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ABSTRACT

The decline in standardized test scores during the 1960s and 1970s is well documented and is seen in both aptitude and achievement test scores. This paper describes and analyzes the test score trends over the 1960s, 1970s and early 1980s for five aptitude tests: (1) the Scholastic Aptitude Test; (2) the American College Test; (3) the Preliminary Scholastic Aptitude Test; (4) the Graduate Record Examinations; and (5) the Graduate Management Admission Test. Test score means are standardized and represented graphically. This standard score transformation placed each test on the same score scale and allowed for comparisons of trends between tests, using the Pearson product-moment correlation. Variables correlated were annual test score means and number of years. Analyses were conducted between the initial data point and 1980, and between 1980 and 1984. The second analyses were intended to test two hypotheses: (1) that the score decline has "bottomed out"; and (2) that a statistically significant change in test scores occurred in the more recent time frame. The decline in aptitude test scores through the 1960s and 1970s is evident for most tests. Lowest score points occurred throughout the mid-1970s to 1981. Most of the aptitude test scores increased during the 1980s, with a common turning point in the school year 1981-1982. (BAE)

# Aptitude Test Score Trends: 1959-1984[1,2]

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The decline in standardized test scores that occurred during the 1960s and 1970s is well documented and was evidenced in both aptitude and achievement test scores. To name a few, Harnischfeger & Wiley (1975), Munday (1976), the Advisory Panel on the Scholastic Aptitude Test Score Decline (1977), and Waters (1981) reported declining test scores on such tests as the Scholastic Aptitude Test (SAT), the American College Test (ACT), the Graduate Record Examination (GRE), the National Assessment of Educational Progress (NAEP), and the Iowa Tests of Basic Skills (ITBS). The phenomenon was clearly not limited to one test or to one geographic region.

Reactions to the test score decline by the public and educational communities were strong. The decline and it's possible causes were the subject of numerous reports, studies, and commissions in an all out effort to identify the root of the problem and thus gear efforts toward solutions. Many explanations for the decline were proposed and studied, varying from the quality of teachers to the quality of students' diets. The most common theme, however, was that the school systems were in some way deficient, be it curriculum, standards, homework assignments, teachers, or text books. This prevailing idea led to the National Commission on Excellence in

[1]Paper presented at the 1987 Annual Meeting of the American Educational Research Association in Washington, D.C.

[2]This paper was drawn from a technical report, Update and Analysis of Test Score Trends: 1959-1984. The study was sponsored by the National Center for Education Statistics. Opinions expressed are those of the author and do not represent official positions of the federal government.

Education's (NCEE) report A Nation at Risk (1983a). This comprehensive report studied the nation's school systems, providing recommendations for reform, and may have marked the culmination of the nation's response to the test score decline. In the late 1970s, there was a slowing in the rate of decline in standardized test scores. More recent literature suggested that the decline had bottomed out and that perhaps scores were rising in the 1980s.

This paper describes and analyzes the test score trends over the 1960s, 1970s, and early 1980s for five aptitude tests. The test score decline of the 1960s and 1970s is documented, and trend analyses are used to discover whether scores were on the rise in the early 1980s.

**Methodology**

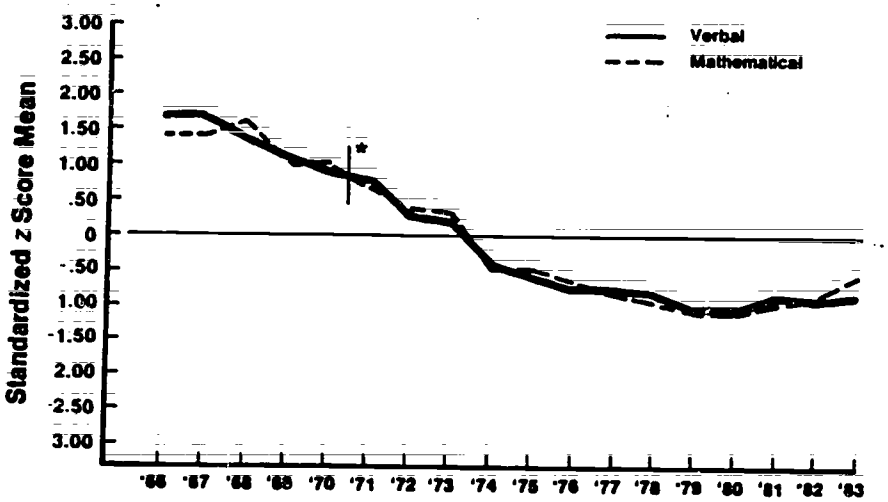
Annual test score means were obtained for five aptitude tests: (a) the Scholastic Aptitude Test (SAT); (b) the American College Test (ACT); (c) the Preliminary Scholastic Aptitude Test (PSAT); (d) the Graduate Record Examination (GRE); and (e) the Graduate Management Admissions Test (GMAT). Test score means were standardized and represented graphically. This standard score transformation placed each test on the same score scale using means across years within tests, and allowed for comparisons of trends between tests.

Test score trends were analyzed using the Pearson product-moment correlation. The variables correlated were annual test score means and number of years. Significance was established at the $\alpha = .05$ level. Correlations of .20 and below were interpreted as no trend and correlations greater than .20 were considered to be a meaningful increase or decrease.

Two sets of analyses were performed on test score means. First, analyses of trends between the initial data point (for example, 1966, 1967, or 1969) and 1980 were conducted to test mean score changes during the 1960s and 1970s. Second, analyses of changes between 1980 and 1984 were performed in an effort to: (a) test the hypothesis that the test score decline has "bottomed out"; and (b) test whether a statistically significant change in test scores occurred in the more recent time frame. Statistical significance for the second set of analyses should be interpreted with caution since attaining statistical significance is unlikely with only five data points.

## Test Score Trends

Scholastic Aptitude Test (SAT). The SAT, published by the Educational Testing Service (ETS), is the most widely used college entrance examination. The examinee population is predominantly high school juniors and seniors interested in attending college. Figure 1 shows a steady, consistent decline



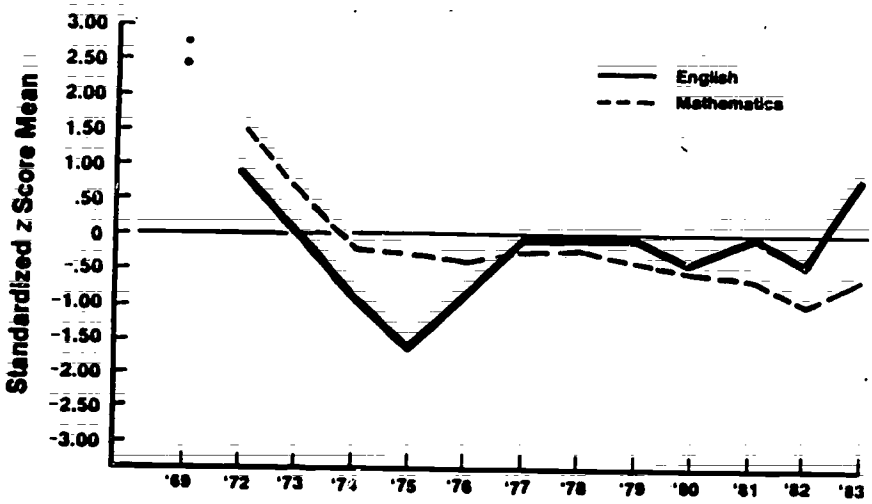

Source: Admissions Testing Program of the College Board (1984). *National College-Bound Seniors, 1984.* Princeton, NJ: Educational Testing Service.

NOTE: *Prior to 1972, SAT Data were not maintained in automated files, therefore means for 1967 through 1971 are estimates, based on a 10% sample. There is no reason to suspect that the data from these samples are not valid within the limits of sampling error.

Figure 1: SCHOLASTIC APTITUDE TEST (SAT)

in SAT scores, for both Verbal and Mathematical subtests, until school year (SY) 1981 when scores apparently began to rise.

American College Test (ACT). The ACT consists of a battery of four tests: English, Mathematics, Social Studies, and Natural Sciences, and yields a composite score which is an average of the four subtest scores. In this paper, the English and Mathematics subtests were analyzed since they most closely parallel subtests reported for other tests (i.e., verbal and quantitative). This test population is similar to that of the SAT, although it tends to be more concentrated geographically in the southeast and midwest. Figure 2 displays a sharp decline in English scores until SY 1976 when a sharp increase began. English scores then leveled off beginning in SY 1978, and increased in SY 1983. Mathematics scores declined until SY 1983, when they rose.

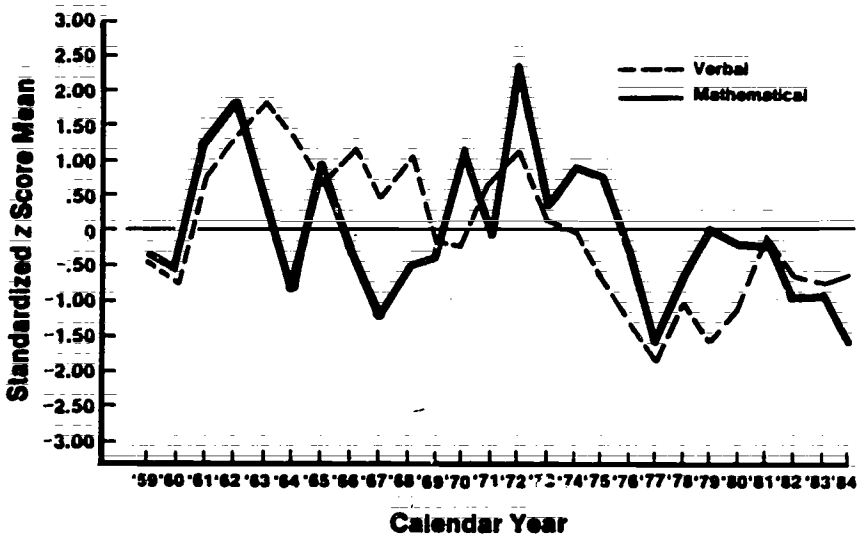



Source: American College Testing Program (1984). *ACT Score Means & SD's for Successive Years of ACT-Tested College-Bound Students (Table I).* Iowa City, IA: American College Testing Program.

NOTE: Data for SY 1969 are of a 3% national sample. Data for SY 1972 through SY 1983 are of a 10% national sample.

**Figure 2: AMERICAN COLLEGE TEST (ACT)**

Preliminary Scholastic Aptitude Test (PSAT). The PSAT is a shortened version of the SAT and is administered to high school juniors in October of each year. Since 1971, the test has been connected to the National Merit Scholarship Competition (NMSC). Thus, the examinee population for the PSAT is highly selected with predominantly high ability students. Figure 3 shows erratic patterns of PSAT scores from 1959 through the end of the period, with the overall pattern tending to decrease. Both subtests reached their lowest point in 1977. The highly restricted nature of the PSAT population likely affected the lack of clear trends over time.

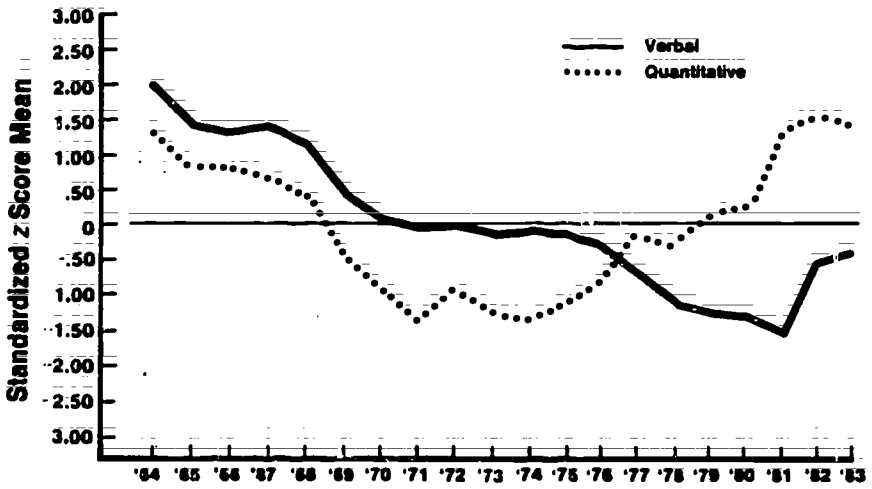



Source: College Board and National Merit Scholarship Corporation (1984). *Preliminary Scholastic Aptitude Test/National Merit Scholarship Qualifying Test October Administrations Statistical Summary.* Princeton, NJ: Educational Testing Service.

**Figure 3: PRELIMINARY SCHOLASTIC APTITUDE TEST (PSAT)**

Graduate Record Examination (GRE). The GRE, developed by ETS, yields both Verbal and Quantitative scores. Examinees are predominantly college seniors competing for graduate school admissions. Figure 4 shows a consistent decline in Verbal scores, reaching the lowest point in SY 1981 and then

clearly rising in SY 1982 and 1983. Quantitative scores generally declined until SY 1974 and then rose steadily. With the exceptions of SY 1978 and 1983 (which showed slight decreases), Quantitative scores have continued to rise since SY 1975.




Sources: Adelman, C. (1984). *The Standardized Test Scores of College Graduates, 1964-1982.* Washington, DC: National Institute of Education. (ERIC Document Reproduction Service No. ED 248 827)

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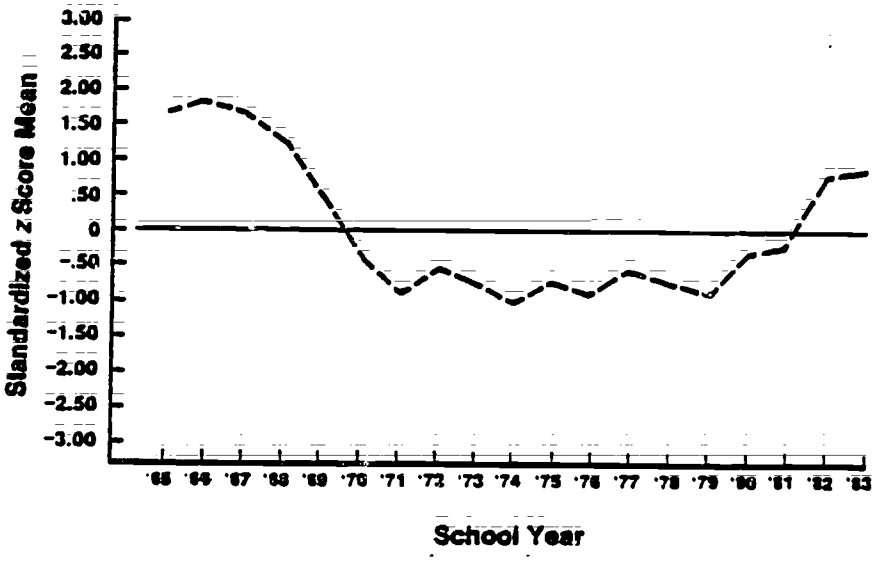
**FIGURE 4: GRADUATE RECORD EXAMINATION (GRE)**

Graduate Management Admissions Test (GMAT). The GMAT is typically required of applicants for graduate business programs. The examinee population tends to consist of college seniors and graduates interested in entering MBA programs. Figure 5 shows a sharp decline in GMAT scores until

SY 1972 when scores became relatively stable through the 1970s. In SY 1980, scores increased and continued to increase through SY 1983.




Source: Graduate Management Admission Test (1984). *GMAT Total Score Means and Standard Deviations, 1965-66 to 1983-84 (Table).* Princeton, NJ: Educational Testing Service.

**Figure 5: GRADUATE MANAGEMENT ADMISSIONS TEST (GMAT)**

**Overall Trends**

The declines in aptitude test scores through the 1960s and 1970s are evident for most tests represented in Figures 1 through 5. Lowest score points occurred throughout the mid 1970s to 1981. As recent literature suggests, most of the aptitude test scores have increased during the 1980s, with a common turning point being SY 1981-82.

Table 1 summarizes the results of correlational trend analyses for the five aptitude tests. By breaking the tests down into subtest scores--where

these data were available--a total of nine separate sets of statistical comparisons of test score means resulted. Correlational analyses of aptitude test score trends up to 1980 inclusive revealed statistically

Table 1

CORRELATIONAL TREND ANALYSES OF APTITUDE TEST SCORES

| TEST | SUBTEST | YEARS | Pearson r |
|---|---|---|---|
| Scholastic Aptitude Test | Verbal | SY 1966-1979 | -.98* |
| | | SY 1979-1983 | .79ns |
| | Mathematical | SY 1966-1979 | -.98* |
| | | SY 1979-1983 | .91* |
| American College Test | English | SY 1969-1979 | -.59* |
| | | SY 1979-1983 | .52ns |
| | Mathematics | SY 1969-1979 | -.89* |
| | | SY 1979-1983 | -.49ns |
| Preliminary Scholastic Aptitude Test | Verbal | CY 1959-1980 | -.62* |
| | | CY 1980-1984 | .10ns |
| | Mathematical | CY 1959-1980 | -.16ns |
| | | CY 1980-1984 | -.94* |
| Graduate Record Examination | Verbal | SY 1964-1979 | -.97* |
| | | SY 1979-1983 | .77ns |
| | Quantitative | SY 1964-1979 | -.58* |
| | | SY 1979-1983 | .90* |
| Graduate Management Admissions Test | | SY 1965-1979 | -.85* |
| | | SY 1979-1983 | .98* |

* Statistically significant at the $\alpha = .05$ level.
ns Not significant.

significant coefficients for eight of the tests and subtests. The PSAT Mathematical subtest scores showed no trend for this time period. From 1980 through 1984, three of the aptitude test and subtest correlations showed

significant increases. However, as discussed in the methodology section of this paper, it is difficult to attain statistical significance with only five data points. Thus, for these analyses, the size of the correlation (r) should be taken into consideration. From 1980 through 1984, six of the nine aptitude tests and subtests analyzed showed mean score increases, with five of those having a correlation of .70 or above. The ACT Mathematics subtest, and the PSAT Mathematical subtests showed decreases during the 1980s with the decrease in the PSAT Mathematical subtest being statistically significant.

**Discussion**

In the later 1970s, when the College Entrance Examination Board (CEEB) published several reports documenting the consistently declining SAT scores, and other sources indicated similar declines in other aptitude/achievement test scores, the search for the cause(s) of the decline began. No hypothesized cause has emerged as conclusive, although some are supported with persuasive evidence. As previously noted, much attention has been drawn to the quality of our school systems, perhaps because of the realization that change can be effected in this area.

In the last several years, a general increase in test scores has occurred, possibly as a result of educational reforms brought about in response to the test score decline. Six months after A Nation at Risk was published, the NCEE produced a follow-up report on efforts toward educational reform in the United States (National Commission on Excellence in Education, 1983b). As of mid November 1983, the NCEE found that 165 state-level task forces were organized in 50 states. Results of a survey

conducted by the National Conference of State Legislatures results showed that efforts to improve curriculum standards had shifted from a previous emphasis on developing student competency tests, to a current emphasis on strengthening basic course requirements and lengthening the school day and/or the school year. Additionally, the survey results revealed a change in teacher improvement efforts from an emphasis on developing teacher competency tests to emphases on providing more training and education for teachers, and developing policies to either help or discharge inadequate teachers. At the local level, the NCEE found that school districts had also begun efforts toward educational reform. A large number of school districts had developed task forces and planning efforts to examine curricula and teaching. Many school systems had implemented educational improvement efforts involving curriculum and course requirements, classroom time, teaching and professional incentives, management, and community support.

**Conclusion**

Aptitude and achievement test scores are still under close scrutiny and research on factors that may affect scores continues. As many authors and researchers have already stated, there is probably no single factor responsible for the decline (or increase) in standardized test scores. Almost certainly, many factors contributed both independently and interactively. However difficult, or impossible, the task of identifying the precise variables which contribute to the achievement or ability of the nation's students, efforts toward improving and facilitating academic achievement should continue.

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