TEXAS
EDUCATION
AGENCY

AUSTIN, TEXAS

Predictive Power of Grade 3 TAKS and STAAR on Future Academic Success

OFFICE
OF GOVERNANCE
AND
ACCOUNTABILITY

DIVISION OF
RESEARCH
AND ANALYSIS

DECEMBER 2019

Predictive Power of Grade 3 TAKS and STAAR on Future Academic Success

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December 2019

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Citation. Texas Education Agency. (2019). *Predictive power of grade 3 TAKS and STAAR on future academic success* (Document No. GE20 601 04). Austin, TX: Author.

This report is available in PDF format on the agency website at http://tea.texas.gov/acctres/dropcomp_index.html. Additional information about this report may be obtained by contacting the Texas Education Agency Division of Research and Analysis by phone at (512) 475-3523 or by e-mail at Research@tea.texas.gov.

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Introduction

The first statewide standardized testing program in Texas, the Texas Assessment of Basic Skills (TABS), was developed in response to requirements passed by the 66th Texas Legislature in 1979. Administered beginning in the 1979-80 school year, TABS assessed basic competencies in reading, writing, and mathematics in Grades 3, 5, and 9. TABS was replaced by the Texas Educational Assessment of Minimum Skills (TEAMS) in 1985-86. TEAMS assessed more grades, and students were required to pass the Grade 11 test to receive a high school diploma. In 1990-91, TEAMS was replaced by the more rigorous Texas Assessment of Academic Skills (TAAS). Implementation of TAAS shifted the focus of testing from minimum skills to academic skills, including problem-solving and critical thinking. The Texas Assessment of Knowledge and Skills (TAKS) replaced TAAS in 2002-03. TAKS was designed to be more comprehensive than previous tests and to measure more of the state curriculum, the Texas Essential Knowledge and Skills. The fifth and current testing program, the State of Texas Assessments of Academic Readiness (STAAR), replaced TAKS in 2011-12. Designed to emphasize college-readiness, STAAR assesses students in Grades 3-8 and includes end-of-course (EOC) tests in English I, English II, Algebra I, biology and U.S. history.

The goal of this investigation was straight-forward: examine the external validity of the two most recent Texas statewide standardized tests by analyzing whether passing Grade 3 TAKS and STAAR Reading tests predicted subsequent academic success. Short- and long-term outcomes were examined across five cohorts of students. Specifically, the study examined whether passing Grade 3 TAKS or STAAR Reading tests predicted success on the following future academic outcomes: Grade 5 and Grade 8 TAKS or STAAR Reading test performance; grade-level promotion/retention in Grades 3-5, Grades 6-8, and Grades 9-12; TAKS English exit-level test or English I EOC test performance; meeting SAT and ACT criterion scores; high school graduation and dropout; two-year and four-year college enrollment; college persistence; and college graduation with a two-year or four-year degree. Importantly, the analyses in this study do not include any additional predictor or explanatory variables (e.g., economic disadvantage, race/ethnicity, school quality). It is possible, for example, that the relationship between passing the Grade 3 TAKS or STAAR Reading test and future academic outcomes varies by school quality. For instance, a student who fails the Grade 3 STAAR Reading test and subsequently attends a higher-quality school may be more likely to pass future STAAR tests than a student who fails the Grade 3 STAAR Reading test and subsequently attends a lower-quality school. That and other limitations of the current analyses are discussed in the "Limitations" section of this report, on page 26.

This study adds to an existing research base that provides evidence for the validity of TAKS and STAAR. Several of these studies, described in the “Discussion” section on page 25 of this report, document the association between success on TAKS and STAAR and future academic success. Further evidence of the validity and reliability of STAAR has been provided by Human Resources Research Organization (HumRRO), which contracted with the Texas Education Agency (TEA) in 2016 to provide an independent evaluation, in compliance with House Bill 743 (84th Texas Legislature) (HumRRO, 2016).

Methods

Cohorts

To examine whether passing Grade 3 Reading tests predicted future academic success, five cohorts of students were included in the study. To examine the associations between high school and college success and Grade 3 standardized test performance, Grade 3 TAKS Reading test results from school years 2002-03 and 2007-08 were used for the 2003 cohort (*N*=287,897) and the 2008 cohort (*N*=339,689), respectively. To examine the associations between Grade 3 standardized test performance and success on more recent outcomes, Grade 3 STAAR Reading test results from school years 2011-12, 2014-15, and 2015-16 were used for the 2012 cohort (*N*=364,204), the 2015 cohort (*N*=390,839), and the 2016 cohort (*N*=403,005), respectively.

To be included in an analysis for a specific future academic outcome, a student must have had a valid result for the Grade 3 Reading test and data available for the specific outcome in the grade and year expected for the student's cohort. Although students did not need to remain in Texas public schools in the intervening years if they rejoined the cohort in the expected grade, students with missing data were excluded from analyses. In most cases, data were missing because the student was retained or left Texas public schools and did not return. In a small number of cases, data were missing because the student tested above grade level or skipped a grade level. Missing data in this study were assumed to be randomly distributed. As discussed in the "Limitations" section of this report, on page 26, missing data that are not randomly distributed can introduce bias into a study's results.

Students who were retained in Grade 3 in the cohort year were included in the analyses for grade-level promotion/retention in Grades 3-5 but were excluded from analyses of other future academic outcomes unless they subsequently returned to grade level. However, that is not to say that students who were retained in Grade 3 were missing from most analyses. Students who were already repeating Grade 3, after being retained the prior year, were included in a cohort's analyses. Those retained students were categorized as passing or failing the Grade 3 TAKS or STAAR Reading test based on their test performance during their second year of Grade 3. In summary, each cohort lost a group of students who were retained during the first year of the cohort and gained a similar group of students who were retained during the previous year.

Notably, students in the 2003 and 2008 cohorts, when Student Success Initiative (SSI) requirements were in place for Grade 3 (Texas Education Code §28.0211, 1999), were more likely to be retained in Grade 3 than students in later cohorts. Under SSI, a student in Grade 3 was required to pass the state reading test to advance to Grade 4, although the student could still be promoted to the next grade if a grade placement committee (GPC) unanimously decided the student was likely to perform on grade level if given additional accelerated instruction during the next school year. Though not all students who failed the Grade 3 Reading tests were retained, SSI requirements may nevertheless present a confound in results for the 2003 and 2008 cohorts. See the "Outcomes" section, on page 3 of this report, for additional discussion.

Data Sources

Academic outcome data were collected from several sources. TAKS, STAAR, grade-level retention, high school graduation, and high school dropout data were available from the TEA. SAT and ACT data were provided by the College Board and by ACT, Inc., respectively. College enrollment and graduation data from Texas public two-year and four-year institutions were provided by the Texas Higher Education Coordinating Board. College enrollment and graduation data from Texas private institutions and institutions outside Texas were provided by the National Student Clearinghouse.

Outcomes

Overview

To be included in an analysis, students needed to have data available for the Grade 3 Reading test and the subsequent outcome in the expected year, at the expected grade level (e.g., Grade 5 performance was assessed two years after Grade 3; Grade 8 performance was assessed five years after Grade 3). Consequently, students who were retained, for example, were included in the grade-level retention measure for the appropriate grade span but excluded from analyses for other future academic outcomes unless they subsequently returned to grade level. Students who tested above grade level or skipped a grade level were also excluded from analyses for future academic outcomes unless they subsequently returned to grade level. Grade 3 test performance and all subsequent outcome measures were dichotomized (i.e., success/failure) for the analyses.

TAKS/STAAR Reading, English Exit-Level Test, and English I End-of-Course Test Performance

Analyses of TAKS and STAAR results included English-language versions of the tests as well as any Spanish-language and accommodated versions with passing standards considered equivalent to those for the English-language versions. Dichotomous outcomes (i.e., passed/failed) were analyzed as follows:

- 2003 Cohort
    - TAKS 2005 Grade 5 Reading
    - TAKS 2008 Grade 8 Reading
    - TAKS 2011 Exit-Level English Language Arts
- 2008 Cohort
    - TAKS 2010 Grade 5 Reading
    - STAAR 2013 Grade 8 Reading
    - STAAR 2014 English I EOC

- 2012 Cohort
    - STAAR 2014 Grade 5 Reading
    - STAAR 2017 Grade 8 Reading
- 2015 Cohort
    - STAAR 2017 Grade 5 Reading
- 2016 Cohort
    - STAAR 2018 Grade 5 Reading

Grades 3-5, Grades 6-8, and Grade 9-12 Grade-Level Retention

Dichotomous outcomes for grade-level retention (i.e., promoted/retained) were analyzed for three different grade spans: elementary school (Grades 3-5), middle school (Grades 6-8), and high school (Grades 9-12). The data were analyzed as follows:

- 2003 Cohort
    - Elementary school promotion/retention
    - Middle school promotion/retention
    - High school promotion/retention
- 2008 Cohort
    - Elementary school promotion/retention
    - Middle school promotion/retention
    - High school promotion/retention
- 2012 Cohort
    - Elementary school promotion/retention
    - Middle school promotion/retention
- 2015 Cohort
    - Elementary school promotion/retention

Academic success was defined as being promoted from one grade level to the next each year within a specified grade span. Retention was defined as a student repeating a particular grade. Although a student can be both promoted and retained over the course of a specified grade span, a student was counted only once for the grade span. A student who was retained in any of the grades in a specified grade span was included once in the count of retained students for that grade span. That student was excluded from the analyses for grade level promotion/retention in any future grade span unless he or she subsequently returned to grade level. A student who was promoted in each of the grades in a specified grade span was included once in the count of promoted students for that grade

span. That student was included in the count of promoted students for any future grade span if he or she remained on grade level. Students who left Texas public schools at any point within a specified grade span were not included in the analyses.

Retention rates may be higher for some cohorts and grade levels than others, based on whether SSI requirements were in place at the time of promotion/retention. SSI required that students in Grade 3 pass the state reading test (2003 and 2008 cohorts only) and students in Grades 5 and 8 pass the state reading and mathematics tests to advance to the next grade level. Consequently, some students were retained as a result of TAKS and STAAR performance, and it is important to note a possible confound resulting from those cases: when TAKS and STAAR test performance caused students to be retained, correlations between test performance and retention were inflated. The magnitude of this confound was mitigated, however, as a student who failed the test or tests could still be promoted to the next grade level if a GPC unanimously decided the student was likely to perform on grade level if given additional accelerated instruction during the next school year. As a result, some students who failed the TAKS or STAAR were promoted regardless. In some cases, students who passed the TAKS or STAAR were, nevertheless, retained for other reasons.

SAT and ACT Criterion Scores

Dichotomous outcomes for SAT and ACT performance (i.e., met criterion score/did not meet criterion score) were analyzed for the 2003 and 2008 cohorts. Academic success was defined as meeting criterion scores. SAT and ACT outcomes for the 2003 cohort were based on data for examinees in the class of 2012 and outcomes for the 2008 cohort were based on data for examinees in the class of 2017. For examinees in the class of 2012 (i.e., 2003 cohort), the criterion scores were defined as a combined score of 1110 on the critical reading and mathematics sections of the SAT and a composite score of 24 on the ACT. In 2016, the SAT test was redesigned resulting in changes to the scoring system and the standard for meeting criterion. For examinees in the class of 2017 (i.e., 2008 cohort), the criterion scores were defined as a combined score of 1180 on the evidence-based reading and writing and mathematics sections of the SAT and a composite score of 24 on the ACT.

High School Dropout and Graduation

Dichotomous outcomes for four-year longitudinal dropout (i.e., did not drop out/dropped out) and graduation (i.e., graduated/did not graduate) were analyzed for the 2003 and 2008 cohorts. Academic success for dropout was defined as not dropping out between Grades 9-12. Academic success for graduation was defined as enrolling in high school at the expected time for the cohort and graduating on time. The four-year dropout and graduation outcomes were analyzed based on a class of beginning ninth graders and identified those who graduated or dropped out within four years; that is, by the end of the fourth school year after they began ninth grade. Only students who graduated, continued into a fifth year of high school, received a Texas Certificate of High School Equivalency, or dropped out were included in the class (i.e., the denominator for these analyses). In other words, students who left Texas public schools to enter other educational settings between Grades 9 and 12 were not included in dropout and graduation analyses. The four-year dropout and graduation outcomes for the 2003

cohort were based on data for students in the class of 2012; that is, students who began ninth grade in the 2008-09 school year. The four-year dropout and graduation outcomes for the 2008 cohort were based on data for students in the class of 2017, or students who began ninth grade in the 2013-14 school year.

Two-Year and Four-Year College Enrollment

Dichotomous outcomes for enrollment in two-year or four-year colleges (i.e., enrolled/did not enroll) were analyzed for the 2003 cohort; specifically, for the students who made up the high school class of 2012. The dichotomous outcomes were based on enrollment in a two-year or four-year college at any point during the 2012-13 school year, the school year immediately following expected high school graduation. Academic success was defined as enrolling in college. Students who were enrolled at any time between June 1, 2012, and May 31, 2013, were considered to have enrolled in college.

College Persistence

Dichotomous outcomes for persistence into a second year of college (i.e., persisted/did not persist) were analyzed for the 2003 cohort; specifically, for the students who made up the high school class of 2012. The dichotomous outcomes were based on enrollment in a two-year or four-year college during both the 2012-13 and 2013-14 school years. Academic success was defined as persisting in college. Students who enrolled in college in the 2012-13 school year and who remained enrolled in a two-year or four-year college at any time between June 1, 2013, and May 31, 2014, were considered to have persisted into a second year of college.

College Graduation with a Two-Year or Four-Year Degree

Dichotomous outcomes for students who graduated from a two-year or four-year college (i.e., graduated/did not graduate) were analyzed for the 2003 cohort; specifically, for the students who made up the high school class of 2012. These students were expected to graduate from a two-year college by 2013-14 or from a four-year college by 2015-16. Academic success was defined as graduating from a two-year or four-year college. Students who enrolled in a two-year college in the 2012-13 school year and earned a degree or certificate before or during the 2013-14 school year were considered two-year college graduates. Likewise, students who enrolled in a four-year college in 2012-13 and earned a degree before or during the 2015-16 school year were considered four-year college graduates.

Analyses

Descriptive and logistic regression analyses were conducted for this study. Logistic regression models are often used when outcome variables of interest are dichotomous, as they are in this study. Logistic regression provided a method for estimating whether passing the Grade 3 TAKS or STAAR

Reading test had a statistically significant effect on the probability of subsequent academic success, when the two available outcomes were success and failure. To estimate the effects of Grade 3 TAKS or STAAR test performance on subsequent academic outcomes, the logistic regression models were specified of the form:

$$logit(\pi) = log\left(\frac{\pi}{1-\pi}\right) = \alpha + \beta x,$$

where π is the probability of success with respect to the subsequent dichotomous academic outcome of interest, α is an intercept parameter, x represents passing the Grade 3 TAKS or STAAR Reading test, and β is a slope parameter that describes the effect of passing TAKS or STAAR on the subsequent academic outcome of interest.

Results of the comparative descriptive statistics and logistic regressions are presented in the "Results" section of this report, on page 9. When interpreting the results, it is important to consider that the analyses did not include any other factors typically associated with academic success, including student demographics and school characteristics, which could affect outcomes but were outside the scope of this study.

Data Interpretation

The following section of this report presents results for each of the five cohorts of Grade 3 students in the study. Results for the logistic regression analyses are presented first, followed by the descriptive statistics.

For each academic outcome, a logistic regression analysis was conducted to determine whether there was a statistically significant relationship between passing the Grade 3 TAKS or STAAR Reading test and future academic success. To help with data interpretation and comparison of effects, all logistic regression analyses were designed to predict the likelihood of a positive outcome occurring. For example, the analyses predicted the likelihood of being promoted in elementary school (vs. retained) and not dropping out of high school (vs. dropping out). The logistic regression summary tables (e.g., Table 1 on page 10) include the logistic regression coefficients, Wald tests, odds ratios, and the 95% confidence intervals for the odds ratios for each outcome. These values can be used to determine the magnitude of the differences in future academic success between students who passed and students who failed the Grade 3 TAKS or STAAR Reading test (i.e., the larger the odds ratio, the larger the likelihood of success). The main value of interest in the logistic regression tables is the *p*-value, or probability (labeled: *p*). The *p*-value represents the probability that the results of the investigation were produced by chance alone. In each statistical analysis, a *p*-value of .05 or smaller is considered statistically significant. For example, when predicting the likelihood of students in the 2003 cohort passing the Grade 5 TAKS Reading test based on performance on the Grade 3 TAKS Reading test, $p < .001$ can be interpreted as a less than 0.1% probability that students who passed the Grade 3 TAKS Reading test were more likely to pass Grade 5 TAKS Reading test than based on chance alone. This suggests it is very likely that passing the Grade 3 TAKS Reading test is positively associated with future success on the Grade 5 test. Please note, however, that there may be unexamined variables that account for this and other statistically significant relationships found in this study. Additionally, these data are correlational in nature and should not be construed as indicating a causal relationship between Grade 3 test performance and future academic outcomes.

The descriptive tables are summaries of the outcome variables by group (i.e., failed the Grade 3 TAKS or STAAR Reading test and passed the Grade 3 TAKS or STAAR Reading test) and are included simply to describe the outcomes for each cohort. For example, Table 2 on page 11 presents the counts of students in the 2003 cohort who passed or failed the Grade 3 TAKS Reading test. For each of these groups, the table also presents the counts of students who subsequently passed or failed the Grade 5 TAKS Reading test and the percentages they represent of the total number of students with valid Grade 5 TAKS Reading test scores. The table shows that, of the 255,156 students who passed the Grade 3 TAKS Reading test, a total of 223,265 had valid results for the Grade 5 TAKS Reading test. Of these, 179,034 (80.2%) passed the Grade 5 test, and 44,231 (19.8%) did not. Of the 32,741 students who failed the Grade 3 TAKS Reading test, a total of 17,318 had valid results for the Grade 5 TAKS Reading test. Of these students, 3,670 (21.2%) passed the Grade 5 test, and 13,648 (78.8%) did not.

Results

Overview

As noted previously, the primary focus of this study was to examine the external validity of Grade 3 TAKS and STAAR Reading test performance as a predictor of subsequent academic success. Results were compared using descriptive statistics and statistical models. Results were consistent across all cohorts and outcomes examined – students who passed Grade 3 TAKS or STAAR Reading tests were more likely to be successful on future academic outcome measures than students who failed the tests. All logistic regression analyses were statistically significant at the $p < .001$ level. The results for each cohort are described below.

2003 Cohort

Students in the 2003 cohort took the Grade 3 TAKS Reading test in the 2002-03 school year. Short- and long-term academic outcomes were examined for these students through their expected fourth year of college in 2015-16. Across all outcomes examined, students who passed the Grade 3 TAKS Reading test were more successful than students who failed. For example, students who passed the test were significantly more likely to enroll in a two- or four-year college the year after high school graduation, persist in college the following year, graduate with a two-year degree within two years, and graduate with a four-year degree within four years (Table 1 on page 10). Among these college outcomes, effect sizes (i.e., odds ratios) were largest for graduating from college with a four-year degree and for enrolling in a four-year college. As shown in Table 2 on page 11, 26.4 percent of students who passed the Grade 3 TAKS Reading test, and were members of the high school class of 2012, enrolled in a four-year college the year after high school graduation and 11.5 percent graduated from college within four years with a four-year degree. Among students who failed the Grade 3 test, and were members of the high school class of 2012, 6.9 percent enrolled in a four-year college the year after high school graduation and 1.3 percent graduated from college within four years with a four-year degree.

Table 1
Logistic Regression Analyses Predicting Future Academic Outcomes From Grade 3 TAKS Reading Performance, 2003 Cohort

Outcome	B	SE(B)	Wald	Df	p	OR	95% CI
Passing Grade 5 TAKS Reading	2.71	.02	19,662.02	1	<.001	15.05	14.49-15.63
Being promoted in Grades 3-5[a]	2.46	.02	23,481.89	1	<.001	11.73	11.37-12.11
Passing Grade 8 TAKS Reading	2.61	.02	14,539.96	1	<.001	13.65	13.08-14.24
Being promoted in Grades 6-8	1.17	.03	1,827.54	1	<.001	3.23	3.06-3.41
Passing English exit-level test	2.42	.03	5,388.79	1	<.001	11.23	10.53-11.98
Meeting criterion score on SAT[b]	3.95	.19	449.37	1	<.001	52.02	36.10-74.96
Meeting criterion score on ACT[c]	4.02	.21	353.01	1	<.001	55.85	36.71-84.98
Being promoted in Grades 9-12	1.14	.02	4,208.65	1	<.001	3.12	3.02-3.23
Not dropping out in Grades 9-12	1.21	.03	1,913.08	1	<.001	3.35	3.17-3.54
Graduating from high school on time	1.10	.02	2,639.18	1	<.001	3.00	2.88-3.13
Enrolling in two-year college	0.16	.02	79.27	1	<.001	1.18	1.13-1.22
Enrolling in four-year college	1.58	.03	2,526.38	1	<.001	4.87	4.58-5.18
Persisting into second year of college	1.06	.02	3,081.62	1	<.001	2.89	2.78-3.00
Graduating from college with two-year degree	0.33	.06	27.31	1	<.001	1.39	1.23-1.56
Graduating from college with four-year degree	2.27	.07	1062.65	1	<.001	9.64	8.41-11.05

Source. ACT, Inc., College Board, National Student Clearinghouse, Texas Education Agency, and Texas Higher Education Coordinating Board.

Note. Results include only the first TAKS test administration in a given school year. All results statistically significant at the $p < .001$ level.

[a]For the 2003 cohort, Student Success Initiative requirements were in effect for Grade 3. [b]The criterion for the SAT was a combined score of 1110 or higher on the critical reading and mathematics sections of the exam. [c]The criterion for the ACT was a composite score of 24 or higher.

Table 2
Future Academic Outcome Performance Based on Grade 3 TAKS Reading Performance, 2003 Cohort

	Failed Grade 3 TAKS (*N* =32,741)		Passed Grade 3 TAKS (*N* =255,156)	
Outcome	Number	Percent	Number	Percent
Passed Grade 5 TAKS Reading				
Passed	3,670	21.2	179,034	80.2
Failed	13,648	78.8	44,231	19.8
Promoted in Grades 3-5[a]				
Promoted	19,877	66.4	222,007	95.9
Retained	10,081	33.7	9,597	4.1
Passed Grade 8 TAKS Reading				
Passed	11,779	71.3	199,687	97.1
Failed	4,752	28.8	5,904	2.9
Promoted in Grades 6-8				
Promoted	17,909	90.7	208,962	96.9
Retained	1,847	9.4	6,674	3.1
Passed English exit-level test				
Passed	10,367	85.9	174,053	98.6
Failed	1,697	14.1	2,537	1.4
Met criterion score on SAT[b]				
Met criterion score	29	0.7	26,806	25.5
Did not meet criterion score	4,413	99.4	78,396	74.5
Met criterion score on ACT[c]				
Met criterion score	22	0.7	19,265	28.8
Did not meet criterion score	3,046	99.3	47,740	71.3
Promoted in Grades 9-12				
Promoted	11,304	66.7	170,276	86.2
Retained	5,646	33.3	27,232	13.8
Did not drop out in Grades 9-12				
Did not drop out	14,391	88.8	191,041	96.4
Dropped out	1,818	11.2	7,207	3.6
Graduated from high school on time				
Graduated	12,969	80.0	182,999	92.3
Did not graduate	3,240	20.0	15,249	7.7
Enrolled in two-year college				
Enrolled	4,607	28.4	63,054	31.8
Did not enroll	11,602	71.6	135,194	68.2
Enrolled in four-year college				
Enrolled	1,112	6.9	52,323	26.4
Did not enroll	15,097	93.1	145,925	73.6

Source. ACT, Inc., College Board, National Student Clearinghouse, Texas Education Agency, and Texas Higher Education Coordinating Board.

Note. Parts may not add to 100 percent because of rounding. Results include only the first TAKS test administration in a given school year.

[a]For the 2003 cohort, Student Success Initiative requirements were in effect for Grade 3. [b]The criterion for the SAT was a combined score of 1110 or higher on the critical reading and mathematics sections of the exam. [c]The criterion for the ACT was a composite score of 24 or higher.

continues

Table 2 (continued)
Future Academic Outcome Performance Based on Grade 3 TAKS Reading Performance, 2003 Cohort

	Failed Grade 3 TAKS (*N* =32,741)		Passed Grade 3 TAKS (*N* =255,156)	
Outcome	Number	Percent	Number	Percent
Persisted into second year of college				
Persisted	3,776	23.3	92,672	46.8
Did not persist	12,433	76.7	105,576	53.3
Graduated from college with two-year degree				
Graduated	278	1.7	4,677	2.4
Did not graduate	15,916	98.3	193,249	97.6
Graduated from college with four-year degree				
Graduated	212	1.3	22,277	11.5
Did not graduate	15,690	98.7	171,037	88.5

Source. ACT, Inc., College Board, National Student Clearinghouse, Texas Education Agency, and Texas Higher Education Coordinating Board.

Note. Parts may not add to 100 percent because of rounding. Results include only the first TAKS test administration in a given school year.

[a]For the 2003 cohort, Student Success Initiative requirements were in effect for Grade 3. [b]The criterion for the SAT was a combined score of 1110 or higher on the critical reading and mathematics sections of the exam. [c]The criterion for the ACT was a composite score of 24 or higher.

2008 Cohort

Students in the 2008 cohort took the Grade 3 TAKS Reading test in the 2007-08 school year. Short- and long-term outcomes were examined for these students through their expected high school graduation in 2016-17. Results for the 2008 cohort were similar to those for the 2003 cohort – across all outcomes examined, students who passed the Grade 3 TAKS Reading test were more successful than students who failed. For example, students who passed the test were significantly more likely to meet criterion scores on the SAT and on the ACT and to graduate from high school on time and significantly less likely to be retained or drop out in Grades 9-12 (Table 3 on page 14). Among these high school outcomes, effect sizes were largest for meeting criterion scores on the ACT and on the SAT. Of the students who passed the Grade 3 TAKS Reading test, 22.5 percent met the criterion score on the SAT, compared with less than 1 percent of students who failed the Grade 3 test. Results were similar for the ACT. Of the students who passed the Grade 3 TAKS Reading test, 28.1 percent met the criterion score on the ACT, compared with less than 1 percent of students who failed the Grade 3 test (Table 4 on page 15).

The 2008 cohort is the only cohort that included both TAKS and STAAR outcomes. Students who took the Grade 3 TAKS Reading test in 2007-08 took the Grade 8 STAAR Reading test in 2012-13 and the English I EOC test in 2013-14. As shown in Table 3 on page 14, students who passed the TAKS Reading test in Grade 3 were significantly more likely to pass the STAAR Reading test in Grade 8 and the English I EOC test in Grade 9 than students who failed the Grade 3 test. Ninety percent of students who passed the Grade 3 TAKS Reading test subsequently passed the Grade 8 STAAR Reading test, whereas 48.7 percent of students who failed the Grade 3 test subsequently passed the Grade 8 STAAR Reading test. Similarly, 79.5 percent of Grade 3 TAKS passers subsequently passed the English I EOC test, whereas 35.3 percent of students who failed the Grade 3 TAKS test subsequently passed the English I EOC test.

Table 3
Logistic Regression Analyses Predicting Future Academic Outcomes From Grade 3 TAKS Reading Performance, 2008 Cohort

Outcome	B	SE(B)	Wald	Df	p	OR	95% CI
Passing Grade 5 TAKS Reading	2.52	.01	32,486.29	1	<.001	12.42	12.08-12.77
Being promoted in Grades 3-5[a]	2.82	.02	23,719.66	1	<.001	16.70	16.11-17.31
Passing Grade 8 STAAR Reading	2.26	.01	23,854.42	1	<.001	9.54	9.27-9.82
Being promoted in Grades 6-8	1.16	.03	1,701.38	1	<.001	3.19	3.02-3.37
Passing English I end-of-course test	1.97	.01	20,033.17	1	<.001	7.14	6.95-7.34
Meeting criterion score on SAT[b]	3.62	.12	971.38	1	<.001	37.27	29.68-46.79
Meeting criterion score on ACT[c]	3.73	.14	727.86	1	<.001	41.60	31.73-54.54
Being promoted in Grades 9-12	1.13	.02	5,586.72	1	<.001	3.10	3.01-3.19
Not dropping out in Grades 9-12	1.11	.02	2,261.97	1	<.001	3.05	2.91-3.19
Graduating from high school on time	1.09	.02	3,421.91	1	<.001	2.96	2.86-3.07

Source. ACT, Inc., College Board, and Texas Education Agency.

Note. Results include only the first TAKS/STAAR test administration in a given school year. All results statistically significant at the $p < .001$ level.

[a]For the 2008 cohort, Student Success Initiative requirements were in effect for Grade 3. [b]The criterion for the SAT was a combined score of 1180 or higher on the critical reading and mathematics sections of the exam. [c]The criterion for the ACT was a composite score of 24 or higher.

Table 4
Future Academic Outcome Performance Based on Grade 3 TAKS Reading Performance, 2008 Cohort

	Failed Grade 3 TAKS (*N* =43,215)		Passed Grade 3 TAKS (*N* =296,474)	
Outcome	Number	Percent	Number	Percent
Passed Grade 5 TAKS Reading				
Passed	11,300	42.4	243,757	90.2
Failed	15,333	57.6	26,629	9.9
Promoted in Grades 3-5[a]				
Promoted	29,870	75.6	267,578	98.1
Retained	9,645	24.4	5,173	1.9
Passed Grade 8 STAAR Reading				
Passed	11,585	48.7	222,325	90.0
Failed	12,225	51.3	24,589	10.0
Promoted in Grades 6-8				
Promoted	27,766	93.9	254,345	98.0
Retained	1,795	6.1	5,154	2.0
Passed English I end-of-course test				
Passed	9,240	35.3	190,426	79.5
Failed	16,968	64.7	48,982	20.5
Met criterion score on SAT[b]				
Met criterion score	75	0.8	32,342	22.5
Did not meet criterion score	9,634	99.2	111,479	77.5
Met criterion score on ACT[c]				
Met criterion score	53	0.9	27,509	28.1
Did not meet criterion score	5,655	99.1	70,559	72.0
Promoted in Grades 9-12				
Promoted	18,376	71.1	211,942	88.4
Retained	7,469	28.9	27,801	11.6
Did not drop out in Grades 9-12				
Did not drop out	22,851	89.8	233,848	96.4
Dropped out	2,591	10.2	8,701	3.6
Graduated from high school on time				
Graduated	21,087	82.9	226,743	93.5
Did not graduate	4,355	17.1	15,806	6.5

Source. ACT, Inc., College Board, and Texas Education Agency.

Note. Parts may not add to 100 percent because of rounding. Results include only the first TAKS/STAAR test administration in a given school year.

[a]For the 2008 cohort, Student Success Initiative requirements were in effect for Grade 3. [b]The criterion for the SAT was a combined score of 1180 or higher on the critical reading and mathematics sections of the exam. [c]The criterion for the ACT was a composite score of 24 or higher.

2012 Cohort

Students in the 2012 cohort took the Grade 3 STAAR Reading test in the 2011-12 school year. Short- and long-term outcomes were examined for these students through their expected completion of the English I EOC test in 2017-18. Results for STAAR test takers were similar to those for TAKS test takers – students who passed the Grade 3 STAAR Reading test were more successful on all subsequent academic outcome measures than students who failed. Students who passed the Grade 3 STAAR Reading test were significantly more likely to be promoted in Grades 6-8 and pass the Grade 8 STAAR Reading test and the English I EOC test. Among these middle school and early high school outcomes, the effect size was largest for passing the Grade 8 STAAR Reading test (Table 5 on page 17). Over 89 percent of students who passed the Grade 3 test passed the Grade 8 test, compared with 44.2 percent of students who failed the Grade 3 test (Table 6 on page 18).

Table 5
Logistic Regression Analyses Predicting Future Academic Outcomes From Grade 3 STAAR Reading Performance, 2012 Cohort

Outcome	B	SE(B)	Wald	Df	p	OR	95% CI
Passing Grade 5 STAAR Reading	2.73	.01	71,276.56	1	<.001	15.37	15.07-15.68
Being promoted in Grades 3-5	2.49	.02	15,155.42	1	<.001	12.04	11.57-12.53
Passing Grade 8 STAAR Reading	2.41	.01	53,680.83	1	<.001	11.14	10.91-11.37
Being promoted in Grades 6-8	1.35	.03	2,191.64	1	<.001	3.87	3.66-4.10
Passing English I end-of-course test	2.29	.01	49,090.84	1	<.001	9.83	9.64-10.03

Source. Texas Education Agency.

Note. Results include only the first STAAR test administration in a given school year. All results statistically significant at the $p < .001$ level.

Table 6
Future Academic Outcome Performance Based on Grade 3 STAAR Reading Performance, 2012 Cohort

	Failed Grade 3 STAAR (*N* =90,043)		Passed Grade 3 STAAR (*N* =274,161)	
Outcome	Number	Percent	Number	Percent
Passed Grade 5 STAAR Reading				
Passed	23,611	34.3	223,560	88.9
Failed	45,285	65.7	27,893	11.1
Promoted in Grades 3-5				
Promoted	71,103	86.1	247,063	98.7
Retained	11,436	13.9	3,301	1.3
Passed Grade 8 STAAR Reading				
Passed	29,322	44.2	208,829	89.8
Failed	36,983	55.8	23,645	10.2
Promoted in Grades 6-8				
Promoted	65,944	96.3	234,629	99.0
Retained	2,557	3.7	2,350	1.0
Passed English I end-of-course test				
Passed	23,878	38.3	184,457	85.9
Failed	38,446	61.7	30,204	14.1

Source. Texas Education Agency.

Note. Parts may not add to 100 percent because of rounding. Results include only the first STAAR test administration in a given school year.

2015 Cohort

Students in the 2015 cohort took the Grade 3 STAAR Reading test in the 2014-15 school year. Short-term outcomes were examined for these students through their expected completion of the Grade 5 STAAR Reading test in 2016-17. Students who passed the Grade 3 STAAR Reading test in 2015, like students who passed Grade 3 Reading tests in all prior cohorts, were more successful on subsequent academic outcomes than students who failed the test. Students who passed the Grade 3 test were significantly more likely to pass the Grade 5 test and significantly more likely to be promoted in Grades 3-5. Effect sizes were large for both measures, but slightly larger for passing the Grade 5 STAAR Reading test (Table 7 on page 20). As shown in Table 8 on page 21, 85.7 percent of students who passed the Grade 3 test subsequently passed the Grade 5 test, whereas 27.2 percent of students who failed the Grade 3 test subsequently passed the Grade 5 test.

Table 7
Logistic Regression Analyses Predicting Future Academic Outcomes From Grade 3 STAAR Reading Performance, 2015 Cohort

Outcome	B	SE(B)	Wald	Df	p	OR	95% CI
Passing Grade 5 STAAR Reading	2.78	.01	85,768.25	1	<.001	16.08	15.78-16.38
Being promoted in Grades 3-5	2.36	.02	11,157.58	1	<.001	10.62	10.16-11.09

Source. Texas Education Agency.

Note. Results include only the first STAAR test administration in a given school year. All results statistically significant at the $p < .001$ level.

Table 8
Future Academic Outcome Performance Based on Grade 3 STAAR Reading Performance, 2015 Cohort

	Failed Grade 3 STAAR (*N* =100,466)		Passed Grade 3 STAAR (*N* =290,373)	
Outcome	Number	Percent	Number	Percent
Passed Grade 5 STAAR Reading				
Passed	23,036	27.2	230,694	85.7
Failed	61,754	72.8	38,466	14.3
Promoted in Grades 3-5				
Promoted	83,461	90.3	264,519	99.0
Retained	8,978	9.7	2,681	1.0

Source. Texas Education Agency.

Note. Parts may not add to 100 percent because of rounding. Results include only the first STAAR test administration in a given school year.

2016 Cohort

Students in the 2016 cohort took the Grade 3 STAAR Reading test in the 2015-16 school year and the Grade 5 STAAR Reading test in 2017-18. As with all prior cohorts, students who passed the Grade 3 test were significantly more likely to pass the Grade 5 test (Table 9 on page 23). A total of 92.5 percent of students who passed the Grade 3 STAAR Reading test subsequently passed the Grade 5 STAAR Reading test (Table 10 on page 24). Among students who failed the Grade 3 test, 40.0 percent passed the Grade 5 test.

Table 9
Logistic Regression Analyses Predicting Future Academic Outcomes From Grade 3 STAAR Reading Performance, 2016 Cohort

Outcome	B	SE(B)	Wald	Df	p	OR	95% CI
Passing Grade 5 STAAR Reading	2.91	.01	88,550.63	1	<.001	18.44	18.09-18.80

Source. Texas Education Agency.

Note. Results include only the first STAAR test administration in a given school year. All results statistically significant at the $p < .001$ level.

Table 10
Future Academic Outcome Performance Based on Grade 3 STAAR Reading Performance, 2016 Cohort

	Failed Grade 3 STAAR (*N* =113,815)		Passed Grade 3 STAAR (*N* =289,190)	
Passed Grade 5 STAAR Reading	Number	Percent	Number	Percent
Passed	39,297	40.0	248,433	92.5
Failed	58,938	60.0	20,204	7.5

Source. Texas Education Agency.

Note. Parts may not add to 100 percent because of rounding. Results include only the first STAAR test administration in a given school year.

Discussion

Overview

Across all cohorts and every outcome examined, passing the Grade 3 Texas Assessment of Knowledge and Skills (TAKS) or State of Texas Assessments of Academic Readiness (STAAR) Reading test was a statistically significant predictor of future academic success, providing evidence of external validity for the tests. In other words, the Grade 3 Reading tests measured student achievement in a way that predicted student achievement across a variety of academic outcomes that were not directly related to the tests. This replicates the findings of several previous studies that support the external validity of TAKS and STAAR tests.

For example, the Texas Education Agency (TEA) previously examined the relationship between TAKS and SAT/ACT performance to determine whether TAKS could be used to predict college readiness (Miller, Twing, & Meyers, 2008; Twing, Miller, & Meyers, 2008). The authors found that TAKS performance was strongly correlated with meeting SAT/ACT college readiness performance benchmarks and used the results of the studies to develop college readiness benchmarks on Grade 11 TAKS Mathematics and English Language Arts tests. Another study found evidence of predictive, concurrent, discriminant, convergent, and construct validity of the Grade 3 and Grade 4 TAKS tests, including finding correlations between Grade 3 TAKS performance and subsequent performance on Grade 4 TAKS as well as teacher reported end-of-year numerical grades in reading and mathematics (Burk, Johnson, & Whitley, 2005). A follow-up study on the Spanish-version TAKS found evidence of predictive and concurrent validity for the Grade 3 and Grade 4 tests, including also finding that Grade 3 TAKS performance was correlated with end-of-year teacher reported numerical grades in reading and mathematics (Reyes & Johnson, 2010).

In addition, STAAR end-of-course (EOC) college readiness performance standards were established using an approach that incorporated multiple external validity studies that are available on the TEA website (TEA, n.d.). Strong correlations between performance on STAAR EOC tests and assessments of college readiness, such as ACT, SAT, ACCUPLACER, and the Texas Higher Education Assessment (THEA), were used to set STAAR EOC college readiness standards. Those performance standards were then used to vertically align all STAAR English and Mathematics tests, from the top down, starting with English III and Algebra II standards and proceeding down through the middle and elementary school tests. By design, then, passing standards for elementary and middle school STAAR tests are associated with passing standards for STAAR EOC tests, which, in turn, are associated with standards for assessments of college readiness.

In summary, there is substantial evidence that TAKS and STAAR measures of student achievement are highly correlated with, and predictive of, future academic success, and this study supports these previous findings.

Limitations

The results of this study suggest that students who perform well on the Grade 3 TAKS or STAAR Reading test continue to perform comparatively well on future academic outcomes and, conversely, students who perform poorly on the Grade 3 Reading tests continue to perform comparatively poorly on future academic outcomes. Important questions about who failed the TAKS and STAAR tests, why they failed, and factors that affected their future performance were outside of the scope of this study and were not addressed. Furthermore, there are limitations to the study that are important to consider when interpreting the results.

As with most studies, the results of this study are based on the populations of Grade 3 TAKS and STAAR Reading test takers, and the results should be interpreted as average effects. It is important to remember that some students who failed the Grade 3 TAKS Reading test later went on to enroll in college after graduating from high school, and some students who passed the Grade 3 TAKS Reading test later dropped out of high school. In addition, the effects of variables known to be correlated with academic outcomes, such as English language proficiency and economic disadvantage, were not examined. Examining such factors could shed light on why students who perform well in Grade 3 tend to continue to perform well, and students who perform poorly in Grade 3 tend to continue to perform poorly. However, these questions were beyond the scope of the current study.

As discussed in the "Cohorts" section of this report, on page 2, a student for whom data were missing for a specified future academic outcome in the grade and year expected for the student's cohort was excluded from the analyses for that outcome, and students with missing data were assumed to be randomly distributed. Missing data that are not randomly distributed can introduce bias into a study's results. For example, students who failed the Grade 3 Reading test may have been more likely than students who passed the test to have missing data and be excluded from the later analyses (e.g., because of retention). That scenario introduces the possibility of bias, because it is unknown how those students performed on future academic outcomes.

Additionally, because STAAR was not administered until the 2011-12 school year, this study was limited to investigating long-term outcomes (e.g., high school and college) for students who took the Grade 3 TAKS Reading test. Therefore, the effects of passing the Grade 3 STAAR Reading test on long-term academic outcomes remains unknown. While it is important to keep this distinction in mind, it is reasonable to assume that, given the STAAR standard-setting procedures described in the “Discussion” section of this report, on page 25, passing the Grade 3 STAAR Reading test will be associated with high school and college success in the future.

Conclusion

In conclusion, the results of this study provide evidence of external validity for TAKS and STAAR tests by showing that students who performed well on the Grade 3 TAKS or STAAR Reading test performed better on short- and long-term future outcomes than students who performed poorly on the tests. While this study provides additional evidence of external validity for the TAKS

and STAAR tests, exploring factors that affect student success in Grade 3 and future academic success would seem to merit further investigation.

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Document No. GE20 601 04
December 2019