did not allow for description thereof, if detected. Models were run in EQS using maximum likelihood estimation, with robust standard errors.

Overall Rationale for Statistical Analyses

Before proceeding to describe the results of statistical analyses in the current study, it is important to point out a key advantage of the analyses selected. With common available methods to examine group differences (e.g., t-test, ANOVA, MANOVA) or changes over time (e.g., repeated measures ANOVA or MANOVA), error that is associated with observed variables (e.g., SCARED items) is included in the latent constructs assessed (e.g., SCARED anxiety disorder subscales). It is believed in such analyses that these constructs are a linear combination of observed variables *plus* error. In

contrast, with structural equation methodology (e.g., multi-group analysis, LGM), latent constructs are assumed to be error free because error terms are instead associated with observed variables. Examination of group differences or growth trajectories are thereby theoretically error free, which is a distinct advantage of employing a SEM approach (Cohen, Cohen, Teresi, Marchi, & Velez, 1990; Dimitrov, 2006; Kline, 2006; Schreiber, in press).

The present investigation does not include examination of non-linear patterns of growth, as such trends are difficult to demonstrate statistically unless a minimum of four years of data are available for analysis and even then, at least five are preferable (J. Schreiber, personal communication, August 10, 2009). This is admittedly a limitation of the present work and should be addressed via future studies of longer duration.

CHAPTER IV

RESULTS

The results of all analyses carried out as part of the current study, as described in chapter three, are presented in this chapter. First, descriptive statistics are reported for the demographic variables of race (based on the data used to answer research question one) and race, poverty, and parenting status (for the data used to answer the second and third research questions); the mean age of girls in the sample across years is also reported. Next, correlations between subscales of the SCARED are examined. The internal consistency of the SCARED is then assessed, both in the total sample and separately for girls of European American and African American race, across the study period. Finally, results of the analyses undertaken to answer the research questions guiding the present investigation are provided.

Descriptive Statistics

As discussed previously, the sample used to answer the first research question differed slightly, in terms of both size and demographic makeup, from that used to answer the remaining two questions. This differentiation occurred because the requisite analyses involved different elements of the data (i.e., research question one made use of item-level data from the SCARED, whereas the second and third research questions employed SCARED subscale data). Information pertaining to how missing data was handled in each instance, resulting in the unique samples, is contained within chapter three.

The sample used to answer the first research question, pertaining to anxiety disorder symptom structure in European American and African American female youth,

was comprised of 44.2% of European American girls ($n = 252$) and 55.8% of African American girls ($n = 318$). Participants who identified themselves as being of multiracial or Asian backgrounds (the only non-African American, minority categories represented in the sample) were deleted prior to conducting analyses to permit comparison between the two most widely represented racial groups included in the study sample. Inclusion of the former subjects would have also been of limited practical value, given the small number of multiracial and Asian girls in the study.

The sample used to answer the second and third research questions, pertaining to trajectories of anxiety disorder symptoms and racial differences thereof, was made up of 43.3% of European American girls ($n = 241$) and 56.7% of girls who were African American ($n = 315$). The distribution of additional demographic variables (poverty, parenting status) in this sample is reported in Table 1, for both the collective sample and for each racial group separately. Frequencies and percentages were examined across years and did not change appreciably from one year to the next (in the sample at large or in the distinct racial groups); values are therefore only reported on the basis of data obtained at study inception.

As evident from the data presented below, African American girls in the sample were more likely than their European American counterparts to belong to families that were recipients of public assistance (e.g., WIC, food stamps, welfare), commonly viewed as an indicator of poverty or socioeconomic status. Girls of African American race were also considerably more apt to reside in homes headed by a single caretaker than were those of European American descent. This trend was observed (and to a comparable degree) for each year of the present investigation.

Table 1

Frequencies and Percentages of Demographic Indices at Study Inception

Variable	<u>European American</u> <i>n</i> (%)	<u>African American</u> <i>n</i> (%)	<u>Total Sample</u> <i>n</i> (%)
Poverty status ^a			
Receiving	41 (17.0)	128 (40.6)	169 (30.4)
Not receiving	199 (82.6)	183 (58.1)	382 (68.7)
Missing	1 (.4)	4 (1.3)	5 (.9)
Parenting status ^b			
Single	56 (23.2)	185 (58.7)	241 (43.3)
Cohabiting	184 (76.3)	126 (40.0)	310 (55.8)
Missing	1 (.4)	4 (1.3)	5 (.9)

Note. $N = 556$. European American $n = 241$. African American $n = 315$. % = percentage.

^a = Dichotomous variable; caregiver indicates whether or not public assistance (e.g., WIC, food stamps, welfare) is received. ^b = Dichotomous variable; caregiver indicates whether he/she is a single parent or cohabiting with a partner.

To provide additional information regarding composition of the present sample, the average age of girls in the facet of the sample used to answer the second and third research questions ($N = 556$), related to trajectories of anxiety disorder symptoms, is reported below in Table 2 for each year of the study.

Table 2

Mean Age of Girls in Study Sample by Year

Year	<u>Age</u> <i>M (SD)</i>
One	9.63 (.33)
Two	10.74 (.35)
Three	11.70 (.36)
Four	12.80 (.37)

Note. $N = 556$. European American $n = 241$. African American $n = 315$. M = mean; SD = standard deviation.

Before proceeding, it is worth noting that age was not reported for all girls in the above-referenced sample for each year of the present investigation. As a result, the ages recorded in Table 2 are based upon a slightly variable number of girls from one year to the next, ranging from a high of 551 (during year one) to a low of 541 (during year four). Nevertheless (and as reflected above), trajectories of each anxiety disorder subtype were examined when girls were between the ages of nine and twelve (inclusive).

Preliminary Statistical Analyses

Correlation Analysis

Bivariate correlations between all study variables (i.e., the five anxiety subtypes measured by the SCARED) were examined before analyzing data to answer specific research questions to provide preliminary information about interrelationships evident within the data. Results of the correlation analysis are reported below in Table 3.

Correlations were only obtained on the basis of data collected during the first year of the present study (when girls were roughly nine years of age). All values are based on data

from the entire sample (i.e., European American and African American girls combined) used for analyses pertaining to the second and third research questions.

Table 3

Correlations Between Study Variables During Year One

Variable	GAD	Panic	SchPhb	SAD	SocPhb
GAD	---	.699**	.635**	.641**	.580**
Panic		---	.602**	.614**	.538**
SchPhb			---	.520**	.393**
SAD				---	.587**

Note. $N = 556$. GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia. ** = correlation significant at the .01 level.

As reported in Table 3, bivariate correlations between anxiety subtypes ranged from a low of .393 (between school phobia and social phobia) to a high of .699 (between generalized anxiety disorder and panic disorder). At least a moderate degree of relationship between anxiety scores would be expected, given that all are measuring a different facet of the same broad construct (i.e., anxiety). All correlations, including those that tended to be weak, were statistically significant, presumably due to sample size. When large samples are employed, it is commonplace for associations that are small in magnitude to be found statistically significant, even if the degree of relationship is of limited practical meaning or value.

Internal Consistency Analysis

Prior to proceeding with further data analysis, the internal consistency of the five subscales of the SCARED was evaluated. Assessment of internal consistency is based on correlations among items that comprise the same scale; item correlations reflect the

degree to which individual items tap the same general construct. Cronbach's coefficient alpha values are frequently used as an indicator of the internal consistency of items that comprise a particular scale. Alpha values and the 95% confidence intervals surrounding them are reported in Table 4 for each subscale of the SCARED, based on data gathered during the first year of the current study. The sample employed was that used for analyses pertaining to the first research question ($N = 570$). Values are reported for both the sample at large and European American and African American girls separately.

Table 4

Cronbach's Alpha and Confidence Interval Values for SCARED Subscales

Subscale	<u>European American</u> α (CI)	<u>African American</u> α (CI)	<u>Total Sample</u> α (CI)
GAD	.83 (.80-.86)	.79 (.76-.82)	.82 (.79-.84)
Panic	.86 (.84-.89)	.85 (.83-.86)	.86 (.84-.88)
SchPhb	.61 (.53-.69)	.57 (.49-.64)	.62 (.56-.67)
SAD	.73 (.68-.78)	.71 (.66-.76)	.73 (.70-.76)
SocPhb	.76 (.71-.80)	.68 (.62-.73)	.72 (.68-.75)

Note. $N = 570$. European American $n = 252$. African American $n = 318$. α = Cronbach's alpha; CI = confidence interval; GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia.

Obtained values suggest that the SCARED subscales demonstrated good overall internal consistency in the present sample, reflected by coefficient alpha values ranging from .57 (for school phobia among African American girls) to .86 (for panic disorder among European American girls). Although alpha values were slightly lower for African American girls than European American girls across anxiety subscales, they were not

appreciably different and are nonetheless respectable. A relationship was evidenced between the number of items comprising each SCARED subscale and coefficient alpha values, such that scales with more items (e.g., generalized anxiety disorder, panic disorder) appeared more internally consistent than scales made up of fewer items (e.g., school phobia), a pattern that was observed among girls of both European American and African American race. Such findings are to be expected, as the proportion of explained variance and reliability are higher the more items that comprise a scale. Items should not artificially be added purely for these reasons, however, as parsimony is a primary goal in scale development.

Statistical Analyses for Research Questions

Analyses for Research Question # 1

Research Question # 1

Are there differences in the structure of anxiety disorder symptoms among European American and African American female youth at age nine?

Hypothesis # 1

Investigation of the structure of anxiety disorder symptoms among girls from various racial groups is intended to be exploratory in nature, as prior empirical results in this area are mixed. For instance, Hale, Raaijmakers, Muris, and Meeus (2005) found evidence to suggest that anxiety disorder symptom structure is parallel among samples of international youth from the general population, regardless of age, gender, or ethnicity. Birmaher and colleagues (1997) likewise found support for comparable race-based symptom structure among an outpatient sample of male and female youth. Boyd and colleagues (2003), in contrast, assessed African American youth based in the community,

obtaining results that caused them to question the experience of separation anxiety and school phobia (supported empirically among European American children and adolescents) among African American youth.

Results for Research Question # 1

Confirmatory factor analysis. As described in chapter three, a confirmatory factor analysis (CFA) was conducted using the entire sample ($N = 570$) prior to examining race-based differences in anxiety disorder symptom structure. The intent was for racial differences to be investigated only as per the best fitting model for the larger sample, necessitating that a CFA be undertaken first. A number of theoretically and/or empirically grounded factor structures were tested and their overall fit was compared.

First, a five factor structure wherein the 41 items of the SCARED loaded onto five factors (corresponding to generalized anxiety disorder, panic disorder, school phobia, separation anxiety disorder, and social phobia), as theorized and empirically validated by creators of the SCARED (e.g., Birmaher et al., 1997) and others (e.g., Hale et al., 2005), was tested against the data. Fit indices suggested a good fit of the data to the hypothesized structure of item-factor relations for the five factor model, evidenced by values of the comparative fit index ($CFI = .97$) and root mean square error of approximation ($RMSEA = .045$; 90% confidence interval = $.042 - .048$). According to Kline (2005), when lower bounds of the 90% confidence interval associated with the RMSEA fall at or below $.05$ (as is the case here), this is indicative of particularly good fit of a model to the data. Fit was believed to be sufficient, such that no modifications (e.g., addition or deletion of paths from items to factors) aimed to enhance fit were deemed necessary.

Standardized values for path coefficients are provided in Table 5. Although this information is more frequently conveyed via a diagram illustrating item-factor relationships, the sheer number of items included in this analysis would make such a figure cumbersome and difficult to interpret. The table also includes squared multiple correlation values, a common way of conceptualizing the lower bound of reliability for a given scale item (obtained by squaring standardized coefficients).

Table 5

Standardized Path Coefficients for the Five Factor Model of Anxiety

Item	Standardized Coefficient	SMC
GAD		
Q1	.52	.27
Q2	.57	.32
Q3	.55	.30
Q4	.59	.35
Q5	.60	.36
Q6	.50	.25
Q7	.63	.40
Q8	.57	.33
Q9	.64	.41
Panic		
Q1	.52	.27
Q2	.64	.41
Q3	.52	.27

Table 5 (continued)

Item	Standardized Coefficient	SMC
Q4	.67	.45
Q5	.61	.37
Q6	.46	.21
Q7	.58	.34
Q8	.52	.27
Q9	.49	.24
Q10	.60	.36
Q11	.55	.30
Q12	.67	.45
Q13	.61	.37
SchPhb		
Q1	.46	.21
Q2	.57	.33
Q3	.60	.36
Q4	.51	.26
SAD		
Q1	.41	.17
Q2	.25	.06
Q3	.51	.26
Q4	.71	.50
Q5	.69	.47

Table 5 (continued)

Item	Standardized Coefficient	SMC
Q6	.46	.21
Q7	.37	.14
Q8	.65	.42
SocPhb		
Q1	.33	.11
Q2	.45	.20
Q3	.55	.30
Q4	.60	.36
Q5	.62	.38
Q6	.54	.29
Q7	.53	.28

Note. $N = 570$. SMC = squared multiple correlation; Q = question/item; GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia.

As observed above, nearly all standardized path coefficients for the five factor model fell between approximately .50 and .70. The most notable exception was the second question on the separation anxiety disorder factor (standardized path coefficient = .25). The corresponding SCARED item requires respondents to rate the extent to which a statement about “following my mother or father wherever they go” is true of them. This item appears to somehow function differently than others among girls in the sample for the current study.

The rationale for the alternative models that were assessed was presented in chapter three. Briefly, a model with a unitary anxiety construct (i.e., all SCARED items loading on a single factor) was tested, in light of the assertion by some (e.g., Ferdinand, van Lang, Ormel, & Verhulst, 2006) that anxiety is best conceptualized as one-dimensional among child and adolescent populations. An additional model was evaluated, wherein the 41 items of the SCARED were randomly assigned to load on one of five factors, the hypothesis being that overall fit would be poor given the lack of theoretical and/or empirical basis. This model did not converge, would not run, and was therefore dropped from further consideration.

Comparison of fit of the five and one factor models to the data in the present study necessitated examining the associated Akaike information criterion (AIC) values. The AIC permits direct comparison of models that are non-nested (i.e., one is not a subset of the other) and based on data from the same sample, contrasting with the assessment of fit for an individual model. Smaller values of the AIC are indicative of better fit than larger ones. The AIC values for the five and one factor models are reported in Table 6 below.

Table 6

Comparison of CFA Model Fit

Model	AIC
Five factors	1825.97
One factor	2538.79

Note. $N = 570$. AIC = Akaike information criterion.

Race-based differences were examined via a multi-group analysis, as reported below, of the five factor model since it fit better than did the single factor model and is more grounded empirically.

Multi-group analysis. As outlined in chapter three, conducting a multi-group analysis involves a process consisting of several steps, the first of which is examining the fit of a given CFA model (the five factor structure previously described was used in the current study) separately in the groups one desires to compare (European American and African American girls herein). The five factor model demonstrated good fit strictly among European American girls ($n = 252$), supported by a CFI value of .97 and RMSEA value of .049 (90% confidence interval = .044 - .054). It likewise fit well among a sample composed solely of African American girls ($n = 318$), evidenced by a value of .96 for CFI and a value of .046 (90% confidence interval = .041 - .050) for RMSEA.

Although it is unnecessary to report standardized coefficients for individual item-factor loadings for purposes of the current work, it suffices to say that coefficients tended to be comparable when those obtained in the European American and African American samples were compared. The most noteworthy exception was an item from the separation anxiety disorder subscale, on which respondents are asked to rate how true it is that they are “scared when sleeping away from home.” Although this item seemed to fit well for African American girls, fit was a good deal poorer among those of European American racial background. Additionally, the item mentioned in the previous section (pertaining to a child following his/her mother or father) had low standardized loadings on the requisite factor in both European American and African American girls (.20 and .09, respectively).

Individual item loadings were not observed to be consistently higher (or lower) among girls of one race when compared to the other.

The next step of the multi-group analysis involved assessment of configural invariance, which amounts to determining if a model is the same (i.e., invariant) across groups (this concept is more fully described in chapter three). The primary indicator of whether configural variance is achieved is the overall chi-square value and the associated p value; large values of the latter (those that would not traditionally be considered to indicate statistical significance) are evidence of configural invariance. The chi-square test statistic produced when configural invariance was assessed in the current study was 2746.26 ($p < .001$), which failed to support the existence of configural invariance of the SCARED in the European American and African American girls in the study sample.

The presence of weak invariance (a more stringent criterion to meet, as described in chapter three) was likewise tested, even though it was unlikely to be supported given that configural invariance was not. The assessment of weak invariance resulted in a chi-square value of 2788.01 ($p < .001$). This did not support the presence of weak invariance among girls of different racial backgrounds in the present study.

Analyses for Research Question # 2

Research Question # 2

What does the developmental trajectory of symptoms of: a) generalized anxiety disorder, b) panic disorder, c) school phobia, d) separation anxiety disorder, and e) social phobia among female youth look like over time?

Hypothesis # 2

Generalized anxiety disorder. On the basis of gender-specific findings obtained by Hale and colleagues (2008), it is hypothesized that symptoms of generalized anxiety disorder will increase gradually from age nine onward, reaching their highest point in early adolescence (i.e., age 12).

Panic disorder. Given that onset of panic disorder is rare prior to adolescence or adulthood, it is hypothesized that levels of panic disorder symptoms will remain relatively low over the course of study. If elevated symptom levels are observed, it is assumed that this will occur among girls at the oldest age of assessment (i.e., age 12).

School phobia. It is presumed that the experience of school-related anxieties will remain low for the duration of the data collection period. It is believed that by age nine (the first time point at which data are utilized), youth are sufficiently familiar with school and comfortable with its structure that high levels of anxiety will not be experienced. From a developmental standpoint, it would be expected that anxiety levels may be highest at introduction to school (i.e., kindergarten/first grade) and perhaps times of transition (e.g., promotion from elementary to middle school). A slight increase in school phobia symptoms around age 11 or 12 may therefore be observed, coinciding with when most youth in the sample likely move from elementary to middle school.

Separation anxiety disorder. In line with normative developmental expectations and empirical findings regarding the predominance of separation fears early in life, it is hypothesized that separation anxiety disorder symptoms will remain low over the course of the study. Symptoms are first assessed during middle childhood (i.e., age nine), a

phase of development when separation-related concerns are likely to dissipate in light of youth's increasing independence.

Social phobia. Based on normative developmental theory, it is hypothesized that symptoms of social phobia will gradually increase from age nine until girls reach early adolescence (i.e., age 12), at which time it is assumed that they will be their highest. This is consistent with findings obtained in an investigation conducted by Gullone and colleagues (2001), wherein self-reported social anxiety symptoms increased over a three year period among a sample of children and adolescents ranging in age from seven to 18 at study inception.

Results for Research Question # 2

The five factor model of anxiety formed the basis of analyses relevant to the second research question, given its overall good fit among girls in the current sample as a whole and stronger theoretical and empirical backing than alternative models tested. As detailed in chapter three, a combined group of 556 girls (241 European American, 315 African American) was subjected to latent growth modeling (LGM) techniques to permit examination of trajectories of anxiety disorder symptoms over a four year period. Trajectories were analyzed without controlling for any demographic indices (e.g., poverty) or pubertal development, as originally intended, due to problems related to how these constructs were assessed and capabilities of the software package used.

Model fit statistics for each of the five anxiety disorder symptom trajectories are reported in Table 7. These include the model chi-square, degrees of freedom, and associated *p* value, as well as CFI and Tucker-Lewis index (TLI) values (interpretation of overall fit is based on the latter two indices in the present study).

Table 7

Fit Statistics for Latent Growth Models of Anxiety Disorder Symptoms

Anxiety Subtype	χ^2	Model Fit Statistics			
		df	<i>p</i>	CFI	TLI
GAD	74.59	8	<.001	.91	.93
Panic	153.34	8	<.001	.81	.86
SchPhb	78.73	8	<.001	.88	.91
SAD	94.16	8	<.001	.87	.91
SocPhb	17.88	8	<.001	.98	.98

Note. *N* = 556. df = degrees of freedom; CFI = comparative fit index; TLI = Tucker-Lewis index; GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia.

It is important to note that the above-reported fit statistics are not appropriate for comparison of overall fit across models. Nonetheless, it appears that the latent growth models of each anxiety subtype fit reasonably well to the data. Although ideal values for both the CFI and TLI exceed .95, anything around .90 or above is generally indicative of acceptable fit (Kline, 2005). The model for social phobia appeared to fit the data especially well, evidenced by CFI and TLI values of .98. Fit for the panic disorder model seemed to describe the data only fairly, in light of modest CFI and TLI values of .81 and .86, respectively.

In the examination of trajectory models, general description of the model (in terms of initial symptom level and pattern of growth over time) is often of greater interest than model fit, although should be considered in accordance with global indices of fit. Analysis of growth is generally based on examination of model intercept and slope

values. Unstandardized intercept and slope values for each anxiety disorder symptom trajectory assessed in the present study are reported in Table 8 below. Unstandardized estimates are expressed in terms of the original metric (i.e., scale) of the SCARED; they do not permit comparison from one trajectory to the next. Although researchers tend to prefer standardized solutions in many areas of statistics (e.g., due to their ease of interpretation and ability to be compared), unstandardized estimates are commonly afforded preference in the SEM literature (Kline, 2005).

Table 8

Unstandardized Intercept and Slope Values for Latent Growth Models of Anxiety Disorder Symptoms

Anxiety Subtype	Unstandardized Estimates	
	Intercept	Slope
GAD	6.03	-.71
Panic	6.56	-1.15
SchPhb	2.58	-.37
SAD	6.78	-1.29
SocPhb	7.22	-.59

Note. $N = 556$. GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia.

Intercept values represent the initial level of symptoms (i.e., those during year one of the current study) displayed by the sample at large ($N = 556$), while slope values reflect change over time. Specifically, slope estimates signify the average decrease in the relevant anxiety subscale score each year, expressed in the original metric of the particular SCARED subscale under consideration (e.g., each year, the generalized anxiety disorder score decreases by roughly .71 points). As evidenced below, all subtypes of

anxiety assessed in the current study decreased over the four year course of the investigation, evidenced by negative slope values across types.

Magnitude of downward growth cannot be readily compared on the basis of the above, since unstandardized values are reported and because each of the five SCARED subscales has a unique possible range of values (based on the number of items contained on the scale). Similar logic applies, such that intercept values can likewise not be meaningfully compared (and conclusions cannot be drawn about which subtypes of anxiety are lower or higher at study inception).

Analyses for Research Question # 3

Research Question # 3

Are there differences in the developmental trajectories of anxiety disorder symptoms among European American and African American female youth ages 9-12?

Hypothesis # 3

Based on literature to suggest that other internalizing forms of psychopathology (e.g., depression) are more common among minority youth (e.g., Sen, 2004), it is hypothesized that African American youth will evidence a higher degree of symptoms than the European American facet of the sample. It is believed that the overall shape of anxiety disorder symptom trajectories will be similar across races.

Results for Research Question # 3

The third research question, pertaining to racial differences in anxiety disorder symptom trajectories, was answered via application of LGM techniques to the data. This was done in a manner similar to that required to answer the second research question, but with the introduction of race as a covariate in trajectory analyses. Select fit indices for the

trajectory of each anxiety subtype are reported below in Table 9. The non-normed fit index (NNFI) values are analogous to those reported for the Tucker-Lewis index (TLI) in an earlier portion of this text. The terminology used was consistent with that produced by the individual software packages employed (i.e., LISREL versus EQS).

As observed below, each of the trajectory models examined for the third research question provided a good fit to the data, evidenced by fit index values that consistently exceeded .95, the commonly recommended lower bound. The reported statistics provide no information about potential race effects; they only allow determinations regarding overall model fit to be made. Global fit is important to consider in the examination of statistics relevant to the detection of race-based differences. Again, the fit statistics reported in Table 9 are not appropriate for direct comparison of fit across models.

Table 9

Fit Statistics for Latent Growth Models of Anxiety Disorder Symptoms (With Race Added)

Anxiety Subtype	Model Fit Statistics	
	CFI	NNFI
GAD	.981	.937
Panic	.988	.959
SchPhb	1.000	1.011
SAD	.999	.998
SocPhb	.997	.989

Note. $N = 556$. CFI = comparative fit index; NNFI = non-normed fit index; GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia.

Pertinent to the fit indices provided for the trajectory of school phobia symptoms (as in Table 9), global indices of model fit are not bound mathematically by zero and one. Values that exceed one are typically viewed as indicative of “over-fit,” or suggestive that scores collected at multiple time points are highly correlated with one another. The latter is commonplace in LGM studies because errors are correlated in analyses (J. Schreiber, personal communication, July 6, 2009).

In order to provide insight into potential race-based differences in anxiety disorder symptom trajectories, model intercept and slope values were examined, as reported in Table 10 below. Standardized values are provided (in contrast to the unstandardized values reported for analyses relevant to research question two), given that the second and third questions necessitated that different software packages (with different output options) be utilized for analyses. Values are reported in accordance with the default provided by each of the respective programs (LISREL and EQS).

Table 10

Standardized Intercept and Slope Values for Latent Growth Models of Anxiety Disorder Symptoms (With Race Added)

Anxiety Subtype	Standardized Estimates	
	Intercept	Slope
GAD	.162	-.336
Panic	.274	-.246
SchPhb	.404	.092
SAD	.155	-.126
SocPhb	.232	-.007

Note. $N = 556$. GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia.

Examination of standardized intercept values within this context permits conclusions to be drawn about the extent of differences (by race) in trajectory starting points. For each of the five anxiety disorder subtypes assessed, African American girls began with higher reported symptom levels than their European American counterparts. The intercept values reported in Table 10 suggest that the degree of race-based differences is greatest when symptoms of school phobia are considered (standardized intercept = .404) and least for separation anxiety disorder symptoms (standardized intercept = .155).

In the interpretation of slope, it is important to note that with a sample size as large as that employed in the current study, virtually any standardized value that exceeds approximately .20 is likely to be indicative of statistical significance, in terms of which racial group assessed increases or decreases most rapidly with time (J. Schreiber, personal communication, July 2, 2009). Per the above-reported values, only trajectories of generalized anxiety disorder (standardized slope = -.336) and panic disorder (standardized slope = -.246) symptoms met this criterion, whereas statistically meaningful differences in magnitude of trajectory growth for symptoms of school phobia, separation anxiety disorder, and social phobia did not exist on the basis of race.

A relatively new trend and area of research in LGM is examination of variability in trajectory intercept and slope values. The extent of variability evidenced is reflective of the degree to which there may be multiple starting points and slope trajectories among individuals in a given sample, contrasting the common assumption in linear analyses that a single intercept and slope value adequately capture growth among all members of a particular group. Evidence of variability is, in essence, indicative that individuals in a

sample do not follow the same basic, linear path, but rather may conform to varied trajectories of growth (Nagin, 1999; Raudenbush, 2001). Variance in intercept and slope values for each of the five anxiety subtypes assessed as a component of the third research question is reported below in Table 11.

Table 11

Variance in Intercept and Slope Values for Latent Growth Models of Anxiety Disorder Symptoms (With Race Added)

Anxiety Subtype	Variance	
	Intercept	Slope
GAD	.936*	.151*
Panic	1.476*	.231
SchPhb	.177*	.030*
SAD	.743*	.115*
SocPhb	.611*	.121*

Note. $N = 556$. GAD = generalized anxiety disorder; Panic = panic disorder; SchPhb = school phobia; SAD = separation anxiety disorder; SocPhb = social phobia. * = value significant at the .05 level.

On the basis of the above-reported values, the greatest individual variability in symptom trajectories was evidenced for generalized anxiety disorder and panic disorder. The possibility of distinct trajectory groups for these symptoms (and others) does not pertain to race per se, as there may be other, non-assessed variables (e.g., poverty level) that influence which individuals in a given sample fall into particular trajectory classes. Determination of factors that differentiate trajectory groups is a prime area for future research, for reasons outlined in chapter five.

CHAPTER V

DISCUSSION

The results of the statistical analyses carried out as part of the current study, as presented in chapter four, are more fully described in this chapter. Specifically, findings are briefly summarized, highlighting the answers to the research questions posed and whether or not the associated hypotheses were supported. Conclusions and implications based on these results are then discussed in the context of relevant theoretical and empirical grounds. A number of strengths and limitations of the present investigation are also provided, along with inferences for how findings are interpreted. Recommendations for future research are then offered on this basis.

Summary of Results

Research Question # 1

The first research question, pertaining to race differences in anxiety disorder symptom structure among girls, was formulated with the intent of being exploratory in nature, in large part due to the absence of relevant theoretical or empirical grounds for hypothesis generation. There has been mixed support in this arena, with some (e.g., Birmaher et al., 1997) obtaining evidence to suggest comparable symptom structure across racial groups and others (e.g., Boyd, Ginsburg, Lambert, Cooley, & Campbell, 2003) asserting that structural differences in symptoms exist on the basis of race.

Per results of the current study, it appears that structure of symptoms analogous to *DSM-IV-TR* defined anxiety disorders are evidenced in girls of both European American and African American descent. More in-depth assessment revealed, however, that the structure of anxiety symptoms (as measured herein by the SCARED) is not necessarily

invariant among female youth belonging to these two populations. A five factor structure to anxiety disorder symptoms, consistent with descriptions provided in previous chapters, explains data from both groups of girls seemingly well, yet somehow functions differently on the basis of race (e.g., SCARED items may configure differently among the five factors). Analyses undertaken in the present study do not permit generation of more definitive answers in this regard.

Research Question # 2

The second research question involved examination of trajectories of anxiety disorder symptom types over a period of four years. Developmental theory guided the formulation of hypotheses regarding patterns that would be evidenced in symptoms characteristic of generalized anxiety disorder, panic disorder, school phobia, separation anxiety disorder, and social phobia over time. Relevant empirical work was also employed for this purpose.

Results of the present study suggest that symptoms of each of the aforementioned anxiety disorders decrease among pre-adolescent girls between the ages of nine and twelve. Hypotheses were only partially supported, in that it was assumed two subtypes of anxiety (generalized anxiety and social phobia) would gradually increase over the study period, inconsistent with what was observed in the current sample. Findings pertaining to panic disorder, school phobia, and separation anxiety were supported, as no increase or elevations in symptom levels were displayed. It was speculated that symptoms of school phobia may increase temporarily around the age of 11 or 12, when most youth transition from elementary school to junior high, a finding not supported by data in the present

investigation. Potential explanations for the results obtained herein are provided in an upcoming section of this chapter.

Research Question # 3

The third research question addressed racial differences in anxiety disorder symptom trajectories, in light of prior research to suggest that other internalizing forms of psychopathology (e.g., depression) are more common among minority youth than those belonging to majority racial groups (e.g., Sen, 2004). It was hypothesized that similar overall trends would be evidenced among European American and African American girls, with the latter consistently demonstrating higher symptom levels.

Results of the current study suggest that at the age of nine, African American girls displayed higher symptom levels across anxiety subtypes, most notably for symptoms of school phobia. Rates of growth over the four year course of study differed by race, from a statistically significant vantage, for symptoms of generalized anxiety disorder and panic disorder only. The hypothesis raised was largely supported, in that overall similarities in patterns of growth were evidenced among European American and African American girls, with rate of change differing over time by race (and African American girls reporting more symptoms than their European American counterparts). Further examination of findings indicated that unique trajectory groups (perhaps based on variables other than race) may be evidenced among girls in the sample for at least several of the anxiety subtypes assessed.

Conclusions

Structure of Anxiety Disorder Symptoms

Results of the current study suggest that among this sample of pre-adolescent female youth of European American and African American descent, five factors best describe the structure of anxiety disorder symptoms among members of this (combined) population. This structure is consistent with anxiety disorder conceptualizations provided in the *DSM-IV-TR*, and enjoys markedly more empirical support (e.g., Birmaher et al., 1997; Hale, Raaijmakers, Muris, & Meeus, 2005) than alternatives assessed as part of the present study. Similarly, these findings lend support to the notion that anxiety subtypes can be meaningfully differentiated among youth and that unitary models (i.e., those where anxiety is conceptualized as a single, broad-based construct) do not adequately reflect the experience of anxiety in members of this population.

It may be that even more applicable models of youth anxiety exist that have not yet been well articulated or validated empirically. As an alternative, it is possible that a similar five factor structure would be evidenced among children and adolescents, if *DSM-IV-TR* (and measures, such as the SCARED, that are based on it) anxiety disorder criteria were modified so as to be more age and developmentally sensitive than those in use at present. The relative newness of this general research area precludes firm conclusions from being drawn in this regard.

The results of the present investigation have potential implications for future use of the SCARED in both clinical and research contexts. For instance, evidence of several low item-factor loadings seemingly suggests that revisions to the scale (e.g., removal of items, regrouping how items load onto factors) may be warranted. In the event that

existing item wording does not adequately capture the manner in which anxiety is experienced among pre-adolescents (and female youth in particular), updating the way in which items are stated may be similarly beneficial. Re-visiting items to ensure that they reflect the current state of knowledge with regard to youth anxiety likewise seems paramount, in that minimal changes have been made to the SCARED since its creation over ten years ago. Improved overall fit of a five factor structure in this sample (or others) and/or increased item loadings, as a result of such revisions, would foster parsimony, a common aim among researchers and statisticians. For those who interact with youth in clinical contexts, parsimony translates to shorter assessment measures with at least comparable predictive value, when compared to their lengthier counterparts.

Trajectories of Anxiety Disorder Symptoms

Results of the present investigation suggest that symptoms of generalized anxiety disorder, panic disorder, school phobia, separation anxiety disorder, and social phobia all decrease among female youth over the four year age span of 9-12. These findings are aligned with those obtained by Gullone, King, and Ollendick (2001), who asserted that youth-reported symptoms of anxiety decrease over time, both when overall anxiety levels and specific subtypes (except for social anxiety) are considered. Symptom decline was particularly noteworthy among girls and youth in the later stages of childhood and early adolescence (ages 10-14) in the Gullone et al. (2001) study, both reflective of the sample used in the present study.

The findings reported herein are consistent with developmental theory for school and separation-related anxieties, as such anxiety is presumed to manifest primarily among young children (e.g., Weems & Costa, 2005). It would be expected, from the vantage of

normative development, that increasing autonomy and individuation would be associated with decreased levels of anxiety symptoms of these varieties. Findings (for these variants of anxiety) are also consistent with prior research conducted by Hale and colleagues (2008), who found decreases in school phobia and separation anxiety disorder symptoms among an adolescent sample comprised of youth of both genders.

In contrast, results pertaining to social phobia are inconsistent with the developmental expectation that anxiety related to social acceptance and evaluation, particularly within the peer group context, rises as youth approach adolescence (e.g., Weems & Costa, 2005). It is somewhat surprising that such a trend was not observed in the current study, in that girls tend to be more interpersonal in orientation than boys, and so are often thought to be at greater risk for the development of social-related anxieties (Albano & Krain, 2005). Reasons for the disparity between developmental theory and results of the current study (pertaining to social phobia) are unclear. It may be that SCARED items designed to assess symptoms of social phobia do not adequately reflect the form of social anxiety most commonly observed among girls during the pre-adolescent years. To illustrate, items tend to refer globally to anxiety around “people” one does not know well and do not have a strong evaluative component (i.e., inclusion of statements about evaluation by others). The SCARED may thus not provide insight into the experience of social anxieties in a specific context (e.g., peer group) or in situations involving real (or perceived) evaluation of performance. This again points to the potential benefit of making revisions to the current version of the SCARED, such that scale items are more worded in a more specific manner and are truly reflective of anxiety symptoms most typical among a pre-adolescent and adolescent population.

Findings related to generalized anxiety disorder symptoms likewise contrasted with what was expected, on the basis of available empirical evidence. Research conducted by Hale et al. (2008) suggested that symptoms of generalized anxiety disorder increased over time and peaked in early adolescence, with elevated levels maintained subsequently. Interestingly, the results obtained in the present investigation mirror those reported by Hale and co-authors (2008) for boys in their sample, among whom a decrease in symptoms of generalized anxiety disorder symptoms were observed with time. Failure of findings of the current study to align with the gender-specific results reported by Hale et al. (2008) may be attributable to a number of factors, such as differential sample size and participant age. Because Hale and colleagues (2008) assessed anxiety among a sample of youth from the Netherlands, it could alternatively be that generalized anxiety disorder items were interpreted (and responded to) differently among their sample and the one utilized in the current study.

Results pertaining to symptoms of panic disorder are perhaps most difficult to interpret, in that panic is a rare phenomenon in childhood and early adolescence, and a relative absence of empirical study in this area characterizes the existing literature, precluding comparison with earlier research findings. The current study is thus more exploratory in this domain than in those related to other anxiety disorder symptom types.

Although speculative at this stage of inquiry, a number of potential explanations for the observed inconsistencies between results of the current study and relevant theory and/or empirical data can be put forth. Attending to these issues explicitly via future study may result in improvements in overall latent growth model fit and evidenced patterns of growth that more genuinely reflect symptom trajectories in the target

population. For instance, model fit may be improved by controlling for demographic (e.g., poverty) and developmental (e.g., puberty) variables that may impact the development and maintenance of anxiety among female youth. It could also be that inclusion of a greater number of time points (i.e., more years of data) would naturally enhance model fit. Alternatively, trajectories of certain anxiety disorder symptoms may be better described according to non-linear (e.g., quadratic) patterns of growth.

Nonetheless, a primary implication of the findings obtained herein relates to the timing of prevention and early intervention activities targeted toward anxiety among youth. Apparent decreases in symptom displays for all anxiety disorders assessed suggest that late childhood and early adolescence may be ideal periods of development in which to focus these initiatives, and offer the opportunity to aid the greatest number of youngsters. Efforts addressing facets of anxiety that youth, particularly girls, are believed to be increasingly vulnerable in as they age (e.g., social anxiety), may be among the most beneficial.

The above being said, for those who work with youth in a clinically-oriented capacity, it merits mention that overall, pre-adolescent female youth do not appear to experience anxiety to any major degree and are therefore unlikely, by and large, to require specified interventions geared toward anxiety reduction. What is perhaps most crucial to advise clinicians is to aid young girls in anticipating and developing skills for coping with common life stressors experienced during the pre-adolescent and adolescent years (e.g., start of puberty, transition to a new school environment) rather than centrally targeting anxiety per se. Helping youth and families to deal with potential correlates of

anxiety (e.g., poverty) may help to reduce the experience of anxiety and reduce its impact on youth outcomes as well.

Race Differences

Anxiety disorder symptom structure. Conclusions regarding race-based differences in anxiety disorder symptom structure are based upon results of the multi-group analysis, as described in chapter four. Analysis of overall fit of a five factor structure to separate samples of European American and African American female youth suggested that such a conceptualization fit well in each of the groups independently. This would seemingly lend support to the notion that employing existing *DSM-IV-TR* anxiety disorder criteria (on which the SCARED, and hence the five factor model, were based) is appropriate for girls of both racial backgrounds included in the present study. It may be that the one item (addressing how scared youth are when sleeping away from home) that obviously functioned differently in these two groups was interpreted in a different manner by girls in the study sample, depending on race. This claim is merely speculative, and should not be taken as truth unless subjected to (and supported by) empirical scrutiny.

Despite the apparent favorableness of the above (i.e., good fit of the five factor model in girls of both racial backgrounds), further analysis revealed that the SCARED did not function invariantly among European American and African American girls in the current study. This is perhaps not surprising, in light of prior research to suggest that race-based differences in presentation of anxiety-related symptoms may exist (e.g., correlation between somatic complaints and severity of anxious symptoms among African American youth; Kingery, Ginsburg, & Alfano, 2007). Alternatively, lack of

evidence to support configural (or weak) invariance in the present investigation may be attributable to semi-unique clustering of symptoms on the basis of race. That is, all SCARED items may be reflective of anxiety in racially diverse, pre-adolescent female youth, but group in a slightly different manner among girls of different racial backgrounds (although still on five factors). Only future empirical work attending to race differences in manifestation of anxiety among children and adolescents will be able to shed greater light in this area.

Anxiety disorder symptom trajectories. Race-based differences in anxiety disorder symptom trajectories were evaluated by means of latent growth modeling, as previously described (relevant to research question three). Results of the current study suggest that, consistent with prior research related to other forms of internalizing psychopathology (e.g., depression), African American female youth evidenced higher levels of anxiety disorder symptoms at study initiation, across the five anxiety disorder subtypes assessed, than their European American counterparts (Sen, 2004). Precise reasons for this differentiation remain elusive, but may be related to variables that were not assessed herein (e.g., poverty level, pubertal development) that are potentially correlated with race.

Race differences related to starting levels of separation anxiety disorder symptoms were least noteworthy (when compared to the other anxiety subtypes assessed), perhaps attributable to the developmental expectation that anxieties of this sort would be relatively uncommon among youth at the age of nine (when girls were first assessed). Differences in initial level of school phobia symptoms were most pronounced, possibly due to biases that seemingly favor students from majority racial groups (e.g., primarily European American teachers, lack of diversity reflected in curricular materials).

If there is merit to such contentions, it would be expected that attending school, at virtually any age, would create more anxiety for minority students than their majority peers.

It is also possible that the small number of items on the school phobia subscale of the SCARED impacted the results obtained, as scores tend to be less stable (e.g., over time, across groups) when a scale contains relatively few items. Measurement-wise, this could have implications for future modifications of the SCARED, if undertaken (e.g., addition of items to the school phobia subscale; removal of items assessing school phobia entirely since it is not supported empirically to the same extent as other variants of anxiety).

Examination of racial differences in growth trends over time revealed that statistically, only trajectories of generalized anxiety disorder and panic disorder symptoms evidenced differential patterns over the course of the study. Specifically, trajectories of symptoms of these two anxiety disorders declined more notably with time for African American girls than European American girls, whereas statistical differences in trajectories of school phobia, separation anxiety disorder, and social phobia symptoms were not evidenced. Although speculative, it may be that “regression to the mean” was operative in this regard, in that African American girls began with higher symptom levels, and could therefore be expected to evidence greater decline (i.e., normalization) of symptoms over time. It could be, alternatively, that statistical differences were not evidenced for the latter subtypes due to comparatively less empirical support for the existence of these constructs among youth (e.g., school phobia has limited research behind it and is not, as yet, included in the *DSM*). No conclusions can be drawn, on the

basis of results obtained in the current study, regarding the extent of race-based differences at any time point other than the first. It is possible that differences between the experience of anxiety disorder symptoms among European American and African American girls narrows with time, or perhaps even reverses at some juncture (e.g., the size of the “gap” between symptom trajectories may differ across the age range).

It is crucial to note that statistical significance and practical significance are not analogous concepts, and that with a sample as large as that employed in the present study, small, non-meaningful differences may differ statistically from one another, but lack practical utility. Further, race-based differences in trajectories of anxiety disorder symptoms have not knowingly been examined to date, which precludes the ability to speak to the consistency (or lack thereof) of findings reported herein with those obtained via prior study. Of additional note, results of the current investigation suggest that along with race-based differences in anxiety disorder symptom trajectories, there may be unique trajectory classes based on factors (e.g., poverty level) other than race. Without further empirical scrutiny, knowledge of trajectory groups and differentiating variables remains elusive.

Strengths and Limitations of the Current Study

The current study possessed a number of strengths not commonly evidenced by empirical work in the general topic area addressed. For example, it employed a sample composed solely of female youth, which facilitates insight into the unique structure of anxiety disorder symptoms and developmental trends in anxiety disorder symptomology among members of this group. While this could simultaneously be construed as a limitation of the present work (e.g., in terms of the ability to generalize results beyond the

sample), the potential benefits associated with the knowledge gained seemingly outweigh the drawbacks. The current investigation also utilized a community-based sample of youth, whereas a large number of anxiety-related studies employ samples that are clinically-oriented (e.g., those who present for treatment). The ability to generalize findings to the population of interest (i.e., pre-adolescent girls) is enhanced in studies of the former.

Along with the above, the present investigation was longitudinal in nature, which allowed for the examination of trends in anxiety disorder symptoms over a period of time. Many available studies of child and adolescent anxiety occur over a single or very brief time period, which precludes researchers from drawing conclusions about symptom development (and patterns thereof) with time. The current investigation was also unique among similar studies in the more central manner in which race was incorporated into research questions and analyses, made possible (in part) by the unique composition of the sample (i.e., the inclusion of such a high percentage of girls of African American race). If race-based differences are considered in much of the existing empirical literature, it tends to be in a more cursory fashion, which places limits on the insights that can be gained and the conclusions that can be drawn.

Additionally, the present study initiated assessment of anxiety disorder symptoms prior to the onset on adolescence, whereas an overwhelming majority of the available literature centers on anxiety development and manifestation during the adolescent years only, despite evidence that youth may struggle with anxiety-related difficulties before that time. Examination of symptom structure and trajectories exclusively among pre-adolescent girls provides useful insight into the best manner in which to structure

prevention and intervention efforts targeting girls in this age group, based on predominating symptoms and the like. Further, the current study focused on distinct subtypes of anxiety, rather than a broad anxiety or internalizing construct, as is commonplace in the child and adolescent anxiety literature. The former provides more specific knowledge about the manifestation of anxiety, which may inform efforts to prevent and intervene for anxiety-related difficulties in a more pointed and developmentally appropriate fashion than would likely be possible when anxiety is construed broadly.

A number of limitations were inherent in the present investigation as well. For instance, it employed a single measure (i.e., the SCARED) in the assessment of anxiety. Increased confidence in results and greater certitude in the conclusions drawn is generally had when multiple measures and/or informants are incorporated, as this decreases the likelihood that findings are an artifact of the measurement scheme utilized. There was also no assessment of impairment associated with anxiety disorder symptoms in the current work, which prohibits conclusions from being drawn about the extent to which self-reported symptoms have a functional impact on youth. The role of impairment in anxiety-related disturbance among children and adolescents has been discussed in the literature, with some researchers suggesting that prevalence rates may decline if impairment was routinely required for diagnosis (e.g., Evans et al., 2005a), and others asserting that extent of impairment evident in youth who struggle with anxiety may be a useful mechanism by which to differentiate those whose anxiety is normative versus pathological (e.g., Christophersen & Mortweet, 2001).

The oversampling of girls from low-income neighborhoods served as an additional barrier, in that it places limitations on the ability to generalize study findings. These girls may be considered at greater risk for the development of psychopathology, and may consequently demonstrate more elevated symptom levels (though not necessarily more impairment or distress) than might be expected in the general population of pre-adolescent female youth. The manner in which race was operationalized in the current study also precluded information from being obtained regarding the experience of anxiety among girls from more varied ethnic backgrounds (i.e., those other than European American and African American); conclusions may not be readily applicable to more diverse populations of youth. Further, demographic variables (e.g., poverty) and pubertal development were not controlled for when trajectories of anxiety disorder symptoms were examined. Given that such factors may impact the propensity that one will develop anxiety and potentially influence symptom manifestation, it would behoove researchers to incorporate them into future investigations of anxiety disorder symptom trajectories.

Lastly, inability to examine non-linear patterns of growth in anxiety disorder symptoms, due to the small number of data points incorporated into analyses, placed limitations on the insight to be gained about potential growth of a non-linear nature. Assessment of such growth patterns would have been difficult to demonstrate in a statistically meaningful fashion herein and was thus not undertaken.

Recommendations for Future Research

Both the broad and narrow purposes of the current study, along with the results described herein, form the basis for a number of recommendations for fruitful areas of

future research pertaining to anxiety among youth, particularly young females. For example, given findings to suggest that the SCARED may function differently in girls of European American and African American racial backgrounds, it seems paramount that future investigative efforts continue to look into potential race-based differences in the factor structure and overall functioning of this scale. This is underscored by the commonality of using the SCARED as a screening and progress monitoring tool across settings (e.g., schools, clinics). If indeed differential functioning by race is observed across studies, this would have implications for the use and interpretation of the scale, and may point to the need to revise the measure in light of observed racial differences.

With regard to trajectories of anxiety disorder symptoms, it is suggested that future examinations include control of various demographic (e.g., poverty level) and developmental (e.g., pubertal status) variables that may influence observed levels of anxiety and manifestation thereof. This was unable to be done in the present study due to factors outside of the researcher's control, and was admittedly a primary limitation of this investigation. Trajectory-oriented research would likewise benefit from incorporation of a measure to assess impairment associated with anxiety symptoms, so that levels of anxiety are not interpreted in isolation. In planning prevention and intervention efforts targeting anxiety-related difficulties among youth, it would be useful to have insight not only into when young people are developmentally vulnerable, but also the extent to which anxiety problems adversely impact functional outcomes.

Future empirical studies of anxiety disorder symptom trajectories would also do well to include assessment over a longer period of time, ideally spanning childhood and adolescence, than is typical among existing investigations. This would provide valuable

information about developmental changes in anxiety development and manifestation that is largely impossible to glean from results of available studies in this general topical area. Incorporation of a greater number of time points would also permit non-linear patterns of symptom growth to be examined and thereby provide further information into the timing and structure of anxiety disorder symptoms evidenced by girls across their development.

Additionally, future work aimed at the examination of distinct trajectory classes (e.g., those with stable high levels of anxiety, those whose anxiety increases markedly with time) and variables that predict group membership would be a highly beneficial endeavor. This would allow for easier identification of individuals who may be most vulnerable to anxiety-related distress, and thereby facilitate the development of proactive and/or pointed intervention strategies.

It is further recommended that additional investigation of racial differences in anxiety disorder symptom structure and trajectories be undertaken, due to the relative gaps in this area of the literature. Results of studies with such focus could do much to inform the most racially sensitive ways to conceptualize anxiety-related disturbance in children and adolescents, as well as assess and intervene on problems in this domain. Examinations seeking to do more than expose differences (e.g., to identify possible origins) carry the potential for particular usefulness. Inclusion of more racially diverse samples in future empirical studies would be especially beneficial as well, in order to permit insight into the unique development and manifestation of anxiety-related difficulties among children and adolescents representing a broad spectrum of human diversity.

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