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SPECIAL ISSUE

Enhancing Performance on the Scholastic Aptitude Test for Test-Anxious High School Students

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The Scholastic Aptitude Test (SAT) is a unique test because of the consequential nature of its direct effect on the outcome of college acceptance. Performing poorly on the SAT may be the academic equivalent of "choking" in an athletic event. A program to enhance performance should incorporate elements that have been successful in preventing choking as well as reducing test anxiety. This includes a combination of relaxation training and cognitive therapy with skill training in taking the SAT.

The Scholastic Aptitude Test's Role in College Acceptance

Today's highly competitive nature of the college acceptance process, with its attendant need to score highly on the Scholastic Aptitude Test (SAT), creates a problem for adolescents who perform poorly in the face of stress. There is a need for a program that can enhance performance by neutralizing the effects of stress. The structure of such a program has roots in both the work linking stress management with academic performance and that work connecting stress with "choking" in the competitive moment.

With more than 66% of high school seniors in the United States applying to college (Isaacs, 2001), the acceptance process contains all the elements of a stressful endeavor for students and their parents. The choice of which college a child will attend can be unpredictable and out of his or her control. Applications to tertiary education schools have been steadily increasing over the past 10 years, creating a more competitive environment due to the combination of a never-ending supply of baby boomer progeny and the increased number of adolescents with aspirations. The variables that determine one's acceptance are grades, extracurricular activities, teacher references, and SAT scores. Of all these, the SAT has the greatest ability to interfere with the goal. It is the one common standard against which all students are compared. Pressure to succeed is enormous, and stress is its by-product.

The Connection Between Stress and Test Anxiety

A number of theorists have linked stress with anxiety. In describing the difference between trait and state anxiety, the state-trait theory of anxiety proposes that people who are high on trait anxiety will show the greatest increases in anxiety under stress (Bolger & Kellaghan, 1990; Endler & Edwards, 1983; Spielberger, Gorsuch, & Lushene, 1970).

It has been believed that test anxiety is an important cause of poor academic performance. An anxious person will do more poorly than others on a test that causes stress. This assumption has been supported by the finding that the performance of test-anxious subjects varies inversely with evaluation stress (e.g., Sarason & Palola, 1960; Sarason, 1972, 1973, 1978, 1980). Sarason (1978) showed that cognitive interference was an important factor. In another study, Sarason (1984) analyzed the nature of test anxiety and its relationship to performance and cognitive interference from the standpoint of attentional processes. He developed a new instrument to assess dimensions of reactions to tests and described its psychometric properties. The scales of the Reactions to Tests Questionnaire (Worry, Tension, Test-Irrelevant Thinking, Bodily Symptoms) were compared with regard to intellectual performance and cognitive interference. The results were consistent with the idea that the problem of anxiety is, to a significant extent, a problem of intrusive thoughts that interfere with task-focused thinking. In the last of the three studies reported, it was shown that self-preoccupying intrusive thinking can be reduced by means of a task-focusing experimental condition.

The Effects of Inattention and Worry on Performance

Wine (1971) reviewed the literature and suggested an attentional interpretation of the adverse effects that test anxiety had on task performance. During task performance, the highly test-anxious person divides his or her attention between self-relevant and task-relevant variables. This is

in contrast to the low-test-anxious person who focuses his attention more fully on the task.

In their processing efficiency theory, Eysenck and Calvo (1992) argued that test-anxious worry reduces performance efficiency but not necessarily performance effectiveness. Thus, it is believed that test-anxious individuals are impaired, in that they may need to put in more effort to achieve satisfactory levels of performance but they are not incapable of satisfactory task performance. Evidence supports this notion that test anxiety, especially worry, has a detrimental impact on performance and that working memory may be the mechanism (Calvo & Eysenck, 1996; Ikeda, Iwanaga, & Seiwa, 1996; Richards, French, Keogh, & Carter, 2000). However, a second (related) explanation why test anxiety is associated with less efficient performance is because of a susceptibility to distraction and interference (Alting & Markham, 1993; Nottelmann & Hill, 1977). For example, Alting and Markham (1993) found not only that test-anxious individuals are generally more susceptible to distraction but also that such effects are triggered by anxious mood. However, such studies tend to use observational measures of off-task glancing and so may be more prone to measurement error.

Keogh, Bond, and Flaxman (2006) used more objective, computer-based tasks to assess distraction. They found that those high in trait anxiety are hypervigilant, in that they scan the environment for threatening or potentially threatening material (Eysenck & Calvo, 1992). Such hypervigilance results in selective attentional biases in favor of the location of threatening material and results in an increased susceptibility to distraction and interference (e.g., Mathews, May, Mogg, & Eysenck, 1990).

Deffenbacher and Hazaleus (1985) investigated sources of interference in highly test-anxious subjects performing under evaluative stress. Students from the upper and lower quartiles of the Test Anxiety Scale (Sarason, 1972) took a short intellective test under either the usual test instructions or reassuring instructions. A multivariate analysis of variance revealed no effects for sex of subject, type of instructions for testing, or any of the interactions involving sex of subject, testing condition, and subject anxiety level. Subject anxiety level, however, was significant and yielded a consistent main effect on every variable except pulse rate, for which there was no effect either pretest or posttest. Highly test-anxious subjects performed more poorly; felt less positive about themselves, their abilities, and the task; experienced more anxiety; felt it interfered more with performance; estimated spending less time on task; and rated themselves engaging in more worry, emotionality, and task-generated interference than did low-test-anxious subjects. Comparisons among the means for the high-test-anxious group revealed that worry and task-generated interference levels were not significantly different but that both were higher than emotionality level. Regression analyses, however, suggested that worry was the primary source of interference, as only worry consistently predicted performance and estimated time on task when common variance was controlled.

Early Efforts to Improve Performance

The idea that test anxiety causes poor performance has prompted attempts to enhance academic performance by reducing test anxiety. Early treatment efforts focused primarily on reducing the arousal of test-anxious subjects. Behavioral therapies (e.g., systematic desensitization) directed toward the reduction of autonomic arousal have been successful in reducing self-reported anxiety (e.g., Deffenbacher, 1976; Russell & Lent, 1982; Russell, Miller, & June, 1975; Snyder & Deffenbacher, 1977) but have in each instance failed to improve performance measures (e.g., Finger & Galassi, 1977; Russell et al., 1975; Sime, Ansorge, Olsen, & Parker, 1987).

A different approach was taken by Lin and McKeachie (1972), Wittmaier (1972), and Culler and Holahan (1980), who studied the role of intellectual ability and study habits in academic performance for low- and high-test-anxious students. Their results show that high-test-anxious students have poorer ability and poorer study skills. They conclude that at least part of the academic performance decrement for high-test-anxious students may be due to less knowledge of the relevant material as a function of differential study skills. According to this line of reasoning, high-test-anxious students have good reason to be anxious. Not only does anxiety produce poor performance, but poor ability also produces anxiety. This claim is supported by the fact that many studies that have used different methods to reduce test anxiety (e.g., systematic desensitization) succeeded in reducing test anxiety, but very few of them showed improvement in academic performance as a consequence.

These studies introduced a new element to the thinking about anxiety and performance: the need to address the issue of study skills.

If poor preparation is the major problem of test-anxious students, effective study skills training might be expected to both relieve anxiety and improve academic performance. Study skills training alone is usually found to be ineffective in either reducing anxiety or improving academic performance (Altmaier & Woodward, 1982; Osterhouse, 1972). However, the combination of study skills training and systematic desensitization has been shown to be effective and superior to either component alone, both in reducing anxiety and in

improving academic performance (Allen, 1971; Russell & Lent, 1978; Mitchell, Hall, & Piatkowska, 1975; Mitchell & Ng, 1972).

Dendato (1986) found similar results. Forty-five test-anxious students were randomly assigned to one of four treatment conditions: (a) relaxation/cognitive therapy, (b) study skills training, (c) a combination of relaxation/cognitive therapy and study skills training, or (d) no treatment. Pretreatment and posttreatment measures were collected on self-reported state anxiety and classroom examination performance. The relaxation/cognitive therapy was found to be effective in reducing anxiety but failed to improve classroom test scores. Study skills training had no significant effect on either measure. The combined therapy both reduced anxiety and improved performance relative to the no-treatment control condition and was significantly more effective than was either treatment alone.

Similarity Between SAT Test Anxiety and Choking in Sports

In determining the best ways to minimize test-related performance anxiety, one other dimension should be explored. Test anxiety about the SAT is potentially more debilitating than anxiety from other testing situations because of its consequential outcome. It is one test on one day that can determine the course of one's future. Anxiety in this milieu resembles performance anxiety in sports, when a player might choke in a critical moment of the game. Therefore, the techniques that have proven helpful in mastering this kind of anxiety might be most helpful.

Although taking the SAT does not involve coordinating physical movements, engaging in direct competition with another, or performing in front of a group, it does elicit a stress-mediated response. In identifying the factors underlying the phenomenon of choking or failing to perform when under pressure, Baumeister and Showers (1986) found that attentional theories offered the most complete explanation of the processes underlying paradoxical performance or choking under pressure. Decrements in performance were associated with four pressure variables: audience presence, competition, performance-contingent rewards and punishments, and ego relevance of the task. The last two factors are relevant to the SAT and college experience.

In more recent work, Jordet, Hartman, Vissher, and Lemmick (2007) examined the outcomes of penalty shootouts in the knock-out phase of major international tournaments. Data were collected from Internet sites containing soccer statistics on all 41 penalty shootouts and 409 kicks taken in the World Cup, European Championships, and Copa America between 1976 and 2004. The results showed that the importance of the kicks (indicative of stress) was negatively related to the outcomes of the kicks, whereas skill and fatigue were less (or not) related to outcome. It was concluded that psychological components are most influential for the outcome of penalty kicks.

The techniques that have been successful in reducing performance interference by anxiety in sports range from eliminating the effect of external and internal stressors (Suinn, 2005) to using systematic desensitization (Bauman & Carr, 1998; Heyman, 1987). External stressors have been described (Suinn, 2005) as the external cues that generate anxiety such as seeing an opponent's high score or hearing the roar of the crowd on the opponent's home court. These are real events or observations that trigger anxiety. Internal stressors are anxiety-producing negative interpretations of events such as the perception of fatigue or internal dialogues that are a result of poor game performance. Other internal anxiety producers are thoughts that either are worrisome ruminations, poor self-efficacy statements, or helpless-oriented thoughts such as a sense of not being in control.

The action that counters external stressors is to ignore them or block them out. The solution to the internal stressors is to cognitively restructure them or use a cognitive therapy approach to identify the thoughts that underlie the feeling, to assess how realistic the thought is, and if it the thought is not realistic, to replace it with another thought that is more realistic.

A Program to Neutralize SAT Stress and Anxiety

The SAT is a time-sensitive test in which a penalty occurs with a wrong answer, no credit is given for a skipped answer, and one point is awarded for a correct answer. The objectives are speed and accuracy. One needs to get as many answers correct as possible and to get through the test quickly enough to be able to answer all the questions. The effects of stress such as task-irrelevant thoughts, worry, and distraction serve to decrease speed and therefore cause poorer performance.

The corollary to external stress in the SAT is observing that time is running out, not knowing several answers in a row, or seeing someone else finish the test. Internal stressors are self-judgmental, catastrophizing, and worrying thoughts.

The training program for performance enhancement on the SAT should combine techniques of stress management and relaxation along with skills training for excelling on the SAT. This could consist of a brief course in relaxation therapy, consisting of breathing exercises that create a relaxation response combined with techniques to identify when a stressor is occurring and providing a number of skills to counter it. In addition to SAT skills training, the program

should include an abbreviated primer in cognitive therapy techniques. If the stressor is the observation of an external event, the student should be given a number of ways to ignore it, unless doing so creates a problem. For worry and internal dialogue, thought stopping or another cognitive intervention can give a different meaning to the anxiety-producing thought.

By detaching from the anxiety-producing event, the student should be able to redirect his or her energy to focusing on the test. Interruption of the cycle should stop the spiral of anxiety that leads to poor performance. Using the techniques that have proven effective in both stress management and sports psychology, the student taking the SAT can have a way to counter the disadvantage that comes to those who are anxious when they are under stress.

Stress affects all aspects of life, and applying to college ranks high in stress. Although those who are less anxious by nature are less vulnerable, all students are affected by the intense pressure to succeed. Creating a program that can neutralize the effects of stress caused by taking the SAT is a valuable endeavor and would be a great help to those paralyzed by this process.

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