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Score Gains on Retesting with the ACT Assessment

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Abstract

This study investigated the nature of score gains for examinees who took the ACT Assessment at least twice prior to graduation from high school. The primary objective of this study was to investigate and document the typical changes in test scores for examinees who elect to retest. A second objective was to determine whether any particular group of examinees obtains systematically higher or lower mean gains. Analyses were conducted for gains from first to second, second to third and third to fourth testing.

It was found that the mean gain from first to second testings was slightly higher than the mean gain from second to third testings, which was slightly higher than the mean gain from third to fourth testings. Mean gains consistently decreased as previous test scores increased. Differences in mean gains between males and females, and among all racial/ethnic groups were very small. Results are also presented that can be used to estimate the probability that an examinee with some given test score will obtain a score increase of some desired level.

Score Gains on Retesting with the ACT Assessment

This study investigated the nature of score gains for examinees who took the ACT Assessment at least twice prior to graduation from high school. The ACT Assessment is a battery of curriculum-based achievement tests designed to measure examinees' higher-order thinking skills in four subject areas: English, mathematics, reading, and science reasoning. These tests assess the knowledge and skill examinees acquire throughout their high school experience in preparation for post-secondary education. A score is reported for each of these four areas on a common score scale that ranges from 1 to 36. Additionally, a composite battery score, the average of the four test scores, is reported. The most common use of the ACT Assessment is as a component in decisions regarding: college admissions, college course placement, the determination of academic awards and scholarships, and eligibility to play varsity athletics at an institution affiliated with the National Collegiate Athletic Association (NCAA).

The ACT Assessment is administered on five national test dates each academic year (October, December, February, April and June). A new test form is introduced on each national test date. Each new test form is constructed according to a consistent set of content specifications to ensure comparable content coverage and, therefore, consistent test result interpretation. Raw scores from all test forms are expressed on a common score scale using appropriate equating procedures. As a result, scores from all test forms of the ACT Assessment are comparable to one another.

Examinees can take the ACT Assessment on any national administration date. Therefore, examinees who initially test in October of their junior year could test as many as 10 times before graduating from high school. Examinees elect to retest for a variety of reasons: they may feel that they were not adequately prepared when they previously took the test; they may not meet the

admissions criteria of a specific college or university; they may desire a higher score to be considered for a scholarship or award; or, if they plan to compete in varsity athletics, they may not meet the NCAA's eligibility criteria.

The ACT Assessment is also administered in a number of additional settings. Certain forms of the ACT Assessment are modified in presentation format and/or time restrictions for examinees with special needs. Post-secondary institutions can purchase previously administered test forms of the ACT Assessment for administration at their discretion (residual testing). Tests may also be administered outside the United States, in conjunction with state test programs, or in connection with a military program (DANTES). In each of these settings, test administration conditions may vary in some way from the standard conditions of the national test dates.

The primary objective of this study was to investigate and document the typical changes in test scores for examinees who elect to retest. A second objective was to determine whether any particular group of examinees (e.g., race, gender) is advantaged or disadvantaged on retesting, in that they obtain systematically higher or lower mean gains. Knowledge of typical score gains made on retesting can help counselors advise students attempting to improve upon their previous scores as to the likelihood of obtaining the desired gains. Although there may be an association between the magnitude of gains made on retesting and the reasons examinees choose to retest, ACT does not collect information from examinees regarding their reasons for retesting, thus prohibiting analysis of this factor.

Little previous research has been conducted to document the nature of score gains on retesting. Lanier (1994) conducted an investigation of score gains with the ACT Composite focused on how likely students are to obtain a number of specific ACT Composite scores on retesting. Differences by gender, race/ethnicity were examined. In this investigation, the mean

gain on retesting was found to be 0.8 scales score points. Kingston & Turner (1984) examined score changes patterns on the Graduate Record Examination General Test, primarily to address differences in gains made on an old and new form of the GRE. Mean gains were 26.6 for the Verbal test, 29.5 for the Quantitative test, and 22.0 points on the Analytical test. Neither of these analysis examined score changes by initial score level.

Other studies have examined important issues associated with retesting. Boldt, Centra, & Courtney (1986) conducted a study on the validity of a variety of methods of combining the results of multiple test administrations for prediction of future academic success; they also provide an excellent summary for this research. Alderman (1981) conducted analyses of SAT Verbal and Mathematics scores to assess whether it can be assumed that errors of measurement are negative for individuals who choose to retest. How errors of measurement relate to previus test score, of course, is integral to any explanation of changes in test scores on retesting from the perspective of classical test theory. Neither of these studies, however, documented the gains students make on retesting.

Data

Of the 875,603 ACT-tested 1993 high school graduates, 311,729 (36%) tested on more than one occasion during their junior and senior academic years. Over the past four years, 1993 to the present, this percentage has remained fairly constant. To ensure homogeneity of test administration procedures, only non-special needs students who tested on national test dates during their junior and senior academic years were selected for analysis. Consequently, examinees who for at least one test administration test administration tested under a state program, in conjunction with a military program, (DANTES), or before their junior year in high school were eliminated from all analyses. A total of 282,231 examinees remained for analysis.

Of these examinees, 223,177 (79%) tested exactly twice, 47,144 (17%) tested exactly three times, 9,453 (3%) tested exactly four times, and 2,457 (1%) tested on five or more occasions (Table 1).

Results of this study, then, are most directly generalizable to the population of retested examinees consisting of non-special need students who test on more than one national administration date during their junior or senior years. Inferences to the retested population assume that the sample utilized in this study does not differ substantially from the retested population in any characteristics that are associated with differential gains on retesting.

The data presented in Table 1 allows some comparisons to be made between the retested sample and the ACT-tested graduating class of 1993. Females made up 58% of the retested sample, and 55% of the total ACT-tested class of 1993. White examinees made up the largest group of both the retested sample and the ACT-tested graduating class of 1993 (76% and 71%, respectively); African-Americans were the second largest group (approximately 10% of both populations). All other racial-ethnic groups comprise less than 4% of both the retested sample and the ACT-tested graduating class of 1993.

White examinees made up a slightly larger percentage of the retested sample than of the ACT-tested graduating class of 1993 (76% and 71%, respectively); concurrently, a substantially lower percentage of the retested sample (6%) failed to identify their racial/ethnic background than in the ACT-tested graduating class of 1993 (11%). The differences between these pairs of percentages are nearly identical and each may be the source of difference in the other. Overall, with respect to racial and gender composition, differences between the retesting population and ACT-tested class of 1993 are generally small.

Within the retested sample, the following trends associated with an increase in the number of times tested may be discerned. The percentage of females retested decreases from 58% to 55%, with a corresponding increase in the percentage of males retested. Also, the percentage of white examinees retested decreases from 77% to 70%, while the percentage of African-American examinees retesting increases from 9% to 16%. The percentages of all other racial/ethnic groups remain nearly constant.

Analyses and Results

All analyses were conducted using the ACT Composite score, which is the mean of the scores on the English, mathematics, reading, and science reasoning test, rounded to the nearest whole number. Results are presented for gains from first to second, second to third, and third to fourth testing. In this way, information is provided that describes the gains an examinee might expect to make with each decision to retest.

Gains From First to Second Testing

Analyses were conducted to characterize the typical gains obtained from first to second testing for the 282,231 examinees tested 2 or more times. Table 2 contains descriptive statistics of examinee gains including the mean, and the 5th, 25th, 50th, 75th, and 95th percentiles of the gain score distributions. All results are presented conditioned on first test score, and across all first test scores. Examining Table 2 and Figure 1, it is clear that the mean gains from first to second testing depend upon the score obtained on first testing; as first test score increases, mean (and median) gains decrease. Examinees with the lowest scores on first testing obtained the largest gains on second testing; the mean gain for examinees with first test scores of 10 was 2.8 scale score points and decreased to 0.9 scale score points at a first test score of 15. Through the range

of first test scores from 17 through 28 (which contains approximately 90% of examinees) the mean gain is more stable, decreasing from 0.7 to 0.4 scale score points.

Through the range of first test scores from 10 to 33, the 5th, 25th, 75th, and 95th percentiles of the conditional gain distributions were also calculated, and are displayed in Table 2 and Figure 1 (with polynomial smoothing). From Figure 1, the 25th and 75th percentiles are essentially equidistant from the mean and median gains, as are the 5th and 95th percentiles, suggesting that the distributions of gains are symmetric. The 5th and 95th percentiles, obtained from Table 2, may be useful for identifying unusually low or high gains at any first ACT Composite score. It is significant to note that for first test scores from 16 through 30 the 95th percentile of the gain score distributions is 3 score scale points, and that for examinees with the lowest first test scores, the 95th percentile of the gain score distributions is 5 score scale points. For all but the lowest scoring examinees, then, gains of 4 or more score scale points on the ACT Composite may be regarded as unusual.

Table 3 contains information that can be useful to help individual examinees decide whether they should take the ACT Assessment a second time. It presents, at each score scale point, the percentage of examinees that decreased their scores on second testing; obtained the same score on second testing; increased their scores by 1, 2, 3, or 4 points on second testing; or increased their score by 5 or more points on testing. These data may be combined to provide examinees information about how likely they are to obtain some specific desired gain. For example, to determine the percentage of examinees with first composite score of 18 that increased their score by 2 or more points, simply add the percentages of examinees that made gains of 2, 3, 4, and 5 or more points (18, 9, 3, and 1, respectively) to obtain 31%. One result that can easily be seen is that for examinees initially scoring 16 or higher, the chance of

obtaining a gain of 4 or more scale score points on second testing is at most 5 in 100; indeed, for all but the lowest scoring examinees, gains of 5 or more points are unusual. Another result is that the percentage of examinees increasing their score by any specific amount on retesting decreases as first test score increases, consistent with the decrease in mean gains as first test scores increases.

Analyses of Gains by Gender and Race

Summary statistics describing gains scores by gender and race are presented in Table 4. Although there are some differences in mean gains, they are generally small. For example, the mean gains for females and males are 0.6 and 0.8 scale score points, respectively. Examining the percentage of examinees making gains of 1, 2, 3, 4, and 5 or more scale score points it is clear that the percentages of males and females making each gain is nearly identical; the maximum difference is 3 percentage points.

Differences among the racial/ethnic groups presented are also minimal. The percentages of examinees making any specific gain (1, 2, 3, 4, and 5 or more scale score points) differ by at most 2 percent across racial/ethnic group. Considering further the differences among mean gains for these groups, rounding each mean gain to the whole number score scale used for reporting gives the same value, 1.0. The difference between any pair of group means never approach 0.5 scale score points, a value that might suggest a whole number difference in mean gains for any of these groups. For these reasons, the observed differences among mean gains imply no substantial differences among these groups with respect to their ACT Composite gains from first to second testing.

Analysis of Examinees Testing 3 or More Times

Analyses characterizing typical gains were conducted for the 59,054 examinees who chose to test 3 or more times. First, this group of examinees was compared to the 223,177 examinees who chose to test exactly twice. Comparisons between these two groups were made with respect to the mean gains made from first to second testing and the percentages of examinees increasing their scores from first to second testing. Second, analyses were conducted to characterize the gains made from second to third testing.

Comparing examinees testing 3 or more times to examinees testing exactly twice. The mean scale score gain from first to second testing was 0.7 scale score points for examinees testing exactly twice, and 0.6 scale score points for examinees testing three or more times (Table 5); the percentage of examinees increasing their scale score from first to second testing was 55% for examinees testing exactly twice, and 53% for examinees choosing to test three or more times (Table 5). Examinees testing 3 or more times, however, generally scored lower on first testing than examinees testing exactly twice; the modal first test scores for these groups are 16 and 19, respectively.

The pattern that seems evident in Table 5 is that the gains from first to second testing for examinees testing 3 or more times are slightly smaller than the gains for examinees tested exactly twice. Although for some first ACT Composite scores the mean gains for these groups are the same, the mean gains are consistently smaller for students testing 3 or more times. Similarly, the percentage of examinees increasing their scores on second testing is generally lower for examinees tested 3 or more times. The differences between these two groups are most noticeable for first ACT Composite scores from 15 to 18, a range of scores that includes approximately 33% of examinees that chose to test 3 or more times.

Gains from second to third testing. Analyses were conducted to characterize the typical gains obtained from second to third testing for the 59,054 examinees tested 3 or more times. These analyses parallel the analyses conducted on gains from first to second testing. Tables 6 and 7 contain descriptive statistics of examinee gains, and smoothed curves of the patterns of mean gain and various percentiles of the gains score distributions are displayed in Figure 2. Results of these analyses closely parallel those obtained from first to second testing.

Examining Table 6 and Figure 2, it is clear that the mean gains made from second to third testing depend upon the score obtained on second testing, generally decreasing as second test score increases. Examinees with the lowest scores on second testing made the largest gains; the mean gain for examinees with second test scores of 11 was 2.7 scale score points. Through the range of second test scores from 17 to 27 the mean gains range from 0.4 to 0.6 scale score points. Mean gains decrease further for second test scores larger than 27. From Figure 2, the 25th and 75th percentiles appear essentially equidistant from the mean gains, as do the 5th and 95th percentiles, suggesting that the distributions of gains are symmetric. For second test scores from 15 through 29, the 95th percentile of the gain score distributions is 3 score scale points; for examinees with the lowest first test scores, the 95th percentile of the gain score distributions is 5 score scale points.

Table 7 contains information useful to address the concerns of individual examinees deciding whether they should take the ACT Assessment a third time. These data can be used to obtain an estimate of how likely an examinee is to obtain some specific desired gain. For example, it can be used to determine the percentage of examinees with a second test score of 20 that increased their score by 2 or more points by adding the columns for gains of 2, 3, 4, and 5 or more points (16, 7, 3, and 1, respectively) to obtain 27%.

Comparing the descriptive statistics of gain score distributions from second to third testing (Tables 6 and 7) to the descriptive statistics of gains score distributions from first to second testing (Tables 2 and 3) it is clear that slightly smaller gains are made from second to third testing than from first to second testing. When conditional mean gains differ, they are smaller from second to third testing; when percentiles of conditional gain score distributions differ, they also are smaller from second to third testing. The magnitudes of these differences, however, are relatively small and may not be of much consequence to most examinees. The trend to smaller gains on second retesting, however, is unmistakable.

Gains from first to third testing. An analysis was also performed to examine the gains made from first to third testing for examinees choosing to test 3 or more times. Mean gains were obtained from first to second testing, second to third testing, and first to third testing, conditioned on first test score and across first test scores (Table 8). Of interest in this analysis is that the pattern of mean gains from second to third testing is opposite that from first to second testing, that is, the largest gains from second to third testing are made by examinees initially scoring higher on first testing (and making the smallest gains from first to second testing). The net result of these two patterns of mean gains is that the mean gain from first to third testing is more stable across a wider range of first test scores, near the overall mean of 1.2 score scale points than are gains from first to second testing, or second to third testing.

Analysis of Examinees Testing 4 or More Times

Analyses characterizing typical gains were conducted for the 11,910 examinees who chose to test 4 or more times. First, this group of examinees was compared to the 47,144 examinees who chose to test exactly three times. Comparisons between these two groups were made with respect to the mean gains made from first to third testing and the percentages of

examinees increasing their scores from first to third testing. Analyses were also conducted to characterize the gains made from third to fourth testing, conditioned on third test score and across third test scores.

Comparing examinees testing 4 or more times to examinees testing exactly 3 times. The mean ACT Composite score gain from first to third testing was 1.2 scale score points for both groups (Table 9); the percentage of examinees increasing their ACT Composite score from first to second testing was 67% for examinees testing exactly three times, and 66% for examinees that choose to test four or more times (Table 9). Examinees testing 4 or more times, however, scored slightly lower on first testing than examinees testing exactly three times; the modal first test scores for these groups are 16 and 17, respectively.

No clear pattern is evident in Table 9 regarding mean gains from first to third testing for these groups of examinees. Although near the modal first scores for both groups the mean gain is generally larger for examinees testing exactly three times, for a number of first score scale points above 18, the mean gain from first to third testing is larger for examinees that chose to test 4 or more times. The percentage of examinees increasing their scores from first to third testing display the same pattern. These data do not clearly identify examinees choosing to test a fourth time as those examinees that gained less on their previous retesting.

Gains from third to fourth testing. Analyses were also conducted to characterize the typical gains obtained from third to fourth testing for the 11,910 examinees tested 4 or more times. Tables 10 and 11 contain descriptive statistics of examinee gains, and smoothed curves of the patterns of mean gain and various percentiles of the gains score distributions are displayed in Figure 3.

Examining Table 10 and Figure 3, it is clear that the mean gains made from third to fourth testing depend upon the score obtained on third testing, generally decreasing as third test score increases. Examinees with the lowest scores on third testing made the largest gains; the mean gain for examinees with third test scores of 12 and 1.6 scale score points. Through the range of third test scores from 16 and 28, the mean gains are between 0.4 to 0.6 scale score points. From Figure 3, the 25th and 75th percentiles appear essentially equidistant from the mean gains, as do the 5th and 95th percentiles, suggesting that the distributions of gains are again symmetric. For nearly all third test scores, the 95th percentile of the gain score distributions is 3 score scale points. Table 11 contains information useful to address the concerns of individual examinees deciding whether they should take the ACT Assessment a fourth time. From Table 11, an examinee that obtained a score of 15 on third testing can determine that he or she has a 26% chance obtaining an increase of 2 or more scale score points on fourth testing.

Comparing the descriptive statistics of gain score distributions from third to fourth testing (Tables 10 and 11) to the descriptive statistics of gain score distributions from second to third testing (Tables 6 and 7) and the descriptive statistics of gain score distributions from first to second testing (Tables 2 and 3), it is clear that with each successive retesting, slightly smaller gains are obtained. When conditional mean gains differ, they are largest from first to second testing, smaller from second to third testing, and smaller still from third to fourth testing; when percentiles of conditional gain score distributions are compared, they also suggest distributions of gain scores that are generally largest from first to second testing, smaller from second to third testing, and smallest from third to fourth testing. Consider, for example, the 25th percentiles of the conditional gain score distributions from first to second, second to third, and third to fourth testing. From first to second testing the 25th percentile is 0 for first test scores of 24 and lower

and –1 for first test scores of 25 or higher. From second to third testing, the 25th percentile at scale score points below 25 are –1; from third to fourth testing, values of –1 are found for the 25th percentile at still lower scores. This pattern suggests that with each successive retesting, the conditional gain score distributions decrease.

The magnitudes of the differences in gains for each successive retesting seem relatively small and may not be of much consequence to most examinees. The mean gains made by these three groups of examinees are 0.8, 0.7, and 0.5 score scale points, respectively. The differences among these gains are not large, however, when perceived in the context that a difference of 0.5 scale score points might be associated with a whole number difference in gain scores. The trend to smaller gains with each successive retesting, however, is clear.

Summary

A consistent pattern of gains can be established across all incidences of retesting. Examinees with the lowest scores gain the most, and examinees with the highest scores are most likely to decrease their scores on retesting. From the perspective of classical test theory, this result can be explained by the lowest scores having the largest negative errors of measurement, and the highest scores having the largest position errors of measurement. For the vast majority of examinees (those with scale scores in the range from 15 through 28), gains of 1 or more scale score point are obtained by approximately 50% of examinees; examinees maintain or increase their score on retesting approximately 75% of the time. Large gains (gains of 4 or more points) are made by less than 5% of examinees.

Significantly, there are only small differences in gains made among gender or racial/ethnic groups. The magnitude of differences in mean gains are much smaller than 0.5, a difference that would suggest a mean gain difference of 1 whole scale score point.

Given that the gains each examinee may make on retesting can vary substantially (they reflect error in both test testing occasions), an adequate summary of the score gains made on any occasion of retesting may be provided by Tables 2 and 3, regardless of gender or racial/ethnic group. By utilizing Tables 2 and 3 as guidelines of possible retest results rather than as a deterministic description of retesting behaviors, they can provide useful information about possible score gains for each decision to retest.

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Table 1

Descriptive Statistics for the Retesting Sample
And the ACT-Tested Graduates of the Class of 1993

Subgroup	Number of times tested				Retest sample	Class of 1993
	2	3	4	5+		
Gender						
Female	57.5*	57.8	56.9	55.0	57.5	55.0
Male	42.5	42.2	43.1	45.0	42.5	45.0
Racial/Ethnic Group						
African-American, Black	9.2	12.3	15.0	15.5	10.0	9.2
American Indian, Alaska Native	1.0	1.0	1.0	1.3	1.0	1.2
Caucasian	76.9	74.2	71.9	70.2	76.2	71.4
Mexican-American, Chicano	2.5	1.9	1.4	1.0	2.4	3.2
Asian-American, Pacific Islander	3.1	3.7	3.5	4.8	3.2	2.8
Hispanic	1.3	1.1	0.8	0.7	1.2	1.6
Missing	6.0	5.8	6.4	6.6	6.0	10.6
Total group (N)	223,177	47,144	9,453	2,457	282,231	875,603

- Numbers in each column are the percentages of the total number (N) of students (last row).

Table 2

ACT Composite Score Mean Gains and Selected Percentiles of Gain Score Distributions from First to Second Testing

First ACT Composite Score	N	Percentile 5	25	50	75	95	Mean gain
Overall	282231	-2	0	1	2	3	0.7
7	5	*	*	*	*	*	*
8	3	*	*	*	*	*	*
9	29	*	*	*	*	*	*
10	102	0	2	3	4	5	2.8
11	526	0	1	2	3	5	2.4
12	1995	-1	1	2	3	4	1.7
13	5493	-1	0	1	2	4	1.3
14	10539	-1	0	1	2	4	1.1
15	15993	-2	0	1	2	4	0.9
16	21238	-2	0	1	2	3	0.8
17	23841	-2	0	1	2	3	0.7
18	24525	-2	0	1	2	3	0.7
19	25756	-2	0	1	2	3	0.7
20	24417	-2	0	1	2	3	0.7
21	22247	-2	0	1	2	3	0.7
22	20979	-2	0	1	2	3	0.7
23	18983	-2	0	1	2	3	0.6
24	16367	-2	0	1	2	3	0.6
25	14059	-2	-1	1	2	3	0.6
26	11453	-2	-1	1	2	3	0.5
27	8555	-2	-1	0	2	3	0.5
28	6426	-2	-1	0	2	3	0.4
29	4441	-2	-1	0	1	3	0.3
30	2305	-2	-1	0	1	3	0.3
31	1222	-2	-1	0	1	2	0.2
32	539	-2	-1	0	1	2	0.1
33	158	-3	-1	0	1	2	-0.2
34	33	*	*	*	*	*	*
35	2	*	*	*	*	*	*

- Percentiles of conditional gain score distribution not obtained due to small N.

Table 3

Percentage of Examinees Making Various
Gains in ACT Composite Score from First to Second Testing

First ACT Composite Score	N	Percentage of examinees making gains that are:						
		Negative	Exactly 0	Exactly 1	Exactly 2	Exactly 3	Exactly 4	5 or more
Overall	282231	23	22	24	17	9	3	1
7	5	*	*	*	*	*	*	*
8	3	*	*	*	*	*	*	*
9	29	*	*	*	*	*	*	*
10	102	1	5	12	24	30	12	17
11	526	2	6	19	29	24	12	8
12	1995	5	14	27	26	17	7	3
13	5493	11	20	27	23	12	5	2
14	10599	15	22	26	20	11	4	2
15	15943	18	22	25	19	10	4	2
16	21238	20	22	25	18	10	3	2
17	23841	22	22	25	17	9	3	1
18	24525	22	22	24	18	9	3	1
19	25756	23	23	24	17	9	3	1
20	24417	23	22	24	17	9	3	1
21	22247	23	22	24	17	9	3	1
22	20979	24	22	23	17	9	3	1
23	18983	25	22	23	17	8	3	1
24	16367	25	22	23	17	9	3	1
25	14059	26	22	23	17	9	3	1
26	11453	27	23	23	16	8	3	1
27	8555	27	23	23	15	8	3	1
28	6426	29	22	22	16	7	2	1
29	4441	29	24	24	16	6	1	0
30	2305	31	23	23	16	5	1	0
31	1222	31	27	24	14	4	1	0
32	539	32	28	26	13	1	0	0
33	158	38	30	22	9	1	0	0
34	33	*	*	*	*	*	*	*
35	2	*	*	*	*	*	*	*

Table 4

Descriptive Statistics of ACT Composite Score Gain
Distributions from First to Second Testing, by Gender and Race

			Percentage of examinees making gains that are:						
Group	N	Mean gain	Negative	Exactly 0	Exactly 1	Exactly 2	Exactly 3	Exactly 4	5 or more
Female	162232	0.6	24	23	24	17	8	3	1
Male	119999	0.8	21	21	24	18	10	4	2
Black	28191	0.6	23	24	24	17	8	3	1
American Indian/ Alaska Native	2791	0.7	22	23	25	18	8	3	1
Caucasian	215089	0.7	23	22	24	18	9	3	1
Mexican-American/ Chicano	6718	0.7	22	23	25	17	9	3	1
Asian American/ Pacific Islander	9094	0.7	23	24	24	17	8	3	1
Puerto Rican/Hispanic	3496	0.7	23	23	24	17	8	3	2

Table 5

Mean Gains and Percentages of Examinees with Second ACT Composite Scores Equal to/Greater than First ACT Composite Scores, by Number of Times Tested

First ACT Composite score	Sample size		Mean gain		Percent with second equal to first		Percent with second greater than first	
	2	3+[b]	2	3+	2	3+	2	3+
Overall	223177	59054	0.7	0.6	22	24	55	53
7	4	1	*	*	*	*	*	*
8	2	1	*	*	*	*	*	*
9	25	4	*	*	*	*	*	*
10	86	16	2.8	*	6	*	93	*
11	392	134	2.4	2.4	7	4	91	96
12	1527	468	1.7	1.8	15	12	79	84
13	4041	1452	1.3	1.3	20	18	68	73
14	7694	2845	1.1	1.0	21	22	63	64
15	11936	4057	1.0	0.7	21	24	61	56
16	16100	5138	0.9	0.6	21	26	60	51
17	18830	5011	0.8	0.5	22	26	57	49
18	19755	4770	0.8	0.6	22	24	56	52
19	20815	4941	0.7	0.6	23	25	55	51
20	19781	4636	0.7	0.7	22	23	54	55
21	17863	4384	0.7	0.7	22	22	54	56
22	16740	4239	0.7	0.7	23	21	54	55
23	14953	4030	0.6	0.6	22	22	53	54
24	12924	3443	0.6	0.6	22	22	53	54
25	11166	2893	0.6	0.5	22	24	52	51
26	9107	2346	0.6	0.4	22	24	52	46
27	6820	1735	0.5	0.3	23	26	51	44
28	5179	1247	0.5	0.2	22	26	50	42
29	3667	774	0.4	-0.1	22	35	51	30
30	1999	306	0.3	-0.1	22	29	48	34
31	1092	130	0.2	-0.3	26	34	45	26
32	498	41	0.1	*	27	*	42	*
33	149	9	-0.2	*	30	*	34	*
34	30	3	*	*	*	*	*	*
35	2	0	*	*	*	*	*	*

[a] Students taking the ACT Assessment exactly twice.
[b] Students taking the ACT Assessment 3 or more times.

Table 6

ACT Composite Score Mean Gains and Selected Percentiles of Gain Score Distributions from Second to Third Testing

Second ACT Composite score	N	Percentile 5	25	50	75	95	Mean gain
Overall	59054	-2	0	1	2	3	0.6
9	4	*	*	*	*	*	*
10	4	*	*	*	*	*	*
11	75	0	2	3	3	5	2.7
12	337	0	2	2	2	4	1.7
13	999	-1	1	1	2	4	1.3
14	2179	-1	0	1	2	4	1.0
15	3498	-2	0	1	2	3	0.8
16	4523	-2	0	1	2	3	0.7
17	4817	-2	-1	1	2	3	0.5
18	4672	-2	0	1	2	3	0.6
19	4659	-2	-1	1	2	3	0.5
20	4444	-2	-1	1	2	3	0.5
21	4365	-2	0	1	2	3	0.6
22	4333	-2	-1	1	2	3	0.5
23	4059	-2	-1	0	2	3	0.5
24	3771	-2	-1	1	2	3	0.5
25	3441	-2	-1	0	2	3	0.5
26	2830	-2	-1	0	1	3	0.4
27	2173	-2	-1	0	1	3	0.4
28	1648	-2	-1	0	1	3	0.3
29	1268	-2	-1	0	1	3	0.1
30	534	-3	-1	0	1	2	-0.1
31	283	-2	-1	0	1	2	-0.1
32	106	-3	-1	0	1	2	-0.3
33	27	*	*	*	*	*	*
34	5	*	*	*	*	*	*

* Percentiles of conditional gain score distribution not obtained due to small N.

Table 7

Percentage of Examinees Making Various
Gains in ACT Composite Score from Second to Third Testing

First ACT Composite score	N	Percentage of examinees making gains that are:						
		Negative	Exactly 0	Exactly 1	Exactly 2	Exactly 3	Exactly 4	5 or more
Overall	59054	25	24	24	17	8	2	1
9	4	*	*	*	*	*	*	*
10	4	*	*	*	*	*	*	*
11	75	3	5	8	31	31	12	11
12	337	5	13	27	30	15	5	4
13	999	11	18	29	23	12	5	2
14	2179	16	21	26	21	10	4	2
15	3498	19	22	27	18	8	3	1
16	4523	22	24	25	18	8	3	1
17	4817	25	24	24	17	7	2	1
18	4672	25	23	24	17	7	3	1
19	4659	25	23	24	16	8	2	1
20	4444	25	24	24	16	7	3	1
21	4365	24	25	24	17	8	2	1
22	4333	26	24	24	16	7	2	1
23	4059	25	25	23	16	8	2	1
24	3771	25	24	24	17	7	3	1
25	3441	27	24	23	16	7	2	1
26	2830	29	24	24	14	7	2	1
27	2173	29	24	24	14	7	2	0
28	1648	29	24	23	15	6	2	0
29	1268	35	25	21	12	6	1	0
30	534	39	26	22	9	4	1	0
31	283	35	29	23	11	2	0	0
32	106	42	31	18	8	0	1	0
33	27	*	*	*	*	*	*	*
34	5	*	*	*	*	*	*	*

Table 8

Mean Gain from First to Second, Second to Third, and First to Third Testing on the ACT Composite Score for Examinees Testing Three or more Times

First ACT Composite score	N	Mean gain		
		First to second	Second to third	First to third
Overall	59054	0.6	0.6	1.2
7	1	*	*	*
8	1	*	*	*
9	4	*	*	*
10	16	*	*	*
11	134	2.4	0.2	2.7
12	468	1.8	0.1	1.9
13	1452	1.3	0.3	1.7
14	2845	1.0	0.4	1.4
15	4057	0.7	0.4	1.2
16	5138	0.6	0.5	1.1
17	5011	0.5	0.6	1.1
18	4770	0.6	0.5	1.2
19	4941	0.6	0.6	1.2
20	4636	0.7	0.6	1.3
21	4384	0.7	0.6	1.3
22	4239	0.7	0.6	1.3
23	4030	0.6	0.6	1.3
24	3443	0.6	0.6	1.3
25	2893	0.5	0.7	1.2
26	2346	0.4	0.7	1.1
27	1735	0.3	0.7	1.0
28	1247	0.2	0.7	0.9
29	774	-0.1	0.8	0.7
30	306	-0.1	0.7	0.6
31	130	-0.3	0.9	0.6
32	41	*	*	*
33	9	*	*	*
34	3	*	*	*

Table 9

Mean Gains and Percentages of Examinees with Third ACT Composite Scores Equal to/Greater than First ACT Composite Scores, by Number of Times Tested

First ACT Composite score	Sample size		Mean gain		Third score equal to first score		Third score greater than first score	
	3[a]	4+[b]	3	4+	3	4+	3	4+
Overall	47144	11910	1.2	1.2	19	19	67	66
7	1	0	*	*	*	*	*	*
8	1	0	*	*	*	*	*	*
9	2	2	*	*	*	*	*	*
10	10	6	*	*	*	*	*	*
11	96	38	2.5	*	4	*	95	*
12	333	135	1.9	1.9	11	10	83	85
13	1044	408	1.7	1.7	14	14	77	81
14	2127	718	1.5	1.1	18	19	72	69
15	3113	944	1.2	0.9	19	20	68	63
16	4087	1051	1.1	0.9	20	22	65	59
17	4107	904	1.1	1.0	19	23	64	61
18	3924	846	1.2	1.2	20	17	65	68
19	4074	867	1.2	1.3	20	16	66	68
20	3787	849	1.2	1.4	18	18	67	70
21	3518	866	1.3	1.5	18	17	67	71
22	3381	858	1.3	1.4	18	16	67	70
23	3199	831	1.3	1.3	18	20	68	67
24	2760	683	1.3	1.3	19	15	66	71
25	2320	573	1.2	1.2	18	20	66	68
26	1858	488	1.1	1.2	19	19	63	67
27	1376	359	1.0	0.8	19	22	62	61
28	984	263	1.0	0.7	20	26	62	56
29	611	163	0.9	-0.2	17	31	65	28
30	266	40	0.7	*	20	*	61	*
31	117	13	0.6	*	17	*	61	*
32	36	5	*	*	*	*	*	*
33	9	0	*	*	*	*	*	*
34	3	0	*	*	*	*	*	*

[a] Students taking the ACT Assessment exactly three times.
[b] Students taking the ACT Assessment 4 or more times.

Table 10

ACT Composite Score Mean Gains and Selected Percentiles of Gain Score Distributions from Third to Fourth Testing

Third ACT Composite score	N	Percentile 5	25	50	75	95	Mean gain
Overall	11910	-2	-1	1	2	3	0.5
7	1	*	*	*	*	*	*
9	1	*	*	*	*	*	*
10	2	*	*	*	*	*	*
11	11	*	*	*	*	*	*
12	65	-1	0	2	2	3	1.6
13	228	-1	0	1	2	4	1.3
14	470	-2	0	1	2	3	0.9
15	725	-2	0	1	2	3	0.7
16	938	-2	-1	0	2	3	0.5
17	885	-2	-1	1	2	3	0.6
18	769	-2	-1	0	1	3	0.4
19	783	-2	-1	0	1	3	0.4
20	790	-2	-1	0	1	3	0.5
21	797	-2	-1	1	2	3	0.6
22	769	-2	0	1	2	3	0.6
23	900	-2	-1	0	2	3	0.5
24	742	-2	-1	1	1	3	0.4
25	782	-2	-1	0	2	3	0.4
26	652	-2	-1	0	2	3	0.4
27	542	-2	-1	0	2	3	0.5
28	447	-2	-1	0	1	3	0.4
29	397	-3	-1	0	1	3	0.0
30	127	-3	-1	0	1	2	0.1
31	63	-2	-1	0	1	2	-0.1
32	20	*	*	*	*	*	*
33	3	*	*	*	*	*	*
34	1	*	*	*	*	*	*

* Percentiles of conditional gain score distribution not obtained due to small N.

Table 11

Percentage of Examinees Making Various
Gains in ACT Composite Score from Third to Fourth Testing

Third ACT Composite score	N	Percentage of examinees making gains that are:						
		Negative	Exactly 0	Exactly 1	Exactly 2	Exactly 3	Exactly 4	5 or more
Overall	11910	26	24	24	16	7	2	1
7	1	*	*	*	*	*	*	*
9	1	*	*	*	*	*	*	*
10	2	*	*	*	*	*	*	*
11	11	*	*	*	*	*	*	*
12	65	6	20	15	37	18	2	2
13	228	9	21	27	24	11	4	3
14	470	18	21	25	22	11	3	1
15	725	21	24	28	15	8	2	1
16	938	27	25	22	15	7	2	1
17	885	26	22	24	17	7	3	0
18	769	26	26	25	15	6	1	1
19	783	31	23	23	13	7	3	0
20	790	25	25	25	15	6	2	1
21	797	26	23	24	17	6	4	1
22	769	23	23	25	17	9	2	1
23	900	28	22	23	16	8	3	0
24	742	26	24	28	16	4	2	0
25	782	30	24	20	15	7	3	1
26	652	27	25	22	16	6	3	1
27	542	26	24	24	15	8	2	1
28	447	26	26	25	14	8	2	0
29	397	38	22	22	12	5	1	0
30	127	32	23	27	13	4	1	0
31	63	38	24	25	10	3	0	0
32	20	*	*	*	*	*	*	*
33	3	*	*	*	*	*	*	*
34	1	*	*	*	*	*	*	*

Figure 1. Gains from first to second testing conditioned on first test score.

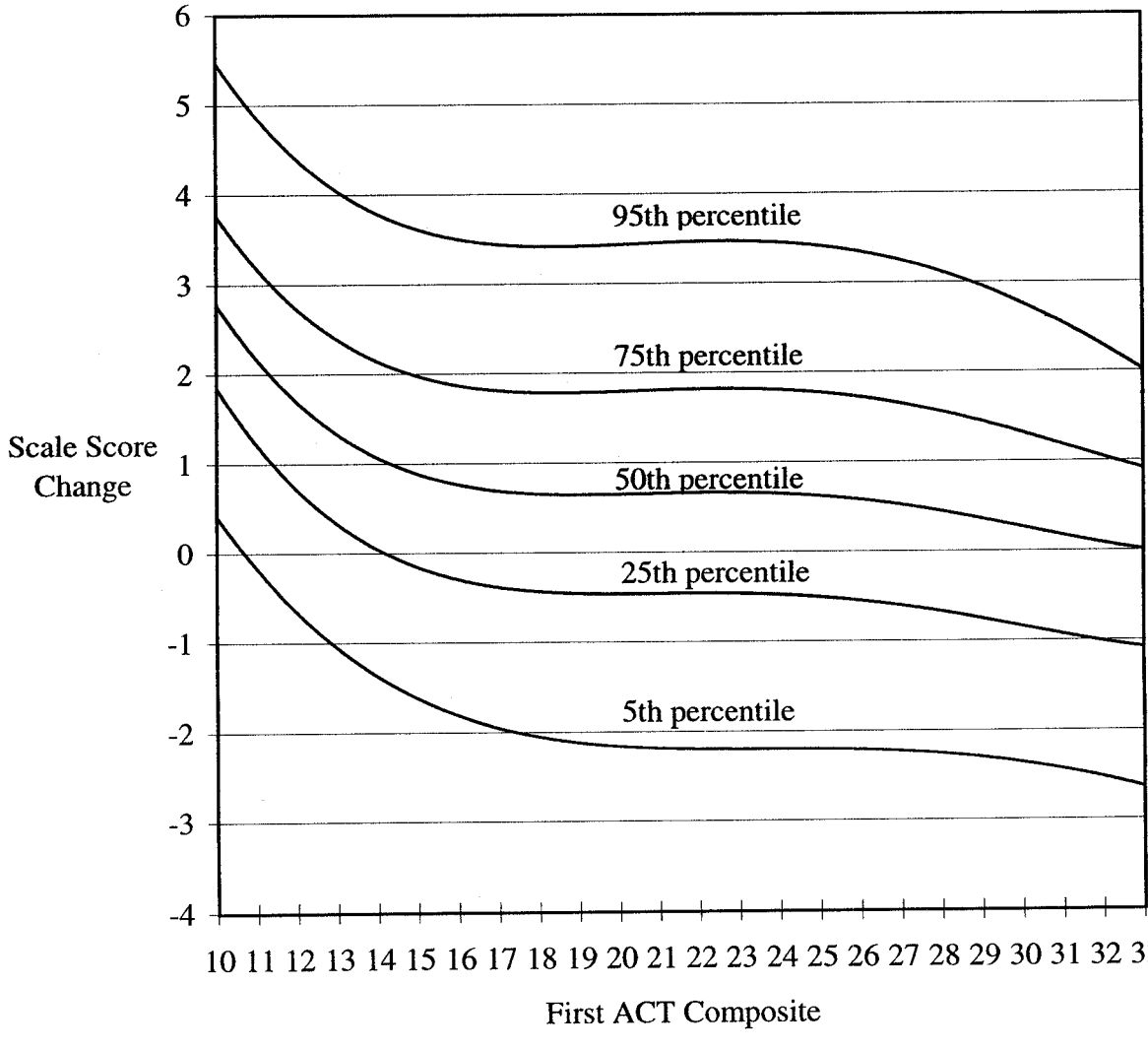

Figure 2. Gains from second to third testing conditioned on second test score.

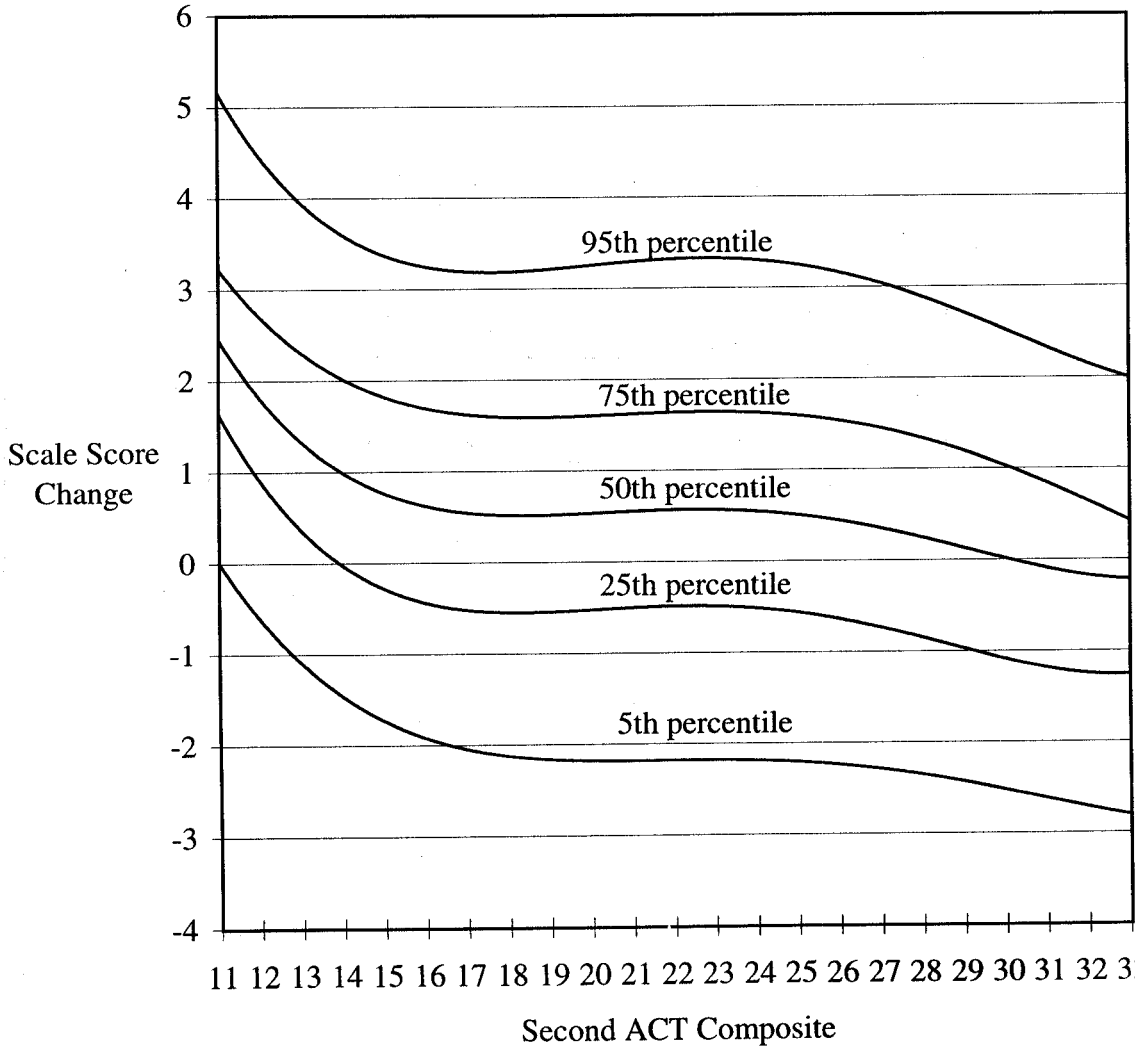
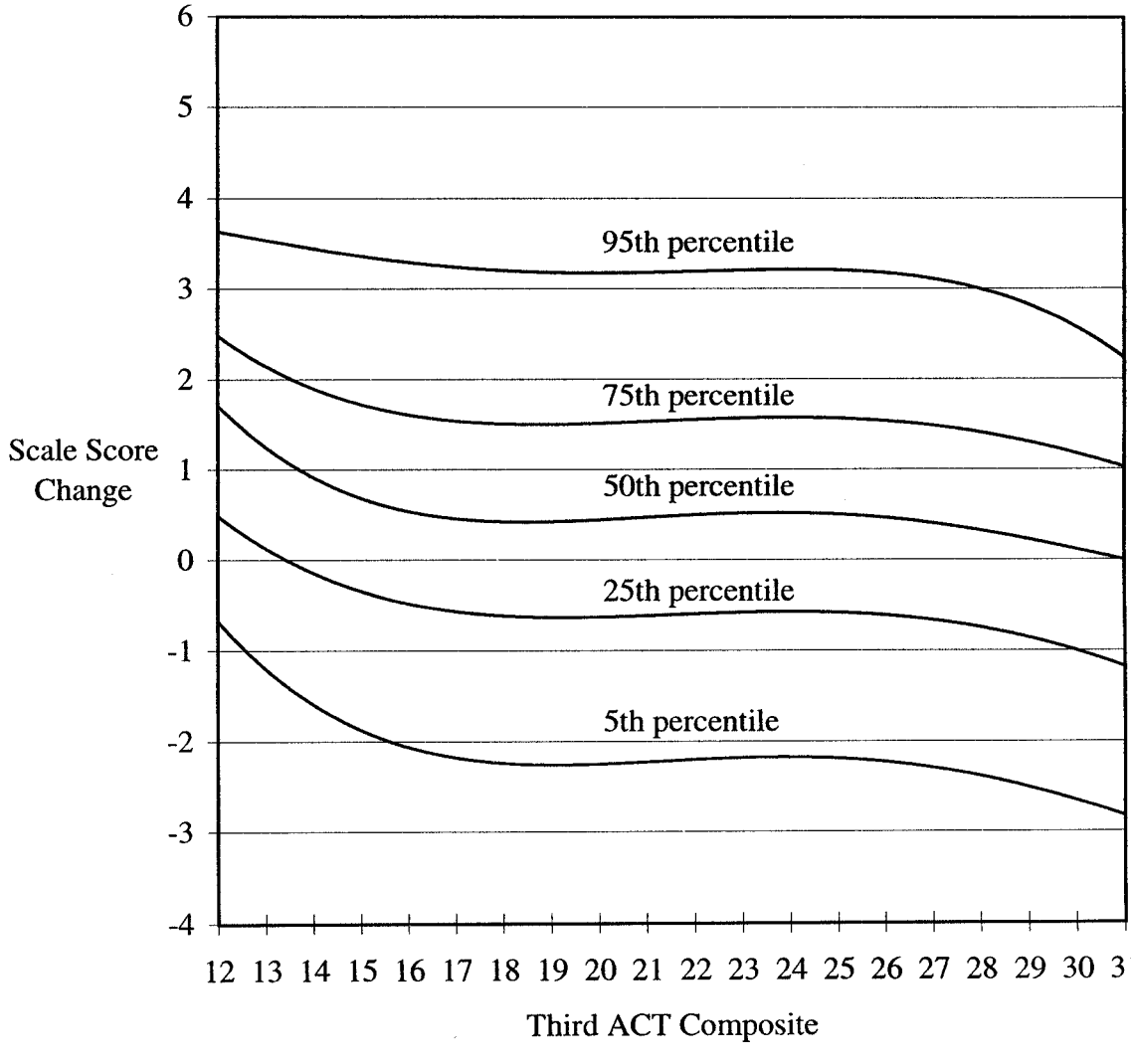
Figure 3. Gains from third to fourth testing conditioned on third test score.