SOMATIC COMPLAINTS IN ANXIOUS YOUTH

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by

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ABSTRACT

Objective: This study examined (a) the distribution of physical symptoms in youth with specific primary anxiety disorders (i.e. separation anxiety disorder [SAD], generalized anxiety disorder [GAD], and social phobia [SP]) and (b) their response to treatment with cognitive-behavioral therapy (CBT; 14 sessions of CBT over the course of 12 weeks), medication, combination therapy (CBT + medication), or pill placebo in a sample. **Method**: Anxiety disordered youth (N = 488, age 7-17) who met criteria for a primary diagnosis of GAD, SAD, and/or SP as part of the Child/Adolescent Anxiety Multimodal Study (CAMS; Walkup et al. 2008) were included in this study. The sample was diverse and included children with comorbid secondary diagnoses. **Results**: The most common somatic complaints were headache, stomach pain or aches, feeling drowsy or too sleepy, head cold or sniffles, and sleeplessness. The distribution of these complaints did not differ across diagnostic groups. The number and severity of physical symptoms decreased over the course of treatment. Treatment condition, including placebo, was unrelated to the number and severity of physical symptoms posttreatment. **Conclusions**: Treatment of anxiety leads to a decrease in the number and severity of physical symptoms experienced in anxiety-disordered youth, irrespective of treatment type.

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CHAPTER 1

INTRODUCTION

Overview

Anxiety disorders are among the most common forms of psychopathology in youth, occurring in approximately 10% of all youth (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). They are associated with impairment in family functioning, social functioning, and academic functioning (Ezpeleta, Keeler, Erkanli, Costello, & Angold, 2001; Van Ameringen, Mancini, & Farvolden, 2003) and tend to run a chronic course into adulthood if they are left untreated (Bittner et al., 2007; Costello & Angold, 1995; Ferdinand & Verhurlst, 1995). Children with anxiety disorders are also at risk for anxiety disorders, depression, substance abuse, substance dependence (Swendsen et al., 2010), and educational underachievement as adults (Woodward & Fergusson, 2001).

Somatic complaints are common in youth with anxiety disorders (Ginsburg, Riddle, & Davies, 2006; Hofflich, Hughes, & Kendall, 2006); more than 50% of youth with anxiety disorders report experiencing at least one somatic complaint (Beidel, Christ, & Long, 1991; Ginsburg et al., 2006). These complaints include a wide variety of physical symptoms including but not limited to headaches, stomachaches, backaches, muscle tension/pain, difficulty breathing, difficulty swallowing, shaking, pounding heart, racing heart, sweating, hot flashes, blushing, chills, and fatigue. These physical symptoms play a major role in our definitions of anxiety disorders as a whole. At present, somatic complaints are required for the diagnosis of certain anxiety disorders, including panic disorder (PD), generalized anxiety disorder (GAD), and posttraumatic stress disorder (PTSD) and are part of the possible diagnostic criteria for others,

such as separation anxiety disorder and acute stress disorder (American Psychiatric Association, 1994). Somatic complaints are not specific to any one disorder and have been found to be equally common in disorders that do not explicitly use somatic complaints as part of their definition (e.g. separation anxiety disorder, see Hofflich, Hughes, & Kendall, 2006).

The cognitive behavioral model of anxiety posits that thoughts, feelings, and behaviors are involved in the development and maintenance of childhood anxiety disorders. Cognitive Behavioral Therapy (CBT) is a treatment that is classified as "probably efficacious" by the Task Force on the Promotion and Dissemination of Psychological Procedures (1995; see also Ollendick & King, 1998; Ollendick, King, & Chorpita, 2006). Given recent reports (Kendall et al., 2008; Walkup et al., 2008) CBT for childhood anxiety disorders is said to now qualify as "efficacious." Randomized Controlled Trials (RCTs) conducted on CBT for anxious youth have empirically supported the efficacy of CBT for anxiety disordered youth (e.g., Barrett, Dadds, & Rapee, 1996; Flannery-Schroeder and Kendall, 2000; Kendall, Hudson, Gosch, Flannery-Schroeder, & Suveg, 2008; Walkup et al., 2008). Additionally, reviews of CBT for anxious youth have found that CBT is an effective treatment for anxious youth (e.g., Albano & Kendall, 2002; Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; James, Soler, & Weatherall, 2009; Silverman, Pina, & Viswesvaran, 2008). Although CBT for anxious youth has substantially advanced the ability to successfully treat anxious youth, approximately 1/3 of youth do not respond to treatment. This suggests that further research is needed to identify ways that CBT for anxious youth could be advanced so that more children may be successfully treated for anxiety. Developing modified treatment protocols for children with specific symptoms, such as somatic complaints, could potentially reduce the number of children who do not respond to

treatment. Masia Warner et al. (2011) provide an example of this, as they examined whether a CBT protocol specifically for children with anxiety and somatic complaints. However, it is unknown whether such an adaptation is warranted, as little research has examined the effect of well-researched treatment protocols (e.g. the Coping Cat protocol; Kendall & Hedke, 2006a, Kendall & Hedke 2006b) on somatic symptoms.

CBT for anxious youth combines physiological (relaxation), cognitive (problem-solving, threat appraisal), and behavioral strategies (modeling, exposure, contingency management) to help youth learn to cope with excessive anxiety. Most CBT protocols for anxious youth include a combination of all of these components in addition to psychoeducation, cognitive restructuring, and relapse prevention plans (Albano & Kendall, 2002). Of note, targeting physiological symptoms of anxiety is a core feature of CBT. Additionally, CBT indirectly targets physical symptoms of anxiety through the use of cognitive and behavioral strategies.

Although physical symptoms are core features of some anxiety disorders and are often targeted in empirically-supported treatments of childhood anxiety disorders, little is known about physical symptoms of child anxiety. Last (1991) examined a population of children seeking treatment at an anxiety specialty center and found that more than half endorsed “clinically significant” somatic symptoms. She studied 158 children who were referred to an anxiety disorder specialty clinic. The ages of the children are not reported, though the sample was split in half into a younger group who were younger than 13 years old and an older group who were age 13 and older. Given that half of their sample was adolescents their sample may be older than other samples, though there is no reported data on mean age. Anxiety disorder diagnoses and somatic complaints were determined using the K-SADS, a semi-structured clinical interview.

The version of the K-SADS that Last used was modified to be specific to anxiety disorders. More recent versions of the K-SADS have good reliability and validity (Ambrosini, 2000), but little is known about the modified earlier version used in this study. The K-SADS is a semi-structured interview, so the specific questions that the children were asked about their somatic complaints may have varied. Last used the K-SADS to categorize her sample into "somatic" and "not somatic". The version of the K-SADS that Last used was unpublished so it is unclear which questions were used to identify somatic complaints and what types of somatic complaints counted (tension and restlessness may or may not have been included). More recent versions of the K-SADS (Kaufman et al., 1997) do not count somatic symptoms that are exclusively endorsed in separation situations or in the context of school refusal toward meeting threshold for somatic complaints, with the exception of tension and restlessness. This study does not provide information about specific somatic complaints endorsed in this sample or the frequency of somatic complaints in children who were categorized as somatizers.

Last (1991) found that somatic complaints were significantly more common in children with panic disorder and separation anxiety disorder than they were in the remainder of her anxiety sample. She did not find a significant relationship between somatic symptoms and overanxious disorder (OAD) or depressive disorder when they were compared to her general anxiety population. Last also compared her anxiety population to a control sample of "never psychiatrically ill" children (it is unclear how she determined that they were never psychiatrically ill) on two self-report measures (the STAIC and CMAS) that she modified in an attempt to only include physiological symptoms (some symptoms, such as anger, were included as "physiological", but the majority of symptoms were physical). She found that children with

anxiety disorders were more likely to report physiological symptoms than were “never psychiatrically ill” controls. Unfortunately, effect size was not examined in this study. Last (1991) found no significant difference in rates of parental psychopathology (as measured by the SCID) between parents of AD children with somatic complaints and parents of AD children without somatic complaints

Beidel, Christ, and Long (1991) examined the presence of somatic complaints in a population of children with test anxiety. Their sample was recruited from a population of third to fifth grade schoolchildren, aged 8 to 13 years, from three school districts in southwestern Pennsylvania. The Test Anxiety Scale for Children (TASC; Sarason, Davidson, Lighthall & Waite, 1958) assessed test anxiety. A cutoff was used to identify children with “significant” test anxiety (cutoff for girls was 16 or greater; cutoff for boys was 12 or greater); approximately half of their sample of 76 children met this criteria. They modified this sample by including children who had a DSM-III-R diagnosed anxiety disorder and excluding children who met criteria for any DSM-III-R disorder other than an anxiety disorder. Beidel et al. collected information about somatic symptoms and anxiety disorders using a semi-structured diagnostic interview, the Anxiety Disorders Interview Scale for Children (ADIS-C; Silverman & Nelles, 1988), which has good psychometric properties (Rapee, Barrett, Dadds, & Evans, 1994). The ADIS measured presence of psychological disorders, but asks about the presence of somatic symptoms during times of fear. Beidel examined the presence or absence of these symptoms and found that children with test anxiety self-reported experiencing twice as many somatic symptoms when anxious than children without test anxiety, regardless of whether they had a comorbid anxiety disorder. Specifically, in addition to generally reporting more somatic symptoms, children with

test anxiety were more likely to report symptoms of choking, hot flashes or chills, palpitations, fainting, shakiness, headaches, and feelings of dying. Additionally, significantly more symptoms of flushes/chills, fainting, and dying were reported by a subsample of test anxious children with anxiety disorders compared to children without test anxiety or an anxiety disorder. This study suggests that there may be a unique relationship between somatic symptoms and test anxiety that differs from the general relationship between somatic symptoms and anxiety. This may be because memory for test anxiety may be better than memory for other types of anxiety as tests are salient, time limited, events, while anxiety symptoms such as those present in overanxious disorder may be more difficult for participants to remember and accurately retrospectively report on.

Egger et al. (1999) examined a subset of children from the Great Smoky Mountains Study (N=4,500; Costello et al., 1996) who were experiencing elevated CBCL scores. The Great Smoky Mountains Study was a longitudinal study that examined the development of psychiatric disorders over time. This sample included children aged 9-16 who scored above a 20 on the CBCL or were part of a 1 in 10 random sample of children below the cutoff point. The overall sample size is not reported, though she indicates that 3,733 observations were included in the analyses. The researchers used a semi-structured interview, the Child and Adolescent Psychiatric Assessment (CAPA; Angold et al., 1995), to identify children with anxiety disorders (SAD, OAD, or GAD), as well as identifying children with recurrent headaches, stomachaches, and musculoskeletal pains. Operational definitions were used, with headaches and stomachaches having to occur if they lasted at least an hour and occurred once a week for the previous three months. Musculoskeletal pains were defined as present if they occurred at least three times a

week for the previous three months. Results indicated that girls with an anxiety disorder were significantly more likely to report a somatic complaint than were girls without an anxiety disorder. Specifically, girls with an anxiety disorder reported 2.6 times greater prevalence of headaches, nearly 100 times greater prevalence of stomachaches and headaches together, and 3.4 times greater prevalence of musculoskeletal pains than girls without an anxiety disorder. However, these differences were not found in boys.

Hofflich et al. (2006) examined a sample of 178 youth, aged 7 -14, with a primary diagnosis of GAD, SAD, or SP who were referred to an anxiety disorders clinic. Diagnoses were determined using the ADIS C/P (Silverman & Albano, 1996). Somatic symptoms were measured using the physical symptoms scale of the Multidimensional Anxiety Scale for Children (MASC; March, Parker, Sullivan, Stallings, & Conners, 1997). The somatic symptoms measured by the MASC are those that are commonly found in anxiety disorders including those of tension, breathlessness, shaking, dizziness/faintness, chest pain, jumpiness, heart racing, restlessness, nausea and changes in body temperature. The MASC uses a Likert scale and asks children to indicate the frequency of these symptoms, but it does not exclude somatic complaints that occur outside of the context of anxiety disorders. Hofflich et al. (2006) compared the rates of somatic symptoms among children with GAD, SAD, and SP and found that somatic symptoms were more common in anxiety disordered children than they were in their sample of 36 clinic referred children who did not have an anxiety disorder. The authors also found that somatic symptoms were equally common across these principal diagnostic groups, even though the diagnostic criteria only explicitly require somatic symptoms to be present in the case of generalized anxiety disorder. Hofflich et al. examined individual somatic symptoms but did not find significant

differences between anxiety disorder groups in their frequencies of specific anxiety disorder symptoms. However, they did report that children with comorbid anxiety and depression reported more frequent somatic complaints than children with only anxiety or comorbid anxiety and externalizing disorders.

Ginsburg et al. (2006) examined children diagnosed with SAD, GAD, or SP. Their sample of 128 anxious children (ages 6-17) were recruited for a double blind placebo controlled trial of fluvoxamine. Anxiety disorders were diagnosed using the K-SADS. They used a measure of anxiety related complaints, the Pediatric Anxiety Rating Scale (PARS; Research Units on Pediatric Psychopharmacology Anxiety Study Group, 2002). The PARS is a clinician administered measure of anxiety that includes a checklist of 13 common somatic symptoms. More somatic symptoms are included on the PARS than are included on other anxiety measures such as the MASC, CMAS, K-SADS, or ADIS C/P. Symptoms the PARS examines include: blushing, feeling paralyzed, shaking, dizziness, breathing difficulty, racing heart, changes in temperature (chills/hot flashes), sweating, stomachaches/nausea, urge to use the bathroom, chest pain, paresthesias, problems eating. In addition to asking about whether the symptom was present in the last week, the PARS asks about severity of somatic symptoms. Measures of anxiety and somatic complaints were measured pre and posttreatment by blind clinicians. Like previous findings, Ginsburg et al. (2006) found that somatic symptoms were common, with almost every child in the study endorsing at least one somatic complaint at pretreatment. More than one out of every two children in their study experienced restlessness, stomachaches, and blushing. On average, each child reported 6 somatic symptoms. This high rate of complaints may be due to their use of a more comprehensive measure of somatic complaints. Unlike Hofflich et

al. (2006), who found no differences between the rates of somatic symptoms in GAD, SAD, and SP, Ginsburg et al. found that somatic symptoms were more common in children with GAD than they were in children with social phobia or SAD. Significant differences among groups were also found between individual somatic symptoms and disorders. They examined their findings by disorder and found that children with social phobia were more likely to report sweating and less likely to report difficulty swallowing.

Few research studies examine the prevalence of somatic complaints in OCD. Storch et al. (2008) examined the prevalence of somatic complaints in children with OCD. Participants included 85 children (aged 7 to 17) with ADIS-diagnosed OCD who were seeking treatment for their OCD. Storch et al. measured somatic symptoms using subsets of symptoms collected via parent report on the CBCL and child report on the MASC. Similarly to previous studies, they found that somatic complaints were common, with only 3.5% of their sample not reporting somatic symptoms. Because this study lacked a control group, it is unclear whether these complaints are more common in OCD than they are in community controls.

The combined findings indicate that somatic symptoms are common in childhood anxiety disorders. This conclusion is to be expected, as somatic symptoms are part of the criteria for many anxiety disorders. Alternate definitions of anxiety disorders would be necessary to determine whether the strong association between somatic symptoms and anxiety disorders is a diagnostic artifact.

The findings related to specific relationships between symptoms and disorders are mixed. Ginsburg et al. (2006) provided the most detail about common symptoms, but some of the symptoms that they evaluate, such as blushing, were not evaluated in previous research. Also,

findings about whether these symptoms are equally distributed across diagnostic groups are mixed, with Ginsburg et al. reporting that these symptoms are more common in generalized anxiety disorder than they were in social and separation anxiety disorders and Hofflich et al. (2006) reporting equal distribution of symptoms across these three disorders. Once again, this finding may be an artifact of measurement as Ginsburg et al. used a more comprehensive measure of somatic symptoms. Future research is needed to clarify whether somatic symptoms are more common in certain anxiety disorders and whether certain complaints are more common in certain anxiety disorders. Additionally, a child may present with many somatic symptoms but little impairment from these symptoms. More research is needed on impairment due to somatic symptoms.

Demographic Characteristics of Populations with Somatic Complaints

In community populations, somatic complaints are more common in females than males, and more common in adolescents as compared to younger children (Garber, Walker, & Zeman, 1991). Research on demographic characteristics of children with anxiety disorders and somatic symptoms is limited, as few studies have examined these relationships. Consistent with research on somatic complaints without anxiety disorders, Ginsburg et al. (2006) found that older youth (ages 12-17) were more likely to report somatic complaints than were younger youth (ages 6-11). This study also found that specific symptoms may be more common in older youth; older youth reported more blushing, sweating, trembling/shaking and paresthesias. A significant relationship between somatic symptoms and age was not found in a study with a younger sample (ages 7-14; Hofflich et al., 2006); however, the age of the sample in this study was more restricted. The

extant research on somatic complaints in children with anxiety disorders has not determined whether there is a relationship between severity of somatic complaints and age.

Research has begun to clarify the relationships between the report of somatic complaints in children with anxiety disorders and sex. Research has not found sex differences in the overall number of physical symptoms reported (Ginsburg et al., 2006; Hofflich et al., 2006; and Last, 1991). However, Ginsburg et al. found that boys were more likely to report the specific complaints of stomachaches and chest pain than were girls. In contrast to these two studies, Kingery, Ginsburg, and Alfano (2007) reported that girls endorsed significantly more somatic symptoms than boys on the MASC in a community sample of 114 African-American youth aged 14-19 years with high anxiety (classified based on their responses to the Screen for Child Anxiety Related Emotional Disorders, SCARED, a self-report measure of anxiety; Birmaher et al., 1997). Storch et al. (2008) also found that certain somatic complaints were more common in girls than in boys in a sample of 85 children (ages 7-17) with ADIS diagnosed OCD. Storch et al. used a combination of parent reported somatic symptoms from the CBCL and child reported somatic symptoms from the MASC to form two composite measures of somatic symptoms.

Somatic complaints have not been found to be related to race or family income (Hofflich et al., 2006, Ginsburg et al., 2006, Last, 1991). However, research is needed on larger, more diverse samples. Empirical research is needed to clarify the relationships among these demographic variables and anxiety disorders.

Somatic symptoms are associated with a variety of other difficulties when anxiety is present. Specifically, children with anxiety disorders and somatic complaints have more severe anxiety than children without somatic complaints. (Ginsburg et al., 2006; Storch et al., 2008).

Somatic symptoms also are more common when comorbid depressive symptoms are present (Bernstein et al., 1997; Hofflich et al., 2006) and when comorbid externalizing disorders are present (Hofflich et al., 2006). Additionally, children with anxiety disorders and somatic complaints are more likely to have poorer global functioning (Ginsburg et al., 2006). Finally, adolescents with somatic symptoms have more negative self-perceptions (Kingery et al., 2007). These factors taken together suggest that children with anxiety disorders who also have somatic complaints have more severe psychopathology than children without somatic complaints.

Possibly as a result of the greater severity of anxiety and poorer global functioning, children with anxiety and somatic symptoms also have poorer school performance than community or supranormal control groups (Last, 1991; Bernstein et al., 1997; Hughes, Lourea-Waddell, & Kendall, 1997). Specifically, children with anxiety disorders refuse school more frequently than peers without somatic complaints (Last, 1991). Hughes (1997) found that anxious children were more likely to endorse somatic complaints, and found that in turn somatic complaints were associated with poorer academic functioning as rated by teachers. These findings demonstrate that children with anxiety and somatic symptoms are generally more impaired than those without somatic complaints, although the reasons for this are unclear.

Treatment of Anxiety: Effect on Somatic Complaints

Research has begun to examine whether changes in the number of somatic complaints occur over the course of treatment for anxiety disorders. Ginsburg et al. (2006) examined rates of somatic complaints using the PARS before and after treating anxiety disordered youth aged 6-17 with fluoxamine. This study found that treatment with fluoxamine significantly reduced the number of somatic complaints reported, a promising sign for treatment of somatic complaints.

However this study did not examine whether changes in somatic symptoms that occur over the course of treatment were associated with other treatment produced gains.

Preliminary research suggests that CBT may decrease the number of somatic symptoms in anxiety disordered youth. Storch et al. (2008) found that CBT for children with OCD significantly reduced the number of somatic symptoms reported. The average reduction in somatic symptoms was a 16.5% reduction; 18% of their sample experienced a 35% or greater reduction in somatic symptoms. They found that the presence of somatic symptoms at pretreatment was not associated with treatment response. However, change in somatic symptoms from pre- to post- treatment predicted 35% of the variance in posttreatment scores on the Children's Yale-Brown Obsessive-Compulsive Scale (CY-BOCS; Scahill et al., 1997), a measure of OCD symptoms. Changes in somatic complaints appeared to be a marker of improvement in overall anxiety in this study.

Masia Warner et al. (2011) also examined somatic complaints in children treated with a modified CBT protocol for somatic complaints in anxiety. They used a modified 12 session CBT protocol designed to address somatic complaints in children. Their sample included 40 children (ages 8-16) with ADIS diagnosed anxiety disorders and unexplained physical complaints. Results found reductions in physical discomfort and anxiety disorder frequency (as measured by ADIS-IV-CP) following CBT. It is unclear whether the modified CBT protocol results in differential effects on anxiety compared to a traditional CBT protocol.

These studies provide preliminary evidence that treatment of anxiety disorders may result in reductions in somatic complaints. Research on larger samples of children is needed, as is research on populations of children with the most common anxiety disorders, GAD, SP, and

SAD. Additionally, research is needed to determine whether CBT, medication, and placebo provide comparable reductions in somatic complaints, as CBT may increase monitoring of physical symptoms and medication may have physical symptoms as side effects. Previous studies have not compared the effect of CBT versus the effect of medication on the number or severity of physical symptoms.

The proposed study extends upon the existing research by examining somatic complaints in a large sample of children who received CBT, medication, CBT plus medication, or pill placebo over a 14 week period. This study examined baseline levels of somatic complaints by disorder, examined relationships between sex, age and somatic complaints, and determined whether somatic complaints are associated with comorbid disorders including anxiety and depressive disorders.[1] This study examined whether somatic complaints decrease posttreatment in children who received active treatment conditions as opposed to placebo conditions and compares levels of somatic complaints posttreatment across the treatment conditions.

[1] Participants with comorbid, secondary depression were initially included in CAMS. However a decision was made to exclude children with MDD to make the comparison between medication and CBT fair (i.e. sertraline treats both MDD and anxiety, whereas the CAMS CBT targets anxiety). Participants with comorbid, secondary dysthymia were included throughout the trial.

CHAPTER 2

OVERVIEW OF PRESENT STUDY

Study Aims

The present study aimed to determine the frequency and severity of physical symptoms reported by youth with anxiety disorders, examine whether the frequency and severity of physical symptoms decreases following treatment, and examine the distribution of physical symptoms across youth with GAD, SAD, and SP. This study evaluates the treatment outcomes of youth treated with CBT (CBT), medication (SRT), CBT + medication (COMBO), or placebo to determine if the groups differed in the number and severity of symptoms reported posttreatment. Secondarily, this study aimed to determine whether rates of somatic symptoms were differentially associated with overall anxiety severity, comorbidity, or general functioning.

Primary Hypotheses

Primary Aims

- To compare the number of somatic complaints and severity of somatic complaints pretreatment across primary diagnostic groups.
- To compare the number and severity of somatic complaints posttreatment controlling for pretreatment among groups treated with CBT, SRT, COMBO, and placebo. Planned contrasts examined whether groups treated with (a) medications differed from those who did not receive medications (COMBO and SRT vs. placebo and CBT), and (b) CBT differed from those who did not receive CBT (CBT and COMBO vs. SRT and placebo).

Primary Hypothesis

- Number and severity of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC and by the PARS severity item) will be evenly distributed across primary diagnoses and diagnostic groups.
- The number of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC) and their severity (defined by the PARS severity items) measured posttreatment, controlling for pretreatment scores, will decrease with active treatment (CBT, SRT, or COMBO) in comparison to placebo.
- The number of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC) and their severity (defined by the PARS severity items) measured posttreatment, controlling for pretreatment scores, will be greater for participants who receive medication (COMBO or SRT) than for those who receive do not (CBT and placebo).
- The number of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC) and their severity (defined by the PARS severity items) measured posttreatment, controlling for pretreatment scores, will be fewer for participants who receive CBT (CBT and COMBO) than for those who receive do not (SRT and placebo).

Secondary Hypotheses

Secondary Aims

- To examine the relationship between the number of somatic complaints reported and overall anxiety severity both pre- and post-treatment.

- To examine the relationship between the number of somatic complaints reported and general function at pretreatment.
- To examine the relationship between the number of somatic complaints and their severity and the number of comorbid diagnoses both pre- and post-treatment. Internalizing and externalizing comorbidity will be examined separately, as will the specific relationships to depression and dysthymia.
- To determine whether the number or severity of physical symptoms reported differ between children with any diagnosis of GAD, SAD, or SP.
- To examine the distribution of somatic complaints by sex at pretreatment.

Secondary Hypotheses

- Youth who report greater numbers of physical symptoms (as determined by the total number of somatic complaints endorsed on the PSC) and more severe physical symptoms (as defined by the PARS severity item)will have higher levels anxiety severity (as measured by the CGI-S) pretreatment.
- Youth with higher numbers of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC) and more severe physical symptoms (as defined by the PARS severity item) will have poorer overall functioning (as measured by the CGAS) pretreatment.
- Youth with higher numbers of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC) and more severe physical symptoms (as defined by the PARS severity item) will have more comorbid internalizing disorders and will be more likely to be experiencing clinical or subclinical symptoms of depression.

The number and severity of physical symptoms reported by children with externalizing disorders will not differ from those without externalizing disorders.

- Number and severity of somatic complaints (as determined by the total number of somatic complaints endorsed on the PSC and by the PARS severity item) will be equally common among males and females.

Analytic Plan

Plan for Preliminary Analyses

Prior to testing the primary and secondary hypotheses, preliminary analyses were conducted. T-tests and Chi-squares examined differences in treatment conditions for sex, age, ethnicity, and socioeconomic status. If significant differences were found, the variable was controlled for in subsequent analyses. Descriptive analyses of predictor variables (number of physical symptoms on the PSC, severity of physical symptoms as measured by the PARS) were also conducted. Multicollinearity among independent variables (IVs) was assessed to ensure that assumptions were not violated. Multicollinearity among independent variables was not found in this study, so no variables were removed. When a large correlation (i.e., $r \geq .90$; Tabachnick & Fidell, 2001) between IVs was found, one of the highly correlated IVs was omitted from further analyses. In choosing variables to omit, categories that take into account multiple information sources were selected over single informant sources.

Plan for Primary Analyses

Correlations assessed the degree of relationship and t-tests assessed differences between demographic variables and predictor variables for the entire sample at pretreatment. When a significant difference or relationship was found, the variable was controlled for in subsequent

analyses. To test the primary hypothesis, an ANOVA was performed to determine whether differences among the four treatment conditions existed at pretreatment. Following pretreatment analyses, correlations assessed the degree of relationship and t-tests were performed to assess differences between the demographic and predictor variables for the entire sample posttreatment. ANCOVAs were performed with any significant demographic variables, comorbidity, and anxiety severity as covariates, to determine whether differences among the four treatment conditions existed posttreatment in the frequency and severity of somatic complaints. Planned contrasts were conducted to test *a priori* hypotheses. These contrasts examined if participants who received medication or CBT differed in number and severity of physical symptoms posttreatment, with number of physical symptoms and severity of physical symptoms as dependent variables and with demographic variables entered as covariates if preliminary analyses established a significant difference. All posttreatment analyses of primary hypotheses were conducted both with participants who completed their assigned treatment (treatment completers) and those who may not have completed but who were included at the time of randomization (Intent-to- treat; ITT sample). The ITT used a last observation carried forward (LOCF) methodology; participants who were missing data at posttreatment had their pretreatment score used instead in posttreatment analyses.

Plan for Secondary Hypotheses

The secondary hypotheses were tested using Pearson's correlations and ANOVAs. Pearson correlations were conducted to determine the relationship between the number of somatic complaints endorsed pretreatment and anxiety severity (CGI-S) and general functioning (CGAS). Pearson correlations also examined the relationship between number and severity of

somatic complaints reported posttreatment and posttreatment severity (CGI-S) and improvement (CGI-I). ANOVAs were performed to examine the relationships between the number and severity of physical symptoms and the presence of comorbid disorders pre and posttreatment. ANOVAs were conducted separately for internalizing and externalizing comorbidity, and planned comparisons examined whether groups with no comorbid diagnoses differed from those with one or two or more diagnoses, and also examined whether groups with one comorbid diagnosis differed from those with two or more diagnoses on the number and severity of physical symptoms. ANOVAs were conducted to evaluate the relationship between specific somatic symptoms and primary diagnostic group. ANOVAs were also conducted to evaluate the relationship between specific somatic symptoms and sex. SES, child age, and child sex will be entered as covariates only if found to be significantly related to somatic complaints in preliminary analyses. Given that multiple comparisons were performed, an alpha level of .01 was used throughout this manuscript to determine significant results.

CHAPTER 3

METHODS

Study Design

This study used data collected as part of the CAMS, a multicenter randomized clinical trial for the treatment of anxious youth that compared the efficacy of cognitive-behavioral therapy (CBT; Coping cat), medication (SRT; sertraline), their combination (COMBO), and pill placebo (PBO) in a 12-week acute phase trial (Walkup et al., 2008). The methodology has been previous reported in Walkup et al. (2008) and Compton et al. (2010). Six research sites (Duke University Medical Center, New York State Psychiatric Institute–Columbia University Medical Center–New York University, Johns Hopkins Medical Institutions, Temple University–University of Pennsylvania, University of California, Los Angeles, and Western Psychiatric Institute and Clinic–University of Pittsburgh Medical Center) participated. The CAMS protocol was approved and monitored by institutional review boards at each site and by the data and safety monitoring board of the National Institute of Mental Health.

Youth with a primary diagnosis of SAD, GAD, or SP were included. Youth with comorbid non-primary internalizing and externalizing disorders, as assessed by trained, reliable independent evaluators (IEs) using the ADIS, were included. Youth were randomized using a 2:2:2:1 randomization sequence to 12 weeks of treatment with CBT (14 sessions, N=139), sertraline (at a dose of up to 200mg per day, N=133), a combination of sertraline and CBT (COMBO, N=140), or pill placebo (N=76). Data on anxiety severity and impairment were gathered from parent and child report at baseline as well as at weeks 4, 8 and 12. Data on physical symptoms was collected via structured interview and self-report questionnaires at pre-

and post-treatment. Treatment response was calculated at week 12. Participants were considered treatment responders if they received a score of 1 (very much improved) or 2 (much improved) on the Clinical Global-Improvement Scale (CGIS) as measured by the IE (agreement among raters was high; r=0.85). In this trial, 80.7% of youth randomized to combination therapy, 59.7% of youth randomized to CBT, and 54.9% of youth randomized to sertraline treatment were considered to be treatment responders. This study found that active treatment conditions were all superior to placebo. The combination therapy was found to be superior to both monotherapies.

Participants

Participants were 488 children who were recruited from December 2002 through May 2007 from clinics, schools, primary care providers, mental health providers, churches and temples, community organizations/centers, and paid and public service advertisements in local media, including newspapers, radio, and television. The clinical characteristics of the sample were described in Kendall and colleagues, 2010. Participants were youth ages 7 years, 0 months to 17 years, 10 months who met criteria for a principal diagnosis (defined as the disorder of highest clinical severity) of SAD, GAD, or SP based on the composite of the Anxiety Disorders Interview Schedule for DSM-IV, Child and Parent Version (Silverman & Albano, 1996). Children with comorbid psychiatric diagnoses, including depression, were included in the trial, so long as the co-occurring disorder was of lesser severity than the target disorder and significant suicidal ideation was absent.

The majority of participants were children (74.2%) and 54% of participants were male. Participants were mostly white (78.9%), with 9.0% of participants identifying themselves as Black, 2.5% as Asian, 0.4% as Native Hawaiin/Pacific Islander, 1.2% as American Indian, and

8.0% as other. Twelve point one percent of participants identified themselves as Hispanic or Latino. The majority of participants were middle to high SES as measured by a Hollingshead score of 40-66 (74.6%, Hollingshead, 1975). For additional demographic information see Table 1. Preliminary analyses assessing for significant demographic differences across ages, demographic groups, and incomes were conducted. The results of these comparisons are reported in the Preliminary Analyses section of the Results.

Exclusion criteria included having an unstable medical condition, an IQ of less than 80, current school refusal, not having responded to two adequate trials of selective serotonin-reuptake inhibitors (SSRIs) or a trial of CBT. Additionally, girls who were pregnant or sexually active and not using an effective method of birth control were also excluded as were children who were receiving psychoactive medications other than stable doses of stimulants. Participants were also excluded if their psychiatric condition made participation clinically inappropriate (i.e. they had current substance-use disorder, a lifetime history of bipolar, psychotic, or pervasive developmental disorders, or with active suicidal or homicidal ideation). At trial onset, participants with co-primary MDD were included; however, during the course of the trial, exclusion criteria were changed to exclude participants with MDD. Six participants with secondary MDD were included in analyses.

CAMS used a three-gate entry procedure to screen potential participants and ensure that youth who participated in the study had a stable anxiety diagnosis at the start of treatment. A total of 3066 subjects were screened by telephone for this study; of these, 761 signed consent forms and completed the inclusion and exclusion evaluation. Of those who consented, 524 continued to be eligible for the study and completed the baseline assessment; 488 underwent

randomization following the baseline evaluation. Further details regarding the resulting sample are presented in the CONSORT table for this trial reported in Walkup et al (2008).

Table 1

Demographic Information as Reported in Walkup et al., 2008

	CBT	SRT	COMBO	PLACEBO
Participant Age (M±SD)	134.3 ± 33.4	133.7 ± 33.3	135.2 ± 34.2	132.4 ± 35.1
Sex (%)				
Male	48.2%	54.1%	48.6%	51.3%
Female	51.8%	45.9%	51.4%	48.7%
Race				
White	76.3%	77.4%	82.9%	78.9%
Black	10.1%	9.0%	7.9%	9.2%
Asian	0.7%	3.0%	4.3%	1.3%
Native Hawaiin / Other Pacific Islander	0%	0%	0.7%	1.3%
American Indian	2.2%	1.5%	0.7%	0%
Other	10.8%	9.0%	3.6%	9.2%
Hispanic or Latino	15.1%	11.3%	11.4%	9.2%
Not Hispanic or Latino	84.9%	88.7%	88.6%	90.8%
SES				
Low	23.7%	26.3%	25.0%	27.6%
High	76.3%	73.7%	75.0%	72.4%
Age				
Child	77.7%	74.4%	72.1%	71.1%
Adolescent	22.3%	25.6%	27.9%	28.9%

Note. SD = Standard deviation; CBT = Cognitive Behavioral Therapy (Coping Cat Program), SRT = medication (Sertraline) only, COMBO = medication + CBT.

Measures

General Information Form. The IE completed this form with the family. This form assessed basic demographic variables including child's sex, age, ethnicity, and socioeconomic status via the Hollingshead Four-Factor Index (Hollingshead, 1975).

Anxiety Disorders Interview Schedule for Children - Child and Parent Versions (ADIS-C/P; Silverman & Albano, 1996). The ADIS-C/P is a semi-structured interview used to diagnose anxiety disorders in youth. This interview was administered to anxious youth and their parents by a diagnostician. This interview assessed mood, externalizing and pervasive developmental disorders and collects information about the symptoms, distress, and interference that a child is experiencing. The diagnostician assigned a composite clinician severity rating (CSR) ranging from 0-8 (0 = no symptoms; 1 - 3 = sub-clinical levels; 4 - 8 = significant distress/impairment). CSRs were used to identify the primary (the disorder with the highest CSR) and coprimary (two or more disorders sharing the highest CSR) disorders as well as any secondary concerns. The ADIS-C/P has solid psychometric properties (Silverman & Nelles, 1988; Silverman & Eisen, 1992). Retest reliability for both the parent and child interviews is excellent, with kappa coefficients for GAD, SP, SAD, and Specific Phobias ranging from .80 - .92 (Silverman, Saavedra, & Pina, 2001) Inter-rater reliability of the child and parent versions yielded kappa coefficients ranging from .59 to .82 (Rapee et al., 1994). The ADIS C/P has strong concurrent validity (Wood, Piacentini, Bergman, McCracken, & Barrios, 2002). The ADIS-IV-C/P has been used extensively as a diagnostic measure with anxious youth and is the most commonly used diagnostic measure in research with AD youth (e.g., Silverman & Ollendick, 2005). Anxiety

disorder diagnoses and severity were established using the ADIS C/P; changes in the composite ADIS-C/P diagnoses were used as a measure of treatment outcome.

Physical Symptoms Checklist (PSC; Emslie et al., 2006; see Appendix A). The PSC is a 46 item checklist of general health problems that children may experience. PSC provides a Likert-type self-report scale with anchors of not at all, just a little, pretty much, or very much for each symptom. Participants indicated the symptoms presence only if the symptom was present in the previous week. For the present study, a total score was calculated derived on items 1-44, as the remaining items were female gynecological symptoms. Because these questions would pertain to only 49.6% of the participants, these questions were deemed nonessential for the testing of the hypotheses.

Multidimensional Anxiety Scale for Children (MASC; March et al., 1997). The MASC is a 39-item self-report scale that assesses anxious symptomatology in youth ages 8-16. Items are rated using a 4-point Likert-type scale (0 = “Never true about me”, 3 = “Often true about me”). The MASC yields an overall anxiety score and 4 empirically derived subscale scores: physical symptoms, social anxiety, harm avoidance, and separation anxiety. The MASC is internally consistent (e.g. r=.90 for Total score and r =.74-.85 for subscales; March et al., 1997; March, Sullivan, & Parker, 1999) and reliable in community (r=.79; March et al., 1997) and school-based samples (r=.88; March et al., 1999). Convergent, concurrent, and discriminant validity has also been demonstrated (see March et al., 1997; March & Albano, 1998; Muris, Merckelbach, Ollendick, King, & Bogie, 2002; Villaboe, Gere, Torgersen, & Kendall, 2011; Wood et al., 2002).

Pediatric Anxiety Rating Scale (PARS; Research Units on Pediatric Psychopharmacology Anxiety Study, 2002). The PARS is a 50-item clinician-rated anxiety severity rating scale for children and adolescents. Scores on the PARS are calculated by the summation of six items assessing anxiety severity, frequency, distress, avoidance, and interference during the previous week. Total scores on this scale range from 0 to 30, with scores above 13 indicating clinically meaningful anxiety. The PARS has been found to have acceptable inter-rater reliability, internal consistency, test-retest reliability, and convergent and divergent validity (Ginsburg, Keeton, Dradowski, & Riddle, 2010; Research Units on Pediatric Psychopharmacology Anxiety Team, 2002).

Children's Global Assessment Scale (CGAS; Shaffer et al,, 1983). The CGAS is a clinician-rated measure of a child's global psychological functioning. The CGAS consists of a 1-100 scale with behavioral descriptions and anchor points. The CGAS demonstrates high retest reliability (ICC = .69 to .95) and inter-rater reliability (ICC = 0.74 to 0.87), and is sensitive to level of impairment (e.g. discriminates between inpatients and outpatients; Shaffer et al., 1983; Bird, Canino, Rubio-Stipec, & Ribera, 1987; Dyrborg et al., 2000; Schorre & Vandvik, 2004).

Clinical Global Impression-Severity and Improvement Scales (CGI-S and I; Guy, 1976). The CGI-S and CGI-I are clinician rated scales of global baseline severity ranging from 1 (not at all ill) to 7 (extremely ill) while the CGI-I provides a global rating of clinical improvement ranging from 1 (Very Much Improved) to 7 (Very Much Worse). In this study, the CGI-S and CGI-I ratings reflected only severity and impairment from GAD, SAD, and SP. Participants who received a CGI-I of a 1 (Very Much Improved) or a 2 (Much Improved) were defined as treatment responders.

Interventions

Cognitive-Behavioral Therapy (CBT)

Youth randomized to the CBT condition received 14, 60-minute sessions of CBT over a 12-week period, using the empirically-supported *Coping Cat* protocol (Kendall & Hedke, 2006a, Kendall & Hedke 2006b). The *Coping Cat* is a manual-based treatment that provides six sessions of psychoeducation and eight sessions of exposure tasks, and is designed to teach youth to recognize and manage anxious arousal. The psychoeducation portion of the treatment is designed to help children identify emotions, identify their physiological response as a signal of the presence of anxiety, teach relaxation exercises to calm physiological reactivity, recognize their cognitions about expectations and fears in a situation, modify cognitions to more adaptive cognitions, problem solving to develop plan for coping, rating one's performance, and rewarding themselves for effort. During exposure tasks, children practice using their coping skills while facing their fears. This treatment includes 12 individual child sessions and 2 parent sessions in which parents meet separately with the therapist. In this treatment, the therapist acts as a coach teaching the child the skills they need to manage anxiety. Parents are seen as collaborators and consultants who actively assist the child in treatment. This protocol may be tailored to a child's individual characteristics and developmental level.

Medication

Youth randomized to the medication condition received 8 30 to 60 minute sessions. Medication was prescribed by study psychiatrists who provided education and advice in addition to symptom review and medication monitoring. Medication was administered on a fixed-flexible schedule beginning with 25 mg of sertraline per day and adjusted up to 200 mg of sertraline per day by week 8. Participants were eligible for dose increases up to week 8 if they continued to be mildly ill or worse and experienced minimal side effects. Pill counts and medication diaries were used both to enhance adherence to the medication regimen and to document adherence.

COMBO

Youth randomized to the combination treatment received both the 14 session CBT protocol and the medication protocol described above. Pharmacotherapy appointments occurred prior to CBT appointments and when possible occurred on the same day and in the same location to reduce patient/parent inconvenience and increase adherence. Communication between CBT therapists and psychiatrists was facilitated by weekly CAMS meetings that discussed youth in the combination condition.

Placebo

Participants assigned to pill placebo received the same treatment protocol as those assigned to the sertraline only condition. Study psychiatrists were blind to treatment condition.

Procedure

Informed consent was obtained from all participants. Youth and their parents completed self report questionnaires about anxiety and physical symptoms (MASC, CDI, BSI, PSC) at

intake. Trained reliable diagnosticians (independent evaluators; IEs) administered the ADIS-C/P, PARS, and CGI-S to determine children's primary diagnosis, comorbidities, and severity of physical symptoms. Once eligibility was determined, youth were randomly assigned to one of the four treatment conditions (CBT, SRT, COMBO, or placebo) for 12 weeks. Additional assessments of parents and youth occurred at weeks 4, 8, and 12. IEs were blind to treatment condition.

Power Analysis

Power was determined using a specified significance criteria, effect size, and sample size. Power analyses may also be used to identify a sample size if the desired power, effect size, and significance criteria are specified. In the present study, a set number of participants were included in each treatment condition, enabling power calculations based on a specific significance criteria and effect size.

Given *a priori* hypotheses and stated directionality, a two-tailed significance criterion of alpha = .05 was used with a sample of 488 participants. A small to medium effect size (r = .20) was used, as the most comparable study to this one, Ginsburg et al. (2006) reported differences between treatment conditions that were reflective of a moderate (r = .33) effect size and the population effect size is unknown. Based on a sample of 488 participants, and alpha set at .05, power to detect a medium effect will be .99. Based on power analysis the sample size was sufficient to test our primary and secondary hypotheses.

CHAPTER 4
RESULTS

Tests of Statistical Assumptions

Preliminary Analyses

Multicollinearity among independent variables was assessed to determine whether there was any redundancy of variables (see Table 2). Child, parent, and rater reported PARS severity were highly correlated (using the criteria for potential multicollinearity as proposed by Tabachnick & Fidell, 2001; $r \geq .90$). Rater reported severity was determined by an IE who was trained to assign rater reported severity by incorporating both child and parent report; as a result, the rater-reported PARS severity was chosen to be used in subsequent analyses as it is likely a more accurate reflection of the clinical presentation.

Table 2

Correlation Matrix of Predictor Variables

	Child Severity	Parent Severity	Rater Severity	Sex	Age
PSC	0.36	0.28	0.32	0.03	0.17
Child Severity		0.8	0.86	0.06	0.16
Parent Severity			0.93	0.08	0.12
Rater Severity				0.07	0.17
Sex					0.00

Note: PSC = Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Skewness and kurtosis of the main outcome variables, PSC total score, and severity were evaluated. Shapiro-Wilk's statistics were all significant (Total score on the PSC at intake, $D(389) = .119$, $p < .00$; the total score at week 12, $D(389) = .191$, $p < .00$; rater reported PARS severity $D(389) = .20$, $p < .00$). To correct for skewness, a square root transformation was conducted, though Shapiro Wilk's statistics remained significant (Total score on the PSC at intake, $D(389) = ..07$, $p < .00$; the total score at week 12, $D(389) = .13$, $p < .00$; rater reported PARS severity $D(389) = .33$, $p < .00$). In large sample sizes (N greater than 200) significant differences are common and may not reflect substantially deviations from normality, as small deviations in normality may lead to a significant result with the Shapiro-Wilk's test (Field, 2009), however, caution is warranted when interpreting the results. All analyses were conducted using both the transformed and untransformed variables. When no differences were found, the untransformed variable was used to ease interpretability. Homogeneity of variance among the conditions was assessed using Levene's test. Levene's test was not significant for both transformed and untransformed variables (PSC total score at pre and post and parent, child, and rater reported severity at pre and post), suggesting that variances did not differ among treatment conditions on the main predictor variables.

Correlations and independent samples were used to examine the relationship between demographic variables and predictor variables for the entire sample. The number of physical symptoms at pretreatment was significantly related to age ($r = .17$, $p < .00$), as was the child reported severity of physical symptoms ($r = .16$, $p < .00$), the parent reported severity of physical symptoms ($r = .12$, $p < .00$) and the rater reported severity of physical symptoms ($r = .17$, $p < .00$), with younger children reporting fewer symptoms than older children. Given this

relationship, further analyses controlled for age. The number of physical symptom at pretreatment did not differ between conditions on SES (low versus high, t = 1.47, p = .14), sex (t = -.64, p = .52), or race (t = 1.47, p = .14). The child reported severity of physical symptoms at pretreatment also did not differ among conditions on SES (t = .23, p = .82), sex (t = -1.31, p = .19), or race (t = .44, p = .66); nor did the parent reported severity of physical symptoms at pretreatment (SES [t = -.19, p = .85], sex [t = -1.74, p = .08], or race [t = .53, p = .60]), or the rater reported severity of physical symptoms at pretreatment (SES [t = -.11, p = .91], sex [t = -1.64, p = .10], or race [t = .70, p = .49]).

Primary Analyses

Pretreatment Demographic Differences Among Treatment Conditions

For the number and severity of somatic complaints reported pretreatment, analyses examined pretreatment differences in demographic variables among youth in each of the treatment conditions. Means and standard deviations of pre- and post-treatment primary variables may be found in Tables 3 and 4 respectively. No significant differences were found among the four treatment conditions on the following variables prior to treatment: sex (X^2[3, N = 488] =1.22, p=.75), age (F[3, 484] =.13, p=.95), SES (low versus high, X^2[3, N = 488] =.47, p=.93) and race (white versus nonwhite X^2[3, N = 488] = 2.07, p=.56). These relationships were maintained posttreatment. The number of physical symptoms posttreatment was significantly related to age (r = .17, p < .00) and to reported posttreatment symptoms severity (parent r = .19, p < .00, child r = .27, p < .00, and rater r = .28, p < .00). Specifically, older youth and youth with more severe physical symptoms had increased numbers of physical symptoms. The number of physical symptoms posttreatment was not related to SES (t[415] = -.88, p = .38), sex (t[415] =

2.25, p = .03), or race (t[415]= -.88, p = .38). Posttreatment severity of physical symptoms was unrelated to SES (child t[427] = .72, p = .47, parent t[428] = -.89, p = .37, rater t[436]= -.33, p = .74), sex (child t[427] = .31, p = .75, parent t[428] = .95, p = .34, rater t[436] = .73, p = .47), or race (child t[427] = .48, p = .63, parent t[428] = -.76, p = .45, rater t[436] = .33, p = .74).

Table 3

Pretreatment Means and Standard Deviations of Number and Severity of Physical Symptoms by Treatment Condition

	COMBO	SRT	CBT	Placebo
Total # of physical symptoms	9.76 (7.29)	9.43 (7.92)	8.81 (6.97)	8.62 (6.80)
Rater reported severity	2.29 (1.44)	2.33 (1.85)	2.39 (1.43)	2.50 (1.46)
Child reported severity	2.13 (1.51)	2.19 (1.50)	2.20 (1.44)	2.39 (1.59)
Parent reported severity	2.15 (1.48)	2.30 (1.42)	2.36 (1.50)	2.46 (1.60)

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Table 4

Posttreatment Means and Standard Deviations of Number and Severity of Physical Symptoms by Treatment Condition

	COMBO	SRT	CBT	Placebo
Total # of physical symptoms	5.16 (5.66)	5.04 (5.69)	4.35 (5.39)	5.31 (5.65)
Rater reported severity	0.75 (1.10)	0.82 (1.15)	1.04 (1.32)	0.98 (1.27)
Child reported severity	0.68 (1.11)	0.72 (1.10)	0.96 (1.34)	0.68 (1.10)
Parent reported severity	0.73 (1.34)	0.64 (1.12)	0.94 (1.33)	0.94 (1.35)

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

An ANOVA (see Table 5) tested for differences among treatment conditions prior to treatment. At intake, when controlling for age, treatment conditions did not differ in the number of somatic complaints reported ($F(3, 453) = .17$, $p = .92$) or rater-reported severity of somatic complaints ($F(3, 482) = .35$, $p = .79$). A paired-samples t-test examined whether rates of physical symptoms decreased following treatment. At posttreatment, after controlling for age, the number of physical symptoms reported significantly decreased ($t(390) = 13.15$, $p < .00$), as did the rater-reported severity of physical symptoms ($t(437) = 20.01$, $p < .00$), when looking at the entire sample irrespective of treatment condition.

Table 5

Number and Severity of Physical Symptoms Reported Pre- and Post-treatment

	Pretreatment				Posttreatment			
	M	SD	F	p	M	SD	F	p
Total # of physical symptoms	9.22	7.25	.17	.92	4.98	5.69	.30	.83
Rater reported severity	2.35	1.41	.35	.79	.91	1.20	2.05	.11
Child reported severity	2.21	1.50	.50	.68	.82	1.19	4.65	.18
Parent reported severity	2.29	1.48	.68	.57	.82	1.21	1.90	.13

Note: For reported severity 3 = moderate, 2 = mild, 1 = minimal, 0 = no symptoms; Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Differences Among Treatment Conditions: Completer Analyses[2]

ANOVAs examined the relationships between the number and severity of somatic complaints reported by treatment completers to determine whether the frequency of symptoms differed posttreatment among treatment conditions. The number of physical symptoms reported posttreatment was not related to treatment condition when controlling for age and number of pretreatment symptoms ($F(1,385) = .343$, $p = .79$), or controlling for age, number of pretreatment symptoms, comorbidity, and global severity ($F(3, 382) = .24$, $p = .87$). Controlling for age, number of physical symptoms, comorbidity, and global severity, rater-reported severity of somatic complaints was not related to treatment condition ($F(3, 429) = 2.16$, $p = .09$). To

[2] As there was no test-retest reliability data on the PSC, analyses examined pre- and post-treatment differences separately. However, a repeated measures ANOVA examining treatment condition effects across time (controlling for age) was conducted. No significant differences in the number of physical symptoms were found ($F(3, 386) = .18$, $p = .91$).

summarize, participating in any specific treatment condition was not associated with improvement in the number or severity of physical symptoms.

ANCOVAs, with age as a covariate, were conducted to determine if treatment conditions differed in the number or severity of physical symptoms reported posttreatment between groups. Planned contrasts examined whether there were differences in the number and severity of physical symptoms reported among those who received medication and those that did not (number of symptoms $t(413) = -.18$, $p = .86$, rater reported severity $t(434) = 2.06$, $p = .04$) and between groups who received CBT and those who did not (number of physical symptoms $t(413) = -.35$, $p = .73$, rater reported severity $t(434) = 2.06$, $p = .56$). Groups did not otherwise differ in the number and severity of physical symptoms reported.

With respect to the second primary aim, further analyses were conducted to determine whether the number and severity of physical symptoms were related to treatment response. Controlling for initial report of physical symptoms, treatment responders reported fewer physical symptoms ($F(1, 414) = 6.89$, $p < .00$) and less severe physical symptoms ($F(1, 435) = 77.58$, $p < .00$) than participants who did not respond to treatment, indicating that participants who responded to treatment who were experiencing significantly less anxiety at pretreatment reported fewer and less severe physical symptoms at posttreatment.

Differences Among Treatment Groups: ITT Analyses

The completer analyses were repeated using an ITT sample. As in the completer analyses, ANOVAs were conducted to determine the relationship between the number and severity of physical symptoms posttreatment and treatment condition. The number of physical symptoms reported posttreatment was not related to treatment condition when controlling for age

and number of pretreatment symptoms ($F(3,452) = .752$, $p = .52$), or controlling for age, number of pretreatment symptoms, number of comorbid disorders, and global severity ($F(3, 449) = .69$, $p = .56$). Controlling for age, number of physical symptoms, number of comorbid disorders, and global severity, rater reported severity of somatic complaints was not related to treatment condition ($F(3, 479) = 2.82$, $p = .04$). Controlling for improvement in treatment, there were still no differences among treatment groups (Number of symptoms $F(3, 400) = .79$, $p = .50$; rater reported severity of symptoms $F(3, 429) = 2.68$, $p = .05$). Regardless of whether an ITT or completer sample was used, there were no differences in the reported number or severity of physical symptoms among participants in the four treatment groups.

ANOVAs controlling for age with planned contrasts were conducted to determine if treatment groups differed in the number or severity of physical symptoms reported posttreatment between groups who received medication (number of symptoms $t(480) = .19$, $p = .85$, rater reported severity $t(484) = -1.75$, $p = .08$), and between groups who received CBT (number of physical symptoms $t(480) = -.55$, $p = .58$, rater reported severity $t(484) = -1.73$, $p = .08$). In other words, ITT analyses found that treatment groups did not differ in the number and severity of physical symptoms reported.

Analyses were conducted to determine whether the number and severity of physical symptoms were related to treatment response in the ITT sample. Controlling for initial report of physical symptoms, treatment responders reported fewer physical symptoms ($F(1, 406) = 16.06$, $p < .00$), and less severe physical symptoms (when controlling for pretreatment severity of physical symptoms $F(1, 434) = 80.84$, $p < .00$) than participants who did not respond to

treatment. Again, this suggests that improvement in anxiety, rather than any particular treatment, was associated with a decrease in the number and severity of physical symptoms.

Chi Square tests examined the frequency of symptoms by treatment condition, to determine whether individual symptoms increased or decreased as a result of treatment conditions. No significant differences between symptoms at posttreatment and treatment condition were found.

Secondary Analyses

Relationship Between Physical Symptoms and Severity

With regard to relations among predictor variables, the number of physical symptoms at pretreatment was significantly correlated with several pretreatment variables: child reported severity of physical symptoms ($r = .35$, $p < .00$), parent reported severity of physical symptoms ($r = .28$, $p < .00$), and rater reported severity of physical symptoms ($r = .32$, $p < .00$), as well as the number of physical symptoms posttreatment ($r = .52$, $p < .00$). The severity of physical symptoms at pretreatment was significantly related to the severity of physical symptoms at posttreatment: child $r = .30$, $p < .00$; parent $r = .24$, $p < .00$; rater $r = .28$, $p < .00$. In other words, reporting a larger number of physical symptoms at pretreatment was associated with having more severe physical symptoms at posttreatment. Having a larger number and greater severity of physical symptoms at pretreatment was associated with having a larger number and greater severity of symptoms posttreatment.

Correlational analyses next addressed the relationship between number and severity of physical symptoms reported and overall anxiety severity. At pretreatment, number of physical symptoms was significantly related to overall pretreatment anxiety severity as measured by the

CGI-S ($R = .19$, $p < .00$), with participants with greater numbers of physical symptoms having greater anxiety severity, but was unrelated to posttreatment anxiety disorder severity ($R = .03$, $p = .57$) or improvement as measured by the CGI-I ($R = .00$, $p = .96$). The pretreatment severity of physical symptoms was related to pretreatment anxiety disorder severity ($R = .46$, $p < .00$) and posttreatment anxiety disorder severity ($R = .15$, $p < .00$), but was unrelated to posttreatment improvement in anxiety ($R = .07$, $p = .14$). In other words, having more severe symptoms was associated with having greater pre and posttreatment anxiety disorder severity, irrespective of anxiety disorder improvement. The number of physical symptoms reported posttreatment was related to pretreatment anxiety severity ($R = .20$, $p < .00$), posttreatment anxiety severity ($R = .24$, $p < .00$), and posttreatment improvement ($R = .16$, $p < .00$), with more physical symptoms being reported posttreatment being associated with greater severity of anxiety pre- and post-treatment and less improvement following treatment. The severity of physical symptoms reported posttreatment was related to pretreatment anxiety severity ($R = .21$, $p < .00$), posttreatment anxiety severity ($R = .53$, $p < .00$), and improvement in anxiety ($R = .48$, $p < .00$), with increased severity of physical symptoms posttreatment being associated with more severe anxiety pre and posttreatment and less improvement in anxiety over the course of treatment.

Next, correlational analyses addressed the relationship between the number and severity of physical symptoms reported pretreatment and global functioning. The number of physical symptoms reported pretreatment was significantly related to global functioning as measured by the CGAS ($R = -.13$, $p < .00$). Additionally, increased severity of physical symptoms was significantly related to global functioning (child $R = -.29$, $p < .00$, parent $R = -.30$, $p < .00$, rater

R = -.34, p < .00). These findings indicate that the more physical symptoms reported and the more severe the physical symptoms reported the poorer the overall functioning of the participant.

Comorbidity

An examination of the relationship between the number and severity of physical symptoms at pretreatment was conducted. Given the previously established relationship between age and physical symptoms, age was included as a covariate in all analyses. At pretreatment, the number of physical symptoms endorsed by participants with comorbid diagnoses did not significantly differ from the number of physical symptoms endorsed by participants without comorbid diagnoses (see Table 6; $F(2, 454) = 2.03$, $p = .13$). The severity of physical symptoms also did not differ among groups with and without comorbid diagnoses whether reported by the child (see Table 6; $F(2, 469) = 1.88$, $p = .15$), parents (see Table 6; $F(2, 478) = 1.65$, $p = .19$), or rater (see Table 6; $F(2, 483) = 1.89$, $p = .15$). In other words, number and severity of physical symptoms prior to treatment was not related to the presence of comorbid disorders in general.

Additional analyses examined whether the relationship between physical symptoms and comorbidity was specific to internalizing or externalizing disorders. At pretreatment, the number of physical symptoms endorsed by participants with comorbid internalizing diagnoses significantly differed from the number of physical symptoms endorsed by participants without comorbid internalizing diagnoses (see Table 7; $F(2, 454) = 4.54$, $p = .01$). Additionally, the severity of physical symptoms also differed among groups with and without comorbid internalizing disorders whether reported by child (see Table 7, $F(2, 469) = 3.73$, $p = .03$), parent (see Table 7, $F(2, 478) = 4.25$, $p = .02$), or rater (see Table 7, $F(2, 483) = 4.54$, $p = .01$). Planned contrasts revealed that participants with no comorbid internalizing disorders endorsed fewer

physical symptoms and less severe physical symptoms than those with one comorbid internalizing disorder or two or more comorbid internalizing disorders (number of physical symptoms $t(454) = 2.95$, $p < .00$; severity of physical symptoms $t(483) = 2.98$, $p < .00$). There was a significant difference between participants with one comorbid internalizing disorder and those with two or more comorbid internalizing disorders on the number of physical symptoms ($t(454) = -2.23$, $p = .03$), while there was not a significant difference in the severity of physical symptoms ($t(483) = -1.35$, $p = .18$) reported. At pretreatment, the number of physical symptoms endorsed by participants with comorbid externalizing diagnoses did not differ from the number of physical symptoms endorsed by participants without comorbid externalizing diagnoses (see Table 8; $F(2, 454) = .02$, $p = .98$), nor did the severity (see Table 8) whether reported by the child ($F(2, 469) = .77$, $p = .46$), parent ($F(2, 478) = 2.49$, $p = .08$), or rater ($F(2, 283) = 3.29$, $p = .04$). In summary, the number and severity of physical symptoms reported prior to treatment was related to the presence of internalizing, but not externalizing, disorders.

Additional analyses were conducted to determine if the relationship between comorbidity and physical symptoms pretreatment remained when controlling for global functioning. Controlling for global functioning and age, the number of physical symptoms was no longer related to overall comorbidity ($F(2, 452) = 1.79$, $p = .17$), comorbid internalizing disorders ($F(2, 452) = 4.20$, $p = .02$), and comorbid externalizing disorders ($F(2, 452) = .03$, $p = .97$). Severity of physical symptoms also was no longer related to rater reported overall comorbidity ($F(2, 482) = 1.69$, $p = .19$) or comorbid externalizing disorders ($F(2, 482) = 3.70$, $p = .03$). However, the presence comorbid internalizing disorders ($F(2, 482) = 4.60$, $p = .01$) continued to be related to anxiety severity. This suggests that though there may be a unique relationship between anxiety

disorder severity and the presence of comorbid internalizing disorders, the remaining relationships between increased number and severity physical symptoms and comorbidity may be better explained by the presence of poorer global functioning.

With regard to depression specifically, ANOVAs examining the relationship between major depressive disorder and dysthymia and the number and severity of physical symptoms indicated that controlling for age and global functioning, number of physical symptoms reported was related to major depressive disorder ($F(1, 449) = 10.54$, $p < .00$), but was not significantly related to dysthymia ($F(1, 449) = 3.38$, $p = .07$). Interestingly, when controlling for age and global functioning, severity of physical symptoms was unrelated to the presence of major depressive disorder ($F(1,478) = .49$, $p = .48$) or dysthymia ($F(1, 478) = .70$, $p = .40$).

Table 6

Number and Severity of Physical Symptoms in Populations with Comorbid Disorders at Pretreatment

	Number of comorbid disorders				
	None	One	Two or more	F	p
Total # of physical symptoms	8.75 (6.96)	9.34 (7.09)	10.47 (8.74)	2.03	.13
Child reported symptom severity	2.01 (1.44)	2.36 (1.49)	2.44 (1.49)	1.88	.15
Parent reported symptom severity	2.17 (1.40)	2.51 (1.56)	2.38 (2.03)	1.65	.19
Rater reported symptom severity	2.21 (1.30)	2.54 (1.50)	2.51 (1.41)	1.89	.15

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Table 7

Number and Severity of Physical Symptoms in Populations with Comorbid Internalizing Disorders at Pretreatment

	Number of comorbid internalizing disorders				
	None	One	Two or more	F	p
Total # of physical symptoms	8.75 (6.96)	9.31 (7.17)	13.50 (10.27)	4.54	.01
Child reported symptom severity	2.01 (1.45)	2.46 (1.48)	2.67 (1.47)	3.73	.03
Parent reported symptom severity	2.15 (1.45)	2.54 (1.48)	2.75 (1.42)	4.25	.02
Rater reported symptom severity	2.20 (1.34)	2.59 (1.44)	2.83 (1.47)	4.54	.01

Note: All analyses control for age; Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Table 8

Number and Severity of Physical Symptoms in Populations with Comorbid Externalizing Disorders at Pretreatment

	Number of comorbid externalizing disorders				
	None	One	Two or more	F	P
Total # of physical symptoms	9.31 (7.49)	7.38 (7.80)	9.73 (6.37)	.02	.98
Child reported symptom sev	2.23 (1.47)	2.23 (1.57)	2.00 (1.48)	.77	.46
Parent reported symptom sev	2.37 (1.47)	2.33 (1.49)	1.64 (1.03)	2.49	.08
Rater reported symptom sev	2.40 (1.40)	2.48 (1.46)	1.64 (0.92)	3.29	.04

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Posttreatment analyses were conducted to address whether the relationships among physical symptoms and comorbidity remained following treatment. Controlling for age, the number of physical symptoms endorsed posttreatment by participants with comorbid diagnoses significantly differed from the number of physical symptoms endorsed by participants without comorbid diagnoses ($F(2, 413) = 4.96$, $p < .00$), with participants with comorbid diagnoses endorsing more physical symptoms than those without comorbid diagnoses. Planned contrasts revealed that participants with no comorbid disorders significantly differed from participants with one disorder and from participants with two or more disorders ($t(413) = -2.87$, $p < .00$). Participants with one comorbid disorder did not differ from participants with two or more comorbid disorders ($t(413) = -.24$, $p = .81$), again suggesting that it is the presence of comorbidity is related to increased physical symptoms rather than the number of comorbid

disorders. Analyses also examined whether the severity of physical symptoms differed among groups with and without comorbid diagnoses (see Table 10), whether severity was reported by the child ($F(2, 425) = 3.12$, $p = .05$), parent ($F(2, 426) = 4.79$, $p = .01$), or rater ($F(2, 434) = 4.13$, $p = .17$). Participants with comorbid diagnoses were more likely to report increased physical symptom severity, as reported by the parents, though not when reported by the child or the rater. Planned contrasts revealed that participants with no comorbid diagnoses differed from those with one or two or more diagnoses ($t(426) = -3.06$, $p < .00$), while participants with one comorbid diagnosis did not differ from those with two or more diagnoses ($t(426) = -.95$, $p = .34$), again suggesting that it is the presence of comorbidity rather than the number of comorbid disorders that is associated with the number and severity of physical symptoms.

The relationships between the reported number and severity of physical symptoms to comorbidity remained when looking at comorbid internalizing disorders. Youth with comorbid internalizing disorders marginally differed from youth without comorbid internalizing disorders in terms of the number of physical symptoms endorsed posttreatment (see Table 10, $F(2, 413) = 3.94$, $p = .02$), as well as the severity of physical symptoms, whether reported by the child ($F(2, 425) = 5.51$, $p < .00$), parent ($F(2, 426) = 8.90$, $p < .00$), or rater ($F(2, 434) = 8.05$, $p < .00$). Planned contrasts revealed that there was not a significant difference between participants with no comorbid internalizing disorders and those who endorsed one or two or more disorders in the number ($t(413) = 1.80$, $p = .07$) of symptoms, but there was a difference in the severity of physical symptoms (rater reported $t(434) = 3.89$, $p <.00$). Nor were there differences between participants with one comorbid diagnosis versus those who endorsed two or more diagnoses in number ($t(413) = .34$, $p = .74$) or severity of physical symptoms (rater reported $t(434) = -1.93$, p

= .05). At posttreatment, youth with comorbid externalizing disorders did not differ from youth without comorbid externalizing disorders in terms of the number of physical symptoms endorsed (see Table 11; $F(2, 413) = 3.37$, $p = .04$) or severity of physical symptoms, whether reported by the child ($F(2, 425) = .76$, $p = .47$), parent ($F(2, 426) = 0.55$, $p = .58$), or rater ($F(2, 434) = .36$, $p = .70$). Thus, youth with comorbid internalizing disorders at posttreatment exhibited more severe somatic symptoms, regardless of rater, compared to youth without comorbid conditions, though the number of physical symptoms was not related to the presence of comorbid internalizing disorders posttreatment, while youth with comorbid externalizing disorders did not differ from those without comorbid externalizing disorders on the number and severity of symptoms reported at posttreatment.

Table 9

Differences in Posttreatment Physical Symptoms by Number of Comorbid Disorders at Pretreatment

	Number of comorbid disorders				
	None	One	Two or more	F	P
Total # of physical symptoms	4.17 (4.71)	5.04 (5.96)	6.49 (6.71)	4.96	.00
Rater reported symptom severity	0.80 (1.13)	0.96 (1.19)	0.91 (1.36)	4.13	.17
Child reported symptom severity	0.65 (1.09)	0.87 (1.18)	0.86 (1.32)	3.12	.05
Parent reported symptom severity	0.69 (1.11)	0.89 (1.24)	0.86 (1.40)	4.79	.01

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Table 10

Differences in Posttreatment Physical Symptoms by Pretreatment Presence of Internalizing Disorders

	Number of comorbid internalizing disorders				
	None	One	Two or more	F	P
Total # of physical symptoms	4.35 (4.79)	5.18 (6.37)	8.29 (6.86)	3.94	.02
Child reported symptom severity	0.68 (1.09)	0.83 (1.16)	1.59 (1.62)	5.51	< .00
Parent reported symptom severity	0.67 (1.07)	0.91 (1.28)	1.48 (1.67)	8.90	< .00
Rater reported symptom severity	0.78 (1.10)	0.97 (1.24)	1.56 (1.53)	8.05	< .00

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Table 11

Differences between Posttreatment Physical Symptoms by Pretreatment Presence of Externalizing Disorders

	Number of comorbid externalizing disorders				
	None	One	Two or more	F	P
Total # of physical symptoms	4.82 (5.58)	5.48 (6.87)	5.45 (7.19)	3.37	.04
Child reported symptom severity	0.82 (1.20)	0.72 (1.11)	0.55 (0.93)	.76	.47
Parent reported symptom severity	0.86 (1.25)	0.69 (1.07)	0.27 (0.65)	.55	.58
Rater reported symptom severity	0.94 (1.23)	0.77 (1.09)	5.36 (7.32)	.36	.70

Note: Total # of physical symptoms refers to the total number of symptoms endorsed on the Physical Symptoms Checklist, Child Severity = Child Reported Severity on the Pediatric Anxiety Rating Scale, Parent Severity = Parent Reported Severity on the Pediatric Anxiety Rating Scale, Rater Severity = Rater Reported Severity on the Pediatric Anxiety Rating Scale

Relationship Between Physical Symptoms and Diagnostic Group

Descriptive statistics were run to determine which physical symptoms were most commonly reported by anxious youth. Overall, 94.5% of participants endorsed at least one physical symptom on the PSC. The five overall most commonly reported symptoms pretreatment include headache, stomach pain or aches, feeling drowsy or too sleepy, head cold or sniffles, and sleeplessness (see Table 12). Chi square analyses were performed to determine if differences existed between groups. Of the 48 symptoms, only two significantly differed among groups; feeling restless or uncomfortable ($X^2(6) = 16.21$, $p = .01$), and having nightmares or strange dreams ($X^2(6) = 17.89$, $p < .00$). Posttreatment, the five most commonly reported physical symptoms were feeling drowsy or too sleepy, headache, trouble sleeping, stomach pain or ache, and head cold or sniffles (see Table 13). Chi square tests of differences posttreatment found that groups differed among the following: allergies ($X^2(6) = 19.83$, $p < .00$), dry skin ($X^2 (6) = 21.56$, $p < .00$), and heart skipping a beat ($X^2 (6) = 19.02$, $p < .00$).

Table 12

Pretreatment Percentage of Participants Endorsing Symptom on the Physical Symptoms Checklist by Primary Diagnosis

Pretreatment Symptom											
	Primary Diagnosis										
	SAD	SoP	GAD	SAD SoP	SAD GAD	SoP GAD	SAD SoP GAD	Overall Total	X^2	df	p
Allergies	6.2	17.5	42.4	23.7	31.2	35.6	37.9	33	14.6	6	0.02
Head cold or sniffles	50	40	25	34.2	41.7	39.2	44.7	40.4	5.74	6	0.45
Dizziness / faintness	6.2	17.5	12.1	7.9	12.5	21.5	54.5	19	10.86	6	0.09
Headache	33.3	32.5	39.4	39.5	58.3	54.4	55.3	50.4	13.97	6	0.03
Fever	0	12.5	15.2	10.5	2.1	8.1	14.9	10.5	10.69	6	0.10
Ringing in the ears	0	15	24.2	7.9	16.7	18.8	23.6	18.8	10.27	6	0.11
Feeling drowsy or too sleepy	25	55	39.4	31.6	47.9	58.1	50.6	33.6	15.04	6	0.02
Dry mouth	6.2	12.5	15.2	18.4	27.1	21.6	31.2	23.4	13.18	6	0.04
Feeling flushed or warm	18.8	17.5	21.2	10.5	25	27.5	32.9	26.2	11.21	6	0.08
Feeling cold or chilled	12.5	22.5	18.2	15.8	22.9	28.2	28.6	25.2	5.99	6	0.43
Hair loss or brittle hair	0	7.5	3	0	4.2	5.4	36.4	4.6	3.88	6	0.69
Dry skin	12.5	22.5	12.1	34.2	41.7	29.5	29.8	28.9	11.84	6	0.07
Skin rash	0	7.5	6.1	15.8	12.5	12.8	16.8	13	7.17	6	0.31
Acne	18.8	37.5	27.3	18.4	16.7	24.2	17.5	21.9	9.64	6	0.14
Hives	6.2	2.5	3	2.6	6.2	0.7	3.7	2.9	5.59	6	0.47
Easy bruising	6.2	7.5	15.2	21.1	16.7	13.6	19.4	15.8	6.07	6	0.42
Sore throat	12.5	12.5	30.3	28.9	35.4	23.6	30	26.5	9.58	6	0.14
Stomach pain or ache	50	30	45.5	47.4	58.3	43.9	51.6	47.3	9.09	6	0.17
Nausea / vomiting	25	10	15.2	15.8	29.2	16.2	29.2	21.5	14.54	6	0.02
Diarrhea	6.2	7.5	17.2	7.9	12.5	10.1	15.5	12.2	5.38	6	0.50
Constipation	0	2.5	9.1	5.3	14.6	13.2	11.5	14.3	8.8	6	0.19
Frequent urination	0	5	9.1	13.5	12.5	12.8	18	13.3	8.5	6	0.20
Pain with urination	0	2.5	3	2.6	12.5	3.4	5	4.5	9.17	6	0.16

Table 12, continued

	Primary Diagnosis										
	SAD	SoP	GAD	SAD SoP	SAD GAD	SoP GAD	SAD SoP GAD	Overall Total	X^2	df	p
Restless or uncomfortable urge to move	37.5	17.5	27.3	23.7	35.4	33.1	45.3	35.1	16.21	6	0.01
Heart skips a beat	12.5	10	3	10.5	20.8	8.1	12.4	11	8.6	6	0.20
Racing or pounding heart	18.8	22.5	18.2	13.2	33.3	26.4	23	23.8	6.21	6	0.40
Chest pain	12.5	17.5	12.1	15.8	22.9	20.3	23.6	20.2	3.93	6	0.69
Heartburn	0	5	6.1	7.9	8.3	12.2	11.2	9.7	4.89	6	0.56
Trouble sleeping	37.5	32.5	45.5	44.7	60.4	48.3	50.3	48	0.1	6	0.03
Sleeplessness	12.5	22.5	36.4	27	29.2	32	42.2	33.6	12.21	6	0.06
Nightmares or very strange dreams	6.2	15	36.4	21.6	37.5	35.1	40.4	33.5	17.89	6	0.01
Excessive sweating	6.2	20	9.1	18.9	16.7	13.5	17.4	15.5	3.96	6	0.68
Tremor, trembling or shakiness	12.5	17.5	9.1	8.1	25	18.9	22.4	18.8	7.8	6	0.25
Difficulty breathing	6.2	7.5	15.2	10.8	18.8	15.5	15.5	14.5	3.84	6	0.70
Coughing or wheezing	25	12.5	15.2	16.2	37.5	28.4	29.4	26.3	12.2	6	0.06
Can't hear well	0	5	3	2.7	4.2	9.5	13.1	8.5	10.71	6	0.10
Dental problems	0	5	9.1	10.8	10.4	10.1	9.4	9.1	2.85	6	0.83
Numbness or tingling in arms or legs	12.5	7.5	6.1	8.1	18.8	9.5	18	12.8	9.98	6	0.13
Muscle aches or cramps	25	25	18.2	18.9	25	30.4	27.3	26.5	3.6	6	0.73
Agitation/disinhibition	18.8	17.9	25.8	5.3	29.2	24.5	25.8	23.2	9.45	6	0.15
Joint pain	12.5	12.8	15.2	7.9	22.9	16.2	14.9	15.3	4.15	6	0.66
Feeling bloated or gassy	0	10.3	15.2	5.3	18.8	21.6	14.9	15.7	11.3	6	0.08
Swelling, water retention	0	5.1	3	2.6	2.1	2.7	5.6	3.7	3.4	6	0.76
Moodiness before my menstrual period	6.7	8.3	0	5.4	2.1	11	5.7	6.8	8.55	6	0.20
Painful, irregular or very heavy menstrual period	6.7	5.6	0	2.7	0	11	5.8	6.2	11.89	6	0.07

Table 13

Posttreatment Percentage of Participants Endorsing Symptom on the Physical Symptoms Checklist by Primary Diagnosis

	Primary Diagnosis											
	SAD	SoP	GAD	SAD SoP	SAD GAD	SoP GAD	SAD SoP GAD	No Primary	Overall Tota	χ^2	df	p
Allergies	18.20	19.70	28.60	11.10	33.30	34.60	57.10	37.80	33.90	19.83	7	0.01
Head cold or sniffles	36.4	31.8	42.9	44.4	33.3	48.1	46.4	42.9	41.6	4.531	7	0.72
Dizziness / faintness	18.2	22.7	14.3	16.7	26.7	25	18.5	18.5	20	2.318	7	0.94
Headache	45.5	51.5	42.9	44.4	40	51.9	57.1	50.9	50.5	1.94	7	0.96
Fever	0	12.1	7.1	5.6	20	9.6	14.3	9.4	10.1	4.373	7	0.74
Ringing in the ears	0	18.2	7.1	11.1	20	17.3	17.9	18.9	18.5	6.84	7	0.45
Feeling drowsy or too sleepy	36.4	62.1	50	33.3	66.7	63.5	42.9	46.3	50.6	13.9	7	0.05
Dry mouth	18.2	21.2	7.1	11.1	14.3	34.6	32.1	24.6	24.1	9.26	7	0.23
Feeling flushed or warm	9.1	28.8	21.4	22.2	33.3	38.5	25	24.5	26.5	6.943	7	0.44
Feeling cold or chilled	9.1	21.2	14.3	27.8	13.3	38.5	21.4	26.2	25.4	9.264	7	0.23
Hair loss or brittle hair	0	7.7	0	0	6.7	9.6	0	3	4.1	10.044	7	0.19
Dry skin	18.2	24.2	14.3	16.7	40	53.8	25	26.6	28.8	21.56	7	0.00
Skin rash	18.2	10.6	14.3	5.6	13.3	13.5	14.3	13.3	12.8	1.575	7	0.98
Acne	18.2	33.3	35.7	11.1	20	23.1	14.3	19.8	22	9.485	7	0.22
Hives	0	3	0	0	0	2	0	4.7	3.2	4.826	7	0.68
Easy bruising	27.3	7.6	7.1	11.8	40	15.7	10.7	19	16.6	13.587	7	0.06
Sore throat	27.3	18.2	21.4	27.8	26.7	29.4	32.1	26.7	26	3.214	7	0.87
Stomach pain or ache	36.4	42.4	42.9	55.6	53.3	45.1	64.3	46.4	47	5.393	7	0.61
Nausea / vomiting	36.4	12.1	28.6	22.2	26.7	19.6	28.6	21.5	21.2	6.523	7	0.48
Diarrhea	0	12.1	21.4	5.6	13.3	15.7	17.9	12.4	12.8	4.46	7	0.73
Constipation	9.1	12.1	21.4	16.7	13.3	17.6	7.1	7.7	10.6	7.826	7	0.35
Frequent urination	0	7.6	7.1	22.2	13.3	15.7	17.9	12.4	12.4	6.066	7	0.53
Pain with urination	0	1.5	0	5.6	6.7	11.8	3.6	4.7	4.8	8.437	7	0.30
Cold or canker sores	10	9.1	0	22.2	13.3	15.7	3.6	10.3	10.6	7.396	7	0.39

Table 13, continued

	Primary Diagnosis											
	SAD	SoP	GAD	SAD SoP	SAD GAD	SoP GAD	SAD SoP GAD	No Primary	Overall Tota	χ^2	df	p
Restless or uncomfortable urge to move	36.4	25.8	35.7	38.9	40	49	42.9	33	35.1	8.32	7	0.31
Heart skips a beat	0	3	7.1	27.8	33.3	15.7	10.7	11.2	11.5	19.022	7	0.01
Racing or pounding heart	9.1	22.7	21.4	33.3	20	33.3	17.9	22.3	23.4	5.832	7	0.56
Chest pain	9.1	19.7	35.7	5.6	20	23.5	14.3	20.6	20	6.361	7	0.50
Heartburn	9.1	10.6	21.4	5.6	13.3	13.7	0	9.9	10.1	6.494	7	0.48
Trouble sleeping	45.5	47	35.7	44.4	53.3	58	46.4	48.5	48.7	3.122	7	0.87
Sleeplessness	18.2	34.8	35.7	44.4	40	44	28.6	30	33.1	6.534	7	0.48
Nightmares or very strange dreams	9.1	31.8	14.3	27.8	53.3	39.2	35.7	33.5	33.3	9.09	7	0.25
Excessive sweating	9.1	19.7	14.3	5.6	20	21.6	14.3	15.5	16.3	3.94	7	0.79
Tremor, trembling or shakiness	9.1	16.7	21.4	22.2	20	25.5	10.7	19.3	19	3.774	7	0.80
Difficulty breathing	9.1	6.1	21.4	16.7	33.3	21.6	14.3	15	15.1	10.536	7	0.16
Coughing or wheezing	18.2	22.7	21.4	22.2	26.7	29.4	39.3	25.4	26	3.924	7	0.79
Can't hear well	9.1	10.8	7.1	5.6	0	15.7	3.6	6.4	7.8	7.919	7	0.34
Dental problems	0	9.2	7.1	5.6	6.7	5.9	14.3	9.9	9	3.313	7	0.86
Numbness or tingling in arms or legs	0	12.1	7.1	5.6	13.3	25.5	7.1	12	12.6	11.309	7	0.13
Muscle aches or cramps	0	13.6	14.3	11.1	13.3	19.6	3.6	16.8	14.9	10.08	7	0.18
Agitation/disinhibition	9.1	24.6	15.4	17.6	26.7	27.5	28.6	23	23.5	3.07	7	0.88
Joint pain	0	13.6	14.3	11.1	13.3	19.6	3.6	16.8	14.9	6.623	7	0.47
Feeling bloated or gassy	0	15.2	14.3	11.1	6.7	27.5	7.1	18.5	17	10.321	7	0.17
Swelling, water retention	0	3	0	5.9	0	9.8	3.6	3.9	4.1	6.237	7	0.51
Moodiness before my menstrual period	9.1	7.8	7.1	6.7	0	7.8	3.7	5.7	6.1	1.968	7	0.96
Painful, irregular or very heavy menstrual period	0	7.8	7.1	6.7	0	9.8	3.7	4.8	5.7	4.177	7	0.76

In addition to examining items on a symptom level, an ANOVA was performed to determine if each primary diagnostic group differed in the number and severity of symptoms reported (means and standard deviations in Table 14). When controlling for age, severity of symptoms reported significantly differed among participants with differing primary diagnoses ($F(6, 479) = 4.19$, $p < .00$) as did number of symptoms reported ($F(6, 450) = 4.07$, $p < .00$). An ANOVA was also performed to determine whether having a specific diagnosis of GAD, SAD, or SP (regardless of whether it was primary) was associated with the report of physical symptoms. Overall, with age as a covariate, when GAD, SAD, and SP were entered as predictors into the model, diagnostic group was a significant predictor of the number of physical symptoms ($F(4, 453) = 9.23$, $p < .00$). GAD ($t = -3.80$, $p < .00$) and SAD ($t = -3.09$, $p < .00$) were significantly associated with the number of physical symptoms reported while SP ($t = -.26$, $p = .80$) was not. GAD ($t = -4.40$, $p < .00$) and SAD ($t = -2.50$, $p = .01$) were also significantly associated with the severity of physical symptoms while SP was not ($t = -.43$, $p = .67$). This indicates that children with GAD and SAD report more physical symptoms than those with SP.

Table 14

Means and Standard Deviations of the Number and Severity of Physical Symptoms for Each Primary Diagnosis

	Number		Severity	
	M	SD	M	SD
SAD	5.47	4.16	1.73	1.62
SoP	7.03	6.70	1.77	1.40
GAD	7.97	5.81	2.30	1.47
SAD SoP	7.06	6.18	1.83	1.32
SAD GAD	10.46	7.50	2.46	1.22
GAD SoP	9.50	6.70	2.48	1.41
SAD SoP GAD	10.33	1.62	2.54	1.37

Note: 3 = moderate, 2 = mild, 1 = minimal, 0 = no symptoms; Total # of physical symptoms refers to the total number of symptoms on the Physical Symptoms Checklist, Severity of physical symptoms refers to the Rater Reported Severity on the Pediatric Anxiety Rating Scale

Relationship to Sex

With regard to sex, ANOVAs were run to determine if there were differences in the report of physical symptoms by sex (see Table 15). Individual ANOVAs did not find any significant differences between males and females on the report of symptoms. This indicates that sex differences with respect to specific physical symptoms were not present in this sample.

Table 15

Percentage of Participants Endorsing Symptom by Sex

	Male	Female	X^2	df	p
Allergies	37.3	28.6	4.12	1	0.04
Head cold or sniffles	42	38.8	0.52	1	0.47
Dizziness / faintness	16.5	21.7	2.12	1	0.15
Headache	46.7	54.2	2.68	1	0.10
Fever	13.1	7.9	3.53	1	0.06
Ringing in the ears	16.8	20.7	1.24	1	0.27
Feeling drowsy or too sleepy	45	54.8	4.57	1	0.03
Dry mouth	24.2	22.6	0.17	1	0.68
Feeling flushed or warm	23.4	29	2.03	1	0.15
Feeling cold or chilled	23.4	27	0.84	1	0.36
Hair loss or brittle hair	3.3	5.8	1.74	1	0.19
Dry skin	27.5	30.3	0.47	1	0.49
Skin rash	12.3	13.7	0.21	1	0.65
Acne	20.2	23.7	0.86	1	0.35
Hives	2.5	3.3	3.3	1	0.57
Easy bruising	12.8	18.8	3.34	1	0.07
Sore throat	24.2	28.9	1.36	1	0.24
Stomach pain or ache	44.7	50	1.38	1	0.24
Nausea / vomiting	20.5	22.5	0.29	1	0.59
Diarrhea	13.9	10.4	1.4	1	0.24
Constipation	11.9	10	0.44	1	0.51
Frequent urination	14.4	12.1	0.57	1	0.45
Pain with urination	4.9	4.2	0.16	1	0.69
Cold or canker sores	7.4	12.5	3.5	1	0.06

Table 15, continued

	Male	Female	X^2	df	p
Heart skips a beat	11.5	10.4	0.14	1	0.71
Racing or pounding heart	25	22.5	0.42	1	0.52
Chest pain	19.7	20.8	0.1	1	0.75
Heartburn	12.7	6.7	5.03	1	0.03
Trouble sleeping	45.7	50.4	1.09	1	0.30
Sleeplessness	31.1	36.1	1.34	1	0.25
Nightmares or very strange dreams	31.6	35.6	0.87	1	0.35
Excessive sweating	17.6	13.4	1.65	1	0.20
Tremor, trembling or shakiness	18.9	18.8	0	1	1.00
Difficulty breathing	13.5	15.5	0.37	1	0.54
Coughing or wheezing	26.2	26.5	0.004	1	0.95
Can't hear well	8.2	8.8	0.06	1	0.81
Dental problems	8.6	9.7	0.17	1	0.68
Numbness or tingling in arms or legs	10.2	15.5	2.96	1	0.09
Muscle aches or cramps	23	30.1	3.19	1	0.07
Agitation/disinhibition	21.1	25.4	1.27	1	0.26
Joint pain	16	14.6	0.2	1	0.66
Feeling bloated or gassy	16.9	14.6	0.48	1	0.49
Swelling, water retention	3.3	4.2	0.25	1	0.62

CHAPTER 5
DISCUSSION

Although somatic complaints are common in youth with anxiety disorders (Ginsburg et al.,, 2006; Hofflich et al., 2006), and are defining characteristics of several anxiety disorders and part of possible diagnostic criteria for other disorders (American Psychiatric Association, 1994), little is known about the number and severity of complaints that occur in an anxiety disordered population of youth and the relationship between these complaints and treatment type and outcome. The present study found that the number and severity of physical symptoms decreased over the course of treatment in a large sample of anxiety disordered youth. Additionally, it was found that treatment type, whether CBT, sertraline, a combination of CBT + sertraline, or pill placebo, did not differentially affect the change in the number or severity of physical symptoms reported. All treatment condition, even pill placebo (though an inert substance) were linked to improvement for some children. Part of the improvement was a reduction in complaints of physical symptoms. Other conditions provided “active” intervention, yet the amount of change on physical complaints was not significantly different. Improvement in anxiety symptoms, regardless of treatment group, was associated with reduced number and severity of physical symptoms.

Differences Among Treatment Groups

Contrary to hypotheses, when controlling for age, no significant differences in the number or severity of physical conditions were found across treatment conditions at posttreatment. These findings are surprising given that previous studies examining changes in somatic symptoms in response to pharmacological (Ginsburg et al., 2006) and CBT (Masia Warner et al., 2011 and Storch et al., 2008) reported significant reductions in somatic symptoms with treatment. However, a closer examination of these studies finds that both Masia Warner and

Storch et al. did not have placebo groups to compare the changes in number of symptoms, nor did they examine differences when controlling for improvement in symptoms. As a result, they may have found a significant reduction in symptoms due to the passage of time, maturation of the sample, being seen in active treatment (regardless of the treatment's effectiveness), or repeated assessment. Also, Ginsburg et al. looked at an 8 week trail of fluoxamine, rather than a 12 week trial, which may have led to differences in the number of somatic symptoms reported; they found that participants treated with fluoxamine exhibited significant reductions in these somatic symptoms in comparison to placebo.

Additionally, it is possible that treatment may reduce the number and severity of certain physical symptoms while increasing other physical symptoms. For example, CBT targets physiological symptoms of anxiety and teaches participants to identify physical symptoms of anxious arousal, to use these reactions as signals to engage in coping, and to actively target physiology through relaxation. It is possible that CBT results in increased self-monitoring of symptoms and therefore increased reporting of symptoms, such as when relaxation is not able to address all of the symptoms. This could result in a balancing out of the effect of CBT on physical symptoms. SSRI's are also associated with increased physical symptoms including known side effects of gastrointestinal symptoms, nausea, and insomnia (Safer & Zito, 2006), and therefore could potentially cause both an increase in symptoms due to side effects and a decrease in symptoms due to anxiety symptom reduction. However, results of this study did not find any differences in the frequency of any specific symptom at posttreatment by treatment condition.

Relationship to Severity

Consistent with hypotheses, youth with higher numbers of physical symptoms and more severe physical symptoms had more severe anxiety. This finding is consistent with other recent

research that found that having greater numbers of somatic complaints is associated with increased anxiety severity (Ginsburg et al., 2006, Kingery et al., 2007; Storch et al., 2008). Together, the findings suggest that physical symptoms may be the result of more severe anxiety, such that more severe anxiety may result in hyperawareness of physical symptoms and may create physical symptoms such as rapid heart rate. Alternately, physical symptoms may be contributive to the development of more severe anxiety disorders, such that individuals who have a propensity for anxiety disorders and who experience physical symptoms are likely to develop more severe anxiety due to their hypervigilance about anxiety symptoms. Finally, the relationship between physical symptoms and anxiety severity could be because physical symptoms are characteristic of anxiety disorders, such that more children with more severe disorders will report more severe physical symptoms.

Also as hypothesized and consistent with Ginsburg et al.'s findings, youth with higher numbers of physical symptoms and more severe physical symptoms had poorer overall functioning at pretreatment. Youth with higher numbers of physical symptoms at pretreatment had more severe physical symptoms at posttreatment. More research is needed to determine the causality of the relationship between physical complaints and severity of psychopathology. A prospective longitudinal study examining the onset of physical complaints and tracking the severity of psychopathology could examine whether physical symptoms are reported before, after, or simultaneously with the onset of psychopathology.

Relationship to Comorbidity

A relationship was found, as hypothesized, between high numbers of and greater severity of somatic complaints and comorbid internalizing disorders both pre and posttreatment. The statistical analyses supported the relationship between somatic complaints and symptoms of

depression, as children with higher numbers of somatic complaints and more severe somatic complaints were more likely to experience symptoms of depression. These findings are consistent with previous research by Bernstein et al's (1997) and Hofflich et al.'s (2006). Specifically, Bernstein found that depressive and anxiety symptoms each uniquely predicted the severity of somatic symptoms reported and Hofflich et al. reported that children with both depressive and anxiety disorders reported more somatic symptoms than children with anxiety disorders who did not have comorbid depressive disorders.

Interestingly, a nonsignificant relationship was found between symptoms of dysthymia and somatic complaints, suggesting that there may be a unique association between depression and somatic complaints in children with anxiety disorders. However, given that the association between depressive disorders and somatic symptoms was better accounted for by global impairment, it may be that children with depression are simply more impaired in their general functioning and that it is this impairment that is associated with somatic complaints. Future research should compare the frequencies of somatic complaints in populations with primary anxiety and secondary depression, primary depression and secondary anxiety, anxiety only, and depression only so that the relationships between global impairment, diagnostic category, and frequency and severity of somatic complaints can be explored.

No relationships were found between high numbers of and greater severity of somatic complaints and comorbid externalizing disorders at pretreatment or posttreatment. Although this is in contrast to Ginsburg et al., 2006, it is consistent with work by Hofflich et al., 2006 that found that children with comorbid anxiety and depression reported more somatic symptoms than children with anxiety alone or than children with anxiety and externalizing symptoms. Internalizing disorders, including many anxiety disorders and depression, are both characterized

by the presence of physical symptoms including insomnia, restlessness, and fatigue, while externalizing disorders do not include physical symptoms as part of their diagnostic criteria. The differences in the definitions of these disorders may explain why no relationship between physical symptoms and externalizing pathology was found in the present study.

Distribution of Somatic Complaints

As expected, somatic symptoms were very common among anxiety disordered youth, with 95% of the sample reporting at least one physical symptom. These data are consistent with previous reports (Storch et al.; 2008; Hofflich et al., 2006) which found that over 95% of children with anxiety disorders reported at least one somatic symptom in children with anxiety disorders. In the general population, pain is less common, though over two-thirds of children experience pain on a monthly basis, and more than one third of children experience pain on a weekly basis (Krisjansdottir, 1997; Peterson, Brulin, & Berstrom, 2006). These studies suggest that the frequency of pain is much higher in the anxiety disorder population than in the general population.

Also as expected, no sex differences in the frequency of somatic symptoms were found. This finding is consistent with those of Hofflich et al. (2006) and Ginsburg et al. (2006), who also found no sex differences in the total number of somatic symptoms reported in their samples, while it is inconsistent with research using community samples (Garber et al., 1991;Kingery et al., 2007). This pattern may result from differences in clinical versus community samples. In general, parents only seek treatment for their children when their child's symptoms are negatively impacting their general functioning. It may be that in community samples, girls report somatic complaints more frequently than boys, but for a subset of girls these complaints are not impacting their general functioning and therefore do not lead their parents to seek treatment.

More research is needed to examine the reasons for these differences, and this research should focus on the relationship between presentation of anxious and somatic complaints in a community population and beliefs regarding reasons for seeking treatment. On a symptom level, no differences were found in the frequency of symptoms by sex, in contrast Ginsburg et al. (2006)'s finding that boys reported more stomachaches and chest pain than girls. It is possible that this difference is due to sampling differences such as Ginsburg et al.'s exclusion of participants with MDD, while this study included participants with secondary MDD diagnoses.

On the symptom level, the majority of symptoms did not differ in presentation across diagnostic groups, including the most common physical symptoms at pretreatment which include headache, stomach pain or ache, feeling drowsy or too sleepy, head cold or sniffles and sleeplessness. Two symptoms, feeling restless and uncomfortable and having nightmares, were significantly associated with principal diagnostic group. The presence of restlessness, part of the diagnostic criteria for GAD, was least common in children with SP only. Interestingly, though part of the diagnostic criteria for SAD, the presence of nightmares, was least common in children with SAD. This finding is consistent with a recent study by Allen, Lavellee, Herren, Ruhe, and Schneider (2010) that found that nightmares were the least common symptom of SAD with only 11% experiencing nightmares. Although they occur infrequently in SAD and can occur with other anxiety disorders, Allen, Lavallee, Herren, Ruhe, and Schneider (2010) suggest that including nightmares in the diagnostic criteria for SAD may increase diagnostic specificity as the unique combination of nightmares and other symptoms may be related to SAD. These symptoms should be further evaluated in future studies to determine whether they might be useful in helping to differentially diagnose youth.

Contrary to hypotheses, children with GAD and SAD reported more physical symptoms and more severe physical symptoms than children with SP. Although surprising, previous studies have varied as to whether they found a relationship between the presence of a diagnosis and somatic symptoms. For example, this finding is consistent with work from Last (1991) that found that somatic symptoms were more common in SAD than in the rest of their anxiety disordered sample, and somewhat consistent with Ginsburg et al. (2006) which found that somatic complaints were more common in GAD than in children with SAD or SP. Previous work by Hofflich et al. (2006) that found no differences across primary diagnostic group is inconsistent with this finding. These inconsistencies could be attributed to a variety of causes. First, the PSC differs in meaningful ways from the measures of somatic complaints used in the other studies. The PSC is a more comprehensive measure of physical complaints and includes items that are not part of the diagnostic criteria for anxiety disorders and are not generally directly associated with anxiety. Secondly, both GAD and SAD's diagnostic criteria list the presence of physical symptoms as criteria for the disorder, while SP does not include physical symptoms as criteria. In other words, it is possible the presence of somatic complaints in these populations may be more related to screening and diagnosis than to meaningful differences between these groups. Alternately, GAD and SAD may involve more physiological reactivity than does SP. Future research is needed to clarify the reasons for the differential distribution of somatic complaints among diagnostic groups. Researchers could examine differences in physiological reactivity by presenting children with mildly anxiety provoking situations and examining differences in physiological reactivity among groups who report equal anxiety symptoms. Researchers could also clarify the role of symptoms in the diagnosis by training diagnosticians to assign laboratory diagnoses of clinical influential anxiety without using physical symptoms and evaluate whether

rates of physical symptoms are equal across diagnostic groups if physical symptoms are not included as a diagnostic criteria.

Demographic Differences Across Treatment Conditions

Prior to treatment, no significant differences were found among treatment groups on demographic variables, with the exception of a significant relationship to age such that older children were reporting greater numbers of physical symptoms and more severe physical symptoms than younger children. Posttreatment, age continued to be related to reporting greater numbers of and increased severity of physical symptoms. This finding is consistent with previous research that have used samples that span in age from childhood to adolescence (Garber et al., 1991, Ginsburg et al., 2006), and that found that older children report more physical symptoms than younger children. In the present study, this relationship held true whether reported by the children, their parents, or an independent rater, suggesting that either adolescents are more aware of physical symptoms as they age and become more aware of other people's experiences or that adolescents actively experience greater numbers of symptoms and severity of symptoms.

Consistent with previous studies (Ginsburg et al., 2006; Masia Warner et al., 2011; and Storch et al., 2008), participants reported fewer physical symptoms and less severe physical symptoms posttreatment when all groups were examined together. This finding may indicate that physical symptoms decrease when they are targeted with an intervention, whether active or placebo. Alternately, the frequency and severity of physical symptoms may decrease due to the effects of repeated assessment or the passage of time; additional research on the PSC is needed to determine the effects of repeated assessment. The decrease in symptoms in the placebo group could be due to a child's perceptions that they are receiving active treatment. This finding is consistent with Ginsburg et al.'s finding that significant reductions occurred in both fluoxamine

and placebo groups; however, they found greater reductions in groups treated with fluoxamine than in placebo groups. Future research should examine the effect of participant knowledge further by randomly assigning participants to treatment groups where they are told that they are receiving active treatment or pill placebo treatment and comparing the differences in treatment outcomes.

Limitations and Future Research and Practice Directions

This study is not without limitations. First, many symptoms fall under the category of physical complaints. This study used the physical symptoms checklist, a checklist of physical symptoms. Given that there is no established standard for reporting physical symptoms, it is important that additional research is conducted to clarify which symptoms might be most significant and or meaningful for clinical and research purposes. Researchers should develop a comprehensive list of possible somatic symptoms regardless of whether they are likely to be related to anxiety. The checklist could be administered to both community samples and anxiety disordered samples, such that symptoms that are either unique to anxiety disorders or are more frequent in anxiety disorders. A checklist could then be developed that included these relevant symptoms, and could potentially be used to identify children with anxiety disorders. The PSC and the PARS both limit reports of symptoms to the past week. This feature of the instructions may be a strength, as the report of physical symptoms is likely to be more accurate with a recent time frame. Future studies could build upon this by examining symptoms as they occur, possibly through the use of electronic communication devices and random text messaging to enable researches to get reports of symptoms when they occur.

Although efforts were made to include a wide array of children, participants were excluded if they had primary diagnoses of Major Depressive Disorder. Future research is needed

to examine the relationship between anxiety, depression, and physical symptoms in populations with anxiety and depression, as the relationships between physical symptoms and psychological symptoms may differ in samples with comorbid coprimary depressive and anxiety disorders. Additionally, the effects of treatment on physical symptoms may differ in populations with comorbid anxiety and depression. Given that physical symptoms were more common in children with secondary internalizing diagnoses in the present study, populations with coprimary anxiety and depression are likely to have greater numbers and severity of physical symptoms than those with anxiety disorders alone.

The CBT and combination treatment groups were not blinded; as a result, participant and family expectancy effects may have influenced the outcome. Additionally, this study used a population of treatment-seeking youth. Rates of somatic symptoms may differ by sex in community as opposed to clinical samples of anxiety disordered youth (Beidel et al., 1991; Garber et al., 1991; Ginsburg et al., 2006; Hofflich et al., 2006; Kingery et al., 2007). As a result, the findings of this study may not be generalizable to community samples.

The present findings have important implications for anxiety assessment, intervention, and prevention. Given that children with anxiety disorders are more likely to present with somatic complaints than are non-anxious community controls (Hughes, Lourea-Waddell, & Kendall, 2007), and knowing that more than 50% of youth with anxiety disorders report experiencing at least one somatic complaint (Beidel, 1991; Ginsburg et al., 2006), it is important that practitioners make informed decisions about when to assess for and treat these somatic symptoms. Our findings suggest that when children present with frequent somatic complaints including headache, stomach ache, difficulty sleeping, drowsiness, and sniffles, an evaluation for anxiety disorders may be warranted.

If an evaluation of somatic symptoms determines that anxiety may be contributing to the somatic symptoms, it is important that caregivers seek treatment for the anxiety, given the impairment in family functioning, social functioning, and academic functioning that are associated with anxiety (Ezpeleta, Keeler, Erkanli, Costello, & Angold, 2001; Ialongo et al., 1995; Strauss et al., 1987; Van Ameringen, Mancini, & Farvolden, 2003). The findings of this study suggest that the type of treatment, whether CBT, sertraline, a combination of CBT and sertraline, or placebo will not affect the number and severity of physical symptoms reported.

The findings of this study, that children presenting with more physical symptoms and more severe physical symptoms were more likely to present with comorbid internalizing disorders and were likely to have poorer global functioning, indicate that practitioners who work with anxious youth should carefully assess internalizing disorders when treating anxious youth who present with physical symptoms. Identifying comorbid depression is especially important in light of recent findings that the presence of affective disorders is associated with poorer CBT treatment outcome for children with a primary diagnosis of SP (Crawley, Beidas, Benjamin, Martin & Kendall, 2008). Additionally, if physical symptoms continue to be present and impairing, the practitioner may want to consider a more intensive treatment, perhaps receiving a combination of CBT and medication rather than one or the other alone, as children who improved pre- to post-treatment experienced fewer and less severe physical symptoms.

Finally, the results of this study have implications for the prevention of anxiety disorders. Specifically, the results of this study suggest that if both interfering anxiety and somatic symptoms are present, a child is likely to have more severe anxiety and poorer overall functioning. If parents, teachers, and treatment providers are aware of this, they may be able to help children label and recognize somatic symptoms as manifestations of their anxiety. Future

research might be able to develop interventions for these children that prevent the onset of clinical levels of anxiety. For example, interventions could be designed to target children with subclinical anxiety who present to school nurses or health care providers with frequent physical symptoms and are at risk for the development of anxiety disorders. Additionally, these results indicate that medical practitioners should collaborate with behavioral health providers to determine whether these children are receiving both the optimal psychological and medical treatment for their symptoms.

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PHYSICAL SYMPTOMS CHECKLIST
Ver. 3.112202 - Pg. 1 of 3
CAMS - PSC - To be filled out by SC / RA

ID 2

DATA CENTER USE ONLY
S V C

DIRECTIONS

Below is a list of general health problems that people sometimes report. Please read each item carefully and fill in the circle for the answer that best describes how much you have been bothered by each condition during the **PAST WEEK**.

	Not at all	Just a little	Pretty much	Very much
1. Allergies	O	O	O	O
2. Head cold or sniffles	O	O	O	O
3. Dizziness / faintness	O	O	O	O
4. Headache	O	O	O	O
5. Fever	O	O	O	O
6. Ringing in the ears	O	O	O	O
7. Feeling drowsy or too sleepy	O	O	O	O
8. Dry mouth	O	O	O	O
9. Feeling flushed or warm	O	O	O	O
10. Feeling cold or chilled	O	O	O	O
11. Hair loss or brittle hair	O	O	O	O
12. Dry skin	O	O	O	O
13. Skin rash	O	O	O	O
14. Acne	O	O	O	O
15. Hives	O	O	O	O
16. Easy bruising	O	O	O	O
17. Sore throat	O	O	O	O
18. Stomach pain or ache	O	O	O	O
19. Nausea / vomiting	O	O	O	O
20. Diarrhea	O	O	O	O

Assessment Week:
Gate B = -2
Gate C1 = -1
or 01 thru 36

Assessment Date: / /

39133

PHYSICAL SYMPTOMS CHECKLIST
Ver. 3.112202 - Pg. 2 of 3
CAMS - PSC

ID 2

	Not at all	Just a little	Pretty much	Very much
21. Constipation	0	1	2	3
22. Frequent urination	0	1	2	3
23. Pain with urination	0	1	2	3
24. Cold or canker sores	0	1	2	3
25. Restless or uncomfortable urge to move	0	1	2	3
26. Heart skips a beat	0	1	2	3
27. Racing or pounding heart	0	1	2	3
28. Chest pain	0	1	2	3
29. Heartburn	0	1	2	3
30. Trouble sleeping	0	1	2	3
31. Sleeplessness	0	1	2	3
32. Nightmares or very strange dreams	0	1	2	3
33. Excessive sweating	0	1	2	3
34. Tremor, trembling or shakiness	0	1	2	3
35. Difficulty breathing	0	1	2	3
36. Coughing or wheezing	0	1	2	3
37. Can't hear well	0	1	2	3
38. Dental problems	0	1	2	3
39. Numbness or tingling in arms or legs	0	1	2	3
40. Muscle aches or cramps	0	1	2	3

Assessment Date____/____/____

PHYSICAL SYMPTOMS CHECKLIST
Ver. 3.112202 - Pg. 3 of 3
CAMS - PSC

ID 2

	Not at all	Just a little	Pretty much	Very much
41. Agitation/disinhibition	0	1	2	3
42. Joint pain	0	1	2	3
43. Feeling bloated or gassy	0	1	2	3
44. Swelling, water retention	0	1	2	3
45. Moodiness before my menstrual period *(Fill in "Not at all" if male or not applicable)*	0	1	2	3
46. Painful, irregular or very heavy menstrual periods *(Fill in "Not at all" if male or not applicable)*	0	1	2	3
47. Other - specify:	0	1	2	3
48. Other - specify:	0	1	2	3

Assessment Date____/____/____