

Handbook of Developmental Psychopathology

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CHAPTER 19

Test Anxiety in the School Setting

Allan Wigfield and Jacquelynne S. Eccles

The impact of test anxiety on school performance and learning has interested educators and motivational psychologists for at least the last 50 years. Numerous studies have demonstrated the negative impact of anxiety on school performance (e.g., K. T. Hill & S. B. Sarason, 1966; Manley & Rosemier, 1972; S. B. Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960). Furthermore, K. T. Hill (1980, 1984) suggested that as many as ten million students in elementary and secondary schools perform more poorly on tests than they should because anxiety and deficiencies in test-taking strategies interfere with their performance. In addition, the strength of this negative relationship becomes stronger over the school years. In this chapter, we begin by defining test anxiety and discussing theoretical approaches that have been used to explain it. The major portion of our discussion focuses on the development of anxiety in school settings, and on intervention programs that have tried to alleviate the school performance problems associated with test anxiety.

Conceptualizing Test Anxiety

Initially, test anxiety was defined in motivational and personality terms. For example, Atkinson (1964) equated test anxiety with the motive to avoid failure. Anxious individuals were said to be more concerned or motivated to avoid failure than to approach success. Atkinson predicted that individuals high in the motive to avoid failure would choose either very easy tasks in which success was very likely, or very hard tasks in which failure would not reflect on the individual's ability. S. B. Sarason *et al.* (1960) conceptualized test anxiety as a relatively stable personality trait that develops when parents hold overly high expectations and are overly critical of their children's achievement efforts. Integrating the approaches of Atkinson and S. B. Sarason *et al.*, K. T. Hill (1972) defined test anxiety in terms of the motivational dispositions to obtain praise, avoid criticism, approach success, and avoid failure. Like S. B. Sarason *et al.*, K. T. Hill believed that overly demanding and critical parents fostered the development of test anxiety in their children. Hill argued that anxious children generally are more aroused than low anxious children, and strive to avoid criticism and failure relatively more than to obtain praise and approach success, because of their greater sensitivity to adults' negative reactions.

Spielberger (1966) made the important distinction between trait and state anxiety, with trait

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anxiety defined as a relatively stable disposition toward experiencing anxiety in evaluative settings, and state anxiety defined as a more transitory anxious reaction to particular evaluative situations. This distinction is critical because anxiety varies across situations (see Richardson & Suinn, 1972). Most developmental studies of test anxiety have ignored this distinction, even though it is very likely some children become anxious in most evaluative situations, whereas others may be anxious only in certain kinds of evaluative situations.

In addition to this state-trait distinction, other theorists have begun to identify different components of anxiety. 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). According to Liebert and Morris, worry is related to the cognitive and attentional cues associated with evaluation and with failure. In contrast, emotionality is a classically conditioned autonomic/affective reaction to cues associated with evaluation. Morris and Liebert (1973) have shown that these two components are empirically distinct (though correlated), and also that worry relates more strongly (and negatively) to test performance than does emotionality (see Defenbacher, 1980, and Morris, Davis, & Hutchings, 1981, for reviews of the work on worry and emotionality).

Similar though more differentiated factors have emerged in studies with children. For example, both Dunn (1964, 1965) and Feld and Lewis (1969) studied anxiety in elementary school aged children, using S. B. Sarason *et al.*'s (1960) Test Anxiety Scale for Children (TASC).¹ They each found four distinct (but correlated) factors or components of anxiety, and these factors were conceptually quite similar across the studies. Based on the content of item loading most heavily on each factor, Feld and Lewis labeled these factors Test Anxiety, Poor Self-Evaluation, Somatic Signs of Anxiety, and Remote School Concerns (listed in order of variance accounted for). In subsequent analyses, Feld and Lewis found that the scale based on the Poor Self-Evaluation factor related more closely to

school performance than did scales based on the other factors.

In another factor-analytic study of children's anxiety, Nicholls (1976) revised the TASC by rewording some items in order to better distinguish between items assessing poor self-evaluation and items assessing test anxiety, and dropping the Remote School Concerns scale. Factor analysis of sixth-grade children's responses to this new scale produced Poor Self-Evaluation, Test Anxiety, and Somatic Signs of Anxiety factors like those of Feld and Lewis as well as an additional factor for boys and girls (labeled Pleasure in Testing Situations) and one for girls only (labeled Effectiveness of Effort). As found by Feld and Lewis, the Poor Self-Evaluation factor related more strongly to children's achievement test scores than did the other factors.

The factors in these four studies are similar to the two components identified by Liebert and Morris (1967). Worry is similar to test anxiety and to poor self-evaluation in that they all refer to concern over performance, whether one's ability is adequate for the task, and are cognitive assessments. Somatic signs of anxiety and emotionality are similar; both refer to the physiological/affective aspects of anxiety. Furthermore, across all the studies, the cognitive component related most strongly to performance.

Theorists increasingly have been interested in understanding the cognitive component of test anxiety. Wine (1971, 1980) put forth a cognitive-attentional model of anxiety, arguing that the performance differences between high and low anxious individuals reflect differences in their attentional strategies: 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. These ruminations, she suggested, cause high anxious individuals to concentrate less on task performance; consequently, they do less well. Similar hypotheses have been advanced by others (e.g., Geen, 1980; Mueller, 1980; I. G. Sarason, 1980, 1986; Tobias, 1980, 1986).

Evidence has supported this 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 their task-irrelevant thoughts often center on negative personal characteristics (Doris & S. B. Sarason, 1955; I. G. Sarason &

¹ The TASC and its companion, the Lie Scale for Children (LSC), a defensiveness measure, have been the scales most frequently used in developmental studies of anxiety. Because of the theoretical advances in conceptualizing anxiety, new scales for children need to be developed in this area. Because of space limitations, we will not discuss measurement issues here (see Wine, 1980).

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Glanzer, 1962, 1963; I. G. Sarason & Koenig, 1965). Such task-irrelevant, self-deprecatory thinking is especially likely when tasks are described as ability assessments (I. G. Sarason, 1973, 1975). High anxious children also have been shown to attend less well to critical information needed to do problem-solving tasks (Dusek, Kermis, & Mergler, 1975; Dusek, Mergler, & Kermis, 1976), and to engage in more off-task behavior during problem solving (Nottlemann & K. T. Hill, 1977).

These various conceptualizations of test anxiety provide a richer understanding of the construct. It is now assumed that anxiety is a multidimensional construct that has both cognitive and affective/physiological components. The cognitive component consists of task-irrelevant, self-deprecatory thoughts and worries that reduce task-focused attention and so interfere with performance. The affective/physiological component consists of heightened arousal, feelings of nervousness and tension, and other somatic signs. The cognitive aspects of anxiety relate more strongly to test performance than do the affective/physiological aspects.

Although more recent conceptualizations provide us with a richer understanding of the anxiety construct, several important issues remain open. First, the state-trait distinction has not received the attention it deserves, and many researchers implicitly assume anxiety is traitlike. We know little about whether the characteristics of state and trait anxiety are similar or different. Further, different components of anxiety may be more statelike or more traitlike. Deffenbacher (1980), discussing worry and emotionality, cautioned that even though studies of state anxiety show worry and emotionality to be separable constructs, researchers should not conclude they are separate components of trait anxiety. More generally, anxiety may best be conceptualized as a state that is aroused under certain conditions, with individual differences in the arousal tendency. We will discuss conditions that elicit anxiety later.

Second, there has been much debate about whether anxiety causes poor performance, or whether poor performance leads to anxiety. We present evidence in later sections that supports each of these views; for instance, some work shows that changing the testing conditions allows high anxious children to perform better, indicating that anxiety can cause performance problems. Other work shows that repeated failure leads to anxiety; hence, poor performance can cause anxiety. We will return to this issue.

Third, individual difference variables need to be considered more fully. We will discuss gender differences in anxiety later. Anxiety also should vary in students of differing abilities. Because anxiety is associated with low-ability perceptions and negatively related to performance, less able students should be more anxious in evaluative situations. However, many bright, capable students also experience anxiety, due to feeling too much pressure (either self-imposed or other-imposed) to perform well. These students even may believe they are doing poorly if they are not outperforming most other capable students. We believe the anxiety dynamics for these two kinds of students are quite different: One group is anxious because they cannot do the work in school; in contrast, the other group is capable of doing the work, but is anxious for other reasons, and so performs less well. We will return to this issue in the section on anxiety interventions.

Fourth, there has been concern about the distinctiveness of anxiety as a construct. Nicholls (1976) showed that individual items on the TASC confound anxiety and low self-perceptions of ability and so argued that, when that scale is used, it is difficult to determine which construct is being measured. Fennema and Sherman (1976) argued that anxiety may best be conceptualized as a lack of confidence (or poor self-evaluation) in one's ability, because in their work measures of the two constructs correlate very strongly. Perusal of other scales used to measure anxiety shows that many items on those scales tap individuals' beliefs that they lack ability. Is anxiety distinct from negative ability perceptions? Certainly, it appears that Liebert and Morris's Emotionality component of anxiety is distinct from ability perceptions, as is Feld and Lewis's Somatic Signs of Anxiety factor. Both of these refer much more to physiological reactions to evaluation and stress. As we have seen, however, this component of anxiety relates less strongly to test performance than the worry component. And the worry component does seem very intertwined with negative self-evaluations of ability, at least as it has been measured. We would argue that although perceptions of ability may lead to the worry component of anxiety, it is useful to maintain the distinction between the two constructs, particularly because low self-evaluations do not always lead to anxiety; there are children who lack confidence in their ability, yet they are not anxious. Nonetheless, even if ability perceptions precede anxiety in causal sequence, the relation be-

tween the two probably becomes cyclical by the middle elementary school years.

The Development of Test Anxiety

Several theorists (e.g., Dusek, 1980; K. T. Hill, 1972; S. B. Sarason *et al.*, 1960) have proposed that anxiety first emerges during the preschool years, when parents hold overly high expectations for their children and criticize them when they do not satisfy those expectations. This claim, though seemingly well-accepted, has never been assessed adequately. Furthermore, it seems to us that, although parents may create the propensity for children to be anxious, the different kinds of evaluations children experience as they progress through school should exacerbate this propensity in those with it and induce anxiety in other children who face repeated failures. Therefore, both family and school experiences may have important causal influences on the ontogeny of anxiety.

Researchers have assessed more thoroughly the development of test anxiety during the elementary and secondary school years. K. T. Hill and Sarason (1966) conducted the most extensive longitudinal study to date, examining (with the TASC and the 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 time. The negative correlations between anxiety total scores and achievement test scores increased as well, from a negligible level in Grades 1 and 2, to between $-.20$ and $-.25$ at Grades 3 and 4, and in some groups to $-.44$ in fifth and sixth grades.

Other studies suggest that the magnitude of the negative correlations between anxiety and achievement test performance continue to increase over the middle school years (Fyans, 1979; Willig, Harnisch, Hill, & Maehr, 1983). Anxiety scores also become more reliable as children get older (Manley & Rosemier, 1972).

Gender differences have emerged fairly consistently in developmental studies. For example, K. T. Hill and Sarason (1966) found that by the 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 (Manley & Rosemier, 1972; Meece, 1981).

K. T. Hill (1972) argued that these gender differences, particularly the discrepancies between TASC and LSC scores, are due to boys' greater defensiveness about admitting anxiety, and con-

cluded that the experience of anxiety is the same for boys and girls. We think this issue deserves closer scrutiny. Boys and girls may become anxious for different reasons, or be anxious about different things. For instance, there is evidence that girls are more sensitive about social approval from adults than are boys (Dweck & Bush, 1976; Maehr & Nicholls, 1980), and so perhaps their anxiety reflects that kind of concern. Boys seem more sensitive to peer evaluation (Dweck & Bush, 1976). Boys' and girls' different interests may play a role too; as they go through school, their interests change, and so it seems likely their concerns about evaluation will also change. Girls may come under more pressure to conform to feminine stereotypes during junior high (J. P. Hill & Lynch, 1983), and at this time may also become more concerned with social activities and popularity than do boys. As a result, their apprehensions may be different. In particular, with regard to math, girls may stereotype math skills as masculine and consequently assume that difficulty reflects lack of talent; alternatively, girls may become concerned about how math interferes with other activities, or may feel some pressure against excelling in math, perhaps leading them to be anxious both about success and failure in math. Boys may be pushed to excel in math, and so become anxious if they do poorly. Such differences may be further complicated by differences in student capabilities across various subject areas. Consequently, even if boys and girls have equivalent propensities for trait and/or state anxiety, it seems quite probable that this propensity will manifest itself differently in boys and in girls.

Because the studies tracing the development of anxiety were descriptive and correlational, we do not know whether higher anxiety scores and stronger negative correlations between anxiety and school performance really do mean that anxiety is increasing, or are a result of children becoming more reliable at answering questions about anxiety. We need studies going beyond these initial correlational studies to better understand the development of anxiety and the processes that relate to anxiety.

Several key issues need to be investigated, beginning with how parental reactions to preschool children's performance in achievement situations shape children's later reactions to being evaluated in school. We also need to assess how the experience of anxiety changes over time. We have seen that different components of anxiety can be identified in school-aged children. How these different components develop has not been charted adequately. We believe children's anxiety first may be

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characterized more by affective responses to failure experiences, and later by the more cognitive worry responses. Young children are not overly self-reflective, and so it is doubtful they would engage in the self-preoccupied thought patterns associated with worry. Instead, young children may simply be more easily distracted by failure and may spend more time off-task (see Nottlemann & K. T. Hill, 1977). As their ability perceptions develop and particularly if they come to view ability as a stable entity over which they have little control (Dweck & Bempechat, 1983), children should become increasingly worried about performing poorly. Studies of the thought processes of low and high anxious children as they solve complex tasks (like those of Diener & Dweck, 1978, on the thought processes of learned helpless and mastery oriented children) would be very useful. We know nothing about how these thought processes change over age. More is known about how children process evaluative feedback, and so we turn next to how such processing relates to anxiety.

Children's Processing of Evaluative Feedback

Assuming that anxiety does increase during the elementary school years, it seems likely that children's developing prowess at processing the evaluative information they receive in school contributes to the increase. During the early elementary school years, children receive a great deal of information about their school-related abilities. Initially, children are very positive about how well they will do in school (Stipek, 1984), even if they actually are doing poorly (Entwisle & Hayduk, 1978, 1982). However, during the middle elementary school years, children become increasingly capable of processing and interpreting evaluative feedback from teachers, and comparing their performance to that of other children (see Ruble, 1983), and so develop clearer ideas of their relative standing (in terms of ability) in the classroom (Nicholls, 1979a). They also understand better how their success and failure experiences relate to their future performance possibilities (Parsons & Ruble, 1977; Rhoades, Blackwell, Jordan, & Walters, 1980), and their perceptions of ability become more differentiated (see Nicholls, 1984). Further, as children get older, many change their view that ability is malleable to the belief that ability is a stable entity that they cannot change (see Dweck & Bempechat, 1983).

But how might patterns of success and failure experiences, children's beliefs about their ability,

and their comparisons of their performance with that of other children relate to anxiety? In K. T. Hill's (1972) view, children who succeed on most school tasks, and so receive positive evaluations from adults, will approach new evaluative situations with confidence, and will be more motivated to approach success than to avoid failure. In contrast, children who experience more failure and/or more critical reactions from adults will become anxious about evaluation, and so be more motivated to avoid failure than to approach success, especially when the evaluation component of the testing is made salient.

Several studies document the negative impact repeated failure experiences have on children's perceptions of their ability (see Dweck & Goetz, 1978). Repeated failure experiences also should elicit anxiety, particularly when children believe that poor performance signifies something negative about them, such as lack of ability. Covington (1983, 1986) argued that students who experience continuing failure in school while still trying inevitably must begin to attribute those failures to lack of ability (see Covington, 1983; Covington & Beery, 1976; Weiner, 1979). Attributing failure to lack of ability produces negative affect, such as shame and humiliation (Covington & Omelich, 1979), and, eventually, anxiety. Covington (1986) showed, using path analysis, that perceptions of low ability do indeed lead to anxiety reactions in evaluative settings. However, doing poorly should not elicit anxiety reactions in the following situations: when tests or school tasks are not defined as measures of ability; if the child does not conceptualize ability as a stable entity of the person; and if the child is not prone to attributing failure to lack of ability. These hypotheses need to be tested.

Social comparison processes may also influence the development of anxiety, through their impact on children's ability perceptions. By comparing their performance to that of others in their classroom, children can define their relative standing in terms of ability. Children who believe they are competent relative to peers should feel more positive (and so less anxious) than those who believe they are less competent than their peers. Thus, there should be changes in anxiety as children's social comparison skills improve. The developmental patterns described earlier are certainly compatible with this prediction. We should find heightened anxiety in settings that make social comparison salient (see Eccles, Midgley, & Adler, 1984), and when changes in the nature of one's peer group lowers one's relative standing. Schwarzer and his

colleagues (R. Schwarzer & Lange, 1983; R. Schwarzer & C. Schwarzer, 1982) have assessed how changes in German students' comparison (or reference) groups influence their test anxiety. In Germany, all students are in heterogeneous classrooms until fifth grade, and then are tracked into high-, middle-, and low-ability schools. R. Schwarzer and C. Schwarzer (1982) assessed test anxiety in a group of students immediately after they made this transition, and in a different group of eighth-grade students who had been tracked for 3 years. R. Schwarzer and Lange (1983) assessed 3-year longitudinal changes in these groups' anxiety scores. Both studies assessed the hypothesis that students doing least well before tracking (and so tracked into the low track) should be most anxious at fifth grade, because their comparison group included many students doing much better than them. In eighth grade, with a more restricted comparison group, this group's anxiety should be lower. Conversely, the fifth-grade students doing best should be least anxious, because their comparison group included poor students, but more anxious at eighth grade because their comparison group then includes only the best students. Results of both the cross-sectional and longitudinal studies clearly supported these predictions.

The work just reviewed suggests that failure experiences, declining ability perceptions, changing views of the meaning of poor performance, developing social comparison skills, and changes in students' reference groups can be tied to the development of anxiety. As yet, however, no developmental study has assessed systematically how these processes relate to the development of anxiety. Based on the correlational work of K. T. Hill and I. G. Sarason and the work on the development of ability perceptions briefly reviewed, it seems that during the early elementary school years, children's failure experiences and ability perceptions would not relate to anxiety, because children remain optimistic after failure, their ability perceptions are relatively undifferentiated, and they basically see ability as an unstable characteristic. By the middle elementary school years when ability perceptions are more differentiated, more closely related to school performance, and are more entitylike, and when children are engaging in social comparison processes more, relations among the constructs should be moderate. Many children with low perceived ability should begin to be anxious in evaluative situations. These relations should increase during the later elementary school years.

School Evaluation and Anxiety

In school, evaluations by teachers, principals, and classmates occur regularly and frequently (Phillips, Pitcher, Worsham & Miller, 1980). The exact form of evaluation varies, and some evaluative practices create more anxiety than others. Furthermore, evaluations of academic performance become more salient in late elementary and secondary school, and classroom characteristics that increase social comparison become more common (see Eccles *et al.*, 1984).

Teachers may influence children's anxiety in a variety of ways. From the theoretical perspectives of S. B. Sarason *et al.* (1960) and K. T. Hill (1972), teachers who set overly high standards and/or criticize students too harshly should be more likely to foster anxiety in their students than other teachers. Classroom observation studies assessing this prediction have yielded mixed results (Zimmerman, 1970), with teacher criticism only weakly predicting anxiety, perhaps because teacher criticism is rarely focused on intellectual content (Blumenfeld, Hamilton, Bossert, Wessels, & Meece, 1983; Parsons, Adler, Futterman, Goff, Kaczala, Meece, & Midgley, 1983).

K. T. Hill (1976) suggested that high anxious children may interpret feedback from teachers differently than do low anxious children, because of their greater sensitivity to adult reaction. Furthermore, Phillips *et al.* (1980) and Parke (1976) suggested that teachers may react differently to high and to low anxious children, providing them with different kinds of feedback. For instance, if teachers are aware that some students are sensitive to criticism, they may try to criticize them less. This is an interesting suggestion, and points to the importance of conceptualizing teacher-student interaction as a bidirectional process. However, Helmke and Fend (1982) found that teacher ratings of their students' anxiety did not correlate with students' own anxiety ratings, and so teachers actually may not be good judges of their students' anxiety levels. Clearly, more process-product studies are needed to assess the relations between teacher criticism and student anxiety. The fact that in laboratory studies high anxious children do less well when their performance is observed (Cox, 1966, 1968) supports the idea that teacher monitoring behaviors may affect anxiety arousal. But demonstrating these effects in classroom settings may be difficult.

The most obvious kinds of evaluations students receive in school are grades and tests. Many

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theorists have discussed how external evaluations or rewards (such as grades) have detrimental effects on intrinsic and continuing motivation (Deci & Ryan, 1980; Maehr, 1976; Maehr & Stallings, 1972). K. T. Hill (1977) and K. T. Hill and Wigfield (1984) have discussed how letter grades can promote a focus on ability perceptions, competition, social comparison, and negative self-evaluations, and so produce anxiety. Moreover, the use of a single letter grade for each subject means that teachers' evaluations of student effort, conduct, and achievement all end up reflected in the one grade. Additionally, parents may push children to attain high grades, and be critical if those standards are not met. Unfortunately, studies assessing the impact of various grading practices on anxiety are not available. K. T. Hill and Wigfield (1984) have recommended that letter grades be replaced (particularly in elementary school) with grading systems containing separate evaluations for student achievement, effort, conduct, and social development. They are currently testing the effect of such a change on levels of student anxiety. If the predicted relationship emerges, then changes in grading practices with grade level (see next section) would be one possible explanation for the grade-related increases in anxiety.

Standardized testing is another form of school evaluation that can both affect and be affected by anxiety. Studies conducted with adults and with children show that high anxious individuals perform less well than low anxious individuals when tasks are introduced as tests of ability (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 (K. T. Hill & Wigfield, 1984). K. T. Hill and Wigfield (1984) discussed the several other unique demands that school achievement tests place on children, all of which may elicit anxiety. These include overly difficult problems, because the same tests often are given at several different grade levels; complex and unfamiliar question and answer formats; and time limits. Time pressure may be the 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 & Hill, 1986).

These studies also have shown that testing

conditions in school can be changed in ways that facilitate anxious children's performance. We will discuss the kinds of testing conditions that facilitate the performance of high anxious children in the section on anxiety interventions.

Changes in Classroom Evaluation across Grades

In general, school evaluation becomes more intensive as children proceed through school. Tests occur more frequently and have greater consequences for students' futures. Many states now have minimal competency tests that students must take before they can graduate from high school, and, of course, many students are quite apprehensive about failing such tests. With concern recently raised by *The Nation at Risk*, some school districts are introducing more frequent competency testing in the primary and in the secondary schools. In addition, tests like the American College Test (ACT) and the Scholastic Aptitude Test (SAT) given in senior high school play a major role in determining to which colleges students are accepted.

Grading practices may also become more rigorous, with most schools adopting letter grades at least by the late elementary school years. There is evidence that secondary school teachers adopt stricter and more differentiated grading policies, leading to a decline in grades during junior high school (Blyth, Simmons, & Bush, 1978; Kavrell & Petersen, 1984; Schulenberg, Asp, & Petersen, 1984). And like test scores, grades take on more meaning, as high school grade-point averages (GPA) are used for college selection and employment purposes. These changes should contribute to heightened evaluation anxiety and to the stronger negative correlations between anxiety and school performance.

Other changes in the classroom environment may also increase the evaluative pressure students feel. Eccles *et al.* (1984) discussed the kinds of classroom environment changes that occur between elementary and junior high, including moving from a smaller to a larger school, having different teachers (and classmates) for each subject, experiencing between-classroom ability grouping, being graded more strictly, and an increasing emphasis on competition and social comparison. These changes make the school environment more impersonal, threatening, diffuse, and less pleasant for some students at a time when students themselves are going

through major physiological changes (Randhawa & Michayluk, 1975; Welch, 1979).

Eccles *et al.* (1984) related these school environment changes to the negative shift in achievement beliefs and attitudes that occurs for some students after the transition to junior high school. Particularly relevant to achievement anxiety are the stricter grading policies, and greater emphasis placed on social comparison, ability perceptions, and competition. We have mentioned work showing that external evaluative practices can decrease intrinsic and continuing motivation. Competition and social comparison also may foster an ego or self-focused educational orientation in students, in which trying to outperform other students becomes more important than mastering school material (Nicholls, 1979b). In such situations, many children will perceive themselves as failures, because they are not outperforming others. This kind of learning environment should be especially detrimental to high anxious students for several reasons. First, such an environment should increase the tendency of anxious children to focus on themselves and ruminate about their performance, rather than focusing on the achievement tasks at hand. Second, because anxious children already are apprehensive about failure, an emphasis on outperforming others should make the consequences of failure even more devastating. Third, an emphasis on competition and social comparison should make anxious children's self-evaluations even less positive, because many already are performing more poorly than their high anxious counterparts. The greater focus on ability and evaluation in many junior high and secondary schools should have especially deleterious effects on the motivation and performance of test anxious children.

To avert these problems, Nicholls (1979b) suggested that optimal motivation for most students will occur when their attention is focused on task mastery, rather than outperforming others, and they are given tasks of appropriate difficulty for them. High anxious students, in particular, should benefit from this kind of educational orientation, because they have difficulty appropriately focusing their attention on the task at hand. Another option may be cooperative learning, as various studies indicate that cooperative learning structures facilitate student motivation (see reviews by Ames, 1984; Johnson & Johnson, 1974; Slavin, 1977, 1983). Such goal structures may be particularly beneficial to anxious students who do not respond well to competition and pressure (Covington & Omelich, 1982). Unfortunately, as Eccles *et al.* (1984) dis-

cussed, most schools are not moving in these directions, and instead continue practices that may increase many students' anxiety. Some intervention programs have been shown to help anxious students perform better in evaluative situations, and we will turn to them next.

Alleviating Anxiety through Intervention

Many anxiety intervention programs have been developed, mostly for use with college students and adults. These programs have been reviewed by Deffenbacher (1980), Denny (1980), Tryon (1980), and Wine (1980). The different kinds of treatment programs range from those teaching relaxation skills to those attempting to change the thought patterns of test anxious individuals. Most treatment studies have shown post-test reductions in anxiety, but few have shown corresponding increases in test performance (see Denny, 1980; Tryon, 1980). Because it is difficult to change behavior and because performance in evaluative situations is influenced by many factors in addition to anxiety, perhaps it is not surprising that programs designed to reduce anxiety do not always have an impact on behavior.

However, the quality of the program obviously makes a big contribution as well. Until recently, most studies used systematic desensitization and relaxation techniques in attempting to alleviate test anxiety, and so focused on the emotionality component of anxiety. As both Tryon (1980) and Wine (1980) have discussed, this emphasis should be changed, because worry has been shown to relate more strongly to test performance. Further, Denny (1980) concluded that treatments dealing with worry by teaching anxious students to focus their attention on the task and not to ruminate about the possibility of their failing have been more successful than simple relaxation treatments in obtaining performance gains as well as reducing anxiety. However, Tryon (1980) has argued that programs combining relaxation techniques and cognitive restructuring may be the most effective kind of program, because it has been difficult to assess which components of the training programs exert the most positive effects (but see Finger & Gallassi, 1977, for an interesting attempt to assess the separate and joint effects of training to reduce worry and emotionality). We agree that the move away from simple desensitization and relaxation techniques is a good one.

Results of some lab studies provide suggestions for what features anxiety intervention pro-

grams should include. In lab studies, changing task instructions to be less evaluative and providing more success feedback have improved the performance of anxious individuals (I. G. Sarason, 1972). However, low anxious individuals' performance sometimes declines under these conditions, a point we will return to. And success experiences alone may not be enough to ensure continued success once failure is encountered again (Dweck, 1975). Other laboratory studies also have shown that task-focusing instructions help anxious children perform better (Dusek *et al.*, 1975, 1976; Mueller, 1978).

Modeling of successful task-completion strategies is another effective way to aid the performance of high anxious individuals in evaluative situations. I. G. Sarason (1973) found that high anxious individuals performed better after they observed models successfully doing an anagrams task while verbalizing the successful strategy they were using. In a second study (I. G. Sarason, 1975), female subjects observed one of four models: a model who admitted anxiety but also described the task strategies she used to cope with it, a model not admitting anxiety, one simply admitting anxiety, and a neutral model. Subsequently, high anxious subjects who had observed the "anxious but coping" model outperformed the low anxious subjects in that condition. These studies suggest that anxious individuals may need strategy training as well as relaxation and "worry reduction" training.

The most systematic anxiety intervention work done with children in school settings is that of K. T. Hill and his colleagues (see K. T. Hill, 1984; K. T. Hill & Wigfield, 1984). This research has focused on three major testing parameters: test time limits and time pressure, success-failure experiences, and testing instructions and mechanics. In a study of the influence of time pressure on children's arithmetic performance, K. T. Hill and Eaton (1977) showed that high anxious children performed much less accurately and more slowly than low anxious children when time limits were imposed. When time pressure was removed, high anxious children performed as well and as quickly as low anxious children on simple arithmetic problems. Plass and K. T. Hill (1986), using age-appropriate math problems administered in group-testing situations to third and fourth graders, obtained similar results: high anxious boys performed as well as low anxious boys when test time limits were removed.

Williams (1976) examined how different kinds of task instructions influenced fifth- and sixth-

grade children's performance on age-appropriate math problems. When the task was introduced as a test of ability, high anxious children did worse than low anxious children. In contrast, when anxiety was reduced by giving "reassurance" instructions, or by telling children that the experimenter was only interested in group and not individual performance, high anxious children did much better and actually outperformed middle and low anxious children in the "group performance" condition.

Combining these treatments, K. T. Hill *et al.* (1980) assessed how changes in test time limits and test instructions influenced junior high school students' performance in an actual achievement test situation. Students took the districts' achievement test in math and English under one of four conditions: standard testing conditions, a relaxed time limits condition, a condition in which students were told not to worry about missing difficult items, and a combined condition in which students were given more time and also told to not worry about missing difficult items. Under the standard testing conditions, the low anxious students did much better than the high anxious students. In contrast, with no time pressure, either by itself or in the condition combining relaxed time limits and difficulty information, middle and high anxious students performed much better on the math subtest. In fact, high anxious eighth graders actually outperformed their low anxious counterparts in the condition with relaxed time limits and with information about how to deal with difficult problems.

The results of this latter 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. Indeed, it appears that testing dynamics interfere with anxious children's performance in these testing situations, so that it is not lack of knowledge but the testing conditions that lead to their poorer performance. Thus, achievement tests given in standard ways with time limits underestimate the achievement of many high anxious students.

Recently, K. T. Hill and his colleagues have turned to more in-depth classroom training programs to facilitate the performance of high anxious children. These programs (see Ambuel, Hartman, Nandakumar, & K. T. Hill, 1983; K. T. Hill, 1986; K. T. Hill & Wigfield, 1984, for descriptions) include two components: training test-taking strategies, and training positive motivation and coping skills for evaluative situation. The training is done by classroom teachers as part of their regular in-

struction, 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 high anxious children at different age levels, and also how the different components of the program influence test performance.

Based on these results, K. T. Hill (1984) and K. T. Hill and Wigfield (1984) have recommended that schools should consider giving tests in two ways: using standard testing conditions for low anxious children and those who have a history of doing well in evaluative situations, because those children often thrive in situations in which there is some evaluative pressure but actually perform somewhat less well when evaluative pressure is removed (see K. T. Hill, 1972; I. G. Sarason, 1972, 1973), and using optimizing conditions for high anxious children. Schools could assess students' anxiety and test-taking skills, to identify which students would benefit from taking tests under optimizing or standard conditions, and benefit from classroom test-taking strategy programs. In this way, achievement tests would better reflect the actual learning of students and not the influence of testing dynamics. If time and budgets allowed, children could take the tests under both conditions, with the higher of the two sets of scores providing the best estimate of achievement.

This intervention work, and the other work on changing testing conditions and task instructions, seems to indicate that anxiety has causal precedence in the anxiety-performance relationship. However, work reviewed earlier shows that repeated failure experiences (and thus poor performance) leads to anxiety. In general, we agree with K. T. Hill (1972) that the cause-effect relationship between anxiety and performance becomes cyclical. We think a better understanding of this relationship could be obtained by looking at individual differences. For low achieving children, performance difficulties likely lead to anxiety. To perform better, these children will need more than changes in testing conditions, because they will not have mastered the material to be tested. Additional skill training will be needed as well. For capable students who are anxious, perhaps anxiety causes their performance problems. With less perceived pressure, more relaxed testing procedures, and a less evaluative classroom environment, these students may be able to demonstrate their mastery of the material. Those developing intervention programs to deal with anxiety need to keep these differences in mind.

Future intervention programs also should con-

sider the age of the child more closely, to deal with the unique problems associated with anxiety at different ages. For instance, if our earlier speculations are correct, making sure young children stay task-engaged may help improve their performance, as would providing test-taking strategies. For older children, programs incorporating worry reduction training may be more successful, because as children get older, it is likely that the worry component of anxiety is what interferes with their test performance.

Conclusion and Directions for Future Research

The theoretical and empirical work on test anxiety done over the last 15 to 20 years has greatly increased our understanding of anxiety as a construct. Additionally, successful intervention strategies have begun to be developed that can reduce the debilitating effects of anxiety on achievement performance. Although these accomplishments are laudable, we still have much to learn, particularly about the development of anxiety.

First and foremost, we must examine the ontogeny of anxiety (or the propensity to be anxious) during the late preschool years and into elementary school. Do early parent-child interactions in achievement situations set the stage for anxious reactions to school evaluation? What is the developmental course of anxiety over the elementary school years; that is, how do the different components of anxiety develop? And what sorts of school evaluative practices either foster or ameliorate the effects of anxiety? Research into these issues would help us understand anxiety better, but also lead to the development of better intervention programs to deal with anxiety in the school setting.

In order to do this research, we must develop new and better ways to measure anxiety. New scales need to be developed that assess the state-trait distinction, and worry-emotionality components of anxiety in children. Measures of the ruminations and other self-deprecatory thoughts anxious individuals engage in would also be useful to clarify the cognitive component of anxiety and so develop interventions to deal with excess worry. In addition to new scales, other kinds of measures of anxiety need to be developed. These could include teacher, parent, and peer-rating scales, and different kinds of observational systems for use during class instruction, seatwork, tests, and so on. Partic-

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As we have pointed out, anxiety does not develop in isolation from other constructs, and so we need to study further its relationships with other constructs. We have discussed the debate over the relationship between anxiety and ability perceptions. We also need to look at the relationships between anxiety and other important achievement beliefs, such as task value. Very little research has examined the link of anxiety to those aspects of motivation associated with task value. Covington and Beery (1976) have suggested that in order to maintain their sense of self-worth, students may reduce their effort if they anticipate failing. A similar process could occur with test anxiety and task value: One way to cope with anxiety over anticipated failure is to reduce the value one attaches to the subject area, thus reducing the potential psychological cost of failure and providing an additional excuse for the low-effort strategy outlined by Covington and Beery. The impact of such a strategy on performance has not been assessed. To the extent that lowered task value leads to reduced effort, this strategy for coping with anxiety will lead to poorer performance by decreasing the likelihood of success. On the other hand, to the extent that lowered task value reduces state test anxiety, this coping strategy may decrease the negative effects of test anxiety on test performance.

Alternatively, the very fact that one is highly anxious about a particular subject area may, through classical conditioning of affective states, lead to avoidance and/or intense dislike of that subject area. Descriptions of math anxiety illustrate the power of these affective associations (Tobias, 1978). It seems likely that the desensitization interventions discussed earlier in this chapter may be essential to undo these associations before skill and attentional training can be effective. But, in any case, very little is known about how or at what age these affective and motivational consequences of anxiety develop, and virtually nothing is known about how these consequences are related to the more cognitive and attentional components of anxiety.

Although the cognitive aspects of anxiety have been emphasized of late, it is useful in closing to put anxiety into the larger context of emotional arousal. Emotional arousal is usually assumed to be necessary for action. However, excessively high levels of arousal may disrupt optimal performance just as unusually low levels of arousal lead to insufficient motivation. This curvilinear relationship between

arousal and performance is well described by the Yerkes-Dodson curve. To the extent that test anxiety is a continuum ranging from very low arousal to very high arousal, then the negative effects of anxiety we have been discussing really reflect only part of the picture. For some children, the problem may be one of under-arousal instead of over-arousal. This problem may be reflected in the poorer performance of low test anxious children in the more relaxed testing conditions reported earlier; such conditions may not be arousing enough to these children. Ideally, teachers and testers should strive to bring all children to their peak level of arousal when important testing is taking place. Unfortunately, different motivating strategies appear to be needed for children with differing levels of test anxiety, and teachers and testers rarely have the luxury to tailor the testing situation to these individual needs.

Finally, although some successful intervention programs for use in the school setting have been developed, there is important new work on intervention programs that needs to be done. Given our emphasis on developmental issues, we think different intervention programs should be developed for children at different ages. Younger anxious children may benefit most from encouragement, test-taking skills training, and task-focus training, and older children may benefit most from the kinds of cognitive retraining that have been successful with adults. We know little about which age groups would benefit most from different kinds of programs such as these. Further, with regard to the intervention programs that have been successful, we need to have a better understanding of which aspects of the programs have the most beneficial effects, in order to be able to improve those programs further.

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