TAKS HIGHER EDUCATION READINESS COMPONENT (HERC)
CONTRASTING GROUPS STUDY

Prepared for the Texas Education Agency
by Pearson Educational Measurement
Psychometric Services
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Executive Summary

This research paper represents the first in a series that outlines the development of the Texas Higher Education Readiness Component (HERC) mandated as part of the Texas Assessment of Knowledge and Skills (TAKS) under Senate Bill 103. This legislation called for the replacement of the Texas Academic Skills Program (TASP) by requiring a performance standard be established for TAKS to identify students likely to be ready for success with college level work. This performance standard also represents the cut score required for students to be ready to receive college instruction and serves as the criterion for receiving dual high-school and college level course work credit. Whereas the HERC cut score is a point on the TAKS scale score system (and is hence implemented by the Student Assessment Division of the Texas Education Agency - TEA), the standard itself was established by the Texas Higher Education Coordinating Board (THECB). Essentially, TEA conducted the research, THECB established the standard and TEA was responsible for implementing and facilitating its use.

The current paper focuses on a traditional standard-setting methodology known as contrasting groups. The purpose of this research was to determine how well students operationally defined as "ready to be successful in college" actually perform on the TAKS assessment. Simply stated, if we knew how well students who were ready for college performed on TAKS, we could then compare this level of performance to actual high school students taking TAKS as well as to the performance of students operationally defined as not ready for college. Such information was invaluable during the process the THECB implemented to determine a college readiness cut score.

The other papers in the series will provide additional information useful for not only the establishment of the HERC standard, but also for understanding the factors contributing to association between performance on TAKS and the likelihood of success in college. The second paper in the series will outline the research used to generate correlations between TAKS and the ACT and SAT I assessments. The third paper in the series will provide participants' survey information regarding their perceptions of course value, grade-point average and college choice for both two-year and four-year colleges. The final paper in the series will describe the steps taken by THECB to actually determine the HERC standard.

Introduction/Background

Senate Bill 103 mandates that the Texas Education Agency (TEA) implement a "college readiness component" as part of the Texas Assessment of Knowledge and Skills (TAKS) exit level assessment. Beginning in spring 2004, performance on the grade 11 exit level mathematics and English language arts tests was used to assess not only a student's level of academic preparation for graduation from a Texas public high school but also the student's readiness to enroll in an institution of higher education. A student who meets the Higher Education Readiness Component (HERC) score on the exit level TAKS is exempt from state-mandated testing requirements under the Texas Success Initiative (TSI). The TSI replaces the Texas Academic Skills Program (TASP) that was repealed by the legislature in June 2003.

The Student Assessment Division of TEA convened a task force in the fall of 2000 to provide guidance for the implementation of the college readiness component of the exit level TAKS. In spring 2001 the task force developed a Higher Education Readiness Component Plan that included a multi-faceted research approach designed to provide information about college readiness to the Texas Higher Education Coordinating Board (THECB), the group responsible for determining a higher education readiness score on TAKS. The plan was presented to the Commissioner's P-16 Council in the summer of 2001, and in October 2001 the plan was approved for implementation by then Commissioner of Education Jim Nelson and Commissioner of Higher Education Don Brown.

Subsequently, TEA, and its primary testing contractor Pearson Educational Measurement, collaborated with the Texas Higher Education Coordinating Board, to collect research data showing the link between student performance on the TAKS and readiness to enroll in an institution of higher learning. Specifically, the "contrasting groups" study examined the performance of high school juniors on the first administration of the exit level mathematics and English language arts TAKS tests in 2003 as compared to performance on the same TAKS assessments by a sample of second semester college freshmen who had demonstrated college readiness through successful completion of their first semester courses[1]. Results of the study were provided and used as part of a standard- setting process conducted by THECB to establish a cut score or "readiness standard" on the TAKS test.

Methods

Contrasting Groups Methodology

Due to the level of content coverage and rigor involved in TAKS, a strong relationship between performance on TAKS and performance on post-high school work was anticipated. The goal of this research was to investigate this relationship. The spring 2003 TAKS testing instrument was the primary data collection device for this study. A representative sample of second semester college freshmen responded to the same testing instrument that was used for the exit level TAKS program in the spring of 2003[1]. Test results for the two populations were compared using a modified contrasting groups methodology.

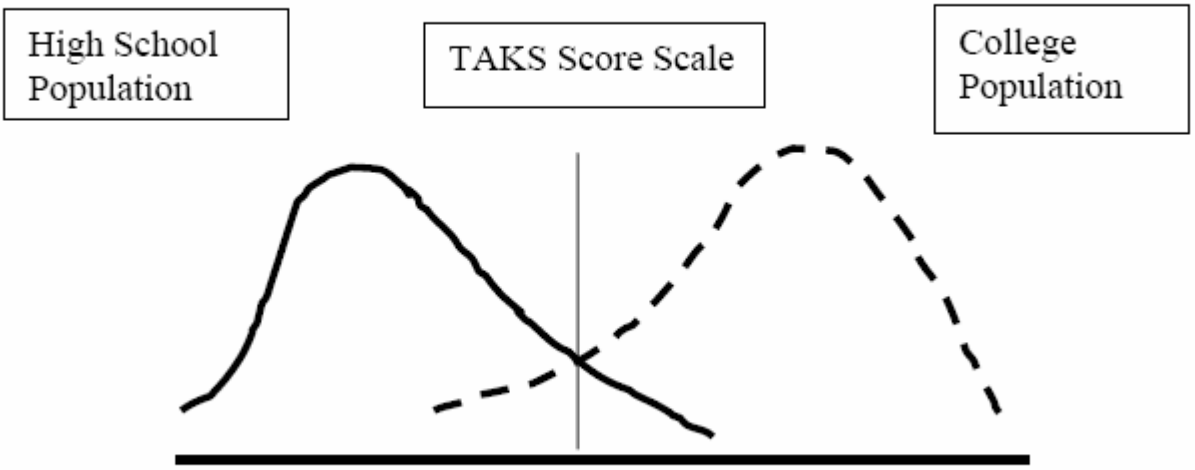
The research design was taken from "standard setting" methodology and is a modification of the area of work typically referred to as "contrasting groups" (Berk, 1976; Zieky & Livingston, 1977). In the contrasting groups design, two populations of students are identified, those seen as "masters" and those seen as "novices." Both of these populations of students are given the same assessment instrument, and their performance is compared. A clear and empirical relationship is determined which shows how the masters compared to the novices on the assessment. The point where the two populations diverge is taken as the "optimal" cut score or the point that would most often classify the masters and the novices

[1] A more elaborate operational definition of "readiness for success in college" will be provided in the next section.

correctly. For purposes of the current research, the assessment instrument was the exit level versions of TAKS in English language arts and mathematics. The high school population (i.e. the "novices") was first time TAKS test takers (all students in Grade 11) in the spring of 2003. The college population (i.e. the "masters") was composed of a sample of second semester freshmen at public two-year and four-year postsecondary institutions in Texas.

Analysis of the results yielded two different distributions of raw and scale scores for each TAKS subject, one each for the high school and college populations. These distributions were on the same assessment (TAKS) and can be directly compared as indicated in the example figure below.

Figure 1. Example of Contrasting Groups Results



Defining Success in College

The first, and most arduous, step in this study was to come to consensus about what constitutes "success in college." A task force was assembled with the goal of creating this definition. The task force included 19 educators from Texas A & M, University of Texas, THECB, TEA, and Pearson Educational Measurement. See Appendix A in this report for a list of task force members. The task force began with a review of Freshmen level courses, syllabi and remedial course offerings from both four-year and two-year institutions of higher learning in Texas. This collective list of courses was then discussed by the task force as a possible set of "pre-requisites" of content that would be required for a successful freshman year entry to college. College representatives on the task force did not see such an eclectic listing of course requirements as a good place to start in trying to define what would constitute a successful college freshman. Other issues such as the marketing of the colleges to potential students, alignment with curricular goals and philosophies and tradition had as much to do with freshman course offerings as did pre-requisite or enabling content skills. As such, a common content definition of success (for example, courses in which students should have pre-requisite skills) was abandoned by the task force.

The task force was able, however, to identify the attributes and characteristics of a successful freshman. These were:

- Return to college for the second semester
- A grade point average of no less than 2.0 on a 4.0 scale

- No remedial course work in the first semester

As such, the task force ultimately defined a successful college student as any second semester returning freshman with a minimum of a 2.0 grade point average who did not need any remediation. This was seen as a good definition of readiness for success in college because being a successful freshman was only the first step to being successful in college overall and being able to graduate. After the task force created this definition of a student ready for success, a focus group consisting of 30 educators and administrators from across the state reviewed the definition. See Appendix B of this report for a list of the focus group members. Additional focus group members who are not listed were also invited to participate in the review including local school district personnel, representatives of the legislature and other recommended educators.

Sample Collection

In order to collect data for the contrasting groups study, the population of potential participants included all four-year and all two-year institutions of higher learning in Texas. Enrollment statistics were collected and a sampling framework was developed. A representative sample of the schools was taken and each school selected was asked to participate in the study. Schools were paid a stipend to help defray costs associated with test administration (see the next section for more detail regarding data collection) and to help recruit students to participate. Students were paid to participate in order to generate motivation and to lessen the impact participation might have on students who would have to give up between one hour and two hours of their time for the study.

Data Collection

During a one-week testing window from April 29 to May 6, 2003, 821 college students deemed "successful" (i.e., met the criterion described previously) were administered the spring 2003 grade 11 exit level TAKS tests in English language arts and mathematics at 8 four-year and 10 two-year Texas public institutions of higher education. Participating colleges were asked to select a random sample of volunteers from students who met all of the following requirements: students who had full-time status for both first and second semester, students who were in their first year out of high school (any U.S. high school), students who were not registered in any developmental education courses during the second semester, and students who had a 2.0 GPA or above for each of their first semester courses.

The college students were tested anonymously but were required to complete a one-page questionnaire about their background and academic experience. Student volunteers who completed the test were paid a $20 stipend.

As a supplement to the spring contrasting groups study, a study of college students in developmental education courses was conducted in September 2003 at 14 colleges and universities (5 four-year colleges and 9 two-year colleges, all of which also participated in the spring study). The spring 2003 versions of the exit level TAKS in ELA and mathematics were administered to students who had *not* demonstrated college readiness in the subject tested as defined by their enrollment in developmental education courses in that content area.

Population Comparisons

The three populations (high school, college, and remedial college) were compared in terms of demographics, and TAKS test performance (raw score and scale score averages and distributions). The score distributions were plotted graphically to identify a TAKS test scale score discriminating between those that were identified as college ready and those that were not.

Finally, the "optimal" scale score cut was used to classify examinees as being either ready ("master") or not ready ("novice") for college on the basis of TAKS score. Students from the college population scoring below the cut score were considered to be misclassified as being not ready for college. Successful college freshmen were compared to high school students, college freshmen were compared to remedial college freshmen, and high school students were compared to remedial college freshmen. The percentage of cases in which students were misclassified was tallied.

Results

Of the 821 student tests that were submitted by the colleges in the spring of 2003, 814 were deemed eligible for scoring (428 mathematics tests and 386 ELA tests). The tests were scored by Pearson Educational Measurement using the same scoring process used for exit level TAKS administered at grade 11. The written portions of the ELA were scored at Pearson's Performance Scoring Center in Austin.

Tables 1-3 present data comparing the spring 2003 two-year and four-year college samples to their respective populations in terms of type and size of college attended, and gender and ethnicity breakdowns.

For the remedial college freshman sampled in September 2003, a total of 468 student answer documents were deemed eligible for scoring, including 275 mathematics tests and 193 ELA tests. The tests were scored by PEM using the same scoring process used for the spring college study.

The contrasting groups research results showed that the mean raw score of successful first semester college students was higher than that of the high school juniors on both the English language arts and mathematics TAKS. The college students receiving developmental instruction were the lowest performing of the three groups, scoring, on average, lower than both their "college ready" counterparts and the high school population. This information is presented in Table 4.

Figures 2 though 4 present comparisons of the score distributions for the TAKS Mathematics test. The distributions have been smoothed using a polynomial regression method of best fit. Visual inspection of the point where the two distributions intersect is one way of determining the scale score which best classifies students as being college ready. So, for example, in figure 5 it appears that the point of intersection between the high school and college population occurs at a scale score value of about 2085.

Table 5 presents the percentage of students scoring at each scale score point on the TAKS Mathematics Test and indicates with an asterisk the scale score that, when used as a cutting score, minimizes the percent of students that are misclassified in their college "readiness." So, for example, the scale score that best classifies students as being ready for college or not using the high school population and the college population is 2089. When defining those as not ready for college using the remedial college population, the optimal cutting score (or the point at which the fewest misclassifications occur) is at a scale score of 2058.

Figures 5 through 7 present comparisons of the score distributions for the TAKS English Language Arts Test. In these graphs the distributions have been smoothed by a two-point moving average method. Visual inspection of the points where the distributions intersect is one method for determining where to appropriately place the cutting score. For Figure 5, it appears that the distributions intersect at a scale score of 2154.

Table 6 presents the percentage of students scoring at each scale score point on the TAKS English Language Arts Test and indicates with an asterisk the scale score that, when used as a cutting score, minimizes the percent of students that are misclassified in their college "readiness." Here, the scale score

that best classifies students using the high school population and the college population is 2141. When defining those as not ready for college using the remedial college population, the optimal cutting score (or the point at which the fewest misclassifications occur) is at a scale score of 2100.

The results of these analyses were presented to the THECB to aide in their decision about where to place the cut score, or cutting point, for determining college readiness. THECB incorporated these datum in a formal standard setting process described briefly in the next section.

Standard-Setting Process

In July 2003 the THECB adopted a standard-setting process for the TAKS Higher Education Readiness Component. In early November 2003, Texas college and university mathematics and English department chairs were invited to participate in one-day meetings to review the HERC research in their respective fields and to provide feedback to THECB staff regarding the higher education readiness score. On November 19, 2003, the Participation and Success Subcommittee of the Coordinating Board met to consider the research and input from college faculty and to consult with three national standard-setting experts regarding the standard-setting process. The subcommittee unanimously voted to accept a recommendation from the Commissioner of Higher Education that the TAKS Higher Education Readiness standard be set at a scale score of 2200 for both the exit level mathematics and English language arts TAKS with the additional requirement of a minimum score of 3 on the composition portion of the English language arts assessment.

On January 29, 2004, the THECB considered, on first reading, the recommendation put forward by Commissioner Don Brown and the Participation and Success Subcommittee to set the higher education readiness standard on the exit level tests at 2200 for mathematics and 2200 with a composition score of at least 3 on English language arts. In April 2004 the THECB made a final determination concerning the higher education readiness standard.

The THECB also passed a rule amendment that addressed eligibility for high school students to enroll in dual credit/concurrent courses. According to the proposed rules, students who achieves a score of 2200 on the grade 10 mathematics TAKS and/or a score of 2200 on the grade 10 English language arts TAKS with a writing subsection score of at least 3 are eligible to enroll in relevant dual credit courses in the eleventh and/or twelfth grade. These rules were accepted by the THECB in April 2004, on second reading.

Table 1. Type/Size of College Breakdown and Percents

Type of college attended breakdown and percentages for first-time, full-time freshmen (fall 2001) and contrasting groups sample at four-year colleges are as follows:

	Total Population	**Sample**
UT System (Sample includes UT Austin, UT Pan Am, and UT San Antonio)	14,714 (30 %)	149 (30 %)
Texas A & M System (Sample includes A& M College Station and Prairie View A & M)	12,166 (25 %)	189 (38 %)
Texas State College System (Sample includes Southwest Texas State University)	6,638 (14 %)	95 (19 %)
All Other Texas Public Universities (Sample includes Texas Tech, and University of North Texas)	15,251 **(**31 %)	61 (12%)
Total	48,769 (100 %)	494 (100%)

Size of college attended breakdown and percentages for first-time, full-time freshmen (fall 2001) and contrasting groups sample at two-year colleges are as follows:

	Total Population	**Sample**
Public Two-Year Colleges with More than 1,000 Freshmen (Sample includes Alamo C.C., Dallas C.C., North Harris C.C., El Paso C.C., Austin C.C., and Blinn College)	30,152 (57 %)	106 (33 %)
Public Two-Year Colleges with Less than 1,000 Freshmen (Sample includes Frank Phillips College, Laredo C.C., Victoria College, and Texarkana College)	22,455 (43 %)	214 (67 %)
Total	52,607 (100%)	320 (100%)

Table 2. Gender/Ethnic Breakdown and Percents

Gender breakdown and percentages for the first-time, full-time public college/university freshman population (fall 2001) and contrasting groups sample are as follows:

	Total Population	Sample
Male	47,276 (47 %)	318 (39 %)
Female	54,100 (53 %)	487 (60 %)
Not Identified	0 (0%)	9 (1 %)
Total	101, 376 (100 %)	814 (100%)

Ethnic breakdown and percentages for the first-time, full-time public college/university freshman population (fall 2001) and contrasting groups sample are as follows:

	Total Population	Sample
White/Caucasian	55,837 (55 %)	384 (47 %)
Hispanic	25,537 (25 %)	204 (25 %)
African American	12,018 (12 %)	151 (19 %)
Asian	4,377 (4 %)	38 (5 %)
Other	3,607 (4%)	37 (4 %)
Total	101,376 (100 %)	814 (100 %)

Table 3. Gender/Ethnic Breakdown and Percents for Public Two- and Four-Year Colleges

Gender breakdown and percentages for two- and four-year college freshman population (first-time, full-time students in 2001) and contrasting groups sample are as follows:

	Population (4-year)	Sample (4-year)
Male	22,290 (46%)	181 (37 %)
Female	26,479 (54%)	308 (62 %)
No Answer	0	5 (1 %)
Total	48,769 (100%)	494 (100%)

	Population (2-year)	Sample (2-year)
Male	24,986 (47%)	137 (43 %)
Female	27,621 (53%)	179 (56 %)
No Answer	0	4 (1 %)
Total	52,607 (100 %)	320 (100 %)

Ethnic breakdown and percentages for two- and four-year college freshman population (first-time, full-time students in 2001) and contrasting groups sample are as follows:

	Population (4-year)	Sample (4-year)
White/Caucasian	27,762 (57 %)	221 (45 %)
Hispanic	10,407 (21 %)	92 (19 %)
African American	6,260 (13 %)	132 (27 %)
Asian	3,037 (6 %)	31 (6 %)
Other	1,303 (3 %)	18 (3 %)
Total	48,769 (100 %)	494 (100 %)

	Population (2-year)	Sample (2-year)
White/Caucasian	28,075 (53 %)	163 (51 %)
Hispanic	15,130 (29 %)	112 (35 %)
African American	5,758 (11 %)	19 (6 %)
Asian	1,340 (3 %)	7 (2 %)
Other	2,304 (4 %)	19 (6 %)
Total	52,607 (100 %)	320 (100 %)

Table 4. Raw Score Summary Comparisons.

		High School Population**	College Sample	Remedial College Sample
Mathematics	**N-Count**	198624	428	275
	Mean	32.15	36.57	20.51
	Standard Deviation	12.06	11.22	7.56
	Minimum	0	14	3
	Maximum	60	59	46
	Median	30	36	19
English/Language Arts*	**N-Count**	183024	386	193
	Mean	46.37	49.74	29.70
	Standard Deviation	11.94	9.79	10.09
	Minimum	0	10	10
	Maximum	73	67	53
	Median	48	52	29

* Total raw score is a combination of multiple-choice, three open-ended items worth three-points each and one essay worth four-points which is weighted by a factor of 4. Resulting maximum total raw score is 73.

** Spring 2003 Grade 11 results.

Figure 2. Mathematics - Contrasting Groups Analysis
(College Sample vs. High School Population)

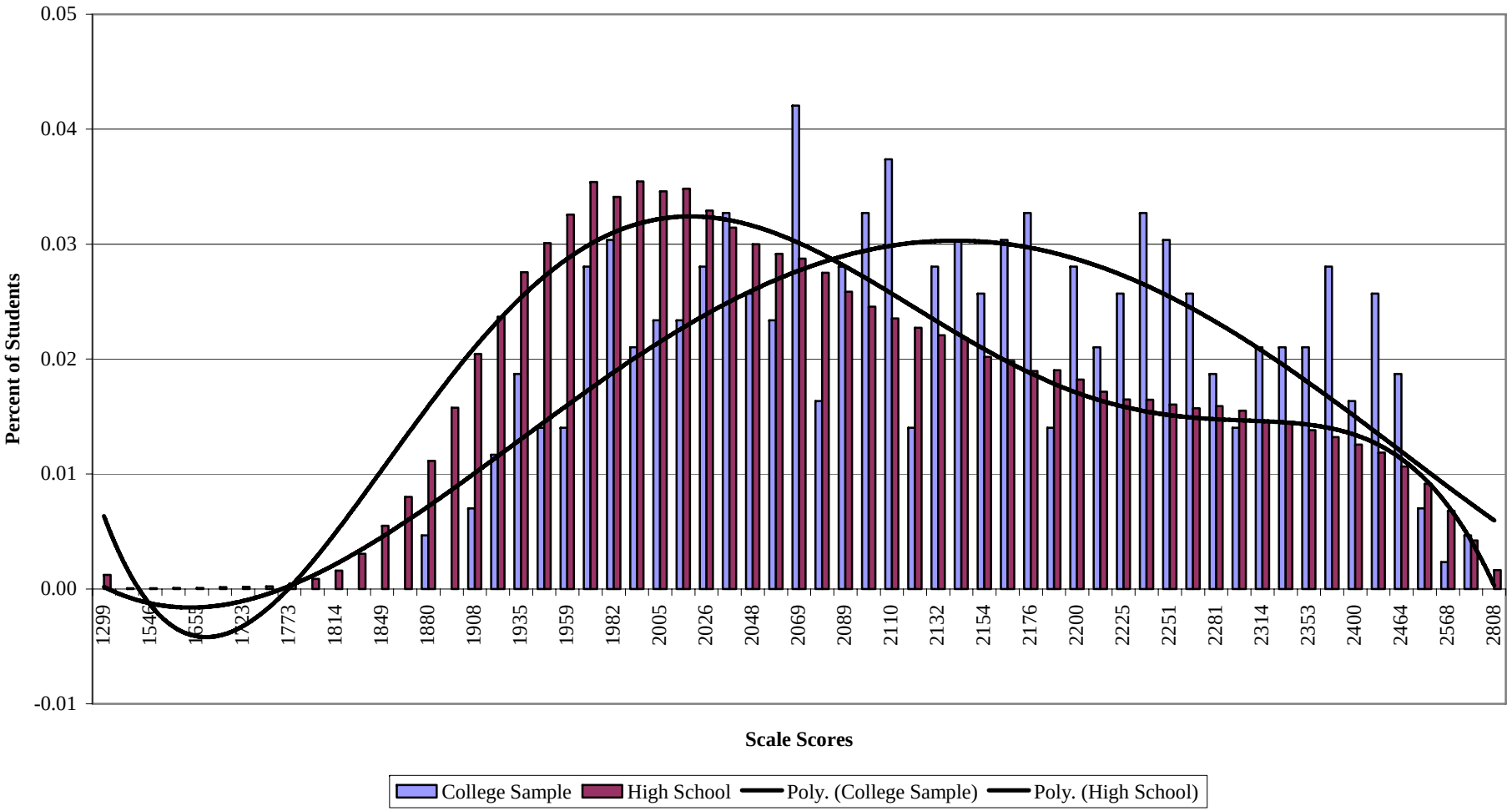


Figure 3. Mathematics - Contrasting Groups Analysis
(College Sample vs. Remedial College Sample)

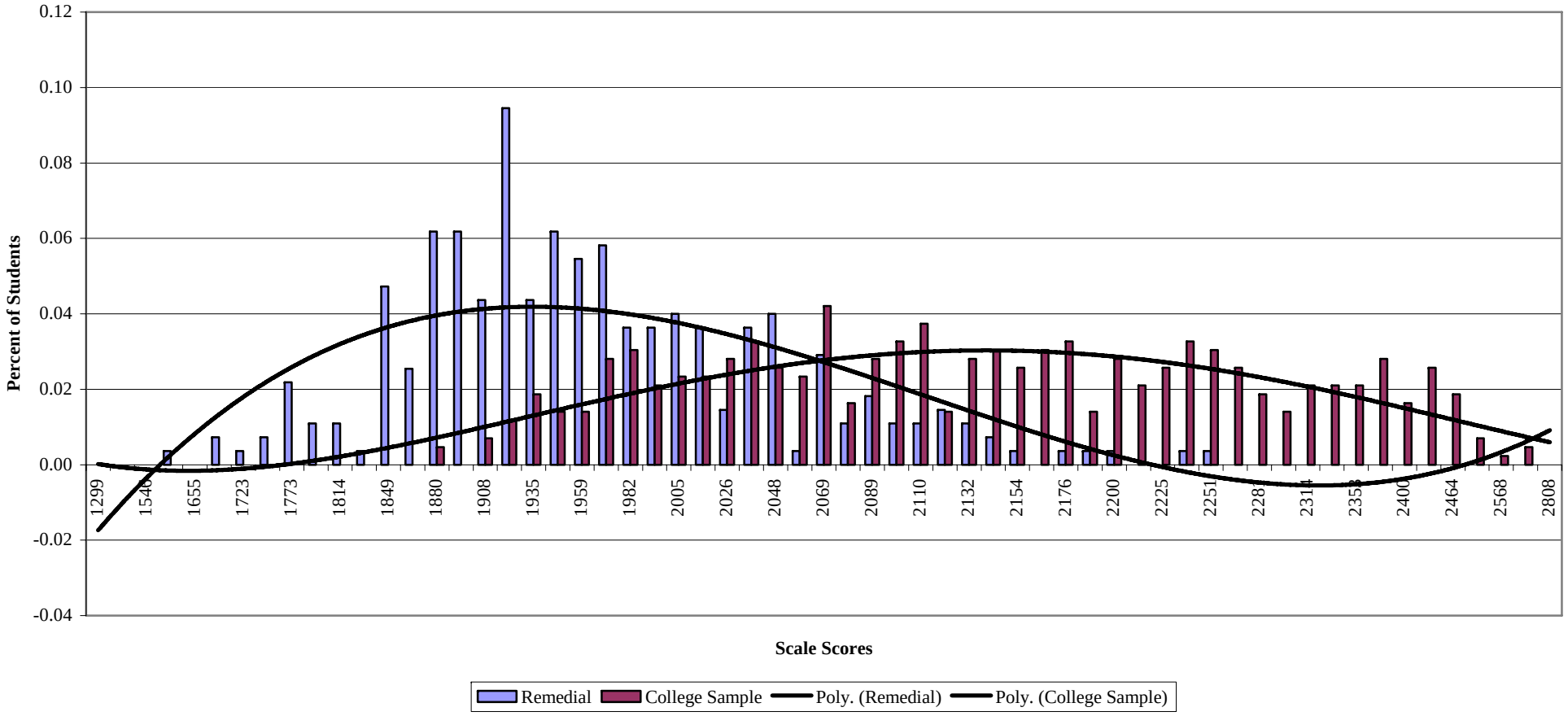


Figure 4. Mathematics - Contrasting Groups Analysis
(High School Population vs. Remedial College Sample)

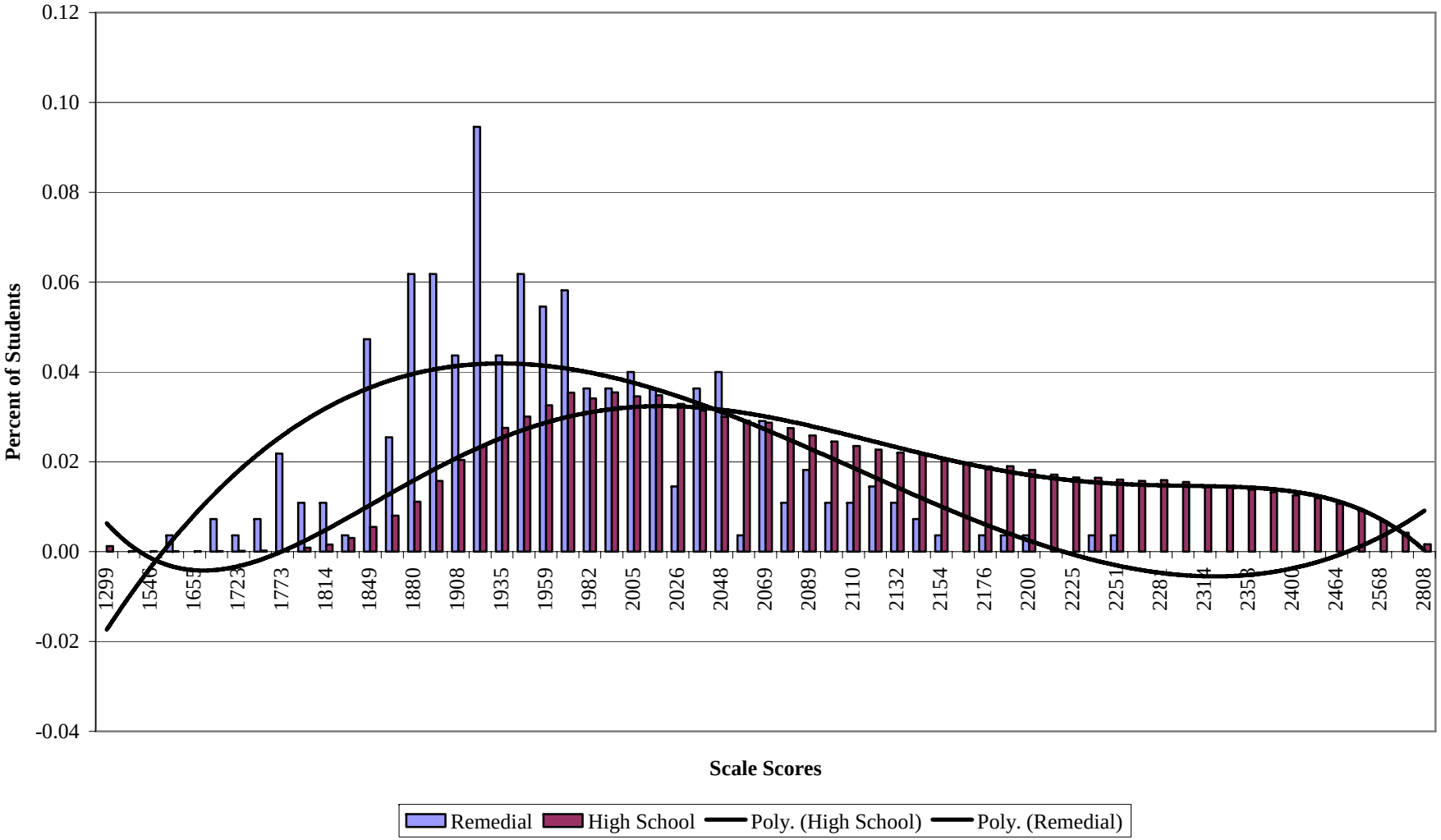


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Table 5. Classification Results from Contrasting Groups Study
Grade 11 Mathematics - Spring 2003 TAKS Population, Spring 2003 College Sample, Fall 2003 Remedial College Sample

		College Sample		High School Population		Remedial Sample		Percent "Misclassified"[1]		
	Scale	Percentage		Percentage		Percentage		College vs.	High School vs.	College vs.
Cut Score	Score	Below	At & Above	Below	At & Above	Below	At & Above	High School	Remedial	Remedial
0	1299	0	100	0	100	0	100	100	100	100
1	1442	0	100	0	100	0	100	100	100	100
2	1546	0	100	0	100	0	100	100	100	100
3	1609	0	100	0	100	0	100	100	100	100
4	1655	0	100	0	100	0	100	100	100	100
5	1692	0	100	0	100	0	100	100	100	100
6	1723	0	100	0	100	1	99	100	99	99
7	1749	0	100	0	100	1	99	100	99	99
8	1773	0	100	0	100	2	98	100	98	98
9	1794	0	100	0	100	4	96	100	96	96
10	1814	0	100	0	100	5	95	100	95	95
11	1832	0	100	1	99	7	93	99	94	93
12	1849	0	100	1	99	7	93	99	94	93
13	1865	0	100	1	99	12	88	99	90	88
14	1880	0	100	2	98	14	86	98	88	86
15	1895	0	100	3	97	20	80	97	83	80
16	1908	0	100	5	95	27	73	96	78	74
17	1922	1	99	7	93	31	69	94	76	70
18	1935	2	98	9	91	40	60	93	69	62
19	1947	4	96	12	88	45	55	92	67	59
20	1959	6	94	15	85	51	49	91	64	55
21	1971	7	93	18	82	56	44	89	62	51
22	1982	10	90	22	78	62	38	88	60	48
23	1993	13	87	25	75	66	34	88	59	47
24	2005	15	85	29	71	69	31	86	59	45
25	2015	17	83	32	68	73	27	85	59	44
26	2026	20	80	36	64	77	23	84	59*	43
27	2037	22	78	39	61	79	21	83	60	44
28	2048	26	74	42	58	82	18	84	60	44
29	2058	28	72	45	55	86	14	83	59	42*
30	2069	31	69	48	52	87	13	83	62	44

31	2079	35	65	51	49	89	11	84	61	45
32	2089	36	64	54	46	91	9	83*	63	46
33	2100	39	61	56	44	92	8	83	64	47
34	2110	43	57	59	41	93	7	84	65	49
35	2121	46	54	61	39	95	5	85	67	52
36	2132	48	52	63	37	96	4	84	67	52
37	2143	50	50	66	34	97	3	85	68	53
38	2154	54	46	68	32	98	2	86	70	56
39	2165	56	44	70	30	98	2	86	72	58
40	2176	59	41	72	28	98	2	87	74	61
41	2188	62	38	74	26	99	1	89	75	64
42	2200	64	36	76	24	99	1	88	77	65
43	2212	67	33	77	23	99	1	89	78	67
44	2225	69	31	79	21	99	1	90	80	69
45	2238	71	29	81	19	99	1	91	81	72
46	2251	75	25	82	18	100	0	92	83	75
47	2266	78	22	84	16	100	0	94	84	78
48	2281	80	20	86	14	100	0	95	86	80
49	2297	82	18	87	13	100	0	95	87	82
50	2314	83	17	89	11	100	0	95	89	83
51	2332	86	14	90	10	100	0	95	90	86
52	2353	88	12	92	8	100	0	96	92	88
53	2375	90	10	93	7	100	0	97	93	90
54	2400	93	7	94	6	100	0	98	94	93
55	2429	94	6	96	4	100	0	99	96	94
56	2464	97	3	97	3	100	0	100	97	97
57	2507	99	1	98	2	100	0	101	98	99
58	2568	99	1	99	1	100	0	101	99	99
59	2668	100	0	99	1	100	0	100	99	100
60	2808	100	0	100	0	100	0	100	100	100
					Minimum =			83	59	43

[1]Some percentages out of range due to rounding.

[*]Point of minimum misclassification.

Figure 5. English Language Arts - Contrasting Groups Analysis
(College Sample vs. High School Population)

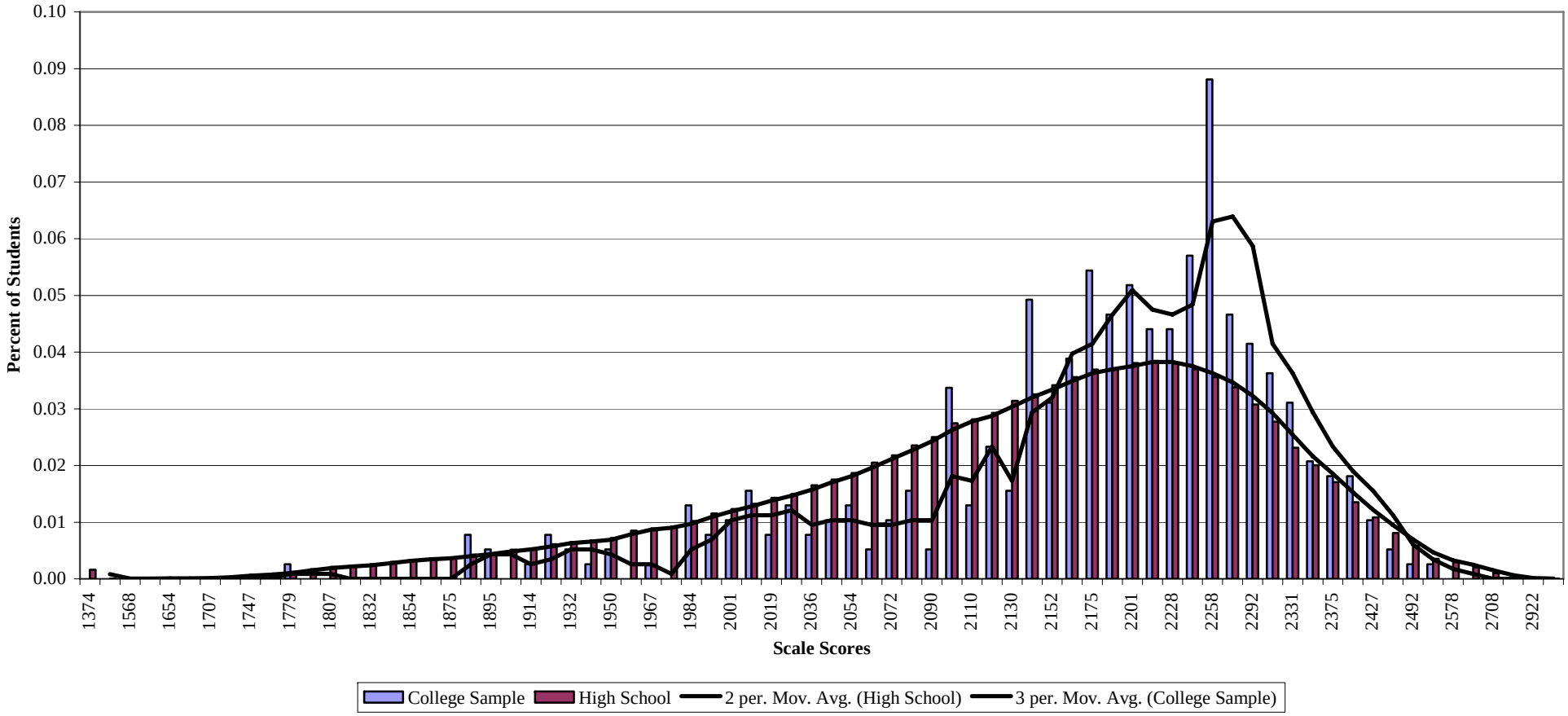

Figure 6. English Language Arts - Contrasting Groups Analysis
(High School Population vs. Remedial College Sample)

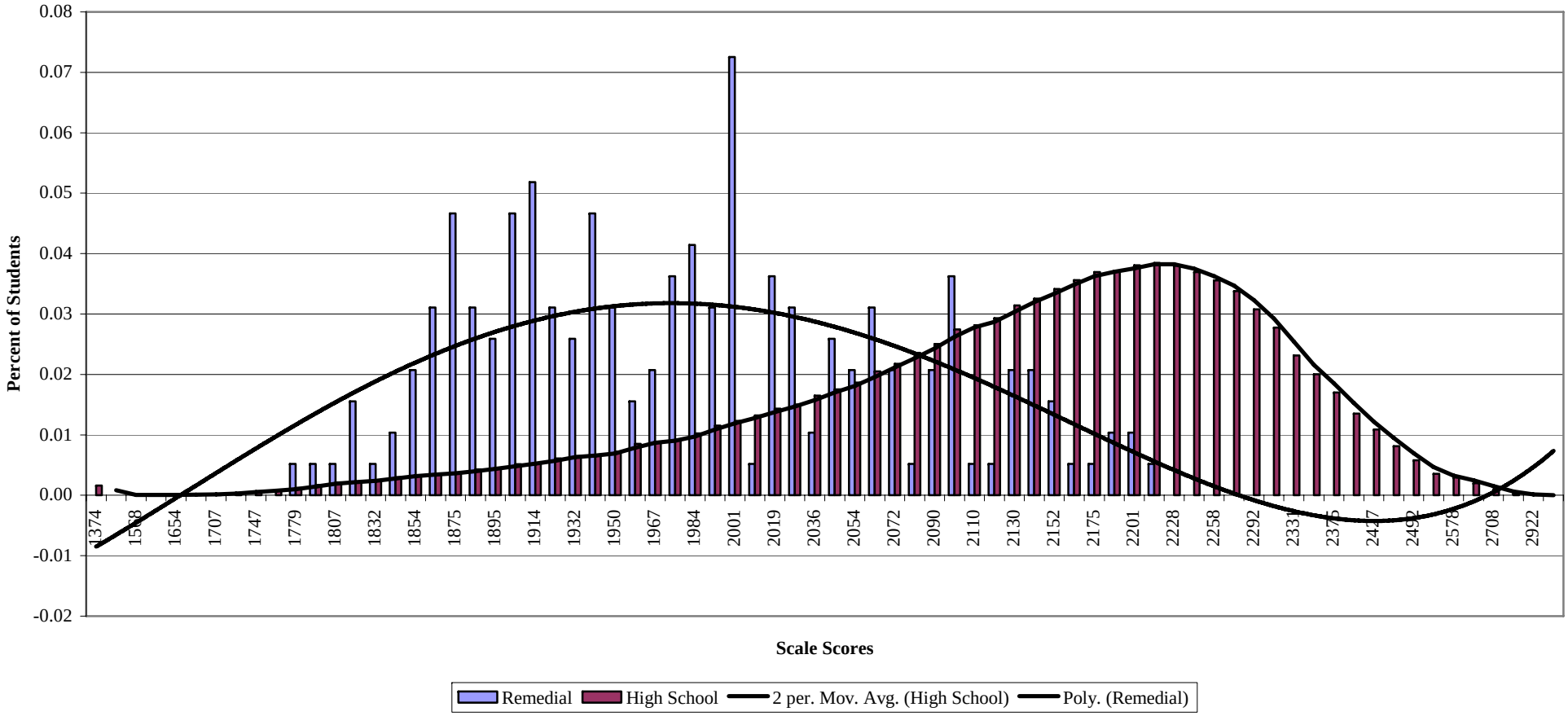

Figure 7. English Language Arts - Contrasting Groups Analysis
(College Sample vs. Remedial College Sample)

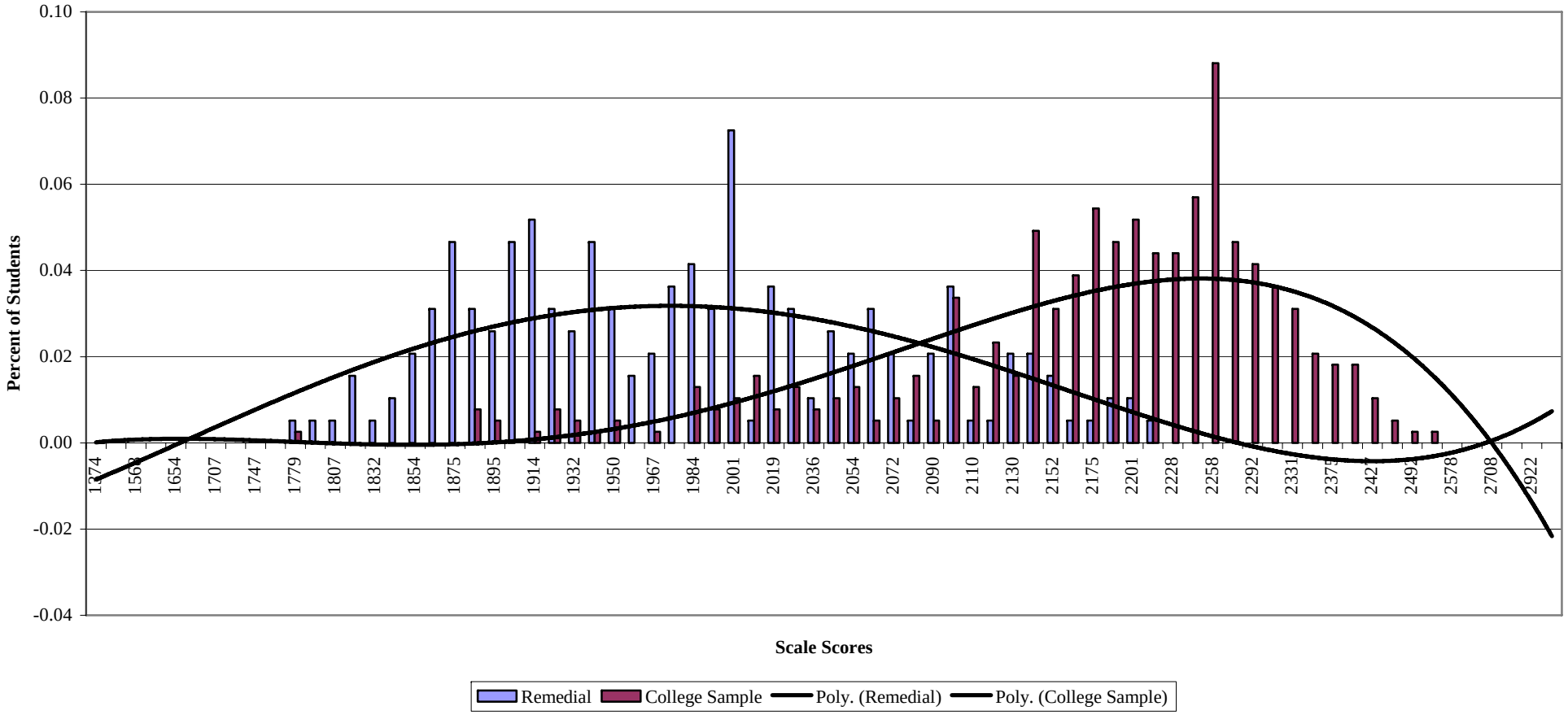

Table 6. Classification Results from Contrasting Groups Study
Grade 11 English/Language Arts
Spring 2003 TAKS Population, Spring 2003 College Sample, Fall 2003 Remedial College Sample

		College Sample		High School Population		Remedial Sample		Percent "Misclassification"[1]		
		Percentage		Percentage		Percentage				
Cut Score	Scale Score	Below	At & Above	Below	At & Above	Below	At & Above	College vs. High School	High School vs. Remedial	College vs. Remedial
0	1374	0	100	0	100	0	100	100	100	100
1	1486	0	100	0	100	0	100	100	100	100
2	1568	0	100	0	100	0	100	100	100	100
3	1618	0	100	0	100	0	100	100	100	100
4	1654	0	100	0	100	0	100	100	100	100
5	1683	0	100	0	100	0	100	100	100	100
6	1707	0	100	0	100	0	100	100	100	100
7	1728	0	100	0	100	0	100	100	100	100
8	1747	0	100	0	100	0	100	100	100	100
9	1764	0	100	0	100	0	100	100	100	100
10	1779	0	100	0	100	1	99	100	100	99
11	1793	0	100	1	99	1	99	100	99	99
12	1807	0	100	1	99	2	98	100	99	99
13	1820	0	100	1	99	3	97	99	98	97
14	1832	0	100	1	99	4	96	99	97	97
15	1843	0	100	1	99	5	95	99	97	96
16	1854	0	100	2	98	7	93	99	95	94
17	1865	0	100	2	98	10	90	98	92	90
18	1875	0	100	2	98	15	85	98	88	86
19	1885	0	100	3	97	18	82	98	85	83
20	1895	1	99	3	97	20	80	98	83	81
21	1905	2	98	4	96	25	75	98	79	77
22	1914	2	98	4	96	30	70	97	74	72
23	1923	2	98	5	95	33	67	97	71	69
24	1932	3	97	5	95	36	64	97	70	67
25	1941	3	97	6	94	40	60	97	66	63
26	1950	3	97	7	93	44	56	97	63	60
27	1959	4	96	7	93	45	55	97	62	59
28	1967	4	96	8	92	47	53	96	61	57

29	1976	4	96	9	91	51	49	95	58	53
30	1984	4	96	10	90	55	45	94	55	49
31	1993	5	95	11	89	58	42	94	53	47
32	2001	6	94	12	88	65	35	94	47	41
33	2010	7	93	13	87	66	34	94	48	41
34	2019	9	91	15	85	69	31	94	45	39
35	2027	10	90	16	84	73	27	93	44	37
36	2036	11	89	18	82	74	26	93	44	37
37	2045	12	88	19	81	76	24	92	43	35
38	2054	13	87	21	79	78	22	92	43	34
39	2063	14	86	23	77	81	19	91	42*	33
40	2072	15	85	25	75	83	17	90	42	31
41	2081	16	84	27	73	84	16	88	43	32
42	2090	17	83	29	71	86	14	88	43	31
43	2100	18	82	32	68	90	10	86	42	28*
44	2110	21	79	35	65	90	10	86	45	31
45	2120	22	78	38	62	91	9	85	47	32
46	2130	25	75	40	60	93	7	84	48	32
47	2141	26	74	44	56	95	5	83*	49	31
48	2152	31	69	47	53	96	4	84	50	35
49	2164	34	66	50	50	97	3	84	53	37
50	2175	38	62	54	46	97	3	84	56	41
51	2188	44	56	58	42	98	2	86	59	45
52	2201	48	52	61	39	99	1	87	62	49
53	2214	53	47	65	35	100	0	88	65	53
54	2228	58	42	69	31	100	0	89	69	58
55	2243	62	38	73	27	100	0	89	73	62
56	2258	68	32	76	24	100	0	92	76	68
57	2275	77	23	80	20	100	0	97	80	77
58	2292	81	19	83	17	100	0	98	83	81
59	2311	85	15	86	14	100	0	99	86	85
60	2331	89	11	89	11	100	0	100	89	89
61	2352	92	8	91	9	100	0	101	91	92
62	2375	94	6	93	7	100	0	101	93	94
63	2400	96	4	95	5	100	0	101	95	96
64	2427	98	2	97	3	100	0	101	97	98
65	2458	99	1	98	2	100	0	101	98	99
66	2492	99	1	98	2	100	0	101	98	99
67	2531	100	0	99	1	100	0	101	99	100
68	2578	100	0	99	1	100	0	101	99	100

69	2635	100	0	100	0	100	0	100	100	100
70	2708	100	0	100	0	100	0	100	100	100
71	2800	100	0	100	0	100	0	100	100	100
72	2922	100	0	100	0	100	0	100	100	100
73	3056	100	0	100	0	100	0	100	100	100
						Minimum =		84	42	31

[1]Some percentages out of range due to rounding.

[*]Point of minimum misclassification.

Note: Percentages in this table DO NOT take into account the additional requirement of scoring at least a "3" on the essay.

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TAKS HIGHER EDUCATION READINESS COMPONENT (HERC)
TAKS AND COLLEGE READINESS CORRELATION STUDY

Prepared for the Texas Education Agency
by Pearson Educational Measurement
Psychometric Services
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Executive Summary

This research paper represents the second in a series that outlines the development of the Texas Higher Education Readiness Component (HERC) mandated as part of the Texas Assessment of Knowledge and Skills (TAKS) under Senate Bill 103. This legislation called for the replacement of the Texas Academic Skills Program (TASP) by requiring that a performance standard be established for TAKS to identify students who are ready to enroll in an institution of higher learning. This performance standard also represents the cut score required for students to be ready to receive college instruction and serves as the criterion for receiving dual high-school and college-level course work credit. Whereas the HERC cut score is a point on the TAKS scale score system and is hence implemented by the Student Assessment Division of the Texas Education Agency (TEA), the standard itself was established by the Texas Higher Education Coordinating Board (THECB). Essentially, TEA conducted the research, THECB established the standard, and TEA was responsible for implementing and facilitating its use.

The current paper focuses on validity evidence by linking performance on the TAKS test with traditional measures of college readiness, the ACT and SAT I. The purpose of this research was to show how well student performance on the TAKS assessment was related to how well the same students performed on the ACT and SAT I. These relationships in performance would then provide THECB with additional interpretive data to aid them in establishing a cut score, or HERC standard, on the TAKS test.

The other papers in the series provide additional information useful for both the establishment of the HERC standard, and for understanding the factors contributing to association between performance on TAKS and the likelihood of success in college. The first paper in the series presented how well returning second-semester college freshmen (who did not require college remediation) performed on the TAKS test when in college. The third paper in the series will provide participate survey information regarding their perceptions of course value, grade-point average and college choice for both two-year and four-year colleges. The final paper in the series will describe the steps taken by THECB to actually determine the HERC standard.

Abstract

Senate Bill 103 mandates that TEA implement a "college readiness component" as part of the Texas Assessment of Knowledge and Skills (TAKS). This report summarizes the results of the correlation analyses performed on the TAKS mathematics and English language arts (ELA) tests with the ACT mathematics and English tests and the SAT mathematics and verbal tests. These analyses were part of a larger collection of research studies that the Texas Higher Education Coordinating Board and the Texas Education Agency have undertaken for assisting the Coordinating Board in setting a college-readiness standard on the 11th grade TAKS for the graduating class of 2005.

The study showed that student scores on TAKS mathematics and English language arts tests correlated highly (0.56-0.79) with corresponding subject scores for students on ACT and SAT I. Expectancy scores were calculated for ACT and SAT I based on TAKS mathematics and ELA scores. Regression analyses were used to predict ACT and SAT I scale scores from TAKS scale scores. The expectancy values and predicted values were compared with the Texas Success Initiative (TSI) exemption score for the ACT and SAT I sections and the national averages for ACT and SAT I scores. Results indicated that the TSI exemption requirement scores on ACT and SAT I in the different sections ranged from 2100 to 2200, scores just at or above the 2100 cut score which signifies the score at which Texas students meet the

standard on the TAKS in both math and English language arts. Results also showed that TAKS scale scores of approximately 2150 to 2200 predicted ACT and SAT I national average scores. These results support using TAKS scores to indicate readiness for college. They also highlight the rigor underlying the TAKS tests, such that proficient cut scores on the TAKS map closely to a standard of success in tests for college entrance.

Purpose

This study is part of a larger collection of research studies that the THECB and the TEA have undertaken to assist the Coordinating Board in setting a college-readiness standard on the 11th grade TAKS for the graduating class of 2005. Students who meet that standard do not have to take a state-mandated assessment required under TEC 51.3062, the Texas Success Initiative.

The general purposes of this study are to evaluate whether student performance on the TAKS informs about their college readiness and to gather data to facilitate the setting of a cut score on the TAKS that best predicts performance on the ACT and SAT I indicative of college readiness. The specific aims of the study were to (1) calculate correlations between TAKS and college readiness assessments in mathematics and English language arts, (2) report probabilities that students would reach specific ACT and the SAT I scores given TAKS mathematics and ELA scale scores, (3) report the most likely ACT and SAT I scores given TAKS scale scores, and (4) compare TSI exemption scores and national averages on the ACT and SAT I to predicted college readiness scores to facilitate the connection of TAKS to college readiness.

Introduction/Background

The Texas Education Agency and its contractor Pearson Educational Measurement (PEM) conducted this study to help fulfill the requirement of Senate Bill 103 regarding college readiness. Senate Bill 103 mandates that TEA implement a college readiness component as part of the Texas Assessment of Knowledge and Skills (TAKS). The intent of the legislation is to use performance on the TAKS to assess not only a student's level of academic preparation for graduation from a Texas public high school but also the student's readiness to enroll in an institution of higher learning.

Before the TAKS could be assumed to inform about college readiness, it was important to evaluate whether TAKS scores correlated with college readiness scores and to find levels of TAKS performance that predicted performance on college readiness measures. This report composes one of a series of major research studies of the Higher Education Readiness Component Analyses. The performance data correlation study examines student performance on TAKS in relation to performance on two college readiness measures that are used nationwide for making college readiness and placement decisions: ACT and SAT I. The TAKS to ACT and TAKS to SAT I comparisons incorporate data collected from Texas public high school juniors who took the exit level TAKS and one or more of these other assessments in 2003.

The academic rigor and broad content range of the new TAKS assessment suggested that it was a stronger potential indicator of success on college-level work than the previous testing program, the Texas Assessment of Academic Skills (TAAS). Consequently, a strong relationship between performance on TAKS and performance on other measures of college readiness, like the ACT and SAT I, was anticipated. In addition, Texas public colleges and universities have a long tradition of incorporating national college entrance examination results into their admission and placement decisions. Although the ACT and SAT I are just two measures among many that colleges and universities use to assess student preparation, these

tests are used extensively and have an established reputation for providing reliable data about student readiness for college (Burton & Ramist, 2001; Camara & Echternacht, 2000; Marco, Abdel-fattah, & Baron, 1992).

Methods

Sample Collection

The students included in the study were those with matched TAKS and ACT or SAT I scores. ACT, Inc. and the College Board sent TEA the ACT and SAT I test results, respectively, for students who tested in the spring, summer, or fall of 2003. If a student took the ACT or SAT I more than once, the last score was used for the analysis. For instance, if they took the ACT twice, the second set of scores was used in this study. ACT and SAT I data were then merged with the grade 11 spring 2003 exit level TAKS results. The matched student count for TAKS ELA and ACT English was 15,304 students, whereas for the TAKS and ACT math, the matched count was 15,702 students. The matched student count for TAKS ELA and SAT I verbal was 35,624 students, and the matched count for TAKS and SAT I math was 36,536 students. *In other words, no sampling of students was conducted, all students with both a TAKS score and either an ACT or SAT I were included in the analyses.*

Correlations

To evaluate the association between TAKS scores and ACT and SAT I scores in mathematics and English language arts, correlations between TAKS scores and college readiness scores were initially calculated. The design allowed correlations of ACT and SAT I results for Texas students who were public high school juniors in 2003 with the corresponding TAKS Grade 11 exit level results from the spring 2003 administrations.

Expectancy Tables

After correlations between TAKS scores and scores on the college readiness exams were calculated, TAKS and ACT as well as TAKS and SAT I expectancy tables were generated. Expectancy tables report probabilities that students will reach at least a certain ACT or SAT I score (for example, 16 on the ACT) given the students' TAKS scores. Glasnapp and Poggio (1996) used these same methods to establish cut score equivalents for the Grade 10 exit level TAAS and the TASP tests.

Before the expectancy values were calculated, TAKS scale scores were grouped in increments of 50. The TAKS scale score frequency distributions were used to recode TAKS scores into 50-point, midpoint scores. For example, a scale score of 2100 was used to represent the 50 scale scores between 2076 and 2125. After the TAKS scale scores were recoded, the expectancy values were calculated by (1) comparing the scale score frequencies from the college readiness examination in a subject with the recoded TAKS scale scores in that same subject, (2) comparing a specific recoded TAKS scale score (for example, 2100) against a specific college readiness scale score in the frequency table (for instance, ACT score of 16), and (3) identifying the percent of students obtaining at least the specific college readiness scale score (percent of students with at least an ACT score of 16) from the cumulative frequencies. In other words, the analyses indicated the percentage of students represented by the recoded TAKS scale score who also achieved a specified score on one of the other tests (ACT or SAT I). Four expectancy tables were created. They included expectancies based on the combination of TAKS mathematics / ACT mathematics scale scores, TAKS English language arts / ACT English scale scores, TAKS mathematics/SAT I mathematics scale scores, and TAKS English language arts / SAT I Verbal scale scores.

Regression

Ordinary least squared regression was then used to predict students' college readiness scale scores from their TAKS scale scores. In these analyses, students' TAKS scale scores were regressed on their ACT and SAT I scores. For example, students' TAKS mathematics scores were used to predict their ACT mathematics scores.

Score Comparisons

As a final step, Texas Success Initiative (TSI) exemption scores on the ACT and SAT I and national averages on the ACT and SAT I in 2004 were compared with TAKS predicted college readiness scores to help interpret findings from the expectancy tables and regression analyses. The TSI was an initiative that required students enrolled in Texas institutions of higher learning to pass an assessment prior to enrolling in classes. As part of the legislation, students were exempted from taking the assessment if they scored high enough on the ACT or SAT I exams. A student was exempt from taking the TSI-mandated assessment if the student obtained an ACT composite score of 23 with at least 19 on both the mathematics and English sections. Similarly, students were exempted if they obtained combined SAT I verbal and mathematics score of 1070 with at least 500 on both the mathematics and verbal sections.

The national averages on the ACT and SAT I assessments in 2004 were 20.7 and 20.4 for the ACT mathematics and English sections, respectively. The 2004 national averages for the SAT I mathematics and verbal sections were 518 and 508, respectively. By identifying the TAKS scores needed to have a likelihood of over 50% of reaching these national averages and by identifying the TAKS scores that predicted the national averages of the college readiness tests, the link between TAKS performance and college readiness was made clearer.

Results

Simple linear correlations of the tests helped summarize the relation between TAKS test scores and scores on the measures of college readiness. Correlations between the TAKS and ACT and TAKS and SAT I math scores were high, 0.79 for both. Correlations between TAKS English language arts scores and English scores on ACT and SAT I were not as high, which may reflect the fact that the TAKS English language arts assessment has open-ended reading tasks and a writing essay as part of its total score, whereas the ACT and SAT I do not. The correlations between the ACT English scores and SAT I Verbal scores with TAKS English / Language Arts scores were 0.59 and 0.56, respectively.

After correlations were evaluated, the probabilities that students would reach certain ACT and SAT I scores given their TAKS scores were calculated and reported in expectancy tables. Results of the TAKS / ACT and TAKS / SAT I expectancy tables are shown in Tables 1 through 4.

Table 1 presents results from the expectancy table and regression analyses. The first column shows TAKS mathematics scale scores from 1950 to 2300 in increments of 50. The next nine columns show the likelihood of obtaining a certain ACT score, given the TAKS mathematics scores. For instance, if a student has a TAKS math scale score of 2250, s/he has a 99.8% likelihood of obtaining an ACT math score of at least 16, a 99.1% likelihood of getting an ACT math score of at least 17, a 98% likelihood of getting an ACT math score of at least 18, etc. The column on the farthest right presents the predicted ACT score for a student with a specific TAKS math scale score when the students' ACT scores were regressed on students' TAKS scores.

Results in Table 1 indicate that students with a TAKS math score of 2100 are 97.6% likely to obtain an ACT mathematics scale score of at least 16, 81.9 % likely to obtain an ACT score of at least 17, 66.2% likely to obtain an ACT score of at least 18, and 51.0% likely to obtain an ACT score of at least 19.

Regression analyses indicated that students with TAKS scores represented by 2150 (scores ranging from 2125 to 2174) are predicted to have an ACT score of 19.5. The ACT score needed to meet the TSI exemption was 19. The TAKS score that best predicts an ACT score closest to the 19 was 2100, since a TAKS scale score of 2100 predicts an ACT score of 19.5. Students who scored a 2150 on the TAKS mathematics assessment were found to be 53.7% likely to obtain an ACT score of at least 20, which was close to the national average of 20.7. Furthermore, the TAKS score of 2150 predicted the ACT national average score of 20.7.

Table 1. Expectancy Table for Grade 11 TAKS and ACT Mathematics Scale Scores

(A) TAKS Mathematics Scale Score*	(B) Likelihood of an ACT Mathematics Scale Score of At Least									(C) Predicted ACT Mathematics Scale Score
	16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	
1950	52.6	35.5	21.1	13.6	7.6	5.7	4.2	3.5	3.1	15.9
2000	63.6	45.7	28.3	18.0	11.5	7.7	6.1	3.5	2.4	17.1
2050	93.1	63.0	45.2	29.6	18.3	14.2	10.6	6.6	4.4	18.3
2100	97.6	81.9	66.2	51.0	36.5	28.0	21.4	13.5	9.5	19.5
2150	99.3	91.6	81.1	68.3	53.7	43.7	34.2	24.3	17.3	20.7
2200	99.7	97.6	93.5	85.5	74.6	65.6	58.1	45.3	36.2	21.9
2250	99.8	99.1	98.0	94.3	89.0	82.8	75.6	65.2	55.6	23.1
2300	99.8	99.7	98.8	97.4	94.0	90.6	86.5	78.1	71.2	24.3
2350	99.8	99.7	99.2	98.7	97.1	95.7	93.9	90.7	86.4	25.5
2400	100.0	100.0	100.0	99.0	98.4	97.2	95.3	94.3	91.7	26.7

* Estimates are based on more than 500 examinees at each TAKS score value for each score except 2400, where there were 387 examinees. Each TAKS score listed is the midpoint of a 50-point range.

Table 2 shows the expectancy table of ACT English scores given TAKS ELA scores. The first column shows TAKS ELA scale scores ranging from 2200 to 2450. The next nine columns show the likelihood of scoring a certain ACT English score, given the TAKS ELA score. The last column shows the ACT predicted score given the TAKS score in the first column. Results indicate that a student with a TAKS ELA scale score of 2400 has a 99.8% likelihood of scoring at least 16 on the ACT math test, a 99.1% likelihood of scoring at least 17 on the ACT math test, and is predicted to score 23.7 on the ACT English test. Similar to the ACT math section, the Texas Success Initiative also has an ACT score of 19 as an exemption requirement for the English section of the test. Students with scores of 2200 and above are predicted to have ACT English scores 19 or higher. The TAKS score that resulted in an expectancy of 50% or greater to reach the national average ACT English score of 20.4 was 2250. The TAKS score of 2250 was shown to have a 70% likelihood of obtaining an ACT score of at least 20, and the TAKS score of 2200 predicted an ACT score of 20.1.

Table 2. Expectancy Table for Grade 11 ELA TAKS and ACT English Scale Scores

(A) TAKS ELA Scale Score*	(B) Likelihood of an ACT English Scale Score of At Least									(C) Predicted ACT English Scale Score
	16	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**	
2200	82.5	73.6	66.3	55.5	46.8	36.7	26.8	19.9	14.1	20.1
2250	91.4	88.2	83.5	75.9	70.0	60.7	50.2	41.2	33.2	21.3
2300	95.1	93.2	91.0	85.6	81.7	75.8	66.9	59.9	52.5	22.5
2350	98.0	96.3	93.3	89.5	84.9	80.2	73.5	64.9	57.5	23.7
2400	98.3	97.3	96.5	92.8	90.0	86.1	80.8	77.1	71.1	24.9
2450	99.3	98.5	98.1	96.4	93.2	90.8	85.4	78.4	71.3	26.1

* Estimates are based on more than 500 examinees at each TAKS score value for each score except 2000 and 2400, where there were 403 and 402 examinees, respectively. Each TAKS score listed is the midpoint of a 50-point range.

Tables 3 and 4 are similar to Tables 1 and 2, except the results represent SAT I mathematics and verbal scale scores. As in the previous tables, the first columns of Tables 3 and 4 show TAKS scale scores, followed by a series of likelihoods of scoring certain SAT I scale scores. The final columns in Tables 3 and 4 identify the predicted SAT I score given the TAKS score in the first column.

Results in Table 3 indicate that students with a TAKS mathematics scale score of 2100 would have a 29.4% chance of scoring 500 on the SAT I math section and are predicted to score 472. If one were to look at the Texas Success Initiative, which has an exemption score of 500 on the SAT I mathematics and verbal sections, a student would most likely need a TAKS mathematics score of at least 2150 to be exempt, given the predicted SAT I math score for a student getting a 2150 on TAKS math was 497. Results showed that a TAKS score of 2200 resulted in a 52.7% chance of obtaining an SAT I mathematics score of 520, which is the SAT I score just above the 2004 national average of 518. Furthermore, the TAKS scale score of 2200 predicted the SAT I score of 521.

Table 4 shows that students with TAKS ELA scale scores of 2100, 2150, 2200, and 2250 would have 29.4%, 46.3%, 67.9%, and 85.6% likelihoods, respectively, of scoring 500 on the SAT I verbal section. Students with TAKS ELA scale scores of 2100, 2150, 2200, and 2250 were predicted to score 472, 497, 521, and 545, respectively, on the SAT I verbal section. If one were to look at the Texas Success Initiative, which has an exemption score of 500 on the SAT I verbal section, a student would most likely need a TAKS ELA score of at least 2150 to be exempt, given the predicted SAT I math score for a student getting a 2150 on TAKS math was 497. Given that the 2004 national average for the SAT I verbal score was 508, the TAKS scale score of 2250 resulted in an expected SAT I score of 500 (the value closest to 508 in the table) with 65.3% likelihood. The TAK scale score of 2200 predicted an SAT I verbal score of 502.

Table 3. Expectancy Table for Grade 11 TAKS and SAT Mathematics Scale Scores

(A) TAKS Mathematics Scale Score*	(B) Likelihood of an SAT I Mathematics Scale Score of At Least											(C) Predicted SAT Mathematics Scale Score
	400	**420**	**440**	**460**	**480**	**500**	**520**	**540**	**560**	**580**	**600**	
1950	45.2	35.5	27.8	20.4	14.3	10.9	8.1	6.6	5.2	3.8	2.8	399
2000	56.5	43.9	33.3	23.5	16.6	11.2	7.0	4.7	2.8	1.7	1.2	424
2050	71.2	60.0	48.0	37.1	25.7	17.3	10.6	7.3	4.9	3.0	1.8	448
2100	88.5	80.8	69.5	56.6	42.6	29.4	18.4	11.9	7.0	4.1	2.4	472
2150	96.2	92.6	86.0	76.2	61.5	46.3	31.2	21.0	13.2	7.5	4.4	497
2200	98.7	97.0	94.2	89.3	80.1	67.9	52.7	40.0	27.8	16.3	9.1	521
2250	99.8	99.4	98.2	96.5	92.5	85.6	74.0	62.9	48.0	33.0	21.7	545
2300	100.0	99.7	99.5	98.8	97.2	93.6	86.4	78.8	65.3	49.4	36.7	570
2350	100.0	100.0	99.7	99.5	99.0	97.9	94.5	90.4	81.9	70.2	57.8	594
2400	100.0	100.0	100.0	99.8	99.4	98.8	97.3	94.2	89.7	81.8	73.0	618

*Estimates are based on more than 1000 examinees at each TAKS score value for each score. Each TAKS score listed is the midpoint of a 50-point range.

Table 4. Expectancy Table for Grade 11 ELA TAKS and SAT Verbal Scale Scores

(A) TAKS ELA Scale Score*	(B) Likelihood of an SAT Verbal Scale Score of At Least											(C) Predicted SAT Verbal Scale Score
	400	**420**	**440**	**460**	**480**	**500**	**520**	**540**	**560**	**580**	**600**	
2100	53.6	40.4	29.7	17.9	12.9	8.3	5.7	3.6	2.4	1.5	1.2	461
2150	77.1	65.9	53.4	39.1	30.5	20.7	13.1	8..5	5.5	3.2	1.6	481
2200	90.8	84.6	76.5	65.2	54.6	42.6	32.1	22.6	14.8	9.7	6.1	502
2250	96.7	93.5	89.6	82.6	75.3	65.3	55.5	45.0	35.8	26.9	19.7	522
2300	68.7	97.4	95.1	90.8	86.4	78.8	70.5	61.5	51.5	41.4	33.1	543
2350	99.2	98.5	97.3	94.3	90.9	85.5	78.6	70.3	61.1	51.1	42.0	564
2400	99.6	99.5	98.7	97.8	95.8	91.4	84.5	77.7	68.9	59.3	49.6	584

* Estimates are based on more than 1000 examinees at each TAKS score value for each score. Each TAKS score listed is the midpoint of a 50-point range.

Summary

This report summarizes the results of the correlation analyses performed on the TAKS mathematics and English language arts (ELA) tests with the ACT mathematics and English tests and the SAT I mathematics and verbal tests. In general, the correlations between the TAKS and college readiness examinations were high, with correlations between math scores higher than correlations between English scores. The high correlations among TAKS scores and college readiness test scores indicate a strong relation between scores on the state mandated exit-level assessment in Texas and two widely used college readiness assessments. Lower correlations between English scores on the TAKS and college readiness assessments (compared with math scores) on the TAKS and college readiness assessments most likely reflect the fact that the TAKS English language arts test had a writing component, whereas ACT English and SAT I Verbal tests did not at the time of the study.

Expectancy tables showed predicted scores based on TAKS mathematics and ELA scores on the corresponding ACT and SAT I sections. Overall, TAKS scale scores of approximately 2100-2250 produced likelihoods greater than 50% that students would reach the TSI exemption score. TAKS scale scores of 2200 to 2250 resulted in likelihoods of 50% or greater that students would score at least the national average on the college readiness exams.

Regression analyses also showed the college readiness scores predicted from the TAKS scores. As seen in the tables, the TSI exempted scores on ACT and SAT I in the different sections was predicted from TAKS scores that ranged from 2100 to 2200 in both mathematics and English language arts. TAKS scores of 2150 to 2200 predicted college readiness scores closest to the 2004 national averages.

Study results should be interpreted taking into account several limitations. Since the study only included students with matched data on TAKS as well as either ACT or SAT I, the study most likely included higher-performing, college-bound students. Finally, the selection of presumably college-bound students (for example, students who have ACT or SAT I scores) likely made the group more homogeneous than the student population, thereby lowering the correlations from what would be seen if all students were required to take the ACT or SAT I. Average scores on the assessments were probably higher than the average of the entire state. The extent to which these results would generalize to all students in the state is not known from this study. Another limitation to this study is that the association of TAKS to college readiness was only examined in one year. It is unclear whether results would be similar over time.

These analyses highlight the need to repeat analyses in subsequent years to see how similar or different the results are across years. Given that the new SAT I assessment includes a writing component and the two tests may now be tapping a more similar construct, the correlations between the SAT I writing and the TAKS ELA scores would be expected to be higher.

Correlations, expectancy tables, and regression analysis results were provided to a standard-setting panel convened by The Higher Education Coordinating Board. The panel's task was to set TAKS cut scores that best predicted college readiness. The standard-setting panel included educational professionals familiar with their institution's standards of admissions to college (for example, ACT and SAT I acceptability scores). Panels considered several factors, including correlation study results, impact data from the contrasting groups study, and performance on TAKS to recommend a set of TAKS cut scores indicating college readiness.

Implications

These results have several implications for Texas students. Results show that the Texas Assessment of Knowledge and Skills (TAKS) can be used to assess not only a student's level of academic preparation for graduation from a Texas public high school but also the student's readiness to enroll in an institution of higher education. Performances on the Grade 11 exit level tests provide information about students' readiness for higher education at least to a degree similar to other measures of college readiness like the ACT and SAT I.

Results also highlight the rigor of the TAKS. TAKS scores of 2100 indicate that students have Met the Standard on the state assessment. In 2004, 67% of all Texas students scored at least 2100 on the TAKS mathematics test in grade 11, and 83% of all Texas students scored at least a 2100 on the TAKS English language arts test. TAKS scores of 2100 are at or just below the TAKS scale scores that predicted the college readiness scores commensurate with the national averages. This means that two-thirds or more of all Texas students scored at or just below the TAKS score associated with the national average on college readiness tests. The cut score indicating "Commended Performance" on the TAKS assessments is 2400 for both mathematics and English language arts. These results highlight the difficulty of the TAKS tests and the success of the Texas education system in preparing their students for higher education.

Study findings also suggest that the TAKS tests might be used to provide valuable information to students about their potential performance on college readiness tests. Since there are costs associated with taking college readiness tests, many students choose not to take college readiness tests. Students, parents, and high school counselors might use TAKS results to help students make the best choices about taking college readiness tests and about students' likelihood of scoring well enough on college readiness tests to meet college admission requirements.

In addition, high school counselors and college admissions officers should use the results of this study (and the companion studies) for assistance in making college entrance and placement decisions. For example, since TAKS scores will be available for all Texas high school students, high school counselors can use this link to the ACT and SAT I, as well as the HERC cut score to discuss with otherwise non-motivated students their likelihood of success in college should they apply. Similarly, college admissions officers should take into account and should pay more attention to TAKS test performance as it is a strong indicator of college readiness (at least based on the relationship between it and the ACT and SAT I as indicated in this study). This means that TAKS scores should take a place along side these more traditional measures of college readiness. Finally, student TAKS performance should also increase in its value to inform placement and scholarship decisions before entrance into college. The correlations between TAKS and the ACT and SAT I show that TAKS is a valuable additional piece of academic performance that should be taken into consideration for award status. Given this, coupled with other research around TAKS and HERC and the fact that *all Texas students will have a score on TAKS*, makes the TAKS test an economically viable and valuable source of information about college readiness.

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