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Test Anxiety in Elementary and Secondary School Students

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In this article, we review the literature on the development of test anxiety in elementary and secondary school children. Recent theoretical conceptualizations of anxiety are presented. Anxiety is posited to be a multidimensional construct that has roots in how parents react to children's early achievement strivings. Its ontogeny is tied to children's developing capacity to interpret their school performance relative to their previous performance, to the performance of other children, as well as to the increasingly strict evaluative practices children encounter as they move through school. Intervention strategies for alleviating anxious children's poor performance in evaluative situations are discussed. Important issues for future anxiety research are presented, including the need for new measures of children's anxiety and for a more thorough assessment of both individual differences in how students experience anxiety and the developmental course of the components of anxiety.

Test anxiety continues to be a significant educational problem in our schools. K. T. Hill (1980, 1984) suggested that as many as 10 million students in elementary and secondary school perform poorer on tests than they should because anxiety and deficiencies in test-taking strategies interfere with their performance. Often, anxious students also have poor study habits and difficulty organizing material and, therefore, do not adequately process information that is presented to them in class (Benjamin, McKeachie, & Lin, 1987; Culler & Holahan, 1980). Despite the importance of this problem, we still know relatively little about how anxiety

develops over the elementary and secondary school years, because most of the research on test anxiety has been done with college students and adults.

In this article, we review the work that has been done on test anxiety in school-age students and update earlier reviews of this work by Dusek (1980) and K. T. Hill (1972). We have several purposes in doing this review. First, there have been important theoretical advances in our understanding of anxiety, and we discuss these conceptualizations and how they can guide new work on the development of anxiety. Second, we tie work on the development of anxiety to the literature on the development of children's achievement self-perceptions. Third, we focus on changes in children's processing of the performance feedback they receive and increases in the evaluative pressure children face in school as mechanisms for explaining why anxiety increases for some children. Last, we critically review the various anxiety intervention studies done with children and discuss how future intervention studies can build on previous work.

Due to space limitations, we had to be somewhat selective in our review and focus on test anxiety rather than on more general school anxiety or anxiety about specific school subjects such as mathematics. Readers interested in these other topics are referred to Phillips's (1978) and Phillips, Pitcher, Worsham, and Miller's (1980) reviews of the school anxiety literature and Richardson and Woolfolk's (1980) and Ramirez and Dockweiler's (1987) reviews of the literature on math anxiety. Along with our own survey of the test anxiety literature, we used Hembree's (1987) excellent bibliography of the test anxiety literature to find relevant studies.

CONCEPTUALIZING TEST ANXIETY

Recent conceptualizations of test anxiety have emphasized cognitive aspects of test anxiety. Several theorists (e.g., Geen, 1980; Mueller, 1980; I. G. Sarason, 1980, 1986; Wine, 1971, 1980) hypothesized that performance differences between high- and low-anxious individuals reflect differences in their attention to the tasks they are doing: Low-anxious individuals maintain their focus on the task at hand while they are being evaluated, whereas high-anxious individuals divide their attention between the task and their ruminations about how they are doing, thus concentrating less on task performance and so doing less well.

There is evidence supporting this cognitive-attentional model. High-anxious adults have more task-irrelevant thoughts than low-anxious adults while they are doing evaluative tasks (Mandler & Watson, 1966; I. G. Sarason & Stoops, 1978), and these thoughts often focus on negative personal characteristics (Doris & S. B. Sarason, 1955; I. G. Sarason & Glanzer, 1962, 1963; I. G. Sarason & Koenig, 1965). Such task-irrelevant,

self-deprecatory thinking is especially likely when tasks are introduced as assessments of ability (I. G. Sarason, 1972). High-anxious children also have been shown to attend less well to important information needed for problem solving (Dusek, Kermis, & Mergler, 1975; Dusek, Mergler, & Kermis, 1976) and are off-task more during problem solving (Nottlemann & Hill, 1977).

Building on the cognitive-attentional model, Tobias (1980, 1985, 1986) discussed how anxiety interferes with students' learning from instruction. Tobias argued that anxiety can interfere with cognitive processes that students utilize in learning situations. He believed anxiety has its greatest effects at three points during the instructional process: in students' initial representation of material presented to them (*preprocessing stage*, in his terms), in their cognitive processing of that material after it is presented (*processing stage*), and in their reproduction of that material (*production stage*), such as on tests (see Tobias, 1980, for a review of evidence). This model is important because most researchers only have considered how anxiety interferes with performance when students are reproducing learned material.

Other theorists have identified different components of test anxiety, instead of assuming that it is a unidimensional construct. Liebert and Morris (1967) distinguished between worry, the cognitive component of anxiety, and emotionality, the more physiological/affective part of anxiety (i.e., nervousness and tension). They stated that worry stems from cognitive and attentional cues associated with poor performance in evaluative settings. Emotionality is a classically conditioned autonomic/affective reaction to cues associated with evaluation. Morris and Liebert (1973) showed that these two components can be empirically distinguished, though they are correlated. They also found that worry relates more strongly and negatively to test performance than does emotionality (see Deffenbacher, 1980, and Morris, Davis, & Hutchings, 1981, for reviews of the work on worry and emotionality).

In the developmental literature, Dunn (1964, 1965) and Feld and Lewis (1969) assessed whether there are different components of anxiety in elementary school-aged children, using S. B. Sarason, Davidson, Lighthall, Waite, and Ruebush's (1960) Test Anxiety Scale for Children (TASC) to assess anxiety. Dunn's work was done with fourth and fifth grade children, and Feld and Lewis's work with second grade children. In each study, four distinct (but correlated) factors or components of anxiety were identified. These factors were conceptually quite similar across the studies. Feld and Lewis labeled these factors: Test Anxiety, Poor Self-Evaluation, Somatic Signs of Anxiety, and Remote School Concerns (listed in order of the amount of variance in anxiety scores explained by each factor). In subsequent analyses, Feld and Lewis found that the scale based on the Poor

Self-Evaluation factor, which taps children's tendency to negatively evaluate their ability to do well on tests, related more strongly to school performance than did scales based on the other factors. Nicholls (1976), using a revised version of the TASC, also identified Poor Self-Evaluation, Test Anxiety, and Somatic Signs of Anxiety in a group of sixth graders. As in Feld and Lewis's study, the Poor Self-Evaluation factor related stronger to children's achievement test scores than did the other factors.

In comparing these different studies of the components of anxiety, the Poor Self-Evaluation and Test Anxiety factors seem similar to Liebert and Morris' worry component, in that they all encompass concern over performance and whether one's ability is adequate for the task. Somatic Signs of Anxiety and Emotionality are similar; both refer to the physiological/affective aspects of anxiety. Furthermore, across all the studies, the cognitive/self-evaluative component related strongest to performance. The comparability of these factors and their different relations to performance suggest it is useful to distinguish these different components of anxiety.

To build on this work, we believe researchers need to examine more fully individual differences in how students experience anxiety, rather than assuming all students experience anxiety in similar ways or for similar reasons. For instance, Wigfield and Eccles (in press) discussed how the experience of anxiety may vary for bright and less bright students. Many less bright students may become anxious because they cannot do the work in school; as their failure experiences increase over the school years, their anxiety also may increase. For these students, their poor performance may lead to increases in their anxiety. In contrast, certain bright students may become anxious because of unrealistic parental, peer, or self-imposed expectations that they should excel in all academic areas. These unrealistic expectations could heighten their anxiety in evaluative situations, so that they may perform less well than they should, even though they are capable of doing the work. For these students, the anxiety they experience may be causing their performance problems. Reducing the evaluative pressure they feel should benefit their performance.

Similarly, Benjamin et al. (1987) distinguished between anxious students who have good study habits but cannot handle evaluative pressure and those that have poor habits and, therefore, do not master the material presented to them. Again, these different kinds of anxious students will perform poorer for different reasons. Those with good study habits presumably have mastered the material presented to them, but cannot reproduce it due to their difficulty coping with evaluative pressure. They should be able to demonstrate their competence in more relaxed testing conditions. Those with poor study habits did not learn material well and, so, may be nervous in testing situations because the tests cover things they have not mastered. Changing testing conditions would not necessarily

improve these students' performance; they also may need study skills training.

Last, the distinction between state and trait anxiety (Spielberger, 1966) has been relatively neglected in the developmental literature. We know little about how the anxiety experience differs for children experiencing trait anxiety compared to those who only experience anxiety in certain situations. We know even less about the developmental course of state and trait anxiety.

MEASURING ANXIETY

There are a myriad of questionnaire measures that assess test anxiety, mostly for use with adults (see I.G. Sarason, 1980, for discussion of the most frequently used scales). The major scale used to assess anxiety in children is S. B. Sarason et al.'s (1960) TASC. This 30-item scale taps several different aspects of anxiety, as we have just seen, though most researchers use it to give an overall indication of the child's anxiety. S. B. Sarason et al. (1960) developed a Lie Scale for Children (LSC) to be used in conjunction with the TASC, to deal with the problem that some children may not be willing to admit anxiety. One item on this scale is: "Do you ever worry?" K. T. Hill (1972) recommended using both TASC and LSC scores to obtain an accurate indication of children's anxiety (see also O'Reilly & Wightman, 1971).

Although this scale has proven quite useful, there are some problems with it. Nicholls (1976) showed that individual items on the TASC confound children's anxiety and with their negative self-evaluations of ability (e.g., "When the teacher says that she is going to give the class a test, do you become afraid you will do poor work?"). He rewrote the scale to separate these constructs and found that a scale based on items assessing only negative evaluations of ability related more strongly to achievement than did a scale assessing only test anxiety. Nicholls thus argued that negative self-evaluations of ability (or low self-concept of ability), rather than anxiety, may be the more important mediator of student performance (see also Covington, 1983, 1986; Fennema & Sherman, 1976).

A second problem is that many of the items on the TASC are complexly worded (e.g., "If you are absent from school and miss an assignment, how much do you worry that you will be behind the other students when you come back to school?"). These items may be difficult for young children to answer; the TASC may be less reliable for those children. Perhaps more simply worded items would provide a better measure of anxiety for young children.

Though the TASC assesses cognitive and physiological aspects of anxiety,

it does not really address the more recent theoretical conceptualizations of those components, particularly the worry component and how self-deprecatory thoughts can interfere with the individuals' performance on evaluative tasks. To tap these conceptualizations, some of the adult anxiety scales could be adapted for use with children. For instance, it would be very interesting to assess developmental differences in worry and emotionality, to see which component may develop first, and how each relates to test performance during the school years. Similarly, I. G. Sarason and Stoops's (1978) Cognitive Interference Questionnaire could be adapted for use with children to assess how high-anxious and low-anxious children may differ in their thought processes as they do evaluative tasks and how such differences change over time.

In sum, the measurement of anxiety in children has not kept pace with theoretical advances in conceptualizing anxiety. New questionnaire measures of anxiety that better separate anxiety and negative self-evaluations of ability need to be developed. In addition, measures of anxiety should try to assess anxiety as a process, because it seems students' anxiety changes over the course of completing a test (see Becker, 1982). Finally, other kinds of anxiety measures to supplement self-report measures, such as observational measures, teacher reports, or behavioral measures, need to be developed.

THE DEVELOPMENT OF ANXIETY

S. B. Sarason et al. (1960) proposed that anxiety emerges when parents with overly high expectations for their child's behavior react critically to their child's performance in evaluative settings. Building on this view, K. T. Hill (1972) postulated that strong critical reactions by parents lead children to become very sensitive to adult reactions. Anxious children thus become strongly motivated to obtain praise and avoid criticism and failure.

Few studies have assessed these predictions. Adams and I. G. Sarason (1963) reported that high school students' anxiety relates to their mothers' anxiety, with the relations somewhat stronger for girls and their mothers than for boys and their mothers. We know of no similar study with younger children, and do not know if parents' anxiety and their children's anxiety are related during the early school years. In a study that can be more directly used to evaluate K. T. Hill's (1972) predictions, Hermans, ter Laak, and Maes (1972) observed high- and low-anxious children working with their parents on a problem-solving task. Parents of high-anxious children provided less support for their children's achievement strivings, rejected children's bids for attention, and withheld reinforcement following successful task completion. Parents of low-anxious children were more constructive and enthusiastic and helped their children find adequate problem-

solving strategies. This study provides some support for the theoretical claims of S. B. Sarason et al. (1960) and K. T. Hill (1972), but does not give a complete test for their views. We need more studies assessing how parental reactions to children's performance in achievement situations shape children's later reactions to being evaluated in school. Do harsh, negative parental reactions foster high anxiety early on, so that children are already anxious when they come to school? Or do those reactions create a propensity towards being anxious, so that when children encounter difficulties in evaluative situations in school they become anxious? We know little of these patterns.

Researchers have examined more fully how the correlations between anxiety and test performance change over the elementary and secondary school years (see K. T. Hill, 1972). K. T. Hill and S. B. Sarason (1966) assessed (using the TASC and LSC) the development of test anxiety across the elementary school years in a sample of 700 mostly White, lower middle-class children. Children's total anxiety scores increased over this time period. The negative correlations between anxiety and achievement test scores increased from essentially 0 at Grades 1 and 2, to between $-.20$ and $-.30$ at Grades 3 and 4, and, in some groups, to $-.44$ in Grades 5 and 6. Willig, Harnisch, Hill, and Maehr (1983) found that in junior high school, the correlations between anxiety and performance were $-.48$ for a group of Hispanic students, $-.35$ for Black students, and $-.27$ for White students. Fyans (1979), in a statewide study of fourth-, eighth-, and 11th-grade students in Illinois, found that the negative correlations between anxiety and test performance increased across the grade levels, reaching $-.60$ at 11th grade. And Payne, Smith, and Payne (1983) found higher negative correlations between test anxiety and science test scores among eighth grade students than among fourth grade students. These higher correlations could be due, in part, to older children answering questions on anxiety measures more reliably, but the consistency in these findings suggests that the relation between anxiety and test performance do become stronger across the school years. In terms of levels of anxiety, Manley and Rosemier (1972) found that junior high school boys had higher mean levels of text anxiety than did high school boys, suggesting that anxiety may peak in junior high. Girls' test anxiety scores also declined somewhat after the junior high years, but the pattern was not as consistent as that in the boys' scores.

Gender differences in anxiety have emerged in these developmental studies. K. T. Hill and S. B. Sarason (1966) found that by third grade, girls' mean TASC scores were higher than boys' scores, but boys' LSC scores were relatively higher than those of girls. Others also have found that girls' anxiety scores are higher than boys' scores in both elementary and secondary school (Douglas & Rice, 1979; Manley & Rosemier, 1972).

K. T. Hill (1972) postulated that the gender differences in TASC and LSC

scores are due to boys' greater defensiveness about admitting anxiety and concluded that the experience of anxiety is similar for boys and girls. This issue deserves closer scrutiny. Boys and girls may become anxious for different reasons or be anxious about different things. There is evidence that girls are more sensitive about social approval from adults than are boys (Dweck & Bush, 1976; Maehr & Nicholls, 1980), and perhaps their anxiety reflects this sensitivity. Boys seem more sensitive to peer evaluation (Dweck & Bush, 1976). Boys' and girls' changing interests also may play a role in what they become anxious about. During early adolescence, girls may come under more pressure to conform to feminine stereotypes (J. P. Hill & Lynch, 1983) and may also become more concerned with social activities and popularity than do boys. Thus, they may become more anxious about social acceptance than boys. Different school subjects, such as math and English, also may elicit different kinds of anxious reactions in boys and girls, in part because they may be stereotyped as masculine or feminine (see Meece, 1981).

Explaining the Development of Anxiety:

I. Children's Processing of Evaluative Feedback

In general, the studies of the development of test anxiety have been descriptive and correlational, and so we do not yet know how the experience of test anxiety changes over the school years. We believe developmental changes in anxiety can be better understood by examining changes in children's processing of the evaluative feedback they receive in school, looking at changes in their achievement self-perceptions, and seeing how school evaluative practices change across the school years. During the early elementary school years, children receive much information about their school-related abilities, as teachers grade them on different tasks. They also obtain information about how their performance compares to that of same-aged peers. Initially, children are very positive about how well they are doing in school and on different achievement tasks, even if they are not doing well in an "objective" sense. For instance, Parsons and Ruble (1977) found that preschool children maintained high expectancies for future success on achievement tasks, even after doing poorly on several trials. Early elementary school children lowered their expectancies somewhat after failure, but their expectancies remained higher than those of older children. Entwisle and Hayduk (1978) had first- and second-grade children from middle and working class backgrounds predict what kind of grades they would achieve in school. Both groups expected As in first grade. Those children subsequently receiving low marks (particularly the working class children) did not modify their expectancies, and so there was little correspondence between their expectancies and the grades they were receiving. It

was not until the end of the second-grade year that children's expectancies began to correlate with the grades they received. Similarly, children in the early elementary grades tend to rank their school performance at or near the top of their class, and their ratings do not correlate highly with their actual school performance (Nicholls, 1978). And although children in kindergarten and first grade are aware of others' performance, they do not seem to use that information in their self-assessments until around the second-grade year (see Ruble, 1983).

During the elementary school years, these optimistic beliefs begin to change. Children's expectancies become more responsive to the actual outcomes they experience: Those children experiencing success continue to have high expectancies, but children experiencing failure begin to lower their expectancies (Parsons & Ruble, 1977; Rholes, Blackwell, Jordan, & Walters, 1980). Children no longer always rank themselves at the top of their class, and by fourth grade, their perceptions of attainment show moderate correlations with school grades (Nicholls, 1978). They also begin to use social comparison information more in evaluating their performance (see Ruble, 1983).

In addition, children's understanding of their abilities changes during this time period. Early on (Ages 5 and 6), children tend to equate judgments of ability and effort, so that they view smartness and trying hard as synonymous and also believe that trying hard will increase one's ability. By Age 11 or 12, many children can separate these two causal categories and come to realize that those with more ability often can succeed without trying very hard, whereas those with less ability, no matter how hard they try, will not be totally successful (Nicholls, 1978, 1984). In a similar vein, Dweck and Bempechat (1983) discussed how young children take an incremental view of ability, which means that they think their abilities can increase through practice and effort. Many older children begin to view ability as a stable entity that cannot be changed very much, regardless of effort. Other older children maintain the belief that their abilities can continue to improve. The studies just reviewed were done in laboratory-type settings, and Blumenfeld, Pintrich, Meece, and Wessels (1982) discussed how the teacher feedback children receive in school emphasizing the importance of trying actually may keep many children thinking that effort will lead to improvement in their abilities. However, results of the laboratory-type studies do show that by the end of the elementary school years, children can distinguish ability and effort as causal categories.

How do children's success and failure experiences, changes in their ability perceptions, and greater use of social comparison relate to increases in anxiety and the stronger negative relations between anxiety and performance we have noted? Concerning children's success and failure experiences, K. T. Hill (1972) hypothesized that children who succeed on most

school tasks will approach new evaluative situations with confidence and will be more motivated to approach success than to avoid failure. Children who experience failure and/or critical reactions from adults will become anxious about evaluation, and they will be more motivated to avoid failure than to approach success, especially when they know the task assesses their abilities. We suggest further that it is the timing and accumulation of failure experiences that is the key, given that early failures do not seem to greatly affect children's expectancies for success or perceptions of attainment. As children get older, failure experiences appear to have a stronger impact on their self-perceptions. These later failure experiences will make children more anxious about failure and perhaps lead them to try to avoid situations in which failure might occur.

Repeated failure experiences also diminish children's perceptions of their ability and lead some children to think their failures are due to a lack of ability (see Dweck & Goetz, 1978). When this occurs, children experience negative affect, such as shame and humiliation (Covington & Omelich, 1979; Weiner, Russell, & Lerman, 1979). Covington (1986) showed that perceptions of low ability also lead to anxiety reactions in evaluative settings. We suggest that this pattern is most likely for those children who begin to view ability as a stable entity. If failure is due to a lack of stable ability, then children will think they do not have much chance of improving. These perceptions should heighten children's evaluative anxiety, because children will anticipate doing poorly when they are tested.

Children's increasing use of social comparison information should also influence the development of anxiety. Children who believe they are competent relative to peers should feel more positive about their school performance and learning and feel less anxious than those who believe they are less competent than their peers. R. Schwarzer and Lange (1983) and R. Schwarzer and C. Schwarzer (1982) showed that changes in German students' comparison groups influenced their test anxiety. Students in heterogeneously grouped classes who were performing well reported experiencing less anxiety than the students doing poorly in those classes. However, once students were tracked into homogeneously grouped schools, the high-performing students (now grouped only with other high performers) reported more anxiety, whereas the low-performing students' anxiety decreased.

To date, researchers have not assessed systematically how these different processes relate to the development of anxiety. To go beyond the descriptive developmental studies that have been done, we must obtain a clearer picture of how these different processes influence (and are influenced by) anxiety. We believe that anxiety is most likely to develop among those children doing somewhat poorly in school, who view their abilities as stable entities that they cannot change much and compare themselves to others doing much

better than themselves. Untangling the causal relations among these different constructs will be difficult, but it is essential if we are to obtain a better understanding of the ontogeny of anxiety.

Referring to the work on distinguishing components of anxiety, we also need to assess how the different components of anxiety develop over time, rather than assuming it is a unitary construct. Dunn's (1964, 1965) work with fourth- and fifth-grade children and Feld and Lewis's (1969) work with second grade children showed that different components of anxiety can be identified in each of these age groups. However, we know little of how these components become differentiated or change over time. We suggest the following developmental pattern. Children's anxiety first may be characterized more by emotional-affective responses to failure experiences and, later, by more cognitive or worry responses. Young children are not overly self-reflective or aware of their cognitions (see Harter, 1983); therefore, it is doubtful they would engage in the self-preoccupied thought pattern associated with worry. Instead, young children may simply become upset by repeated difficulty or failure and spend more time off task (see Nottlemann & K. T. Hill, 1977). As children better understand the consequences of failure and become more self-reflective and aware of their own cognitions (Harter, 1983), it is likely their anxiety will change into cognitive concerns over performing poorly. Zatz and Chassin (1983, 1985) found that high-anxious fifth and sixth graders report more self-deprecatory cognitions than do low- or middle-anxious children, suggesting that worry does characterize older elementary school-aged children's anxious reactions. Interestingly, however, the high-anxious children in their studies report more on-task thoughts as well as these self-deprecatory cognitions. More studies of this kind with different-aged children need to be conducted so that we can understand better the development of the worry component of test anxiety.

Explaining the Development of Anxiety: II. The School Environment and Anxiety

Several factors in the school environment can be linked to the development of anxiety, including the ways in which teachers interact with and instruct students, the structure of the classroom environment, and the kinds of evaluations that occur in school. Concerning teacher-student interactions, in S. B. Sarason et al.'s (1960) and K. T. Hill's (1972) theoretical perspectives, teachers (like parents) who set overly high standards and/or criticize students too harshly should be more likely than other teachers to foster anxiety in their students. In partial support of this view, Zatz and Chassin (1985) reported that high-anxious children perform more poorly on tests than low- or middle-anxious students in classes in which students generally perceive the threat of evaluation to be high. These performance

differences did not occur in classes where students perceived low-evaluative threat. In general, however, few studies have tested Sarason et al.'s and Hill's predictions, and researchers doing classroom observation studies of the relation between teacher criticism and anxiety have found that teacher criticism only weakly predicts anxiety (e.g., Zimmerman, 1970).

Teachers' classroom instructional practices have been shown to have an impact on students' anxiety and performance. Studies in this area (see Cronbach & Snow, 1977; Tobias, 1980, 1986) show that certain kinds of instructional strategies, such as presenting material in an organized fashion and making sure the material is not too difficult, facilitate the performance of anxious students. Loosely structured, student-centered instructional strategies have been found to work less well with anxious students, presumably because the greater uncertainty in those kinds of situations poses a stronger evaluative threat to the anxious students. Again, work in this area does not always produce consistent findings. These processes should be examined more closely, particularly because results of some recent studies indicate that when students have some control over their instruction, their motivation is facilitated (see Eccles, Midgley, & Adler, 1984).

Changes in the classroom environment over time may also increase the evaluative pressure students feel. The transition to junior high school seems an especially important point at which many changes occur in the school and classroom environments of most students. Eccles et al. (1984) discussed some of the major ways in which students' school experiences change between elementary and junior high. These changes include moving from a smaller to a larger school, having different teachers (and classmates) for each subject, which disrupts children's social networks, experiencing between-classroom ability grouping, being graded more strictly, and having fewer decision-making opportunities and less autonomy. They argued that these changes make the school environment more impersonal, threatening, and unpleasant for many students.

Eccles et al. hypothesized that these changes, particularly the increasing emphasis on how students' ability compares to others' ability and the decreasing student autonomy, are important causes of the changes in children's achievement beliefs and motivation that have been shown to occur at this time period. Following the junior high school transition, students have lower intrinsic motivation (Gottfried, 1981; Harter, 1981) and less confidence in their abilities, particularly in math (Eccles et al., 1983). As mentioned earlier, students report higher levels of anxiety in junior high than in senior high school (Manley & Rosemier, 1972). Harter, Whitesell, and Kowalski (1987) assessed students' anxiety in sixth, seventh, and eighth grades, and also their retrospective reports of their anxiety the year before. For each grade group, reports of current anxiety were higher than the

reports of last year's anxiety, and these differences increased over the three grade groups. Further, students who believed their school environment was becoming more evaluative and that social comparison was more prevalent in the current school year reported feeling more anxious about school.

We hypothesize that the changes in evaluation practices are the key school environment factor relating to increases in anxiety. As children move through school, the grades they receive become increasingly differentiated, often going from ratings of satisfactory or unsatisfactory to A-B-C-D-E letter grades. Moreover, many studies have shown that by secondary school, teachers adopt stricter grading policies, so that students' grades decline after the transition to junior high (Blyth, Simmons, & Bush, 1978; Kavrell & Petersen, 1984; Schulenberg, Asp, & Petersen, 1984). Grades also take on more meaning, as high school grade point averages (GPAs) are used for college admission and employment selection.

K. T. Hill (1977) and K. T. Hill and Wigfield (1984) discussed how letter grades can promote a focus on ability perceptions, competition, social comparison, and negative self-evaluations, and so increase anxiety. Unfortunately, studies assessing the impact of various grading practices on anxiety are not available. K. T. Hill (1977) and K. T. Hill and Wigfield (1984) recommended that alternative grading systems be explored, particularly at the elementary school level. They are currently testing how a grading system with separate marks for achievement, effort, and conduct relates to students' anxiety.

Standardized achievement testing is another form of school evaluation that can pose problems for anxious children. As with grades, tests have greater consequences for students' futures during the secondary school years. Minimal competency tests and tests like the American College Test (ACT) and the Scholastic Aptitude Test (SAT) play a major role in what options are open to students. Studies conducted with both adults and children show that high-anxious individuals perform less well than low-anxious individuals when tasks are introduced as tests of ability (e.g., Barnard, Zimbardo, & S. B. Sarason, 1968; Lekarczyk & K. T. Hill, 1969; McCoy, 1965; I. G. Sarason, 1972), and many achievement tests are introduced in this fashion (Hill & Wigfield, 1984). Test time pressure is another key factor: When laboratory tasks or actual school achievement tests are performed under time pressure, high-anxious children do more poorly than low-anxious children, but when time pressure is reduced, high-anxious children's performance improves substantially (K. T. Hill & Eaton, 1977; K. T. Hill, Wigfield, & Plass, 1980; Plass & K. T. Hill, 1986). To illustrate, K. T. Hill and Eaton (1977) found that when high- and low-anxious fifth- and sixth-grade students worked on basic arithmetic problems under time limits, the high-anxious children made three times as many errors and took twice as long to complete the problems as the

low-anxious children did. When children were allowed all the time they needed to finish the problems, high-anxious children performed as well and as quickly as the low-anxious children. K. T. Hill (1980) noted how the use of timed tests becomes more prevalent and test time limits become stricter as children move through school. The key point emerging from this work is that by changing test conditions, anxious students' performance can be improved.

The work reviewed in this section shows that children's anxiety increases over time and relates negatively to their performance in school. We tried to show how changes in anxiety can be linked to changes in children's processing of the evaluative feedback they receive, as well as the increasing evaluative pressure that students face as they proceed through school. More important, the interaction of these different factors may be particularly meaningful in explaining the development of anxiety. As children process evaluative feedback in more sophisticated ways, compare their performance more with that of other children, and alter their expectancies and ability perceptions in response to information about success or failure, they also face stricter school evaluative practices. For children doing poorly (either objectively or because they have overly high expectations), these stricter evaluative practices should further increase their anxiety. Hence, schools that emphasize competition between students and social comparison and have strict ability-based evaluation should be most likely to foster the development of anxiety. We turn next to a discussion of what can be done about these problems.

ANXIETY INTERVENTION PROGRAMS

Many test anxiety intervention programs have been developed for use with college students and adults (see Deffenbacher, 1980; Denny, 1980; Tryon, 1980; and Wine, 1980; for reviews). Most treatment programs have emphasized systematic desensitization and relaxation techniques and have focused on the emotionality component of anxiety. In general, these programs produce posttest reductions in anxiety, but little change in test performance (see Denny, 1980; Tryon, 1980). As both Tryon (1980) and Wine (1980) discussed, this emphasis on desensitization/relaxation should be changed to a greater focus on dealing with the cognitive component of anxiety, because worry has been shown to relate more strongly to test performance. Programs focusing more on worry reduction may be more successful in improving performance as well as reducing anxiety (see Meichenbaum & Butler, 1980).

Fewer test anxiety intervention studies have been done with children, particularly children in elementary school (Hembree, 1987), and in most of

those studies, desensitization and relaxation procedures have been used to reduce anxiety (e.g., Barabasz, 1973; Deffenbacher & Kemper, 1974; Laxer, Quarter, Kooman, & Walker, 1969; Laxer & Walker, 1970; Mann, 1973; Mann & Rosenthal, 1969). In these studies, students worked through a desensitization hierarchy, usually in group settings. Generally, the hierarchy began with slightly threatening or nonthreatening items, such as imagining that the teacher announced an upcoming test, and proceeded through more and more threatening items, such as imagining taking home a test with a poor grade on it. Students worked through each item in the hierarchy until all felt relaxed imagining each situation. Often the training also included relaxation training. In some of the studies different combinations of the two treatments were used. As was the case in the adult literature, most of these studies showed high-anxious students' anxiety was reduced following training, as compared to high-anxious children in control groups (Barabasz, 1973; Laxer et al., 1969; Laxer & Walker, 1970; Mann, 1973; Mann & Rosenthal, 1969). In some studies, anxious students' performance also improved. For instance, Barabasz (1973) reported that high-anxious fifth- and sixth-grade children who received group desensitization training showed significant improvement in Lorge-Thorndike IQ scores relative to high-anxious children in a control group. Deffenbacher and Kemper (1974) reported significant improvement in anxious sixth-grade children's GPAs following desensitization training. And Mann (1973) and Mann and Rosenthal (1969) found that following desensitization training, high-anxious junior high school students outperformed high-anxious students in a control group on the Gates-McGinnitie Reading Test. However, Laxer et al. (1969) found no improvement in school grades for high-anxious secondary school students who received desensitization and relaxation training in comparison to the performance of high-anxious students in a control group.

Though some of these results are promising, there are problems with these studies. First and most serious is the small sample size in many of the studies, which limits their generalizability and lowers the power to detect significant effects. A second major problem is that few of the studies had any kind of long-term follow-up, and so it is impossible to judge whether treatment effects lasted once the treatment was completed. Another problem is that the methods of identifying anxious children varied greatly across studies, from recommendations of school counselors to the use of different score ranges on different anxiety scales. Thus it is not clear how similar the high-anxious children are in the different studies. Fourth, though many of the programs involved numerous sessions and were done in the school setting, they were not well integrated into regular classroom instruction and, therefore, training effects may not have generalized to performance on classroom tests or school achievement tests. Finally, some

of the studies have conflicting results; even with successful studies, it is difficult to know which aspect of the program contributed to the outcome. For instance, in Laxer and his colleagues' (Laxer et al., 1969; Laxer & Walker, 1970) studies, relaxation alone worked nearly as well or better than desensitization, whereas in Mann's (1973) study, vicarious desensitization, which included no relaxation training, worked as well as desensitization training which included relaxation training.

Even fewer studies have used modeling or cognitive-based procedures to reduce children's test anxiety and improve their test performance. Though modeling has been shown to be an effective way to reduce children's fears about different things (see Graziano, DeGiovanni, & Garcia, 1979), Raskind and Nagle (1980) found that modeling did not improve anxious children's test performance. In this study, high-anxious fifth-grade children either observed a filmed model successfully completing an examination or watched a film of a child completing the test with the examiner providing hints on how to cope with test pressure. The films lasted about 10 min. Following treatment, children in these conditions did not differ in their performance on the Wechsler Intelligence Scale for Children (WISC) in comparison to control group children. However, the rather brief and superficial training may have been a major reason why these results occurred.

Regarding cognitive treatments of anxiety, Fox and Houston (1981) used a cognitive self-statement treatment in an attempt to improve anxious fourth-grade children's recitation performance. The pretest consisted of reciting a memorized poem while being videotaped, and all subjects were told their performance would be evaluated later. The self-statement training, which consisted of one session, involved giving subjects statements designed to reduce the aversive aspects of being videotaped (e.g., "even if I don't do this correctly, nothing terrible will happen"). Hence, the statements focused on negative aspects of performance. The posttest was like the pretest, except that a different poem was used. Results showed that relative to a control group of anxious children, high-anxious children in the self-statement group actually became more anxious and rushed through their recitation; hence, the treatment was not successful. As the authors suggested, the negative focus of the self-statements could have caused these results. Meichenbaum and Butler (1980) and others argued for using positive self-statements in trying to change the negative cognitions of high-anxious individuals. Another problem with this study is that the training was quite brief. Clearly, more cognitive training studies are needed before we can evaluate their effectiveness.

As just mentioned, a major problem in many of these training studies is that they have not been integrated adequately into the school curriculum. Hill and his colleagues (see K. T. Hill, 1984; K. T. Hill & Wigfield, 1984)

did the most extensive work designed to identify the particular aspects of testing situations that pose problems for anxious children and developed school-based programs to alleviate those problems. This work has shown that test time pressure and testing instructions strongly influence anxious students' test performance. Concerning time limits, work mentioned earlier (K. T. Hill & Eaton, 1977; Plass & K. T. Hill, 1986) showed that under time pressure, high-anxious children performed much less accurately and more slowly than low-anxious children. When time pressure was removed, high-anxious children performed as well as and quickly as low-anxious children. Concerning test instructions, Williams (1976) showed that task instructions deemphasizing the evaluative nature of the task aided the performance of anxious students, whereas instructions that the task is a test of ability hindered their performance (see also I. G. Sarason, 1972). Low-anxious children's performance changes less in response to changes in these testing parameters.

K. T. Hill, Wigfield, and Plass (1980) showed that changing these two parameters benefited high-anxious students' performance in an actual school achievement test situation. In this study, when standardized math and reading achievement tests were given with time limits and standard instructions, low-anxious children did much better than high-anxious children. Under conditions in which the tests were administered with relaxed time limits or with relaxed time limits and instructions designed to reduce evaluative pressure middle- and high-anxious students performed much better on the math subtest. In fact, high-anxious eighth graders actually outperformed their low-anxious counterparts on the math subtest in the condition with both relaxed time limits and less evaluative instructions.

The results of this study are particularly important because they were obtained in a school achievement testing program and so provide strong evidence that anxious children's performance can be improved when testing conditions are changed. Because changing the testing conditions led to increased performance, it appears children's anxiety caused them to do less well in the standard testing conditions than they could under more optimal conditions. K. T. Hill (1984) and K. T. Hill and Wigfield (1984) suggested that schools should give tests to students in different ways, depending on student characteristics such as anxiety. Practices like these may produce more valid test scores for all students.

Recently, Hill and his colleagues have turned to more in-depth classroom training programs to facilitate high-anxious children's test performance. These programs (see Ambuel, Hartman, Nandakumar, & K. T. Hill, 1983; K. T. Hill, 1986; K. T. Hill & Wigfield, 1984, for detailed descriptions) focus on training test-taking strategies and training positive motivation and coping skills for use in evaluative situations. The training is done by

classroom teachers as part of their regular instruction of all students, and the sessions last several weeks. Initial results of these programs are quite encouraging, and ongoing analyses are assessing how the programs influence the performance of all children and whether high-anxious children benefit most.

These new intervention programs show great promise, but they are only the first steps in dealing with anxiety about evaluation. To build on Hill and his colleagues' work, several things need to be done. First, results of some laboratory studies and the other intervention studies provide suggestions for additional features that could be included in anxiety intervention programs. We have discussed how instructions deemphasizing evaluation facilitate the performance of anxious students. Dusek, Kermis, et al. (1975) and Dusek, Mergler, et al. (1976) showed that instructions which focus anxious students' attention on the task also improves their performance. And I. G. Sarason (1973, 1975) found that when high-anxious college students observed models engaging in successful task completion strategies, their performance improved. Researchers designing new test anxiety intervention programs could incorporate these techniques. In addition, they should assess whether relaxation or desensitization training in combination with these other techniques further improves anxious children's performance.

Second, anxiety intervention work could benefit by incorporating aspects of other intervention work aimed at different aspects of students' self-concepts and motivation. We discussed earlier how students' anxiety and perceptions of their ability are negatively related; perhaps improving students' perceptions of their ability would help them be less anxious too. Dweck (1975) showed that training children to attribute failure more to lack of effort rather than lack of ability leads to improved persistence and performance. Anxious students also may benefit from such attribution retraining. Schunk (1981) focused on improving low-performing students' beliefs in their efficacy to solve math problems, by giving them skill training or having them observe models successfully complete problems. Following such training, children performed better and were more optimistic about their ability to solve other similar problems. Again, anxious students could benefit from these techniques; learning to be more efficacious could lower anxiety, particularly for those students who lack important skills.

Third, new intervention programs need to be focused more on the different kinds of problems that different anxious students face. For instance, students who are doing poorly in school may need additional skills training along with training to reduce their anxiety, because anxiety reduction alone would not be enough to improve their performance. Schunk's (1981) efficacy training might be particularly effective for these students. Brighter, anxious students may simply need programs designed to

reduce their anxiety about evaluation; with lowered anxiety, they would be able to demonstrate they had indeed mastered the material.

Similarly, separate programs also should be designed for students who do poorly on exams, because their anxiety interferes with their performance in that situation, versus those whose poorer performance also is due to having poor study skills (see Benjamin et al., 1987). Like the less bright students, students with poor study skills may need training in how to organize and master material presented to them along with anxiety reduction training, whereas the students who cannot handle test pressure may only need anxiety reduction training. Tobias's (1980, 1986) model of how anxiety interferes with learning at the preprocessing and processing stages and performance at the production stage also should be considered as new intervention programs are developed. Some students may need help at all three points, others at only two, and some at just one. If these strategies were adopted, programs could be targeted at more specific kinds of problems instead of assuming that the same program will work for all students. This kind of approach also would require more fine-grained assessment techniques, to pinpoint which kinds of interventions would be most effective for different children. Questionnaires could be used to tap certain of these different kinds of problems, but we suggest that teacher ratings and classroom observations also should be used to provide more information on the different behavioral manifestations of anxiety.

Fourth, in future intervention work, the age of the child should be a major consideration. If, as we suggested, anxiety begins with more emotional reactions to failure and later changes to worries about evaluation, then different programs would be needed for children at different ages. Younger children may need more encouragement, support, and training to stay on task. Achievement tasks could be geared to their level of performance, so that they do not experience a succession of failure experiences and become anxious about evaluation. For older children, programs to change their negative self-focused cognitions may be more successful. This training could be paired with study skills training and training in how to manage difficult test mechanics.

Last, most of our suggestions for improving intervention programs focus on changing students to fit the existing system of evaluation that occurs in most schools. We also should consider ways in which schools could change evaluative practices to make them less threatening to students, so that more accurate indicators of students' learning and how to improve their learning could be obtained. Such general changes in evaluation practices may have the best chance of reducing or eliminating the problems associated with test anxiety. We believe this area is one in which teachers and researchers can collaborate to lessen further anxiety's negative impact on children's perfor-

mance and work toward the goal of promoting positive motivation for all children.

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