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Will Coaching Improve One's Math Score on the Scholastic Aptitude Test?

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Introduction

The Scholastic Aptitude Test (SAT) has long been a determining factor for admission into most of the nation's colleges and universities. Numerous studies have been conducted to question the reliability and predictive validity of SAT scores, yet they are still widely used. The widespread use of these scores in determining college admission is an indication that the SAT will be around for quite some time. For this reason and for personal reasons, I posed the following research question: "Will coaching improve one's math score on the Scholastic Aptitude Test?"

Coaching refers to activities used by students in preparing to take standardized tests (Ornstein, 1993). From my own experience, I know how anxiety can determine how well one does on a test. During break time, I regurgitated while taking the SAT, the National Teacher Exam (NTE), and Georgia's Teacher Certification Test (TCT). More recently, I took the Graduate Record Exam (GRE) and became physically ill. Consequently, I have always felt that coaching would benefit my students by reducing their test anxiety. On a regular basis, I have incorporated SAT questions and test-taking skills into my lessons without cheating the students of the time needed to appropriately address the subject matter I have been assigned to teach.

On selected Saturday mornings, I have taught SAT workshops sponsored by Educational Talent Search and the Epsilon Beta Lambda Chapter of Alpha Phi Alpha Fraternity. I have volunteered my time

mainly to teach strategies that can be used in taking the math portion of the SAT. One strategy, for example, is knowing that all multiple-choice answers appear in order of magnitude beginning with the smallest. Another is that easy questions appear at the beginning of the test and that hard ones appear at the end. If a question is at the end of the test and has an obvious answer, that answer is probably wrong. Only easy questions have obvious answers, and easy questions come at the beginning. This strategy is simple and useful. Students often know the answer to a question but because of the way the question is worded are not sure which answer to mark. Consequently, it is beneficial to clarify wordy problems or instructions. These are some of the strategies I have practiced with my students in an effort to improve their test scores.

Newspapers are constantly ranking states according to their SAT scores, and Georgia can usually be found near the bottom. Although I understand that colleges need criteria to evaluate applicants, I am saddened that so many students are stressed out by their SAT scores. The media subject students to even more stress by publishing uninterpreted statistics under large demeaning headlines. The SAT is not going to go away any time soon, but it may be possible for coaching to improve the scores of thousands of students who are not skillful test-takers.

In the present study, however, because all of the participants were gifted and consistently scored well on standardized tests, I hypothesized that coaching would not result in a significant difference between the treatment group and the control group.

Literature Review

Average test scores for specific geographic areas, including SAT scores, are often published in newspapers. In areas where the scores are low, the public believes that holding teachers responsible will insure that students will receive a better education (Mehrens, 1989). Callan (1995) states that SAT scores are important in

determining college admission and in the awarding of scholarships. Adam Robinson, a private tutor, says that there is no point in colleges stating that SAT scores are overemphasized when the first item a prospective student sees in a college brochure is the average SAT score of the most recent freshman class (Wilson, 1990b). Immediately, the student feels that he must score at least as high to be considered for admission. The Educational Testing Service (ETS), the maker of the SAT, at one time opposed coaching but no longer does (Ornstein, 1993). The ETS, however, believes that it is not possible to determine who benefits from test preparation (Wilson, 1990b). Peltier (1989) feels the ETS has hurt students by down-playing the effects of coaching.

In 1988 Magner stated that students gave their highest rating to coaching and tutors as useful activities for preparing for the SAT. He went on to say that more than one half of secondary schools conducted SAT preparation programs. The primary goal for three fourths of the schools was to increase familiarity with the test. Another primary goal was to decrease test anxiety and thereby develop self-confidence. Many high school teachers were being asked to prepare their college-bound students for the SAT by coaching, providing information about commercial coaching classes, or recommending computer software and study guides (Schumm, 1991).

Coaching programs for the SAT were first developed in 1946 (Wilson, 1990a) when Stan Kaplan started the country's oldest company, the Kaplan Education Center. His belief was that SAT scores are a better predictor of college performance than high school grades. He agreed with the ETS that the SAT measures critical thinking (Wilson, 1990a). Ornstein (1993) stated that the Kaplan Program focuses on content and involves 40 to 50 hours in class and 30 hours of homework.

One of the nation's largest and most successful test-coaching companies is Princeton Review, founded by John Katzman in 1981. His approach makes a mockery of the SAT. He says the test measures how well students can decipher the strategies of the ETS and not

what one has learned in school (Wilson, 1990c). His 6-week program focuses on test anxiety and test-taking strategies (Ornstein, 1993) and is aimed at helping students think like the people who write the test. Katzman feels that SAT scores separate students into two groups: ones who will be admitted to college and ones who won't. If a student scores below a certain number, he's out; if he scores above, he's in.

Both Kaplan and Katzman believe that students enrolled in their programs can increase their scores by 100 to 150 points. Robert Schaeffer, public education director at the National Center for Fair & Open Testing, believes that if scores can be shown to improve as a result of coaching, then the SAT measures test-taking ability rather than aptitude (Wilson, 1990b). Gardner (1989) reports that a test claiming to measure aptitude will not function as such in all circumstances with all students. He gives an example of a non-English speaking student who is given an aptitude test printed in English. This test will not measure any aspect of aptitude except for the lack of knowledge of English. A test score does not give any insight as to why the individual performed as reported.

In 1993, the proportion of students scoring above 650 on the mathematics portion of the SAT reached an all-time high (Bracey, 1995). Was this due to coaching or higher enrollments in higher-level math courses? In the state of Georgia, students planning to graduate from high school with a college preparatory diploma must now take a fourth math class beyond the previously required Algebra I, Algebra II, and Geometry. Many educators will be anxious to see if test scores rise as a result of this new condition. Schumm (1991) reported that more gains in SAT scores resulted from coaching on the mathematics section than on the verbal section. This conclusion is also supported by Peltier (1989), Ornstein (1993), and Oberman, Perlman, and Reynolds (1988).

Although 9% of high school students spend no time preparing, the average high school student spends an average of 10 hours preparing for the SAT (Magner, 1988). Ornstein (1993) stated that studies show that the length of time spent on coaching is often

associated with improved scores but that improvement levels off after 30 hours. According to Mehrens (1989), even knowledgeable students could miss items on the SAT because of a failure to understand the mechanics of taking a standardized test; therefore, all students could benefit from learning some test-taking skills.

Coaching could be as little as five hours or as much as 300 hours. It could be done by a private tutor in a one-on-one activity or be incorporated into the regular, on-going classroom activities (Dyer, 1987). Many test-taking skills are relatively easy to teach and should take up very little instructional time.

Research Studies

The typical experiment to measure the effects of coaching for the SAT uses two groups of students: a control group that will not be coached and an experimental group that will be coached. A pretest and post-test will be given to both groups, and the average gain for each will be compared. The effect of coaching will be measured by the difference in group averages. In some cases, the differences in scores from pretest to post-test may be negative (Dyer, 1987).

Indeed, "Harvard University's admissions director, William Fitzsimmons, concluded coaching is a waste of time" (Anonymous, 1988, p. A34). Fitzsimmons arrived at this conclusion from a study he did using a group of Harvard students. His findings could be questioned, however, because Harvard students score in the 99th percentile on the SAT (Anonymous, 1988); thus, there is little room for improvement. A study of students with lower scores could have produced different results.

Caplan and O'Rourke (1988) reported on a study done in the DeKalb County School System in Decatur, Georgia. During the 1983-84 school year, a task force was organized to develop a plan for improving SAT scores among DeKalb's high school students. A subcommittee of the task force found that some schools in the district had a few SAT-related activities, but that many schools had no

programs in place to improve SAT scores.

The task force wanted to determine if coaching had a positive effect on improving scores but could find no conclusive research. With the help of a representative of the College Board, the task force decided to do its own study. Fifty-six students from 16 high schools were selected to be in the survey. The report does not say how the students were selected. A 32-hour coaching seminar lasting eight days was conducted focusing on content knowledge and test-taking strategies. Parents, students, teachers, administrators, and counselors were all involved in the program. Seminar participants, from pretest to post-test, showed an average gain of 109 points, prompting the task force to conclude that the goal of improving test scores had been achieved.

Each high school in the system established its own SAT improvement program involving students, teachers, and parents. According to L.A. Bobo (personal communication, July 13, 1998), a science teacher at Dekalb's Columbia High School, the program is still in existence.

Oberman et al. (1988) found different results in their study of a 64-hour PSAT coaching program on urban gifted students from Chicago's public schools. The PSAT is a standardized test given to high school sophomores in preparation for the SAT. Students were invited by letter to participate in the program. In the mathematics section of the course, approximately one half of the time was spent on test preparation. Throughout the program, test-taking practice, drills, and test-taking strategies were incorporated.

Results indicated that PSAT math scores were positively affected by the coaching program but that PSAT verbal scores were not. Students with little or no PSAT experience benefited the most from the program. The study also found that effective coaching appears to concentrate more on test-taking strategies than on cognitive skills. Interest and motivation in improving PSAT scores could have had an effect on study results. Teacher techniques may also have played a part in test scores.

Factors That May Affect the Validity of the Results of Coaching

Most students retaking the SAT raise their test scores by about 50 points (Ornstein, 1993). Coaching companies reporting gains of 100 to 200 points fail to mention this fact. Dyer (1987) maintains that familiarity with the test will cause students with low scores in the spring to come up with larger score gains in the fall. Students retaking the SAT are generally going to improve their scores whether they have been coached or not.

The amount of time a student is willing to dedicate to coaching may determine its effect (Dyer, 1987). Dyer feels that the motivation of the student may negatively affect the success of a coaching program. A student with poor attendance at coaching sessions or one who is sleepy or bored may not take seriously the opportunity to improve test scores. Students in many coaching programs are forced to be there by their parents; others are there because of a strong desire to make gains on their SAT scores. The first type of student may be the reason that some coaching studies show negative gains.

Test scores can vary from day to day. A student taking the same SAT math test on two different days may score 400 the first time and 450 the second. These changes in scores cannot be attributed to any particular factor. In addition, Callan (1995) states that the time of day one takes a standardized test may affect his or her score. Certain people have times of day that are not good for testing. For these students, test schedules may be a burden to overcome and make the administration of the test unfair for a large number of students.

In the College Board's Validity Study Service of 685 colleges, statistical studies showed that high school grade point averages were a greater predictor of freshmen college performance than SAT scores (Dyer, 1987). Why then do colleges place such an emphasis on SAT outcomes? Bagin (1989) states that a standardized test cannot measure all of a student's skills and abilities, and many scores do not reflect what factors may have influenced a test score on any given day. However, as long as the SAT is seen as the measuring stick of

academic intelligence by many colleges, test coaching and preparation techniques will be of interest to students and their parents (Oberman et al., 1988).

Focus of the Study

After reviewing the literature on coaching, I was assured of the importance of test preparation activities for some students. As a person who suffers from extreme test anxiety, I could see that increasing a student's self-confidence may be a way to decrease the anxiety he or she experiences while taking the SAT. A student who is prepared with a strategy for taking the SAT will perform at least as well, if not better, than one who is not so prepared.

My plan was to concentrate only on the SAT mathematics section. In studying the literature, I discovered that most coaching programs were short and intense. I therefore planned to incorporate coaching activities into my daily teaching experience, a few minutes a day, over a long period of time. Instead of cramming, I planned to convey test-taking strategies to my students slowly. After a period of 6 weeks, I hoped to have students who were more skillful test takers. If content and cognitive skills were increased as well, I would consider this increase an added benefit. Therefore, I investigated whether test scores improved from a pretest to a post-test.

Method

Participants

Twenty-nine gifted honors geometry students were the study participants. This sample was a non-random convenience sample of two classes taught by the researcher: 16 students in second period were in the control group, and 13 in fourth period were in the treatment group. Both classes were before lunch. The control group included nine females and seven males; six of the students had prior SAT testing

experience. All 16 students were ninth graders. The treatment group had 10 females and three males; one student had prior SAT testing experience, and 10 were ninth graders and three were tenth graders. To ensure that the groups were equivalent in level of mathematics achievement, a t test was applied to the pretest data. No significant difference was found between the groups [$t(27) = 0.21, p > .05$].

The geometry grades of the participants were not affected in any way. No one received extra credit for participation; no one was penalized for non-participation. Scores from the pretest and post-test did not appear on the individual record of any participant.

Materials

Two instruments were used, one for the pretest and one for the post-test. Both instruments were reprinted from *10 Real SATs*¹ (1997). The pretest was the *SAT I—Reasoning Test* (Saturday, May, 1997 Version), sections 4 and 7; the post-test was the *SAT I—Reasoning Test* (Sunday, May, 1997 Version), sections 3 and 6. Each test consisted of 35 questions divided as follows: 15 quantitative-comparison questions, 10 student-produced response questions, and 10 multiple-choice questions.

The tests were administered to the participants during the time that the researcher had them in class. The class schedule of 55 minutes allowed for the tests to be timed as they would have been during a regular administration of the SAT.

Design and Procedure

Once the Institutional Review Board Committee approved the design study, a consent/assent form was obtained from every participant. Second period was designated as the control group and was not coached in any way for the SAT. Fourth period was the treatment group and was coached for 10 minutes daily each regular school day for the SAT by the researcher. The control group merely

took the pretest and post-test with no coaching of any kind.

A pretest was given to both classes on the same day. The next day the coaching began. The following procedure was used for coaching: At the beginning of the period, while the researcher was checking the students' homework papers, three SAT sample questions were displayed on the overhead projector for the students to solve. After homework papers were checked (approximately 5 minutes), the researcher discussed answers to the problems and discussed solution techniques for answering certain types of questions. Strategies for taking standardized tests were also given when appropriate. The amount of time spent on coaching was approximately 10 minutes per day. Six weeks later, a post-test was given to both classes on the same day.

Scoring

The pretests and post-tests were graded by the researcher using the answers provided by the Educational Testing Service in the book *10 Real SATs* (1997). The raw scores of the participants were used in the study.

Results

A t test for independent samples was applied to the post-test data to determine if a significant difference was found between the treatment group and the control group. The treatment group had a mean score of 20.00 with a standard deviation of 4.00. For the control group, the mean was 19.13 with a standard deviation of 2.63. The difference between the two sets of post-test scores was found to be non-significant, with $t(27) = -.71$, $p > .05$.

Discussion

Although the mean score of the treatment group was greater than that of the control group, the difference was not significant; thus, the null hypothesis was retained. These findings match some of the findings in the literature review. Whether or not coaching has a positive effect on SAT scores is a controversial topic among those who conduct studies on coaching.

Limitations in this study may have affected its results and will prevent these findings from being generalized to a wider population. The limitations included the size and selection of the sample, the length of the testing instruments, and the amount of time spent on coaching.

The researcher was restricted to using students from her own classes; thus, the sample was limited to a small number of participants who were not randomly selected. A larger number of students in each group may have produced different results. All participants in the study were identified as gifted, and both groups, as stated earlier, were similar in level of mathematics achievement. A group of lower achieving students may have benefited more from coaching; gifted students score high on standardized tests whether or not they are coached.

Dyer (1987) stated that familiarity with the test will increase test scores, and students retaking the SAT generally improve their scores. Seven of the participants in the present study had previously taken the SAT. Six of those seven were in the control group. Having those with prior SAT testing experience equally distributed between the groups would have been preferable.

The number of questions on the math portion of the SAT is 60. Restrictions on class time allowed the use of only a 35-question test. A longer test may have given a more accurate assessment of the participants' aptitude for mathematics.

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The length of the present study was shorter than the researcher desired. Coaching daily for a period of 6 months instead of 6 weeks

would have been preferred. As it was, a total of 5 hours was spent on coaching. All of the studies in the literature review had a minimum of 30 hours of coaching.

Although this study indicated that students in the treatment group did not score significantly higher than those in the control group, the findings are not conclusive because of the limitations of the study. As Mehrens (1989) reported, even knowledgeable students could miss items on the SAT because of a failure to understand the mechanics of taking a standardized test; therefore, all students could benefit from learning some level of test-taking skills.

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Footnote

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