



Somatic complaints and childhood anxiety disorders¹

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ABSTRACT. Somatic complaints in children have been associated with internalizing disorders, especially anxiety disorders. However, few studies have examined specific somatic complaints across specific anxiety disorders. This quasi-experimental study examines the type and frequency of somatic complaints in children ($n = 178$; ages 7–14 years) with generalized anxiety disorder (GAD), social phobia (SP), separation anxiety disorder (SAD), and no anxiety disorder. Children and their parents who sought treatment completed a structured diagnostic interview and youth completed the Multidimensional Anxiety Scale for Children (MASC) (March, Parker, Sullivan, Stallings, and Conners). Children diagnosed with an anxiety disorder reported more frequent somatic complaints compared to children without an anxiety disorder, but somatic complaints did not differ across the principal anxiety disorder groups. Children with comorbid anxiety and depressive disorders reported somatic complaints more frequently than children without comorbid disorders. Results are discussed in terms of somatic complaints as a) criteria within the diagnostic system, and b) as part of the process of avoidance.

KEYWORDS. Somatic complaints. Anxiety disorders. Children. Quasi-experimental study.

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RESUMEN. Los síntomas somáticos en niños han sido asociados con trastornos de interiorización, especialmente de ansiedad. Sin embargo, pocos estudios han examinado los síntomas somáticos precisos en trastornos de ansiedad específicos. Desde este estudio cuasi-experimental se examinan el tipo y la frecuencia de síntomas somáticos en niños ($n = 178$; rango de edad 7–14 años) con trastorno generalizado de ansiedad (TAG), fobia social (FS), ansiedad de separación (AS) y sin ningún trastorno de ansiedad. Los niños y sus padres, que acudieron en busca de tratamiento, completaron una entrevista diagnóstica estructurada, los niños completaron además la *Multidimensional Anxiety Scale for Children (MASC)* (March, Parker, Sullivan, Stallings, y Conners). Los niños diagnosticados con un trastorno de ansiedad informaron de síntomas somáticos más frecuentes que aquellos sin trastorno de ansiedad, pero los síntomas somáticos no difirieron entre los principales grupos de trastornos de ansiedad. Los niños con trastornos de ansiedad y depresivos comórbidos manifestaron síntomas somáticos más frecuentemente que aquellos sin trastornos comórbidos. Se discuten los resultados en términos de los síntomas somáticos como a) criterios dentro del sistema diagnóstico, y b) parte del proceso de evitación.

PALABRAS CLAVE. Síntomas somáticos. Trastornos de ansiedad. Niños. Estudio cuasi-experimental.

RESUMO. Os sintomas somáticos em crianças têm sido associados a perturbações de interiorização, especialmente de ansiedade. No entanto, poucos estudos têm examinado os sintomas somáticos precisos em perturbações de ansiedade específicas. A partir deste estudo quase-experimental analisam-se o tipo e a frequência de sintomas somáticos em crianças ($n = 178$; intervalo de idade 7–14 anos) com perturbação de ansiedade generalizada (PAG), fobia social (FS), ansiedade de separação (AS) e sem nenhuma perturbação de ansiedade. As crianças e os seus pais, que procuraram tratamento, completaram uma entrevista diagnóstica estruturada, as crianças completaram também a *Multidimensional Anxiety Scale for Children (MASC)* (March, Parker, Sullivan, Stallings, & Conners). As crianças diagnosticadas com uma perturbação de ansiedade revelaram sintomas somáticos mais frequentes que aqueles sem perturbação de ansiedade, mas os sintomas somáticos não diferiram entre os principais grupos de perturbação de ansiedade. As crianças com comorbilidade das perturbações de ansiedade e depressiva manifestaram sintomas somáticos mais frequentes que aqueles sem perturbações comórbidas. Discutem-se os resultados em termos dos sintomas somáticos como a) critérios dentro do sistema de diagnóstico, e b) parte do processo de evitamento.

PALAVRAS CHAVE. Sintomas somáticos. Perturbações de ansiedade, Crianças. Estudo quase-experimental.

Introduction

Anxiety disorders are prevalent among childhood psychiatric disorders with epidemiological reports indicating that approximately 10% of youth suffer from anxiety disorders (Anderson, 1994; Costello, Mustillo, Erkanli, Keeler, and Angold, 2003). Childhood anxiety disorders are frequently comorbid with additional internalizing and

externalizing disorders (Masi, Mucci, Favilla, Romano, and Poli, 1999; Verduin and Kendall, 2003). Anxiety disorders in children can impair their academic functioning and health. Children with anxiety disorders avoid classroom activities and visit their school nurse or pediatrician frequently with a variety of somatic complaints and may even refuse to attend school because of somatic complaints (Honjo *et al.*, 2001; Kendall, Krain, and Treadwell, 1999). Autonomic and gastrointestinal complaints were the most common somatic complaints among adolescent school refusers with comorbid anxiety and/or depressive disorders (Bernstein *et al.*, 1997). Moreover, children with anxiety disorders often complain of headaches, stomachaches, muscular tension, sweating and feeling jittery (e.g., Eisen and Engler, 1995; Last, 1991). It has been found that almost a quarter of children brought to their pediatrician have reported physical symptoms that are medically unexplained and better accounted for as manifestations of a psychiatric disorder (Campo, Jansen-McWilliams, Comer, and Kelleher, 1999; Garralda, Bowman, and Mandalia, 1999). In addition, Dhossche, Ferdinand, Van der Ender, and Verhulst (2001) found that adolescents who reported somatic complaints continued to report them over an 8-year period and were more likely to report somatic complaints at a later time period than those adolescents who did not originally report somatic complaints. In general, the average frequency of somatic complaints has been found to increase with age (e.g., Campo and Fritsch, 1994; Kendall and Pimentel, 2003) and females have been found to report more somatic complaints than males (e.g. Egger, Costello, Erkanli, and Angold, 1999; Livingston, Taylor, and Crawford, 1988; McCauley, Carlson, and Calderon, 1991).

Studies of children with frequent somatic complaints have found that they are likely to be diagnosed with emotional difficulties, specifically internalizing disorders (e.g., Campo and Fritsch, 1994; Campo *et al.*, 1999; Dhossche *et al.*, 2001). A positive correlation has been found between children's somatic complaints and measures of anxiety and depression (Rauste-Von Wright and Von Wright, 1981; Walker and Green, 1989; Garber, Walker, and Zeman, 1991). Children and adolescents with anxiety and/or depression were found to report more somatic symptoms than those with other psychiatric disorders (Masi, Favilla, Millepiedi, and Mucci, 2000). Adolescents who report multiple somatic complaints also have been found to report more symptoms of anxiety and depression than adolescents with fewer somatic complaints (Egger *et al.*, 1999). Furthermore, adolescents reporting high levels of somatic complaints have been found to be at a higher risk of having major depression at a 4 year follow up than adolescents not reporting somatic complaints (Zwaigenbaum, Szatmari, Boyle, and Offord, 1999).

Studies of children with anxiety disorders have found that they report more somatic or physical complaints than non-anxious children (e.g., Beidel, Christ, and Long, 1991; Dorn *et al.*, 2003). For example, Beidel *et al.* (1991) found that somatic symptoms of choking, flushes/chills, palpitations, fainting, shakiness, headaches, and feelings of dying significantly differentiated anxious children from non-anxious children. Dorn *et al.* (2003) reported that anxious children had higher scores on the Children's Somatization Inventory (CSI) (Walker and Green, 1989) and the somatic subscale of the Child Behavior Checklist (CBCL) (Achenbach, 1992) than control children. In addition, longitudinal

research suggests that anxiety disordered girls were five times more likely to report somatic complaints (e.g., stomachaches, musculoskeletal pains) and had three times the prevalence of headaches compared to girls not diagnosed with an anxiety disorder (Egger, Angold, and Costello, 1998; Egger *et al.*, 1999). Furthermore, children with comorbid disorders (i.e., anxiety, depression) reported more frequent somatic complaints compared to children without comorbidity (e.g., McCauley *et al.*, 1991). Although research indicates a relationship between anxiety disorders and somatic complaints, few studies have examined differences in specific somatic complaints associated with specific childhood anxiety disorders. Egger *et al.* (1999) found headaches and stomachaches associated with Generalized Anxiety Disorder (GAD) in girls and Beidel *et al.* (1991) found heart palpitations, sweating, flushes, and trembling to be reported by children with Social Phobia (SP). However, inconsistent findings have emerged. For example, findings from Livingston *et al.* (1988) indicate that abdominal pain and palpitations are significantly more common among the Separation Anxiety Disorder (SAD) patients than other adolescent psychiatric inpatients. Conversely, Egger *et al.* (1999) found musculoskeletal pains, with or without stomachaches, to be associated with SAD, whereas Bernstein *et al.* (1997) found the absence of cardiovascular complaints and the presence of gastrointestinal complaints to be associated with SAD.

The present quasi-experimental study (Montero and León, 2005; Ramos-Álvarez and Catena, 2004) examines the type and frequency of somatic complaints in youth diagnosed with GAD, SP, SAD, or no anxiety disorder (NAD) on a measure of somatic complaints with established psychometric properties. Consistent with previous research, we hypothesized that anxiety disordered youth will report more somatic complaints compared to NAD children. With regard to specific anxiety disorders, consistent with the literature, we hypothesized that GAD children would report head/body aches and tension (e.g., Egger *et al.*, 1998, 1999), SP children would report trembling and sweating (e.g., Beidel *et al.*, 1991), and SAD children would report gastrointestinal/stomach complaints (e.g., Bernstein *et al.*, 1997; Egger *et al.*, 1998, 1999; Livingston *et al.*, 1988). We examined the relationship between age, gender, and the frequency of somatic complaints. We also examined differences in the frequency of somatic complaints in children with comorbid anxiety and externalizing or depressive disorders.

Method

Participants

Children ($n = 178$) referred to the Child and Adolescent Anxiety Disorders Clinic (CAADC) from multiple community sources served as participants in this study. The sample consisted of 93 males and 85 females (ages 7-14 years). Diagnostic demographics are shown in Table 1. We chose to use few exclusion criteria (i.e., psychotic symptoms, IQ lower than 80, principal disorder other than GAD, SAD, or SP) to have a typical/representative sample. The majority was Caucasian (85%) with 9% African-American and 6% "other." Regarding family income, 20% earned less than \$40,000; 19% earned between \$40,000 and \$59,999; 26% earned between \$60,000 and \$80,000; and 33% earned over \$80,000. All participants were diagnosed using the ADIS-C/P, which is a

semi-structured interview used to diagnose DSM-IV childhood disorders. One hundred and forty-two children met DSM-IV (American Psychiatric Association, 1994) criteria for a principal diagnosis of GAD (60 children), principal diagnosis of SP (45 children), or principal diagnosis of SAD (37 children). Approximately 10% were diagnosed with GAD only (without SAD or SP), 5.6% were diagnosed with SAD only (without GAD or SP), and 9.6% were diagnosed with SP only (without GAD or SAD). Children with GAD only, SAD only, or SP only will be referred to as such. Twenty-five percent of the anxious sample had a comorbid externalizing disorder (i.e., ADHD, ODD, CD), and 6.7% of the anxious children had a comorbid depressive disorder (i.e., past or current MDD or dysthymia). Thirty-six children did not meet DSM-IV criteria for an anxiety disorder.

TABLE 1. Number, percent of cases, gender, and mean age of cases within diagnostic groupings.

<i>Disorder</i>	<i>Total sample (n = 178)</i>	<i>%</i>	<i>Male</i>	<i>Female</i>	<i>Mean age</i>
Principal GAD	60	34	32	28	10.19
Principal SAD	37	21	17	20	9.52
Principal SP	45	25	27	18	10.24
GAD only	19	11	13	6	10.28
SAD only	10	6	4	6	8.91
SP only	17	10	9	8	10.53
Anxiety disorders without comorbid externalizing or depressive disorders	74	42	33	41	10.13
Comorbid anxiety and externalizing disorders	45	25	29	16	9.79
Comorbid anxiety and depressive disorders	12	7	7	5	10.42
NAD	36	20	17	19	9.69

Note. GAD = Generalized Anxiety Disorder; SAD = Separation Anxiety Disorder; SP = Social Phobia; NAD = No Anxiety Disorder.

Measures

- Multidimensional Anxiety Scale for Children (MASC) (March, Parker, Sullivan, Stallings, and Conners, 1997). The MASC is a 39 item self-report measure of anxiety symptoms in children and adolescents. Items are self-rated on a 4-point scale from 0 (never true) to 3 (often true). The MASC yields a physical symptoms scale (with two subscales – tense/restless and somatic/autonomic –), a social anxiety scale (with two subscales – humiliation/rejection and performing in public –), a separation anxiety scale, and a harm avoidance scale (with two subscales - perfectionism and anxious coping –). For this study, we used the physical symptoms scale. The MASC has shown robust psychometric properties (e.g., excellent internal reliability for the total scale ($\alpha = .90$) and for the physical symptoms scale ($\alpha = .85$), test-retest reliability was excellent over a 3-week period ($r_{tt} = .93$) and satisfactory over a 3-month period ($r_{tt} = .78$) in clinical, epidemiological, and treatment studies (March *et al.*, 1997; March and Albano, 1996).

- Anxiety Disorders Interview Schedule for Children (ADIS-C/P) (Silverman and Albano, 1996). The ADIS-C/P is a semi-structured interview used to diagnose DSM-IV disorders in youth by assessing symptomatology, severity, and course. A composite diagnosis is assigned based on independent parent and child interviews. A clinician severity rating (CSR), ranging from 0 (not at all) to 8 (very, very much), was determined based on the combined child and parent symptom severity ratings and the degree of symptom interference. Children were diagnosed by reliable diagnosticians (interrater reliability of Kappa > .85). The ADIS-C/P has shown robust psychometric properties (e.g., Silverman, Saavedra, and Pina, 2001; Wood, Piacentini, Bergman, McCracken, and Barrios, 2002). Pina, Silverman, Alfano, and Saavedra (2002) also reported that ADIS-C/P diagnoses had high temporal reliability (kappa coefficients for SAD, SP, and GAD ranged from .80 to .92). The ADIS-C/P composite score was used to determine the participant's diagnoses.

Procedure

Upon signing informed consent/assent parents and children were interviewed separately by diagnosticians. Subsequently, children completed several self-report forms including the MASC. Three procedures were used to categorize participants to explore the association between somatic complaints and anxiety. First, youth diagnosed with GAD, SAD, or SP were grouped under their respective principal anxiety disorder. If a participant had a co-primary anxiety disorder, the child's CSR was used to determine which disorder was more distressing. In a few cases, the child's global interference rating (GIR) was also used, as was their parents' GIR. Second, to examine the specificity of somatic complaints, youth were grouped by GAD, SP, or SAD only. For example, if a child had GAD and did not have SAD or SP, then they were considered to have GAD only; but if a child had SAD and comorbid SP, then they were not considered to have SAD only. And third, because somatic complaints are not exclusive to anxiety disorders (see Bernstein *et al.*, 1997; Masi *et al.*, 2000; Simon, Von Korff, Piccinelli, Fullerton, and Ormel, 1999 for associations with depression), youth were also grouped by those with comorbid anxiety and externalizing disorders or comorbid anxiety and depressive disorders. Participants not meeting DSM-IV criteria for an anxiety disorder constituted the NAD group.

Results

Demographic analyses among disorders

Preliminary statistical analyses examined differences in principal and GAD, SAD, or SP only diagnoses for age (analysis of variance) and gender, race, and family income (chi-square). There were no significant differences in age ($F(3, 138) = 1.50, p = .22$), gender ($\chi^2 = 2.07, p = .56$), race ($\chi^2 = 6.35, p = .70$), or family income ($\chi^2 = 32.62, p = .11$) between children with principal GAD, SAD, SP, or NAD. There were no differ significant

differences in age ($F(3, 67)=2.33, p=.08$), gender ($\chi^2=2.96, p=.40$), race ($\chi^2=2.52, p=.87$), or family income ($\chi^2=35.84, p=.06$) between children with GAD only, SAD only, SP only, or NAD.

Demographic analyses for overall frequency of somatic complaints

Preliminary analyses of age (Pearson correlations) and of gender, race, and family income (analyses of variance) examined differences in overall frequency of somatic complaints. The overall frequency of somatic complaints, based on the MASC physical scale, was not significantly related to age ($r=.10, p=.25$) or significantly different for gender ($F(1, 176) = .64, p=.42$), race ($F(3, 164) = 1.36, p=.26$), or family income ($F(8, 144) = 1.30, p=.25$).

Differences in somatic complaints among principal anxiety disorder

Between subjects ANOVAs were run to test for group differences on somatic complaints based on principal GAD, SAD, SP, and NAD. Means and standard deviations of each somatic complaint for each disorder category are shown in Table 2. Results indicated significant group differences on 8 of 12 somatic complaints. Tukey analyses indicated several significant group differences. The four groups differed in the frequency of feeling tense or uptight, $F(3, 172) = 5.84, p < .001$. Children with a principal diagnosis of GAD or SP reported feeling tense or uptight more frequently than the NAD group, $p < .001$ and $p < .05$, respectively. Significant group differences were found in the frequency of feeling shaky or jittery ($F(3, 174) = 3.66, p = .014$) and shaking hands ($F(3, 174) = 2.84, p < .04$). Post-hoc analyses indicated that children with a principal diagnosis of GAD reported feeling shaky and jittery and having their hands shake more frequently than the NAD group, $p < .01$ and $p = .04$, respectively. Children with principal GAD, SAD, or SP reported feeling strange, weird, or unreal more frequently than the NAD group ($F(3, 174) = 3.67, p < .02$) as indicated by significant post-hoc Tukey tests, $p = .03, p < .04, p = .02$, respectively. Significant differences between groups were found for the following symptoms: heart racing or skipping beats, $F(3, 174)=3.35, p < .02$; feeling restless or on edge, $F(3, 174) = 4.98, p = .002$; and feeling sick to their stomach, $F(3, 174) = 4.52, p = .004$. Tukey tests revealed that children with principal GAD or SAD reported their heart skipping a beat ($p = .02$ and $.04$, respectively), feeling restless or on edge ($p = .005$ and $p = .004$, respectively), and feeling sick to their stomach ($p = .003$ and $p = .03$, respectively) more frequently than the NAD group. A significant group difference in reports of hands feeling sweaty or cold was also found, $F(3, 174) = 2.82, p = .04$. Tukey tests revealed that children with principal SAD report their hands feeling sweaty or cold more frequently than children without anxiety, $p < .05$. The three principal anxiety disorders did not differ significantly on the somatic complaint items.

TABLE 2. Group differences in reported somatic complaints based on principal and GAD, SAD, SP only.

<i>Somatic complaint</i>	<i>Principal disorder</i>				<i>GAD, SAD, or SP only</i>			
	GAD	SAD	SP	NAD	GAD	SAD	SP	NAD
Tense or uptight								
Mean	1.27 ^a	1.00 ^{a,b}	1.00 ^a	.47 ^b	1.58 ¹	1.30 ¹	1.18 ¹	.47 ²
SD	1.00	1.00	.84	.70	.90	1.06	.81	.70
Trouble getting breath								
Mean	.95 ^a	.81 ^a	.87 ^a	.47 ^a	.74 ¹	.70 ¹	.88 ¹	.47 ¹
SD	1.08	1.02	.89	.88	1.05	.95	.86	.88
Shaky or jittery								
Mean	1.15 ^a	1.03 ^{a,b}	.82 ^{a,b}	.50 ^b	.95 ¹	1.10 ¹	1.00 ¹	.50 ¹
SD	1.17	.96	.89	.81	1.08	.99	.94	.81
Dizzy or faint feelings								
Mean	.77 ^a	.86 ^a	.64 ^a	.31 ^a	.63 ¹	.90 ¹	.71 ¹	.31 ¹
SD	1.05	1.13	.93	.62	.90	1.29	.85	.62
Jumpy								
Mean	.98 ^a	.78 ^a	.58 ^a	.69 ^a	1.16 ¹	.70 ¹	.53 ¹	.69 ¹
SD	1.05	1.13	.72	.98	1.17	1.16	.72	.98
Pains in chest								
Mean	.87 ^a	.73 ^{a,b}	.71 ^{a,b}	.28 ^b	.47 ^{1,2}	.50 ^{1,2}	1.00 ¹	.28 ²
SD	1.17	1.07	.99	.57	.91	.97	1.32	.57
Feel strange, weird or unreal								
Mean	.78 ^a	.84 ^a	.84 ^a	.25 ^b	.58 ¹	.60 ¹	.82 ¹	.25 ¹
SD	1.03	.99	.95	.55	.96	.97	1.02	.55
Heart skips a beat								
Mean	.75 ^a	.76 ^a	.56 ^{a,b}	.22 ^b	.68 ¹	.80 ¹	.76 ¹	.22 ¹
SD	.97	.96	.87	.49	1.00	.92	1.03	.49
Restless and on edge								
Mean	1.02 ^a	1.11 ^a	.82 ^{a,b}	.31 ^b	1.00 ¹	1.30 ¹	.94 ^{1,2}	.31 ²
SD	1.03	1.22	.98	.62	1.05	1.25	1.14	.62
Sick to my stomach								
Mean	1.15 ^a	1.05 ^a	.82 ^{a,b}	.42 ^b	.89 ¹	.60 ¹	.88 ¹	.42 ¹
SD	1.07	1.13	.91	.77	.94	.97	.93	.77
Hands shake								
Mean	.78 ^a	.78 ^{a,b}	.58 ^{a,b}	.28 ^b	.68 ¹	.80 ¹	.71 ¹	.28 ¹
SD	.98	1.00	.89	.62	.82	1.03	.99	.62
Hands feel sweaty or cold								
Mean	.87 ^{a,b}	.95 ^a	.69 ^{a,b}	.36 ^b	.79 ¹	.70 ¹	.94 ¹	.36 ¹
SD	.98	1.10	.95	.76	.92	.95	.97	.76

Note. GAD = Generalized Anxiety Disorder; SAD = Separation Anxiety Disorder; SP= Social Phobia; NAD = No Anxiety Disorder; SD = Standard deviation. Means with different superscripts are significantly different based on Tukey post-hoc tests.

Differences in somatic complaints among GAD, SAD, and SP “only” groups

Between subjects ANOVAs were run to test for group differences based on GAD only, SAD only, SP only, and NAD on the frequency of each somatic complaint. Group differences were found for only 2 of the 12 somatic complaints (see Table 2). Specifically, a significant group difference was found in the frequency of feeling tense or uptight ($F(3, 78) = 8.86, p < .001$). Tukey tests revealed that children with GAD only, SAD only, or SP only reported feeling tense or uptight more frequently than NAD children ($p < .001, p < .03, \text{ and } p = .02$, respectively). However, there were no significant group differences in feeling tense or uptight across GAD, SAD, or SP only groups. A significant group difference was found on feeling restless and on edge ($F(3, 78) = 4.49, p = .006$). Tukey tests indicated that children with SAD only reported feeling restless and on edge more frequently than the NAD group ($p = .02$), however, differences in feeling restless and on edge between children with GAD, SAD, or SP only was not significant.

Differences in somatic complaints among comorbid disorder groups

A four group between subjects ANOVA was also calculated to test for differences between participants identified as having anxiety, comorbid anxiety and depression, comorbid anxiety and externalizing disorder, and NAD on the overall frequency of somatic complaints. Significant group differences were found in the overall frequency of somatic complaints ($F(3, 166) = 10.14, p < .001$). Tukey tests revealed that the NAD group reported significantly less frequent somatic complaints than a) children with comorbid anxiety and externalizing disorders, and b) children with comorbid anxiety and depressive disorders ($p = .01 \text{ and } p < .001$, respectively). In addition, Tukey tests revealed that children with comorbid anxiety and depression reported significantly more frequent somatic complaints than children with anxiety only and than children with comorbid anxiety and externalizing disorders, $p < .01$ for both groups.

Discussion

Children with a GAD, SAD, or SP anxiety disorder (principal, and GAD, SAD or SP only) reported more frequent somatic complaints compared to children without an anxiety disorder. Furthermore, children with a principal diagnosis of SAD reported more gastrointestinal complaints than non-anxious children. These findings replicate previous work and bolster the notion that somatic complaints differentiate children with and without an anxiety disorder and that children with principal diagnosis with SAD have more gastrointestinal complaints than non-anxious children (e.g., Beidel *et al.*, 1991; Bernstein *et al.*, 1997; Egger *et al.*, 1998, 1999; Livingston *et al.*, 1988).

Inconsistent with DSM-IV, significant differences were not found among the specific anxiety disorders with regard to the frequency of specific types somatic complaints. This lack of differentiation among the anxiety disorders indicates that somatic complaints are suggestive of anxiety disorders in general, but are not specific to any one of the anxiety disorders studied herein. Accordingly, these findings may question the use of somatic complaints as diagnostic criterion for a specific anxiety disorder (e.g., GAD,

SAD). There is merit in using medically unexplained symptoms as an indication of a psychiatric disorder (Campo and Fritsch, 1994; Garralda *et al.*, 1999; Campo *et al.*, 1999); however, it appears that the specificity of an anxiety diagnosis may need to rely on other diagnostic criteria.

The DSM-IV includes stomachaches and headaches as one of the possible diagnostic criteria for SAD and refers to somatic complaints in general, but does not specify any specific physical complaints. Children with principal SAD reported a broader variety of somatic complaints than those listed in DSM-IV, suggesting that SAD children are more likely to report experiencing racing heart, feeling strange, restless, sick to their stomach, and having cold or sweaty hands compared to children with no anxiety disorder. Although we found that SAD children differed from non-anxious children, our results indicate that these symptoms are not specific to SAD because a) there was not a significant difference in the reports of children with principal GAD or SP, and b) there was no significant difference between those children with SAD only and GAD only or SP only. The DSM-IV criteria for GAD include at least one physical symptom. Our results indicate that children with principal GAD reported eight physical symptoms on the MASC more than non-anxious children. It is worth noting that children with a principal diagnosis of GAD were found to report a broader variety of physical complaints than those listed in the DSM-IV, including getting shaky or jittery, having pain in their chest, feeling strange, weird, or unreal, heart racing or skipping beats, and feeling sick to their stomach. Again, given the absence of significant group differences across the specific anxiety disorders, findings from this study indicate that these somatic symptoms may not be specific to GAD. This inability to differentiate among the different anxiety disorders with regard to certain somatic complaints is consistent previous findings in the literature, which indicate that children with overanxious disorder (the predecessor to GAD) were not different in their somatic complaints compared to children with other anxiety disorders (Last, 1991). Although the DSM does not require somatic complaints for a diagnosis of SP, the disorder has been reported to be associated with trembling, sweating, and heart palpitations (Beidel *et al.*, 1991). We found that children with a diagnosis of SP did endorse feeling shaky or jittery, having sweaty hands, heart skipping a beat; however, the frequency was not significantly different from children with principal GAD, SAD, or NAD. Therefore, the present results do not support the specificity of these symptoms to SP. In addition, although children with principal SP reported feeling tense or uptight and feeling strange, weird, or unreal more frequently than NAD children, these symptoms were not specific to SP (i.e., children with principal GAD or SAD and children with GAD only and SAD only reported similar frequencies).

We did not find a significant relationship between age or gender and the frequency of somatic complaints (e.g., Bernstein *et al.*, 1997; Egger *et al.*, 1999; Livingston *et al.*, 1988, and Masi *et al.*, 2000). Inconsistent findings have emerged in the literature with regard to age and gender, which may be due to varying methodologies and samples.

Present findings indicate that children with comorbid anxiety and depression report more somatic complaints than both a) children with anxiety disorders and b) comorbid anxiety and externalizing disorders. This finding also suggests the need to assess for depression as well as for anxiety in youth who present with unexplained somatic complaints.

Finding from this study suggest that anxiety disorders are associated with somatic complaints. However, the presence of somatic symptoms does not necessitate the presence of anxiety, or that any particular somatic complaint indicates a particular anxiety disorder. Research indicates that somatic symptoms are fairly stable and predict future psychiatric problems (Dhossche *et al.*, 2001; Zwaigenbaum *et al.*, 1999). If we can identify somatic complaints early on, we may be able to identify and treat children experiencing anxiety or other problems associated with those complaints. Thus, practitioners are encouraged to assess anxiety and depressive symptoms in children who report high levels of somatic complaints. Likewise, if we treat anxiety disorders, either proactively or reactively, we are likely to see a reduction in somatic complaints. A related study by Tortella-Feliu, Servera, Balle, and Fullana (2004) found that a brief school-based selected prevention program for anxiety disorders significantly reduced anxiety sensitivity scores, an early risk factor for anxiety disorders.

Potential limitations merit consideration. First, given that the sample was predominately Caucasian, it is unclear whether the findings would generalize to other ethnicities and if the measures used in the present study would be sensitive enough to detect differences between ethnicities. García-López, Olivares, and Hidalgo (2005) examined the sensitivity of various outcome measures for anxiety among a Hispanic population. Thus, it is suggested that the current findings be replicated with different and more ethnically diverse samples. Second, our examination of the specificity of somatic complaint is limited because our population is children with anxiety disorders and only some had comorbid depression or externalizing disorders. Third, our findings are based on child self-report of somatic complaints. Children's limited ability to understand that emotions may be expressed physically may contribute to under-reporting. Future research could benefit from including parent and/or teacher report of somatic symptoms. Fourth, the MASC measures frequency but not severity of somatic complaints. Future research may benefit from measuring both frequency and severity of somatic complaints. Finally, this is a cross-sectional study and did not address temporal change in somatic symptoms. Longitudinal research examining whether specific somatic complaints predict certain anxiety disorders and whether treatment effects the somatic manifestations of anxiety would be informative.

References

- Achenbach, T. M. (1992). *Manual for the Child Behavior Checklist/4-18 and 1991 Profile*. Burlington: University of Vermont Department of Psychiatry.
- American Psychiatric Association (1994). *Diagnostic and statistical manual of mental disorders*, (4th edition) *DSM-IV*. Washington, DC: Author.
- Anderson, J. C. (1994). Epidemiological issues. In T.H. Ollendick, N.J. King, and W. Yule (Eds.), *International handbook of phobic and anxiety disorders in children and adolescents* (pp. 43-65). New York, NY: Plenum Press.
- Beidel, D. C., Christ, M. A. G., and Long, P. J. (1991). Somatic complaints in anxious children. *Journal of Abnormal Child Psychology*, *19*, 659-670.

- Bernstein, G. A., Massie, E. D., Thuras, P. D., Perwien, A. R., Borchardt, C. M., and Crosby, R. D. (1997). Somatic symptoms in anxious-depressed school refusers. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 661-668.
- Campo, J. V. and Fritsch, S. L. (1994). Somatization in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 33, 1223-1235.
- Campo, J. V., Jansen-McWilliams, L., Comer, D. M., and Kelleher, K. J. (1999). Somatization in pediatric primary care: Association with psychopathology, functional impairment, and use of services. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 1093-1101.
- Costello E. J., Mustillo S., Erkanli A., Keeler G., and Angold, A. (2003). Prevalence and development of psychiatric disorders in childhood and adolescence. *Archives of General Psychiatry*, 60, 837-844
- Dhossche, D., Ferdinand, R., Van der Ender, J., and Verhulst, F. (2001). Outcome of self-reported functional-somatic symptoms in a community sample of adolescents. *Annals of Clinical Psychiatry*, 13, 191-199.
- Dorn, L. D., Campo, J. C., Thato, S., Dahl, R. E., Lewin, S., Chandra, R., and DiLorenzo, C. (2003). Psychological comorbidity and stress reactivity in children and adolescents with recurrent abdominal pain and anxiety disorders. *Journal of the American Academy of Child and Adolescent Psychiatry*, 42, 66-75.
- Egger, H., Angold, A., and Costello, E. J. (1998). Headaches and psychopathology in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 37, 951-958.
- Egger, H. L., Costello, E. J., Erkanli, A., and Angold, A. (1999). Somatic complaints and psychopathology in children and adolescents: Stomach aches, musculoskeletal pains, and headaches. *Journal of the American Academy of Child and Adolescent Psychiatry*, 38, 852-860.
- Eisen, A. R. and Engler, L. B. (1995). Chronic anxiety. In A. R. Eisen, C. A. Kearney, and C. A. Schaefer (Eds.), *Clinical handbook of anxiety disorders in children and adolescents* (pp. 223-250). Northvale, NJ: Jason Aronson.
- Garber, J., Walker, L.S., and Zeman, J. (1991). Somatization symptoms in a community sample of children and adolescents: Further validation of the Children's Somatization Inventory. *Psychological Assessment: A Journal of Consulting and Clinical Psychology*, 3, 588-595.
- García-López, L. J., Olivares, J., and Hidalgo, M. D. (2005). A pilot study on sensitivity of outcome measures for treatment of generalized social phobia in adolescents. *International Journal of Clinical and Health Psychology*, 5, 385-392.
- Garralda, M. E., Bowman, F. M., and Mandalia, S. (1999). Children with psychiatric disorders who are frequent attenders to primary care. *European Child and Adolescent Psychiatry*, 8, 34-44.
- Honjo, S., Nishide, T., Niwa, S., Sasaki, Y., Kaneko, H., Inoko, K., and Nishide, Y. (2001). School refusal and depression with school inattendance in children and adolescents: Comparative assessment between the Children's Depression Inventory and somatic complaints. *Psychiatry and Clinical Neuroscience*, 55, 629-634.
- Kendall, P. C., Krain, A., and Treadwell, K. R. H. (1999). Generalized Anxiety Disorder. In R. T. Ammerman, M. Hersen, and C. Last (Eds.), *Handbook of prescriptive treatments for children and adolescents* (2nd ed.) (pp. 155-171). Needham Heights, MA: Allyn and Bacon.
- Kendall, P. C. and Pimentel, S. S. (2003). On the physiological symptom constellation in youth with Generalized Anxiety Disorder (GAD). *Journal of Anxiety Disorders*, 17, 211-221.
- Last, C. (1991). Somatic complaint in anxiety disordered children. *Journal of Anxiety Disorders*, 5, 125-138.

- Livingston, R., Taylor, J. L., and Crawford, L. (1988). A study of somatic complaints and psychiatric diagnosis in children. *Journal of the American Academy of Child and Adolescent Psychiatry*, 27, 185-187.
- March, J. S. and Albano, A. M. (1996) Assessment of anxiety in children and adolescents. In L. Dickstein, M. Riba, and M. Oldham (Eds.), *Review of Psychiatry* vol. XV (pp. 405-427). Washington, DC: American Psychiatric Press.
- March, J. S., Parker, J., Sullivan, K., Stallings, P., and Conners, C. (1997). The Multidimensional Anxiety Scale for Children (MASC): Factor structure, reliability and validity. *Journal of the American Academy of Child and Adolescent Psychiatry*, 36, 554-565.
- Masi, G., Favilla, L., Millepiedi, S., and Mucci, M. (2000). Somatic symptoms in children and adolescents referred for emotional and behavioral disorders. *Psychiatry*, 63, 140-149.
- Masi, G., Mucci, M., Favilla, L., Romano, R., and Poli, P. (1999). Symptomatology and comorbidity of generalized anxiety disorder in children and adolescents. *Comprehensive Psychiatry*, 40, 210-215.
- McCauley, E., Carlson, G., and Calderon, R. (1991). The role of somatic complaints in the diagnosis of depression in children and adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 30, 631-635.
- Montero, I. and León, O.G. (2005). Sistema de clasificación del método en los informes de investigación en Psicología. *International Journal of Clinical and Health Psychology*, 5, 115-127.
- Pina, A. A., Silverman, W. K., Alfano, C. A., and Saavedra, L. M. (2002). Diagnostic efficiency of symptoms in the diagnosis of DSM-IV: Generalized anxiety disorder in youth. *Journal of Child Psychology and Psychiatry*, 43, 959-967.
- Ramos-Álvarez, M.M. and Catena, A. (2004). Normas para la elaboración y revisión de artículos originales experimentales en Ciencias del Comportamiento. *International Journal of Clinical and Health Psychology*, 4, 173-189.
- Rauste-Von Wright, M. and Von Wright, J. (1981). A longitudinal study of psychosomatic symptoms in healthy 11-18 year old girls and boys. *Journal of Psychosomatic Research*, 25, 525-534.
- Silverman, W. K., and Albano, A. M. (1996). *The Anxiety Disorders Interview Schedule for DSM-IV-Child and Parent Versions*. San Antonio, TX: Graywind Publications, A Division of the Psychological Corporation.
- Silverman, W.K., Saavedra, L.M., and Pina, A.A. (2001). Test-retest reliability of anxiety symptoms and diagnoses with the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Versions. Journal of the American Academy Child Adolescent Psychiatry, 40, 937-944.*
- Simon, G. E., Von Korff, M., Piccinelli, M., Fullerton, C., and Ormel, J. (1999). An international study of the relation between somatic symptoms and depression. *The New England Journal of Medicine*, 341, 1329-1335.
- Tortella-Feliu, M., Servera, M., Balle, M., and Fullana, M.A. (2004). Viabilidad de un programa de prevención selectiva de los problemas de ansiedad en la infancia aplicado en la escuela. *International Journal of Clinical and Health Psychology*, 4, 371-387.
- Verduin T. and Kendall P.C. (2003). Differential occurrence of comorbidity within childhood anxiety disorders. *Journal of Clinical Child Adolescent Psychology*, 32, 290-295.
- Walker, L. S. and Green, J. W. (1989). Children with recurrent abdominal pain and their parents: More somatic complaints, anxiety, and depression than other patient families. *Journal of Abnormal Child Psychology*, 19, 379-294.

- Wood, J.F., Piacentini, J.C., Bergman, R.L., McCracken, J., and Barrios, V. (2002). Concurrent validity of the Anxiety Disorders section of the Anxiety Disorders Interview Schedule for DSM-IV: Child and Parent Versions. *Journal of Clinical Child Psychology*, *31*, 335-342.
- Zwaigenbaum, L., Szatmari, P., Boyle, M. H., and Offord, D. R. (1999). Highly somatizing young adolescents and the risk of depression. *Pediatrics*, *103*, 1203-1209.