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THE RELATION BETWEEN ANXIETY SENSITIVITY AND DEPRESSION IN CHILDREN AND ADOLESCENTS REFERRED FOR ANXIETY

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Summary—Research conducted with adult samples suggests that anxiety sensitivity is positively related to depression (Otto *et al.*, 1995, *Journal of Anxiety Disorders*, *10*, 117–123). The Childhood Anxiety Sensitivity Index (CASI, Silverman *et al.*, 1991, *Journal of Clinical Child Psychology*, *20* 162–168) was used in this study to provide an examination of the relation between anxiety, anxiety sensitivity, and depression in a sample of children and adolescents (N = 234) referred for anxiety disorders. A significant correlation between depression and anxiety sensitivity was found. This relation remained statistically significant when controlling for other aspects of anxiety (i.e. worry, physiological anxiety, and concentration). The similarities between these findings and findings obtained with adults are discussed, as well as suggestions for future research. © 1997 Elsevier Science Ltd

INTRODUCTION

Anxiety sensitivity has been referred to as the "fear of anxiety" (Reiss, Peterson & Gursky, 1988, p. 341). Anxiety sensitivity is indicated by the belief that anxiety related sensations (such as heart beat awareness, increased heart rate, trembling, and derealization) have negative social, psychological, or physical consequences (Taylor, 1995). The concept of anxiety sensitivity is thought to be one of three fundamental fears from which common fears arise (Reiss, 1991). Reiss's (1991) expectancy model of fear holds that the three fundamental fears are fear of injury, fear of negative evaluation, and fear of anxiety (or anxiety sensitivity). Research in the adult literature indicates that anxiety sensitivity is: (a) associated with panic attacks; (b) distinct from other fundamental fears; (c) more strongly related to agoraphobia than other fundamental fears; and (d) is distinct from, but related to trait anxiety (Reiss *et al.*, 1988; Taylor, 1995).

Recently anxiety sensitivity has been shown to be related to depression in adults (Otto, Pollack, Fava, Uccello & Rosenbaum, 1995). Otto *et al.* (1995) found that depressed individuals had lower ratings on the Anxiety Sensitivity Index (ASI, Reiss *et al.*, 1988; Reiss, Peterson, Gursky & McNally, 1986) than individuals with panic disorder, but had scores comparable to those with other anxiety disorders. Otto *et al.* (1995) also found that outpatients (n = 15) with major depression had significantly higher ASI scores than healthy controls (n = 26). Further, participants with major depression (n = 63), major depression with non-panic comorbid anxiety disorder (n = 53), and major depression with comorbid past or present panic disorder (n = 19) were compared and no significant differences among these groups on ASI levels were found. Taylor, Koch, Woody and McLean (1996) replicated the work of Otto *et al.* (1995) and found elevated ASI scores in individuals diagnosed with major depression, further suggesting a positive relation between anxiety sensitivity and depression.

Considerably less is known about anxiety sensitivity in children. Only recently has a Childhood Anxiety Sensitivity Index (CASI) been available (Silverman, Fleisig, Rabian & Peterson, 1991). The CASI is a modified version of the adult ASI (Reiss *et al.*, 1986) designed for use with children. The original research found the CASI to be similar to the ASI in internal

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consistency and reliability (Silverman *et al.*, 1991). Rabian, Peterson, Richters and Jensen (1993) extended work on the CASI by examining whether the CASI could distinguish children with anxiety disorders, children with externalizing disorders, and children with no diagnoses. Rabian *et al.* (1993) found that CASI scores were highest for children with anxiety disorder diagnoses (mean score = 30.56), next were the scores for children with externalizing disorder diagnoses (mean score = 28.84), and the lowest scores were found for children who did not meet the criteria for any diagnosis (mean score = 26.40). The CASI scores were significantly different in pairwise comparisons for differences between the children with anxiety disorder diagnoses versus the children with no disorders.

It is important to continue work on the CASI, given that anxiety sensitivity is seen as a precursor to the development of panic and other anxiety disorders in adults (Maller & Reiss, 1992; Taylor, 1995). In a recent study, Lau, Calamari and Waraczynski (1996) used the CASI to assess the relation between anxiety sensitivity and panic symptoms in adolescents ($N = 77$, mean age = 16.7 years) and found a significant correlation between CASI scores and overall panic symptoms ($r = 0.42$, $P < 0.0005$). CASI scores were also correlated with the number of panic attacks in the past year, past month, the distress the panic attacks caused, and the judged seriousness of the attacks. Lau *et al.*'s (1996) investigation was important because it was the first to extend the use of the concept of anxiety sensitivity to specifically predict panic in youth as done with adult samples. However, the relation between child depression and anxiety sensitivity was not examined in their study.

The purpose of the present study was to examine the relation between depression and anxiety sensitivity in children and adolescents. We expected to find a significant positive correlation between depression and anxiety sensitivity as was found by Otto *et al.* (1995) and Taylor *et al.* (1996) with adult samples. Next, we predicted that anxiety sensitivity and depression would be related after controlling for other aspects of anxiety. Specifically, we examined the relation of anxiety sensitivity and depression while controlling for clinician ratings of severity, and physiological, worry-oversensitivity, and concentration problems as measured by the factor subscales of the Revised Children's Manifest Anxiety Scale (RCMAS). These variables were controlled for because a relation between anxiety sensitivity and depression may be mediated by the severity of the child's disorder or by generalized anxiety as measured by the RCMAS factor subscales. Finally, to examine whether levels of depression influence the relation between anxiety sensitivity and generalized anxiety, we conducted additional partial correlations between CASI and RCMAS scores while controlling for severity of disorder, Child Depression Inventory (CDI) scores, and factor subscale scores of the RCMAS. Partial correlations between CDI and RCMAS scores while controlling for severity, CASI scores and subscale scores of the RCMAS are also presented.

METHOD

Participants

The sample was comprised of 234 children who consecutively presented to a child anxiety specialty research clinic located in southeast Florida during the years 1992 through 1996. Both the child and parent, usually the mother, participated in the assessment procedures which provided the childrens' and adolescents' sample information used in this study. The sample was comprised of 102 girls and 132 boys with a mean age of 10 years, 4 months and an age range of 6 to 17 years. Fifty-four percent of the participants were Euro-American, 39% were Hispanic-American, 2% were African-American, 2% were of other ethnic backgrounds and 3% chose not to report their ethnic background. The range of the participants' family income was as follows: Zero to $20,000 (26%), $21,000 to $40,000 (25%), above $40,000 (38%), and 11% did not report their income. All of the children in this sample were referred to the program due to difficulties with fear and/or anxiety. The families were either self-referred in response to clinic publicity or were referred by pediatricians, school psychologists or other mental health professionals.

Measures

Children's Depression Inventory. The CDI (Kovacs, 1981) was used to assess depressive symptoms. The CDI was developed from the Beck Depression Inventory and includes 27 self-report items related to the cognitive, affective and behavioral signs of depression. Each item has a range of three choices, and the child is instructed to choose the one that best characterizes him or herself during the past 2 weeks. Each item is scored with a 0, 1, or 2 for a range of scores from 0 to 54. The CDI has been shown to have good internal consistency and moderate test–retest reliability and validity estimates (e.g., Kovacs, 1981).

Childhood Anxiety Sensitivity Index. The CASI (Silverman *et al.*, 1991) is an 18-item self-report measure designed to assess children's fear of different symptoms of anxiety. This measure was modified after the ASI and tailored for use with children ages 6 to 17. Children rate each question by selecting one of three choices, 'none', 'some' or 'a lot'. Items are scored 1–3 for a range of 18–54. Example questions are "It scares me when I feel shaky," and "It scares me when I feel nervous." The CASI has been shown to have adequate reliability and validity estimates (Silverman *et al.*, 1991).

Revised Children's Manifest Anxiety Scale. The RCMAS (Reynolds & Richmond, 1978) is a widely used 37-item self-report scale designed to assess general anxiety in children. Twenty-eight items are summed to yield the Anxiety score. The RCMAS yields three anxiety subscale factors: Worry-Oversensitivity, Physiological, and Concentration. The other nine items comprise the social desirability or lie subscale. In the present study, the total anxiety score and three subscale scores were used. The items are scored 'yes' or 'no' and the total score is computed by summing the 'yes' scores for a range of total scores between 0–28. The RCMAS has been found to have good reliability and validity estimates across age, gender, and racial groups (e.g., Reynolds & Richmond, 1978).

Procedure

The Anxiety Disorders Interview Schedule for Children (ADIS-C and ADIS-P, respectively; Silverman & Nelles, 1988) was administered to all referred children and parents. The ADIS-C and ADIS-P are structured interviews that emphasize the anxiety disorders. The interviews permit the clinician to assess and diagnose (via DSM-III-R criteria) other major childhood disorders, including the externalizing and affective disorders. The ADIS-C and ADIS-P have been found to have adequate interrater and test–retest reliability (Silverman & Rabian, 1995). These interviews have been found to reliably differentiate between anxiety and non-anxiety disorders in previous tests of the ADIS-C and ADIS-P's reliability with children from which this sample was drawn (e.g. $\kappa = 0.89$; Silverman & Eisen, 1992; Silverman & Rabian, 1995). Further, a subsample of the child and parent interviews were video-taped and observed by independent judges and 100% agreement on all parent and child diagnoses were obtained.

In cases of multiple diagnoses the relative impact or interference of the specific diagnoses being made was used as the basis for assigning the primary diagnosis, the secondary diagnosis, etc. The specific procedure for determining relative interference of each diagnosis involved the clinician consulting separately with the child and parent to prioritize multiple diagnoses, yielding clinician ratings of severity for each diagnosis. The clinician evaluated the overall interference with functioning and rated this interference on a nine-point scale ranging from 0 to 8, with adverb qualifiers underneath selected points (e.g. 0 = "no severity-disruption of functioning"). The overall test–retest reliability of the clinician ratings of the ADIS-C has been found to be 0.89 (Silverman & Eisen, 1992). The clinician assigned the diagnosis that both sources (parent and child) agreed were the most interfering as primary, and so on. In instances of discordance between parent and child, the clinician adjusted the severity ratings using a method that utilizes both sources' views about interference as delineated in the ADIS-C/P guide (see Albano & Silverman, 1996).

Once the family arrived for an initial assessment, the procedure was explained to both the parent and child, and informed consent was obtained for the assessment. The same individual interviewed both the child and parent. The child was administered the ADIS-C first. While the child was being interviewed, the parent was asked to complete a packet of self-report measures

Table 1. Means, standard deviations, coefficient αs and intercorrelations of measures and subscales (N = 234)

	CDI	CASI	RCMAS-W	RCMAS-C	RCMAS-P	RCMAS-T	Mean(*SD*)	α
CDI							9.90(7.3)	0.86
CASI	0.52**						29.47(7.3)	0.88
RCMAS-W	0.63**	0.63**					5.50(3.4)	0.84
RCMAS-C	0.64**	0.48**	0.71**				2.53(2.1)	0.75
RCMAS-P	0.58**	0.55**	0.67**	0.63**			4.49(2.5)	0.69
RCMAS-T	0.69**	0.64**	0.93**	0.86**	0.86**		12.51(7.1)	0.90
Severity	0.07 ns	0.20**	0.18**	0.10 ns	0.19**	0.18**	6.38(1.7)	–

*$P < 0.05$; **$P < 0.01$; ns = not significant.
CDI is Children's Depression Inventory; CASI is Childhood Anxiety Sensitivity Index; RCMAS is Revised Children's Manifest Anxiety Scale; W = Worry subscale; C = Concentration subscale; P = Physiological subscale; T = total score; Severity = clinician ratings of severity of primary diagnosis.

concerning his/her child's anxiety, behavior, the family, and personal history of psychiatric symptoms and fears. After the child interview had been completed, the parent was interviewed with the ADIS-P, and the child was asked to complete a packet of questionnaires pertaining to his/her fears, behaviors, and thoughts. When completing the questionnaires, younger children were assisted by a trained undergraduate student (i.e., the student would read the questions out loud to the child).

RESULTS AND DISCUSSION

Ninety-three percent of the sample met diagnostic criteria for a primary disorder of anxiety. Most common disorders included simple phobia (38.0%), social phobia (11.1%), overanxious and generalized anxiety disorder (19.6%), and separation anxiety disorder (14.1%). Other anxiety disorders that were diagnosed to a lesser degree, anywhere from 1 to 3.8%, were the following: agoraphobia, posttraumatic stress disorder, avoidant disorder, obsessive-compulsive disorder, and panic disorder. Diagnosed mood disorders included major depression and dysthymia (2.1%). Finally, diagnosed externalizing disorders included attention deficit hyperactivity disorder and oppositional defiant disorder (2.2%). Table 1 presents the means, standard deviations, coefficient αs and the intercorrelations among the measures and subscales. All questionnaires produced acceptable reliability estimates ranging from 0.90 for the total RCMAS score to 0.86 for the CDI. The RCMAS subscales were also found to have adequate reliability estimates. Scores on the CASI ranged from 18 to 52 with a mean score of 29.47 and the distribution was not heavily skewed.

A significant correlation was obtained between scores on the CASI and CDI (r = 0.52, $P < 0.01$). All measures and RCMAS subscale scores were significantly correlated (see Table 1). Clinician ratings of severity, however, were not significantly correlated with the CDI or the RCMAS concentration subscale scores. Next, three sets of partial correlations were conducted. Table 2 presents the results of these analyses. First, correlations between the CASI and CDI were computed while controlling for each of the RCMAS subscale scores, for combinations of the subscale scores and for clinician severity ratings. The correlation between the CASI and

Table 2. Partial Correlation Coefficients between CASI and CDI scores, between CASI and RCMAS scores and between RCMAS and CDI scores.

Variable controlled	CASI and CDI	CASI and RCMAS	RCMAS-T and CDI
1. CDI	N/A	0.45***	N/A
2. CASI	N/A	N/A	0.55***
3. RCMAS-W	0.21**	0.19**	0.38***
4. RCMAS-C	0.32***	0.49***	0.37***
5. RCMAS-P	0.31***	0.40***	0.47***
6. RCMAS P + C	0.24***	0.38***	0.23***
7. RCMAS P + W	0.16**	−0.01 ns	0.29***
8. RCMAS C + W	0.20**	0.21**	0.19**
9. RCMAS P + C + W	0.17**	N/A	N/A
10. Severity	0.52***	0.63***	0.69***

**$P < 0.01$; ***$P < 0.001$; ns = not significant.
CDI is Children's Depression Inventory; CASI is Childhood Anxiety Sensitivity Index; RCMAS is Revised Children's Manifest Anxiety Scale; W = Worry subscale; C = Concentration subscale; P = Physiological subscale; T = total score; Severity = clinician ratings of severity of primary diagnosis.

CDI scores remained significant at or beyond the 0.01 level after controlling for each of the RCMAS subscales, for each combination of subscales and clinician ratings of severity.

Second, correlations between CASI and RCMAS total scores were computed while controlling

for CDI scores, for RCMAS subscale scores, and for clinician ratings of severity. As Table 2 indicates, the correlation between the CASI and RCMAS remained significant at or beyond the 0.01 level while controlling for CDI scores, for each of the RCMAS subscale scores, for combinations of the RCMAS subscale scores and for clinician ratings of severity but not after controlling for a combination of the Physiological and Worry-Oversensitivity subscale scores. Third, correlations between scores on the CDI and RCMAS total scores were conducted while controlling for CASI scores, for each of the RCMAS subscale scores, for combinations of the subscale scores and for clinician ratings of severity. The correlation between the RCMAS total scores and CDI scores remained significant at or beyond the 0.01 level after controlling for CASI scores, for each of the subscales, for each combination of subscales and for clinician ratings of severity (see Table 2).

Finding a positive and fairly strong correlation ($r = 0.51$) between CDI and CASI scores is consistent with the findings of Taylor *et al.* (1996) who reported a significant correlation of $r = 0.22$ between total scores on the Beck Depression Inventory and the ASI. The correlation between CASI and CDI scores remained significant, even after controlling for general anxiety and for clinician ratings of severity. This finding suggests that it is not only physiological or general anxiety that mediates the relation between CASI and CDI scores and that the relation between anxiety sensitivity and depression does not seem to be a function of the severity of the child's primary diagnosis.

Correlations between CASI and RCMAS total scores were computed while controlling