Journal of Abnormal Child Psychology, Vol. 23, No. 2, 1995

Biased Attention in Childhood Anxiety Disorders: A Preliminary Study

Michael W. Vasey,[1,2] Eric L. Daleiden,[1] Laura L. Williams,[1] and Lisa M. Brown[1]

This study provides preliminary tests of two hypotheses: (1) Anxiety-disordered children show an attentional bias toward emotionally threatening stimuli, and (2) normal controls show an attentional bias away from emotionally threatening stimuli. Twelve children, 9 to 14 years of age, with primary diagnoses of anxiety disorder were compared with 12 normal controls matched for age, gender, vocabulary level, and reading ability. Subjects completed a reaction time task that measured visual attention toward threatening versus neutral words. The anxious group showed the predicted attentional bias toward threat words. However, controls did not show the predicted bias away from threat words. These results are the first showing that biased attentional processing occurs among clinically anxious children. The potential role of such an attentional bias in childhood anxiety disorders and future direction for research are discussed.

Considerable evidence supports the existence of mood-congruent information-processing biases among anxious adults (see Logan & Goetsch, 1993, for a recent review). Among the most striking and robust of these biases occur in the encoding stage of information processing. Studies have consistently shown that anxious adults disproportionately attend to emotionally threatening versus neutral stimuli. This tendency is found among clinically anxious (e.g., MacLeod, Mathews, & Tata, 1986) as well as high-trait-anxious subjects (e.g., MacLeod & Mathews, 1988). In contrast, nonanxious

Manuscript received in final form March 29, 1994.
This research was supported by a Seed Grant and a Small Grant to the first author from The Ohio State University. Portions of this paper were presented at the 27th Annual Convention of the Association for the Advancement of Behavior Therapy, Atlanta, November 1993. Thanks are extended to the participants and all those who helped with the project.
[1]Department of Psychology, The Ohio State University, Columbus, Ohio 43210-1222.
[2]Address all correspondence to Michael W. Vasey, Ph.D., Department of Psychology, The Ohio State University, 1885 Neil Avenue, Columbus, Ohio 43210.

adults appear to inhibit attention toward such stimuli (e.g., MacLeod & Mathews, 1988; MacLeod et al., 1986).

Consistent with such adult findings, information-processing factors are becoming the subject of increased attention in the childhood anxiety literature as well (see Kendall & Chansky, 1991 and Vasey, 1993, for recent reviews). One recent study by Martin, Horder, and Jones (1992) suggested that anxious children's attention may be similarly drawn to emotionally threatening stimuli. Martin et al. compared children ages 6 to 13 years who reported fear of spiders with those who reported no fear. Subjects completed a Stroop color-naming task (Stroop, 1935) that included spider-related and neutral words as well as the usual color words. This type of emotional Stroop task has been used widely in studies of anxious adults (see Dalgliesh & Watts, 1990, for a recent review). Such studies have consistently shown that color-naming responses among anxious subjects are delayed more by emotionally threatening words than neutral words. One explanation for this effect is that anxious subjects' attention is drawn to the content of threat words more than neutral words. Therefore, less attention is available for color naming, and response latency is increased. Consistent with previous studies, Martin et al. (1992) found that spider-fearful children were significantly slower to color-name spider-related versus neutral words while nonfearful children showed no impairment.

Unfortunately, emotional Stroop tasks leave the mechanism responsible for color-naming interference unclear. Anxious subjects may be slowed because their attention is disproportionately drawn to threat words. However, slowing could also be due to interference from subjects' emotional reactions to such words or due to a defensive attentional shift away from such words (Dalgliesh & Watts, 1990). MacLeod et al. (1986) resolved this ambiguity by using a probe-detection task that measures the effect of word content on the direction of attention. In this task, pairs of words are presented briefly, one above the other, on a computer monitor. Following their disappearance, a small dot probe sometimes appears in the location of one of the words. Subjects press a button immediately upon noticing the probe's appearance. An attentional bias toward threat is shown by *shorter* probe-detection latencies when probes appear in the same position as threat versus neutral words. A bias away from threat is shown by *longer* latencies for probes that appear in the same position as threat versus neutral words.

Vasey, Elhag, and Daleiden (1994) recently reported a study of attentional biases in high- and low-test-anxious sixth and eighth graders that used an age-appropriate version of the probe-detection task. As predicted, high-test-anxious children showed an attentional bias toward threat words while low-test-anxious subjects showed a bias away from treat words. These findings provided the first evidence for the operation of such attentional biases in children. However, they were limited to a nonclinical sample. It remains to be seen whether samples of clinically anxious children and normal controls show similar biases. The goal of the present study was to replicate the findings of Vasey et al. and extend them to a clinically anxious sample in comparison to normal controls. Thus, an age-appropriate version of the probe-detection task was used to test two predictions: (1) Anxiety-disordered children will show an attentional bias *toward* threat words and (2) normal controls will show an attentional bias *away* from threat words.

METHOD

Subjects

Subjects were 12 anxiety-disordered and 12 normal 9- to 14-year-old children recruited through school systems in the Columbus, Ohio, area. Normal controls were recruited by distributing fliers describing the study to children in fourth through eighth grade in six schools. Normal controls were paid $25.00 for participating in the study. Of 20 volunteers, the first 12 (10 Caucasian and two African–American) of appropriate age and gender were included in the study. Anxiety-disordered subjects were recruited as part of a larger study by offering a free evaluation and treatment program for severely anxious 9- to 14-year-olds to all schools in the Columbus, Ohio, area. This offer yielded 35 referrals over the course of the 1992-1993 school year. A brief telephone interview was conducted to screen out inappropriate referrals. Children were excluded if they were: (1) currently taking anxiolytic medication, (2) without significant anxiety, or (3) outside the age range of interest. Following screening, 23 children were placed on a waiting list for the study. The delay between screening and diagnostic interviewing ranged from 1 week to 3 months with an average of 1 month. When recontacted, parents of nine children withdrew, reporting that their child's problem had remitted. Structured diagnostic interviews revealed that 13 of the remaining 14 children (13 Caucasian and 1 African-American) met DSM-IIIR diagnostic criteria (American Psychiatric Association, 1987) for at least one anxiety disorder. One child was excluded from the present study because he was unable to complete the probe-detection task due to a reading disability.

Children's psychiatric status was assessed via the revised Anxiety Disorders Interview Schedule for Children (ADIS-C; Silverman & Nelles, 1988). The ADIS is a psychometrically sound semistructured interview that includes separate forms for use with parents (ADIS-P) and children (ADIS-C). Both provide extensive coverage of anxiety disorders as well as all of the other major disorders of childhood and adolescence described in DSM-IIIR (APA, 1987). For each subject, the ADIS-C and ADIS-P were administered by separate interviewers (the four authors). These were one doctoral level psychologist (MV), two doctoral students in clinical child psychology (ED and LW), and one advanced undergraduate student (LB). The parent form was administered primarily to mothers (n = 21). Parent and child interviewers arrived at diagnoses separately before formulating a combined diagnosis. To assess interrater agreement at the level of the individual interview, the first author reviewed audiotapes of 50% of the interviews conducted by the other interviewers (n = 15). Cohen's kappa statistic (Cohen, 1960) showed satisfactory agreement (overall kappa = .84). Kappas for specific DSM-IIIR diagnostic categories ranged from .74 to 1.0. To assess interrater agreement for combined diagnoses, the second author reviewed the ADIS-C and ADIS-P for 13 subjects (54%) whose combined diagnoses were unknown to him. The overall kappa was .87 while agreement for individual diagnoses ranged from .58 to 1.0.

All anxious children met criteria for a primary diagnosis of at least one anxiety disorder, though most met criteria for more than one. Combined diagnoses included overanxious disorder (n = 10), separation anxiety disorder (n = 3), social phobia (n = 5), avoidant disorder (n = 3), obsessive–compulsive disorder (n = 3), posttraumatic stress disorder (n = 2), and simple phobia (n = 5). Two children also met criteria for dysthymia, one of whom also had a major depressive disorder. Except for one child who met criteria for attention-deficit hyperactivity disorder, no disruptive behavior disorders were present in this sample.

Other characteristics of the anxious and control samples are summarized in Table I. The t-tests revealed that the two groups did not differ in age, grade in school, or socioeconomic status (SES) as measured by the Hollingshead Four Factor Index (Hollingshead, 1975). The Hollingshead Index suggested that, on the average, subjects came from middle-class families. To ensure that the groups were comparable in their vocabulary knowledge, subjects completed the Vocabulary subtest of the Wechsler Intelligence Scale for Children—Revised (WISC-R; Wechsler, 1974). Also, subjects' reading recognition skills were assessed via the Word Identification subtest of the Woodcock Reading Mastery Test—Revised (WRMT-R; Woodcock, 1987). The groups did not differ on either of these measures.

Additional information concerning children's psychological adjustment was obtained through questionnaires administered to children and their parents. Means and standard deviations for these measures are shown in Table I. Several t-tests (one-tailed) revealed a number of specific differences. According to parents' reports on the Child Behavior Checklist (CBCL; Achenbach, 1991), the anxious group exhibited significantly more

Table I. Subject Characteristics: Means and Standard Deviations (*SDs*) by Group

Variable[a]	Anxiety-disordered		Normal controls	
	Mean	*SD*	Mean	*SD*
Age (years-months)	11-11	1-4	11-10	1-7
Grade	6.3	1.4	5.8	1.4
SES (Hollingshead Four Factor Index)	46.0	15.7	44.8	14.8
WISC-R Vocabulary subtest	11.9	0.9	12.2	3.2
WRMT-R Word Identification subtest (grade level)	7.6	2.0	8.1	3.6
RCMAS (*t*-score)	52.0	11.4	44.9	10.4[b]
STAIC A-Trait (*t*-score)	48.7	13.2	41.4	9.8[b]
CASI	32.4	10.2	26.0	4.2[c]
CDI	9.9	5.7	5.1	3.9[c]
CBCL—Internalizing scale	71.1	9.9	52.8	7.2[d]
CBCL—Externalizing scale	53.2	9.5	46.0	9.5[c]
CBCL—Anxiety/Depression scale	73.2	11.3	54.3	4.2[d]

[a]SES = socioeconomic status; WISC-R = Wechsler Intelligence Scale for Children — Revised; WRMT-R = Woodcock Reading Mastery Test — Revised; RCMAS = Revised Children's Manifest Anxiety Scale; STAIC = State-Trait Anxiety Inventory for Children; CASI = Children's Anxiety Sensitivity Inventory; CDI = Children's Depression Inventory; CBCL = Child Behavior Checklist.
[b]$p < .10$.
[c]$p < .05$.
[d]$p < .001$.

internalizing behavior problems, $t(22) = 5.21, p < .001$, and externalizing behavior problems, $t(22) = 1.87, p < .05$. In addition, anxious children scored significantly higher than controls on the anxiety/depression scale, $t(22) = 5.43, p < .001$. Child self-report measures revealed that anxious children's scores on the trait form of the State-Trait Anxiety Inventory for Children (STAIC A-Trait; Spielberger, 1973), $t(22) = 1.49, p < .10$, and on the Revised Children's Manifest Anxiety Scale (RCMAS; Reynolds & Richmond, 1985), $t(22) = 1.56, p < .10$, were marginally elevated relative to controls. Furthermore, anxious children reported greater anxiety sensitivity on the Children's Anxiety Sensitivity Inventory (CASI; Silverman, Fleisig, Rabian, & Peterson, 1991), $t(22) = 2.41, p < .05$, and more symptoms of depression on the Children's Depression Inventory (CDI; Kovacs, 1981), $t(22) = 2.01, p < .05$.

Measures

Probe Detection Task. Vasey et al.'s (1994) children's probe-detection task differs from that of MacLeod et al. (1986) in two ways to make it appropriate for children. First, word presentation duration is 1250 msec rather than 500 msec. MacLeod et al.'s task requires subjects to read the upper word aloud and pilot testing suggested that some children in this age range had difficulty reading the upper word before the probe's appearance at durations shorter than 1250 msec. Second, using the normative data of Dale and O'Rourke (1981), words used in the task were chosen to have a fourth-grade level of reading difficulty. The norms selected for this study represent the proportion of fourth graders in Dale and O'Rourke's sample who recognized the meaning of a given word. The present study used a minor variation of the Vasey et al. (1994) task in which the number of trials was increased from 160 to 220 and the number of threat words was increased from 40 to 44. The final set of 44 emotionally threatening words appears in Table II. On the average, these words were familiar to 80.6% of fourth graders (range = 67% to 93%) and had an average length of 6.64 letters (range = 4 to 9). Each of the threat words was matched with a neutral word of the same length and level of difficulty (±3%). Besides the 44 threat–neutral word pairs, another 44 neutral–neutral word pairs were also followed by probes. These were matched with the threat–neutral pairs for length and difficulty. An additional 132 neutral word pairs, with each pair matched for length, were used as nonprobed filler material.

The task was presented using a 25-MHz 80386 IBM-compatible computer and a 14-in. SVGA monitor. Words were printed in white on a black screen for 1250 msec, one above the other in the center of the screen and separated vertically by 3 cm. On nonprobed trials the next word pair appeared after 1 sec. On probed trials, the probe appeared 25 msec after the words were erased and remained until the subject responded. The next word pair appeared 500 msec following the subject's response. The probe appeared with equal frequency in the upper and lower word positions and followed threat words and neutral words with equal frequency in each position. Thus, these factors formed a 2 × 2 (Probe Position × Word Content

Table II. Emotionally Threatening Words Presented in the Probe-Detection Task

Abandoned	Accident	Afraid	Ashamed
Bleeding	Coward	Danger	Dangerous
Death	Disease	Disliked	Dumb
Dummy	Emergency	Fail	Failure
Flunk	Foolish	Harmful	Hated
Hospital	Hurt	Injury	Kidnapped
Killed	Lonely	Lonesome	Loser
Murder	Nervous	Painful	Poison
Punished	Rejected	Scared	Scolded
Sickness	Stranger	Stupid	Teased
Test	Unpopular	Unsafe	Worried

at the position of the probe) factorial design such that 11 of the threat–neutral word pairs appeared in each of the four conditions. The average probe-detection latency for each of the four conditions constituted the dependent variables in the present study. Each condition was matched for word difficulty and length. The probe also appeared with equal frequency in each position on the probed neutral–neutral trials.

Procedure

The study was conducted in two sessions. The first session was usually conducted in children's homes, though four families chose to be interviewed in a psychology laboratory instead. During the first session informed consent was obtained and the ADIS and all questionnaire measures were completed. The second session was conducted in a psychology laboratory. The delay between the first and second session averaged 19.9 days (SD = 12.2). During this session, in addition to the probe-detection task, subjects completed a variety of measures not related to the present study. The probe-detection task was the second measure completed, following a 45-min interview concerning strategies for coping with worrisome thoughts. Subjects completed the WISC-R and WRMT-R immediately following the probe-detection task.

To minimize distractions, the computer screen was placed so that subjects faced a wall of the room and the experimenter was seated behind the child. Before the task, a handheld button was placed in the child's dominant hand and the task instructions (see Vasey et al., 1994) were read by the experimenter. After subjects were given an opportunity to ask questions, they completed eight practice trials which were repeated as necessary until subjects showed understanding of the task. The task's duration was approximately 12 min including a 30-sec rest period after the first half of the task.

RESULTS

Data Transformation

Following the recommendations of Bush, Hess, and Wolford (1993), the probe-detection latency data were trimmed by dropping the highest and lowest value in each condition for each subject. This procedure eliminates outliers that may be due to lapses in attention, premature button presses, etc.

Primary Analyses

The mean probe-detection latencies for each condition were subjected to mixed-model analysis of variance (ANOVA) with one fixed between-subjects factor (group status) and two fixed within-subjects factors (word content at the probed position and probe position) resulting in a 2 × 2 × 2 (Group × Word Content × Probe Position) design. If anxious children bias attention toward threat words while controls bias attention away from threat, a significant Group × Word Content interaction would be expected.

The mean probe-detection latencies for the four within-subject conditions are shown in Table III. The predicted Group × Word Content interaction was not significant ($p < .54$). Thus, anxious and normal children did not uniformly differ in their allocation of attention toward threatening and neutral stimuli. However, a significant Group × Word Content × Probe Position interaction, $F(1, 22) = 4.99$, $p < .036$, did support the predicted attentional bias among anxious children. As Fig. 1 reveals, anxious children biased attention toward threatening words, but only in the lower probe position. For anxious children there was a significant Word Content × Probe Position interaction, $F(1, 11) = 9.63$, $p < .01$. Further analyses revealed that this interaction was due to a significant effect for word content in the lower probe position, $F(1, 11) = 7.98$, $p < .017$, but not in the upper probe position, $F(1, 11) = 2.26$, $p < .16$. Anxious children detected probes in the lower position significantly faster when they were preceded by threatening words than when they were preceded by neutral words. In contrast, the probe detection speed of normal controls was unrelated to word content or probe position.

Because the anxious children in the present study also reported significantly more symptoms of depression on the CDI than normal controls, correlational analyses were conducted to examine the relationship between

Table III. Mean Probe-Detection Latencies and Standard Deviations (*SD*s) in Milliseconds

	Content of word at probe position	
Group/probe position	Threat	Neutral
Anxiety-disordered		
Upper	527 (128.7)	509 (127.9)
Lower	510 (110.7)	561 (139.1)
Normal controls		
Upper	474 (97.1)	481 (119.5)
Lower	477 (75.1)	487 (107.9)

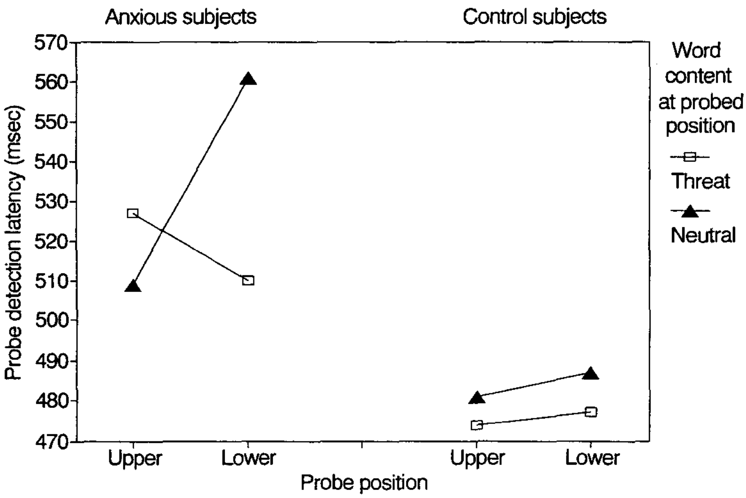

Fig. 1. Three-way interaction of Group × Word Content × Probe Position.

attentional bias and depression. For this purpose, attentional bias was represented by the difference in mean probe-detection latency between threat and neutral trials in the lower probe position. Pearson's correlation coefficient revealed no significant relationship between attentional bias and CDI scores, $r(22) = .10$, n.s.

Finally, the relationships between attentional bias and age, vocabulary, and reading recognition scores were examined in an attempt to account for those predicted effects that were not found. Bias scores were computed by subtracting the average latency for threat trials from the average latency for neutral trials. Separate scores were computed for each probe position. To make these scores comparable for both groups, the sign of this score was reversed for controls. Thus, positive scores for anxious children indicated a bias toward threat while positive scores for controls indicated a bias away from threat. This allowed both groups to be entered into the same analysis, thereby increasing statistical power. Two-tailed tests of Pearson's correlation coefficients showed no significant relationship between vocabulary scores and bias in either position. Similarly, age and reading recognition scores were not significantly related to bias in the lower position. However, bias in the upper position was significantly related to age, $r(22) = .50$, $p < .02$, and marginally related to reading recognition scores, $r(22) = .37$, $p < .10$. Thus, the tendency to show the predicted attentional biases increased with age and reading ability.

DISCUSSION

The present results support the hypothesis that anxiety-disordered children exhibit a mood-congruent attentional bias toward emotionally threatening stimuli. This is the first demonstration of such a bias among clinically anxious children. Furthermore, it replicates the finding of Vasey et al. (1994) in test-anxious children, suggesting that such an attentional bias is a reliable phenomenon among anxious children. Thus, attentional processes may play an important role in the etiology and/or maintenance of childhood anxiety. Though it remains unclear whether this bias is responsible for anxiety or results from it, in either case, it may be a powerful mechanism for maintaining and/or intensifying anxiety once it is present. Although selective attention to signals of threat is presumably adaptive in genuinely dangerous situations, a generalized bias toward threat cues might produce and maintain unnecessary and excessive anxiety. For example, Logan and Goetsch (1993) argued that, "if the threshold for identifying threat is inappropriately low, early detection might prove maladaptive . . ., perhaps maintaining a constant high level of arousal leading to unnecessary avoidance" (p. 542).

In contrast to the findings of Vasey et al. (1994), anxious children in the present study showed the predicted bias only in the lower probe position. The failure to find the bias in the upper position may reflect low power associated with the small sample sizes in this preliminary study. However, studies of adults also have not consistently found the effect in both probe positions (e.g., MacLeod & Mathews, 1988; Mogg, Mathews, & Eysenck, 1992). It may be that, while clearly replicable, the bias is relatively small and can easily be masked or disrupted by other unknown factors. Future research should focus on identifying conditions that maximize or minimize the bias.

Contrary to predictions, the normal controls in the present study did not show an attentional bias away from threat words. Instead, they attended equally to both threat and neutral words. This result is inconsistent with the findings of Vasey et al. (1994), whose low-test-anxious subjects showed a significant attentional bias away from threat words, although only in the lower position. The failure to find this effect in the present study may reflect low power associated with small sample size. However, studies of adults have been similarly inconsistent. For example, Mogg et al. (1992) found no evidence of a bias among normal controls. In fact, aside from Vasey et al. (1994), only MacLeod and Mathews (1988) have reported a statistically significant attentional bias away from threat among nonanxious subjects. Both MacLeod and Mathews and Vasey et al. differed from the present study and from other adult studies in at least one respect. In both studies, nonanxious subjects were characterized by extremely low trait anxiety scores. It may be that the tendency to bias attention away from threatening stimuli appears only among individuals who report such low levels of trait anxiety. Alternatively, it may be that such a bias appears only under conditions of high state anxiety (cf. MacLeod & Mathews, 1988). At present, based on the present findings, we agree with the conclusion of Mogg et al. that, "within the normal range of anxiety, subjects are characterized by an indifferent, rather than defensive, attentional style" (p. 156). The hypotheses that a defensive bias appears only among unusually low-anxious subjects or under condition of high state anxiety should be tested in future research.

Another explanation for the failure to find several of the predicted effects in this study is that children's age and reading ability may limit the sensitivity of the task. The present finding that the tendency to bias attention in the upper position increased with age and reading recognition scores in both groups supports this view. Given that reading speed and/or automaticity is likely to increase with age, perhaps the duration of word presentation used in the present study was not well suited to detection of attentional biases in the younger children in this sample. It may be that younger children and others whose reading skills are limited may have insufficient time or attentional resources to adequately process the word pairs. If so, they should show no evidence of bias in such a task. However, if that is the case, it is unclear why an age effect was not also found in the lower position or why anxious children showed significant bias in that position. Clearly, future studies must explore the impact of factors other than anxiety status (e.g., age or reading ability) on the probe detection task. For example, word presentation duration and age could be systematically varied to determine the optimal duration for a given age. Alternatively, it may be possible to develop other attentional bias measures that would not be as susceptible to the effects of age, perhaps by using tasks that do not rely on reading ability (e.g., pictorial or auditory tasks).

Since the present study did not compare emotionally threatening words to other types of emotionally arousing words, (e.g., positive words), we cannot conclude that anxious children's attentional bias is exclusive to threatening stimuli. This issue has been the center of some controversy (Martin, Williams, & Clark, 1991; Mathews & Klug, 1993). Martin et al. found that anxious adults' color-naming speed was disrupted as much by positive as by threatening words when words were matched for emotional intensity. However, more recently, Mathews and Klug showed that color naming is disrupted by positive words only when they are semantically related to anxiety (e.g., *relaxed* vs. *romantic*). Thus, at present it appears that the bias may be exclusive to threat-related words, though such words may be positive in valence. This is clearly an important issue that should be examined in future studies by including words with positive valence in the probe-detection task.

In conclusion, though small in size, this study provides clear evidence that clinically anxious children, like their adult counterparts, show an attentional bias toward emotionally threatening stimuli. This study and that of Vasey et al. (1994) demonstrate that the probe detection paradigm of MacLeod et al. (1986) can successfully be adapted for use with children. This task is an important addition to the array of techniques available to assess cognitive factors, not just in childhood anxiety, but in childhood psychopathology in general. It should stimulate exciting research in the future.

REFERENCES

Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist-/4-18 and 1991 Profile.* Burlington: University of Vermont, Department of Psychiatry.

American Psychiatric Association (1987). *Diagnostic and statistical manual of mental disorders* (3rd ed., rev.). Washington, DC: Author.

Bush, L. K., Hess, U., & Wolford, G. (1993). Transformations for within-subject designs: A Monte Carlo investigation. *Psychological Bulletin, 113,* 566-579.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measures, 20,* 37-46.

Dale, E., & O'Rourke, J. (1981). *The living word vocabulary.* Chicago: World Book-Childcraft International.

Dalgliesh, T., & Watts, F. N. (1990). Biases of attention and memory in disorders of anxiety and depression. *Clinical Psychology Review, 10,* 589-604.

Hollingshead, A. B. (1975). *Four factor index of social status.* Unpublished manuscript, Department of Sociology, Yale University, New Haven, CT.

Kendall, P. C., & Chansky, T. E. (1991). Considering cognition in anxiety-disordered children. *Journal of Anxiety Disorders, 5,* 167-185.

Kovacs, M. (1981). Rating scales to assess depression in school-aged children. *Acta Paedopsychiatrica, 46,* 305-315.

Logan, A. C., & Goetsch, V. L. (1993). Attention to external threat cues in anxiety states. *Clinical Psychology Review, 13,* 541-559.

MacLeod, C., & Mathews, A. (1988). Anxiety and allocation of attention to threat. *The Quarterly Journal of Experimental Psychology, 40,* 653-670.

MacLeod, C., Mathews, A., & Tata, P. (1986). Attentional bias in emotional disorders. *Journal of Abnormal Psychology, 95,* 15-20.

Martin, M., Horder, P., & Jones, G. V. (1992). Integral bias in naming phobia-related words. *Cognition and Emotion, 6,* 479-486.

Martin, M., Williams, R. M., & Clark, D. M. (1991). Does anxiety lead to selective processing of threat-related information? *Behavior Research and Therapy, 29,* 147-160.

Mathews, A., & Klug, F. (1993). Emotionality and interference with color-naming in anxiety. *Behaviour Research and Therapy, 31,* 57-62.

Mogg, K., Mathews, A., & Eysenck, M. (1992). Attentional bias to threat in clinical anxiety states. *Cognition and Emotion, 6,* 149-159.

Reynolds, C. R., & Richmond, B. O. (1985). *Manual for the Revised Children's Manifest Anxiety Scale.* Los Angeles: Western Psychological Services.

Silverman, W. K., Fleisig, W., Rabian, B., & Peterson, R. A. (1991). The childhood anxiety sensitivity index. *Journal of Clinical Child Psychology, 20,* 162-168.

Silverman, W. K., & Nelles, W. B. (1988). The Anxiety Disorders Interview Schedule for Children. *Journal of the American Academy of Child and Adolescent Psychiatry*, *27*, 772-778.
Spielberger, C. D. (1973). *Manual for the State-Trait Anxiety Inventory for children*. Palo Alto, CA: Consulting Psychologists Press.
Stroop, J. R. (1935). Studies of interference in serial verbal reactions. *Journal of Experimental Psychology*, *18*, 643-662.
Vasey, M. W. (1993). Development and cognition in childhood anxiety: The example of worry. In T. H. Ollendick & R. J. Prinz (Eds.), *Advances in clinical child psychology* (Vol. 15); (pp. 1-39). New York: Plenum Press.
Vasey, M. W., Elhag, N., & Daleiden, E. L. (1994). *Anxiety and the processing of emotionally-threatening stimuli: Distinctive patterns of selective attention among high- and low-anxious children*. Manuscript submitted for publication.
Wechsler, D. (1974). *Manual for the Wechsler Intelligence Scale for Children — Revised*. New York: The Psychological Corporation.
Woodcock, R. W. (1987). *Woodcock Reading Mastery Tests — revised examiner's manual*. Circle Pines, MN: American Guidance Service.