AMERICAN INSTITUTES FOR RESEARCH®

2013–14 Growth Model for Educator Evaluation

Technical Report

Prepared for the New York State Education Department

January 2015

2013–14 Growth Model for Educator Evaluation: Technical Report

January 2015

Prepared for the New York State Education Department

AMERICAN INSTITUTES FOR RESEARCH®

1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000 | TTY 877.334.3499

www.air.org

4058_12/14

Contents

Page

List of Figures

Page

List of Tables

Page

Introduction

As required by Education Law §3012-c, New York State teachers of mathematics and English Language Arts (ELA) in Grades 4–8 and their principals first received growth scores based on 2011–12 state tests. This document describes the models used to measure student growth for the purpose of educator evaluation in New York State for the 2013–14 school year. In 2013–14, growth models were implemented for teacher and principal evaluation in Grades 4–8 ELA and mathematics and for principals of Grades 9–12 (all grades). All models are based on assessing each student's change in performance between 2012–13 and prior years and 2013–14 on state assessments compared to students with similar characteristics.

New York Education Law §3012-c requires performance evaluations for classroom teachers and building principals in New York State. Under the law, New York State is required to differentiate teacher and principal effectiveness using four rating categories: Highly Effective, Effective, Developing, and Ineffective (HEDI). Education Law §3012-c(2)(a) requires Annual Professional Performance Reviews (APPRs) resulting in a single composite teacher or principal effectiveness score that incorporates multiple measures of effectiveness. Education Law §3012-c(1) requires the results of the evaluations to be a significant factor in employment decisions, including but not limited to promotion, retention, tenure determinations, termination, and supplemental compensation. The law also provides that the results be a significant factor in teacher and principal professional development (including but not limited to coaching, induction support, and differentiated professional development).

State-provided growth scores are just **one** of the **several** measures that make up the annual professional performance reviews and count for 20 percent of an evaluation score for the 2013–14 school year. For teachers with fewer than 50 percent of students who take state assessments in Grades 4–8 in ELA or mathematics, other comparable measures of student learning growth must be used for the state growth subcomponent, using the student learning objective (SLO) process established in state-provided guidance. Another 20 percent of educators' evaluations are based on locally selected measures of student achievement that are rigorous and comparable across classrooms in accordance with standards prescribed by the commissioner. The remaining 60 percent is based on multiple measures of educator effectiveness consistent with standards prescribed by the commissioner in regulation. This 60 percent includes the extent to which the educator demonstrates proficiency in meeting New York State's teaching or leadership standards.

The Regents Task Force on Teacher and Principal Effectiveness, made up of representatives from key stakeholder groups, including educators, educator unions, educator professional organizations, and other interested parties, has given input into the development of APPR regulations and the design of the state-provided growth scores. In addition, a technical advisory committee of leading experts in the nation has reviewed the technical accuracy and utility of the statistical methodology used to calculate scores. A list of technical advisory committee members is provided in Appendix A.

Content and Organization of This Report

Results presented in this report are based on 2013–14 and prior school years' data, with some comparisons to prior-year results. Technical reports describing models and full results from 2012–13 and 2011–12 can be found at the EngageNY website at https://www.engageny.org/resource/resources-about-state-growth-measures. The 2010–11 Beta Growth Model technical report, published in August 2012 (also available online at http://usny.nysed.gov/rttt/docs/nysed-2011-beta-growth-tech-report.pdf) describes the initial models that were constructed with 2010–11 and prior school years' data to design an initial model with stakeholder input. The 2010–11 results were not used for evaluation purposes.

This technical report contains four main sections:

1. **Data:** Description of the data used to implement the student growth model, including data processing rules and relevant issues that arose during processing;
2. **Model:** Statistical description of the model.
3. **Reporting:** Description of reporting metrics and computation of effectiveness scores.
4. **Results:** Overview of key model results aimed at providing information on model quality and characteristics.

Data

To measure student growth and to attribute that growth to educators, at least two sources of data are required: student test scores that can be observed over time and information describing how students are linked to schools, teachers, and courses (i.e., identifying which teachers teach which students for which tested subjects and which school[s] those students attended). In addition, New York State models also use other information about students and schools, such as student demographics.

The following sections describe the data used for model estimation in New York in more detail, including some of the issues and challenges that arose and how they were handled.

Test Scores

New York's student growth models drew on test score data from statewide testing programs in Grades 3–8 in ELA and mathematics for the growth models for teachers, schools, and principals of students in Grades 4–8 and on Regents Exam scores for schools and principals of students in Grades 9–12. In Grades 4–8, models are estimated separately by grade and subject using scores from each grade (e.g., Grade 5 mathematics) as the outcome, with predictors as described in the following section. Scores from the state's test of English language proficiency (New York State English as a Second Language Achievement Test or NYSESLAT) also are used as predictors in the growth models. These data are described further in the section that follows on English language learner (ELL) variables.

State Tests in ELA and Mathematics (Grades 3–8)

The New York State tests at the elementary and middle school grade levels measure a range of knowledge and skills in mathematics and ELA. State tests in ELA and mathematics at Grades 3–8 are given in the spring. The 2013-14 school year was the second school year the state tests were designed to measure the Common Core State Standards.

The New York growth models use test scores in each subject area as a predictor for that subject area (e.g., mathematics scores are used to predict mathematics scores). In addition, the other subject's scores are used because they reflect the general achievement of the students prior to the outcome year (e.g., ELA scores are used in mathematics models and vice versa).

Specifically, New York's growth models include three prior test scores in the same subject area and one prior test score in the other subject. If the immediate prior-year test score in the same subject was missing from the immediate prior grade, the student was not included in the growth measures for that subject. For example, students without a prior-year test score or with a prior-year test score for the same grade as the current year test score did not have growth scores computed for them.

For the other prior scores, missing data indicators were used. These missing indicator variables allow the model to include students who do not have the maximum possible test history and mean that the model results measure outcomes for students with and without the maximum possible assessment history. This approach was taken in order to include as many students as

possible. For the 2013–14 analyses, data from 2013–14 were used as outcomes, with prior achievement predictors coming from the three years before (going back to 2010–11). Specific tests used as predictors vary by grade and subject and are as follows:

- Grade 4 ELA and mathematics models used scores from Grade 3 in ELA and mathematics. Students were NOT included if they lacked Grade 3 scores in the same subject.
- Grade 5 ELA and mathematics models used scores from Grades 3 and 4 in ELA and mathematics. Students were NOT included if they lacked Grade 4 scores in the same subject.
- Grades 6–8 ELA and mathematics models used scores from Grades 3–7 in ELA and mathematics. Students were NOT included if they lacked the immediate prior-year score in the same subject (e.g., Grade 6 students must have had a Grade 5 score in the same subject from 2012–13).

In addition to test scores, the New York growth models also used the conditional standard errors of those test scores. All assessments contain some amount of measurement error, and the New York growth models account for this error (as described in more detail in the Model section of this report). Conditional standard errors were obtained from published technical reports for the assessments' prior-year test scores and a similar table was provided by the state's test vendor for 2013–14 test scores.

Regents Exams

One growth measure for Grades 9–12 schools and principals is the calculation of a mean growth percentile (MGP) based on student growth on the Integrated Algebra, Algebra 1 Common Core, ELA Common Core, or Comprehensive ELA Regents Exams compared with those of similar students. These Regents Exams are the most commonly taken exams in high school.

Because Regents Exams are offered multiple times each year and students take Regents Exams at different points in their schooling, in 2013–14, the Grades 9–12 New York MGP models included students and test scores using the following rules:

- Students who take Algebra or ELA Regents Exams prior to high school are NOT included in the MGP of a school or principal of Grades 9–12.
- Regents Exam scores from the following administrations were counted: August of the prior year (except for Grade 9 students) and January and June of the current year.
- Student scores were used until the students passed. (After students pass, we do not want to incentivize additional, unnecessary test taking.)
- If a student took a Regents Exam more than once during the school year, the higher test score was used until that student received a passing score. If a student took both versions of a Regents Exam (e.g., Algebra I Common Core and Integrated Algebra), two student growth percentiles (SGPs) were computed and the higher SGP was used for educator growth measures.

- Students were included for up to eight years after first entering Grade 9, in order to give credit to schools and principals that keep students beyond four years in high school to complete graduation requirements.

Another growth measure for Grades 9–12 schools and principals is the Comparative Growth in Regents Exams Passed model (GRE model). Because a major graduation requirement is for students to pass five Regents Exams (more for advanced Regents diplomas), this measure compares how much progress a school's students are making from one year to the next toward passing up to eight Regents Exams (the five required Regents Exams plus up to three more). A school or principal's score on this measure reflects whether or not students exceeded the average change in number of Regents Exams passed each year by similar students statewide. Major reasons for not including students in a Grades 9–12 school's GRE measure include lack of Grades 7 or 8 State test scores and having already passed the maximum number of Regents Exams used in this measure.

As noted, Regents Exams are offered multiple times each year, and students take Regents Exams at different points in their schooling. In 2013–14, the GRE model included students and test scores using the following rules:

- Regents Exam scores from the following administrations were counted: August of prior year and January and June of current year.
- Student scores were used until they passed. (After students pass, we do not want to incentivize additional, unnecessary test taking.)
- If a student took a Regents Exam more than once during the year, we used the higher test score until that student received a passing score.
- Five required Regents Exams, and no more than three additional exams, were counted. The scores for students who exceeded eight Regents Exams passed were NOT included in a school or principal's results.
- Students must have had a valid prior score from Grade 7 or 8 ELA or mathematics.
- The state's modified passing score rules for students with disabilities were used to determine passing for these students.
- All students who met the minimum enrollment requirement (i.e., students who were enrolled on BEDS day and at the beginning of the June Regents administration) were included in determining a school's or principal's score whether or not they took a Regents Exam during the year.
- Students were included for up to eight years after first entering Grade 9, in order to acknowledge schools and principals that keep students beyond four years in high school to complete graduation requirements.
- Students who dropped out were counted in the school from which they dropped out until they would have reached their fourth year since entering Grade 9, starting with those who dropped out in the 2012–13 school year. Students who dropped out prior to the 2012–13 school year were not counted.

Demographics

The results of growth models are used to measure the effects of educators on student learning gains, taking into account a student's prior achievement; however, some factors outside of an educator's control may impact student learning gains. For example, different learning trajectories are often statistically related to students living in poverty, beyond what would be expected based only on the student's prior achievement.

For all growth measures used in New York State for educator evaluation, students are always compared to similar students in the state[1]—that is, in computing student-level growth, New York's growth models always assess a student's progress relative to students with a similar academic history and other defined characteristics. The rules of the Board of Regents provide that three specific types of characteristics (ELL status, students with disabilities status, and poverty status) be included in the growth models that produce scores used for educator evaluation.

Both student and course or school-level characteristics are included in growth measures used for educator evaluation for 2013–14. For instance, we account for whether a student is an English language learner (ELL), and we also account for the percentage of ELL students in a class or course (in Grades 4–8) or school (in Grades 9–12). This type of class- or school-level factor is intended to take peer effects into account, acknowledging that a student may have a different growth trajectory in a classroom, course, or school with many ELL students compared to one with few ELL students. Table 1 provides a complete list of the factors included in 2013–14. Additional descriptions of these variables follow Table 1.

Factors are the same for growth measures for teachers, schools, and principals of students in Grades 4–8 as for schools and principals of Grades 9–12, with a few additions for the high school context (e.g., Grades 9–12 models also account for the number of Regents Exams a student had already passed). The New York State Education Department (NYSED or "the Department") reports unadjusted growth scores that include only prior achievement as predictor variables and adjusted growth scores including the list of approved predictor variables shown in Table 1. Unadjusted scores are reported for informational purposes to educators and are used for school accountability in Grades 4–8. In this report, results are shown for the adjusted model and the terms "SGP" and "MGP" refer to adjusted versions of the measures (those that include all predictor variables) unless specifically identified as unadjusted.

[1] This "comparison" is done through a regression modeling approach; see the Model section of this report for more detail.

Table 1. Variables Included in the Adjusted Models[1]

Variable	Grades 4–8		Grades 9–12		
	ELA	Math-ematics	Regents ELA Common Core and Comprehensive ELA	Regents Integrated Algebra and Algebra 1 Common Core	Comparative Growth in Regents Exams Passed
Academic History Variables					
Prior-year ELA scale score (student level)[2]	✓	✓	✓	✓	✓
Two-year-prior ELA scale score if available (student level)[2]	✓		✓	✓	✓
Three-year-prior ELA scale score if available (student level)[2]	✓				
Prior-year mathematics scale score (student level)[2]	✓	✓	✓	✓	✓
Two-year-prior mathematics scale score if available (student level)[2]		✓	✓	✓	✓
Three-year-prior mathematics scale score if available (student level)[2]		✓			
Retained in grade (student level)	✓	✓			
Mean prior score (aggregate level)[2,3]	✓	✓	✓	✓	✓
Range around mean prior score (aggregate level)[3]	✓	✓			
New to school in non-articulation year (student level)[4]	✓	✓	✓	✓	✓
Number of years since entering ninth grade (student level)[5]			✓	✓	See note 5
Count of prior required Regents passed (student level)			✓	✓	✓
Students With Disabilities Variables					
Student with disability status (student level)	✓	✓	✓	✓	✓
Student with disability is in the general education classroom less than 40 percent of the time (student level)	✓	✓	✓	✓	✓
Percent of students with disabilities (aggregate level)[3]	✓	✓	✓	✓	✓

Variable	Grades 4–8		Grades 9–12		
	ELA	Math-ematics	Regents ELA Common Core and Comprehensive ELA	Regents Integrated Algebra and Algebra 1 Common Core	Comparative Growth in Regents Exams Passed
English Language Learner (ELL) Variables					
ELL status (student level)	✓	✓	✓	✓	✓
Percent ELL (aggregate level)[3]	✓	✓	✓	✓	✓
New York State English as a Second Language (NYSESLAT) scores (student level)[6]	✓	✓	✓	✓	✓
Economically Disadvantaged Variables					
Economically disadvantaged status (student level)	✓	✓	✓	✓	✓
Percent economically disadvantaged (aggregate level)[3]	✓	✓	✓	✓	✓

[1] Table 1 does not display missing variable indicators. See Appendix H for a complete list of predictor variables by grade and subject (including missing variable indicators) with model coefficients. Also, for Grades 9–12 models, "prior scores" are measured relative to the start of high school (Grade 9). Thus, "prior year" means Grade 8 and "two year prior" means Grade 7.

[2] For Grades 9–12 models, separate predictor variables are included for Common Core–aligned Grades 3–8 state assessments (2012–13) and previous versions (2011–12 and earlier). See Appendix H for a complete list of predictor variables by grade and subject (including missing variable indicators) with model coefficients.

[3] Aggregate-level variables are computed at the class/course level for Grades 4–8 and at the school level for Grades 9–12.

[4] For Grades 9–12 models, the articulation year is Grade 9. Students entering a school that serves Grades 9–12 in a year other than Grade 9 are considered "new to school."

[5] GRE models are estimated separately by cohort (based on number of years since entering Grade 9).

[6] Only scores from the Grade 7/8 form of the NYSESLAT are used in the Grades 9–12 models. Separate predictor variables are included for NYSESLAT scores from 2011–12 and earlier (when two separate scale scores for Listening/Speaking and Reading/Writing were used) and 2012–13 when a single scale score was used.

Academic History Variables

- **Prior Achievement Scores**
  - For Grades 4–8 growth measures, up to three years of prior achievement scores in the same subject were included (except for Grades 4 and 5, where fewer years of data were available). Students without scores from the immediate prior grade level in the immediate prior year were excluded from analysis. In addition, the immediate prior grade-level score in the other subject (for ELA models, the mathematics score; for mathematics models, the ELA score) was included if available.
  - For Grades 9–12 growth measures, scores from Grade 7 and Grade 8 assessments (if available) in ELA and mathematics were used as predictors. For the MGP measure, students must have had at least one score from Grade 7 or Grade 8 in the same subject (for Algebra Regents models, from the Grade 7 or Grade 8 mathematics test; for the ELA Regents models, from the Grade 7 or Grade 8 ELA test). For the Comparative Growth in Regents Exams Passed measure, to be included in analysis, students must have had at least one Grade 7 or Grade 8 score in either mathematics or ELA.
- **Retained in grade (Grades 4–8 growth measures only).** This variable is a yes or no variable that indicates whether a student was retained in grade in one of the two years preceding the most recent school year for students above Grade 4 (for example, if a student was in Grade 5, Grade 5 again, and then Grade 6). Because students must have an immediate prior score from the prior grade, students who were retained in grade between 2012–13 and 2013–14 were not included in the model (for example, students with data from Grade 6 in 2012–13 and Grade 6 in 2013–14). This variable was computed based on students' tested grade in the assessment score file.
- **Mean prior score.** This variable is intended to account for differences in learning environments that are made up of students with disparate levels of incoming achievement.
  - For Grades 4–8 growth measures, the average immediate prior same-subject achievement on the state test of all students attributed to a teacher in the current year was included in the model (for example, the average prior ELA achievement of all students in a teacher's class/course was included in ELA models.)
  - For Grades 9–12 growth measures, average Grade 8 achievement of the schools' students when they were in Grade 8 was included in each model. For the MGP measure, average Grade 8 achievement of the schools' students when they were in Grade 8 at the school level in the same subject (for Algebra Regents models, from the Grade 8 mathematics test; for the ELA Regents models, from the Grade 8 ELA test) was used. For the Comparative Growth in Regents Exams Passed measure, average Grade 8 achievement at the school level in mathematics and ELA was used. Note that separate mean prior variables were used for Common Core–aligned and prior versions of state assessments.
- **Range around mean prior score (Grades 4–8 growth measures only).** Classrooms or courses with the same average prior score may differ in the range of prior scores, and students may have different growth trajectories based on being in classrooms or courses with more widely varying prior scores than those with more closely bunched prior scores.

In other words, students' peers may affect students not only through their average ability but also through the diversity of ability levels in the classroom or course. This aggregate-level variable is an indicator of the magnitude of difference in prior achievement in a teacher's class or course, calculated as the interquartile range of prior test scores—that is, the distance between the 25th and the 75th percentile of prior performance in the class or course. This variable was calculated using prior achievement scores in the same subject in a teacher's class or course. For example, for ELA models, the interquartile range of prior scores in ELA in a teacher's class or course was used in the models.

- **New to school in non-articulation year.** This student-level variable is intended to account for differences among students who enroll in a school at a different grade level than the typical entering year for most students. For example, a student enrolls as a seventh grader in a school that serves Grades 6–8 when most other students entered the school at Grade 6, or for students in a Grades 9–12 school, a student enters in a grade other than Grade 9. To compute this variable for Grades 4–8 models, a student's tested school and grade in 2013–14 was compared to his or her prior tested school and the range of grades served in the school. For Grades 9–12 models, enrollment data from 2012–13 and 2013–14 was compared.
- **Years since entering ninth grade (Grades 9–12 growth measures only).** This variable is intended to account for differences among students related to when they take Regents Exams, rather than using a student's grade level (because student grade assignment is affected by credit accumulation and Regents Exams are taken in many different grades). For example, a student who takes the Integrated Algebra Regents Exams in his third year after entering grade nine has a different academic history than a student who takes the exam in his first year as a ninth grader. This variable is used as an alternative to the "retained in grade" variable used in Grades 4–8 analysis as a way to compare students with similar kinds of academic histories. To compute this variable, the Grade 9 entry date provided on an enrollment file was used.
- **Count of prior required Regents Exams (Grades 9–12 measures only).** This variable captures the number of Regents Exams in the five required subject areas that students have passed before the current year (in this case, 2013–14) for Grades 9–12 MGP models. To compute this variable, we reviewed Regents assessment score files back to 2005–06.

Students With Disabilities Variables

- **Student with disability status.** A yes or no variable is used for each student to indicate the student has an individualized education program (IEP). This variable was derived directly from the assessment score file, representing data that districts reported to the state.
- **Student with disability spending less than 40 percent time in general education settings.** This variable is intended to account for differences among special education students in terms of the intensity or type of services received. According to Individuals with Disabilities Education Act (IDEA) requirements, students should be enrolled in the "least restrictive environment" appropriate for their learning needs. This variable identifies students who spend less than 40 percent of their time in a general education

setting (who may have a disability requiring more specialized or intensive services). This variable was derived directly from the assessment score file, representing data that districts reported to the state.

- **Percent of students with disabilities.** This variable is intended to account for differences in the learning environment for courses or schools serving different proportions of special education students. The variable was defined as the percentage of students identified as having a disability in the class or course for Grades 4–8 growth measures and percentage of students identified as having a disability in the school for Grades 9–12 measures.

English Language Learner (ELL) Variables

- **ELL status.** This variable is a yes or no variable for each student to indicate whether he or she is an ELL student. This variable was derived directly from the assessment score file, representing data that districts reported to the state.
- **NYSESLAT scores.** This variable is intended to account for differences in the English language proficiency of students identified as ELLs by controlling directly for their prior-year NYSESLAT scores. For Grades 9–12 models, NYSESLAT scores from Grade 7/8 forms were used, and separate predictor variables were included for NYSESLAT scores from 2011–12 and earlier (when two separate scale scores for Listening/Speaking and Reading/Writing were used) and 2012–13 (when there was a single scale score). For Grades 4–8 models, NYSESLAT scores from the immediate prior year (in this case, 2012–13 single scale scores) were used.
- **Percent of ELL students.** This variable is intended to account for differences in the learning environment for courses or schools serving diverse proportions of ELL students. The variable was defined as the percentage of students identified as ELL in the class or course for Grades 4–8 growth measures and percent of students identified as ELL in the school for Grades 9–12 measures.

Economic Disadvantage Variables

- **Economic disadvantage (poverty).** A yes or no variable for each student indicates whether the student is identified as economically disadvantaged based on eligibility for a variety of state economic assistance programs. This flag was set to *yes* for students whose families participate in economic assistance programs, such as the free or reduced-priced lunch programs, Social Security Insurance, food stamps, foster care, refugee assistance, earned income tax credit, the Home Energy Assistance Program, Safety Net Assistance, the Bureau of Indian Affairs, or Temporary Assistance for Needy Families, based on district-provided information. This variable was derived directly from the assessment score file, representing data that districts reported to the state.
- **Percent of economically disadvantaged students.** This variable is intended to account for differences in the learning environment for courses or schools serving diverse proportions of economically disadvantaged students. The variable was defined as the percentage of students identified as economically disadvantaged in the class or course for Grades 4–8 growth measures and percent of students identified as economically disadvantaged in the school for Grades 9–12 measures.

Attribution Data and Weighting of Student Growth for Educators

Student-level growth scores are attributed to educators based on records of educational links between the educators and the students. Several different data sources and procedures are used to link students to teachers and principals of Grades 4–8 and 9–12 and to determine the weighting of each student's score for teachers, as described in the sections that follow.

Attributing Students to Teachers of Grades 4–8

A critical element of growth analyses is the accurate identification of the courses students are taking in which they learn the content and skills covered on the tests used to measure their learning. Another critical element is identifying who is teaching those courses.

A first step is to identify which courses are considered "relevant"—that is, courses in which instruction is provided that is aligned to the test being used to measure student growth. New York has developed a common set of course codes across the state, and these were used to identify courses as "relevant" for analysis. Appendix C provides a list of the item descriptions used in analysis.

Students enrolled in relevant courses were attributed to the teacher(s) who was identified as a teacher of record for that course. Teachers' scores may reflect multiple classrooms of students in the same content area. For example, a Grade 7 mathematics teacher might provide instruction for several sections of Grade 7 mathematics.

Students who were enrolled for less than 60 percent of a course's duration were not included in a teacher's MGP. Students with course enrollment of 60 percent or more were included in a teacher's MGP, and their SGPs were weighted based on the percentage of time the students were enrolled in and attended the course. SGPs for students who were in a teacher's course for longer periods of time and who attended the class/course more regularly counted more heavily in a teacher's MGP than those who were enrolled and attended for less time.

A teacher received a single HEDI rating for each district in which he or she had a sufficient number of student scores (i.e., teachers who may work across schools within a district received one rating). For this purpose, New York City is treated as a single district.

Table 2 shows the attribution of students with at least two years of valid same-subject test results. Note that students can have test scores in both ELA and mathematics, so the count of students with valid test data does not represent unique students, but rather student test scores. Note also that the attribution rate is not expected to be 100 percent because students may move within and across schools and teacher assignments may also change. Appendix B provides an overview of data processing for Grades 4–8 models and Appendix F provides an overview of processing for Grades 9–12 models.

Table 2. Grades 4–8 Teacher-Student Attribution Rates

Grade	Valid Student Records	Valid Student Records Attributed to at Least One Teacher	Attribution Rate
4	362,124	334,449	92%
5	364,861	335,310	92%
6	354,805	323,122	91%
7	356,610	325,221	91%
8	320,529	293,005	91%
Total	1,758,929	1,611,107	92%

Note: Student records are considered valid for the purposes of growth modeling when there are at least two consecutive years of valid assessment scores. Students can have as many as two valid records per year, one for ELA and one for mathematics.

Overall, in 2013–14, 92 percent of valid test scores were linked to at least one teacher. In 2012–13, the overall attribution rate was 93 percent.

School Attribution in Grades 4–8

Students were attributed to schools and districts based on a continuous enrollment indicator found in the assessment score files. This variable describes whether or not a student was enrolled at the start and end of the year in a school or district (on BEDS day and at the beginning of the State test administration in the spring). Students who met this criterion were included in school-level MGPs. The same continuous enrollment indicator is used for institutional accountability purposes. Note that student results were not weighted by attendance in determining a school MGP and growth score. The policy rationale for not using attendance weighting for schools (although it is used for teachers) is that school leaders may have more influence on student attendance, and on the integrity of attendance data, than do teachers.

As a result of the difference in data sources and indicators used to attribute students to teachers and schools, students can be linked to a school but not a teacher, and in rare cases, vice versa. Table 3 shows attribution rates for schools.

Table 3. Grades 4–8 School-Student Attribution Rates

Grade	Valid Student Records	Valid Student Records Attributed to at Least One School	Attribution Rate
4	362,124	353,229	98%
5	364,861	356,260	98%
6	354,805	346,744	98%
7	356,610	348,852	98%
8	320,529	313,770	98%
Total	1,758,929	1,718,855	98%

Note: Student records are considered valid for the purposes of growth modeling when there are at least two consecutive years of valid assessment scores. Students can have as many as two valid records per year, one for ELA and one for mathematics.

The attribution rate at the school level (98 percent) was the same in 2012–13 and 2013–14 (and in both years was higher than the student-teacher attribution rate).

Principal Attribution in Grades 4–8

New York's growth models make use of district-reported staff assignment data in growth model reporting. The use of this staff assignment data allows results to be reported for individual principals for the grade levels to which they are assigned or across multiple schools for which a principal was responsible. Students were attributed to principals based on the school-level continuous enrollment indicator found in the assessment score files (see previous section for more information on this variable). Students at each grade level in a school who met the continuous enrollment requirement were attributed to a principal if that principal was assigned to that grade level in the staff assignment file. As with schools, note that student results were not weighted by attendance in determining a principal MGP.

Table 4 shows attribution rates for principals, which are somewhat lower than for schools.

Table 4. Grades 4–8 Principal-Student Attribution Rates

Grade	Valid Student Records	Valid Student Records Attributed to at Least One Principal	Attribution Rate
4	362,124	337,509	93%
5	364,861	338,691	93%
6	354,805	328,632	93%
7	356,610	333,393	93%
8	320,529	300,643	94%
Total	1,758,929	1,638,868	93%

Note: Student records are considered valid for the purposes of growth modeling when there are at least two consecutive years of valid assessment scores. Students can have as many as two valid records per year, one for ELA and one for mathematics.

Some teachers, schools, and principals represented in the data files have no students attributed to them. These data may reflect specialized instructional situations (e.g., teachers who provide additional services to students) or multiple principal assignments, for example. Table 5 shows the number of unique teachers, schools, and principals in the data files and the numbers with at least one student attributed to them. About twenty-six percent of teachers and six percent of schools are not associated with any students who meet the minimum enrollment duration requirements for growth model reporting.

Table 5. Number of Unique Grades 4–8 Teachers, Schools, and Principals With Attributed Students

	Number in Data Files	Number With at Least One Student Attributed	Attribution Rate
Teachers	58,743	43,274	74%
Schools	4,137	3,876	94%
Principals	5,014	3,580	71%

Attributing Students to Schools and Principals of Grades 9–12

Students in Grades 9–12 were linked to schools and principals based on a continuous enrollment indicator created from a school enrollment file. Using school entry and exit dates, the indicator describes whether or not a student was enrolled at the start and end of the year in a school or district (on BEDS day and at the beginning of June Regents Exam administration). Students who were enrolled at these two points in time in a given school were attributed to that school and to any principals assigned to all of Grades 9–12 at that school (based on the staff assignment file).These rules are similar to those used for schools and principals of Grades 4–8, although the sources of data used to implement the rule are somewhat different.[2] Note also that scores are reported only for schools serving all of Grades 9–12.

Table 6 shows school attribution rates for both the MGP and GRE models, and Table 7 shows attribution rates for principals. For the MGP models (based on ELA and Algebra Regents Exams), students are described as having valid data when they had a current year score, had at least one valid Grade 7 or 8 assessment in the same subject (mathematics for algebra and ELA for ELA), and had not passed that Regents Exam in a prior year.

For the GRE model, students are described as having valid data when they were enrolled at a school in Grades 9–12 for any amount of time and had at least one Grade 7 or 8 assessment in ELA or mathematics.

Table 6. Grades 9–12 School-Student Attribution Rates

Model	Valid Student Scores (ELA and Algebra) or Students (GRE)	Valid Student Scores (ELA and Algebra) or Students (GRE) Attributed to Schools	Attribution Rate
Comprehensive ELA	197,203	181,640	92%
Integrated Algebra	170,944	153,477	90%
ELA Common Core	38,739	37,051	96%
Algebra 1 Common Core	109,583	99,463	91%
GRE	750,580	645,578	86%

[2] For Grades 4–8, NYSED provided an indicator (the school_in flag) of student enrollment/attribution for schools. For Grades 9–12, AIR calculated a similar variable directly from enrollment data.

Table 7. Grades 9–12 Principal-Student Attribution Rates

Model	Valid Student Scores (ELA and Algebra) or Students (GRE)	Valid Student Scores (ELA and Algebra) or Students (GRE) Attributed to Schools	Attribution Rate
Comprehensive ELA	197,203	175,919	89%
Integrated Algebra	170,944	147,986	87%
ELA Common Core	38,739	36,284	94%
Algebra 1 Common Core	109,583	96,659	88%
GRE	750,580	621,178	83%

Some of the schools and principals represented in the data files had no students attributed to them (i.e., no students meet the minimum enrollment requirements). Table 8 shows the number of schools and principals in the source data files and the numbers with at least one student attributed to them. Note that for purposes of analysis, schools were defined as unique BEDS codes. In 2013–14, NYSED included BEDS codes for special programs (e.g., out-of-district placements) in source data files. The relatively large number of schools (nearly half of schools) with no students attributed is due to the addition of these BEDS codes.

Table 8. Number of Grades 9–12 Schools and Principals With Attributed Students

	Number in Incoming Files	Number With at Least One Student Attributed	Attribution Rate
Principals	1,514	1,327	88%
Schools	4,383	2,082	48%

Note: For analysis purposes, schools are defined as unique BEDS codes. In 2013–14, NYSED included BEDS codes for special programs (e.g., out-of-district placements) in source data files, increasing the number of entities identified as schools compared with previous years. When special programs are excluded, there are 2,273 schools on the incoming file, and 1,139 (50 percent) of those are reported.

Model

Two different types of models were used to produce growth measures in New York State. The first is the MGP model, which was implemented for Grades 4–8 using State assessments in ELA and mathematics and for Grades 9–12 using Regents Exams in ELA and Algebra. To produce scores describing how well students are progressing toward passing Regents Exams, a second model was implemented for Grades 9–12. This model is referred to as the *Comparative Growth in Regents Exams Passed* (*Growth in Regents Exam* or *GRE model*). These two models are described in detail in the sections that follow.

MGP Model

This section describes the statistical model used to measure student growth in New York between two points in time on a single subject of a State assessment. The section begins with a description of the statistical model used to form the comparison point against which students are measured—based on similar students—and follow with a description of how SGPs are derived from the comparison point. In addition, this section describes how MGPs and all variance estimates are produced.

At the core of the New York growth model is the production of an SGP. This statistic characterizes the student's current year score relative to other students with similar prior test score histories. For example, an SGP equal to 75 denotes that the student's current year score is the same as or better than 75 percent of the students in the data with prior test score histories and other measured characteristics that are similar. It does *not* mean that the student's growth is better than that of 75 percent of all other students in the population.

One common approach to estimating SGPs is to use a quantile regression model (Betebenner, 2009). This approach models the current year score as a function of prior test scores and finds the SGP by comparing the current year score to the predicted values at various quantiles of the conditional distribution.

The methods described here do not rely on the quantile regression method for two reasons. First, the typical implementation of the quantile regression makes no correction for measurement variance in the predictor variables or in the outcome variable. Ignoring the measurement variance in the predictor variables yields bias in the model coefficients (e.g., Wei & Carroll, 2009). Further complicating the issue, the measurement variance in the outcome variable also adds to the bias in a quantile regression (Hausman, 2001), an issue that does not occur with linear regression.

The model implemented for New York State is a linear regression model designed to account for measurement variance in the predictor variables, as well as in the outcome variable, to yield unbiased estimates of the model coefficients. Subsequently, these model coefficients are used to form a predicted score, which is ultimately the basis for the SGP. Because the prediction is based on the observed score, it is necessary to account for measurement variance in the prediction as well. Hence, the model accounts for measurement variance in two steps: first in the model estimation and second in forming the prediction. The next section describes this model in detail.

Covariate Adjustment Model

The statistical model implemented as the MGP model is typically referred to as a *covariate adjustment model* (McCaffrey, Lockwood, Koretz, & Hamilton, 2004), as the current year observed score is conditioned on prior levels of student achievement as well as other possible covariates.

In its most general form, the model can be represented as:

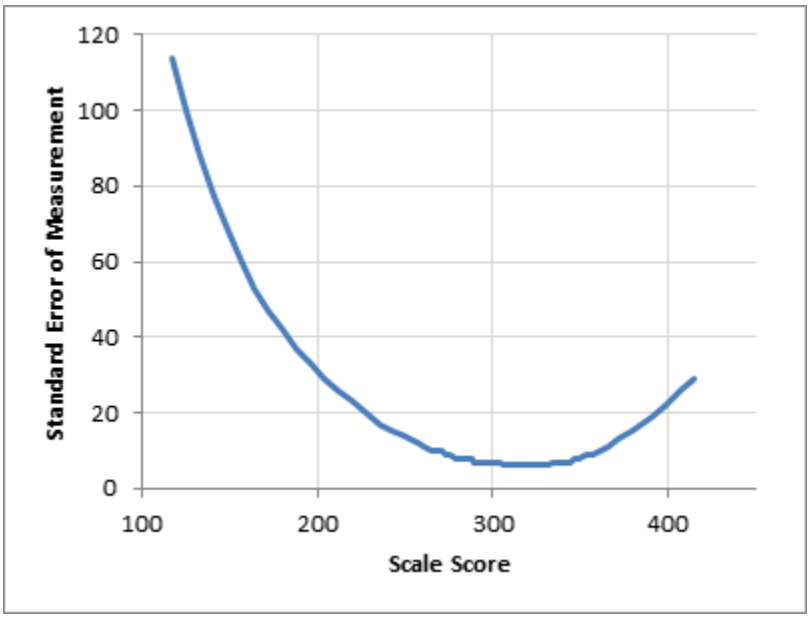
$$y_{ti} = \mathbf{X}_i\boldsymbol{\beta} + \sum_{r=1}^{L} y_{t-r,i}\gamma_{t-r} + e_i, \qquad [1]$$

where y_{ti} is the observed score at time *t* for student *i*, $\mathbf{X}_i$ is the model matrix for the student- and school-level demographic variables, $\boldsymbol{\beta}$ is a vector of coefficients capturing the effect of any demographics included in the model, $y_{t-r,i}$ is the observed lag score at time *t–r* ($r \in \{1,2,\ldots,L\}$), and $\boldsymbol{\gamma}$ is the coefficient vector capturing the effects of lagged scores.

Accounting for Measurement Variance in the Predictor Variables

All test scores are measured with variance, and the magnitude of the variance varies over the range of test scores. The standard errors (variances) of measurement are referred to as *conditional standard errors of measurement* (CSEMs) because the variance of a score is heteroscedastic and depends on the score itself. Figure 1 shows a sample from the Grade 8 ELA test in New York.

Figure 1. Conditional Standard Error of Measurement Plot (Grade 8 Mathematics, 2013–14)



Treating the observed scores as if they were the true scores introduces a bias in the regression, and this bias cannot be ignored within the context of a high-stakes accountability system (Greene, 2003). In test theory, the observed score is described as the sum of a true score plus an

independent variance component, $\boldsymbol{X} = \boldsymbol{X}^{*} + \boldsymbol{U}$ where $\boldsymbol{U}$ is a matrix of unobserved disturbances with the same dimensions as $\boldsymbol{X}$.

Our estimator accounting for the error in the predictor variables is derived in a manner similar to that of Goldstein (1995). The estimator and a complete theoretical derivation are provided in Appendix D.

Specification for MGP Model for Grades 4–8 and Grades 9–12

The preceding section provides details on the general modeling approach and specifically how measurement variance is accounted for in the model. The exact specification for the New York Grades 4–8 model in 2013–14 is described as follows:

$$y_{gi} = \mu + \sum_{l=1}^{K} \beta_l y_{g-r,i} + \sum_{s=1}^{M} \tau_s m_{si} + \sum_{q=1}^{J} \gamma_q x_{qi} + \varepsilon_i,$$

where y_{gi} is the current year test scale score for student *i* in grade *g*, μ is the intercept, β_l is the set of coefficients associated with the three prior test scores, τ_s is the set of coefficients associated with the missing variable indicators, γ_q is the set of coefficients associated with the student-level measured characteristics (which are described in the previous section on data used in growth models), and ε_i is the student residual. For the MGP model used for Grades 9–12, scale scores from assessments taken before Grade 9 were used as predictors (not prior Regents Exam scores themselves, although the number of Regents Exams passed prior to the outcome year was used as a predictor). The form of the model is the same as shown above, where y_{gi} is the Regents Exam scale score for student *i* in subject *s*, μ is the intercept, β_l is the set of coefficients associated with the Grades 7 and 8 test scores and is estimated with an error-in-variables approach, τ_s is the set of coefficients associated with the missing variable indicators, γ_q is the set of coefficients associated with the student-level measured characteristics (which are described in the previous section on data used in growth models), and ε_i is student residual.

MGP models were implemented separately for each grade and subject. There were also two models estimated. The "adjusted" model is the model as described previously. The "unadjusted" model is a special case of the adjusted model that does not contain any variables (such as the ELL status) except prior test scores and missing indicators for the two- and three-year-prior scores. In all models, special procedures are used to adjust standard errors of measurement. These procedures are described in Appendix E.

SGPs

The previously described regression models yield unbiased estimates of the coefficients by accounting for the measurement error in the observed scores. The resulting estimates are then used to form a student-level SGP statistic. For purposes of the growth model, a predicted value and its variance for each student are required to compute the SGPs as:

$$\mathrm{SGP_i} = \Phi\left(\frac{y_i - \hat{y}_i}{\sqrt{\sigma^2_{yf,i}}}\right),$$

where y_i is the observed value of the outcome variable and $\hat{y}_i = \boldsymbol{w}'\widehat{\boldsymbol{\delta}}$ where $\boldsymbol{w}'$ is the *i*th row of the model matrix $\boldsymbol{W}$ and the notation $\sigma^2_{yf,i}$ is used to mean the variance of the predicted value of *y* for the *i*th student.

Here the regression is of the form:

$$\boldsymbol{y} = \boldsymbol{W\delta} + \epsilon,$$

where:

$$\epsilon \sim N(0, \sigma_e^2).$$

The classic variance of a predictor is, for this case:

$$\sigma^2_{yf,i} = [1 + \boldsymbol{w_i}'(\boldsymbol{W}'\boldsymbol{W})^{-1}\boldsymbol{w_i}]\hat{\sigma}_e^2,$$

where $\hat{\sigma}_e^2$ is the variance of the predictor. However, in this case, we make two refinements to acknowledge the effect of measurement error on the residual variance. The first is to use the actual variance on y_i, called σ^2_{yi}, rather than the population variance on y_i, called $\bar{\sigma}^2_{yi}$, which is already included in $\hat{\sigma}_e^2$. This is done by subtracting the population variance and adding back the individual variance. Thus, the variance on the predictor becomes:

$$\sigma^2_{yf,i} = [1 + \boldsymbol{w_i}'(\boldsymbol{W}'\boldsymbol{W})^{-1}\boldsymbol{w_i}]\left[\sigma_e^2 - \bar{\sigma}^2_{yi}\right] + \sigma^2_{yi}.$$

The second refinement is to replace the population variance in $\boldsymbol{w_i}$, called $\overline{\boldsymbol{\Sigma}}$, with the individual variance in $\boldsymbol{w_i}$, called $\boldsymbol{\Sigma_i}$. This replacement is done in the same way as with the variance in y_i, so the variance estimate is now:

$$\sigma^2_{yf,i} = [1 + \boldsymbol{w_i}'(\boldsymbol{W}'\boldsymbol{W})^{-1}\boldsymbol{w_i}]\left[\sigma_e^2 - \bar{\sigma}^2_{yi} - \boldsymbol{\delta}'\overline{\boldsymbol{\Sigma}}\boldsymbol{\delta}\right] + \sigma^2_{yi} + \boldsymbol{\delta}'\boldsymbol{\Sigma}_\mathrm{i}\boldsymbol{\delta}.$$

There is then a predicted value for each student that is used to compute the SGP. However, that prediction is based on the estimates of the fixed effects that were corrected for measurement variance but based on the observed score in the vector $\boldsymbol{w}$.

Figure 2 provides an illustration of how the SGPs are found from the previously described approach. The illustration considers only a single predictor variable, although the concept can be generalized to multiple predictor variables, as presented earlier.

For each student, we find a predicted value conditional on his or her observed prior scores and the model coefficients. To illustrate the concept, assume we find the prediction and its variance but do not account for the measurement variance in the observed scores used to form that prediction. We would form a conditional distribution around the predicted value and find the portion of the normal distribution that falls below the student's observed score. This is equivalent to:

$$\text{SGP}_\text{i} = \int_{-\infty}^{y_i} f(x)dx,$$

with $f(x) \sim N(\hat{y}_i, \sigma^2_{yfi})$, although this is readily accomplished using the cumulative normal distribution function, $\Phi(.)$.

Figure 2. Sample Growth Percentile From Model

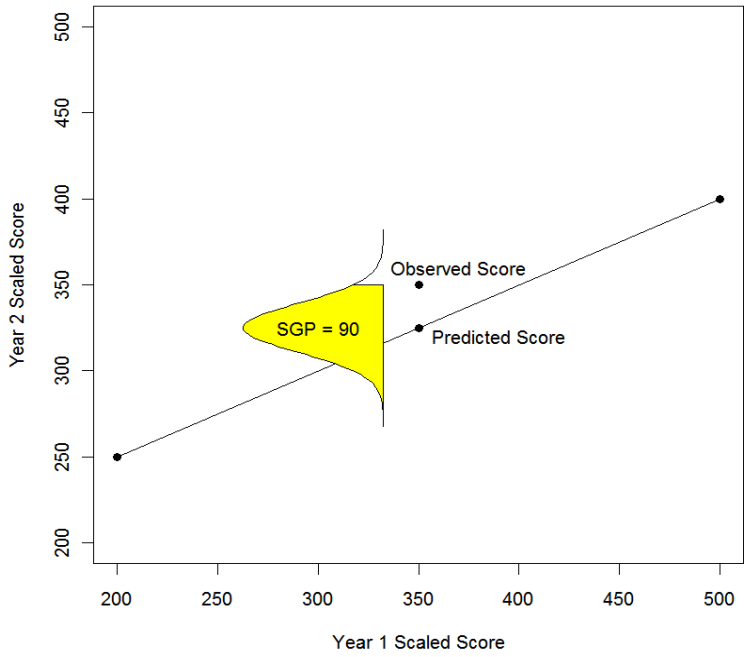
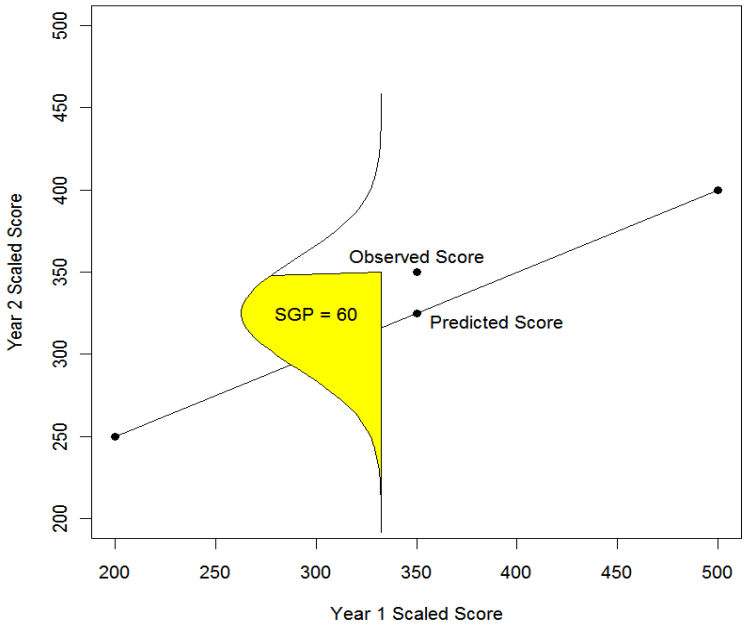


Figure 3 illustrates the same hypothetical student shown in Figure 2. Note that the observed score and predicted value are exactly the same. However, the prediction variance is larger than in Figure 2. As a result, when we integrate over the normal from $-\infty$ to y_i, the SGP is 60 and not 90 as in the previous example. This difference occurs because the conditional density curve has become more spread out, reflecting less precision in the prediction.

Figure 3. Sample Growth Percentile From Model



MGPs

Once SGPs are estimated for each student, group-level (e.g., teacher-level) statistics can be formed that characterize the typical performance of students within a group. New York's growth model Technical Advisory Committee recommended using a mean SGP for educator scores. Hence, group-level statistics are expressed as the mean SGP within a group. This statistic is referred to as the *MGP*.

For each aggregate unit j ($j \in \{1,2,\dots,J\}$), such as a class/course, the statistic of interest is a summary measure of growth for students within this group. Within group j, there are $\{SGP_{j(1)}, SGP_{j(2)}, \dots, SGP_{j(N)}\}$. That is, there is an observed SGP for each student within group j.

Then the MGP for unit j is produced as:

$$\theta_j = \text{mean}(SGP_{j(i)}),$$

for Grades 4–8 and Grades 9–12 schools and principals and using the weighted mean

$$\theta_j = \frac{1}{\sum w_{j(i)}} \sum w_{j(i)} SGP_{j(i)},$$

for Grades 4–8 teachers only, where $w_{j(i)}$ is a weight for student i in teacher j's class/course based on the student's enrollment and attendance.

Like all statistics, the MGP is an estimate, and it has a variance term. The following measures of variance are produced for the MGP.

The analytic standard error of the unweighted MGP (schools and principals) is computed within unit *j* as:

$$\mathrm{se}(\theta_j) = \frac{\mathrm{sd}(\mathrm{SGP}_{ij})}{\sqrt{N_j}}$$

and in the weighted case (teachers):

$$\mathrm{se}(\theta_j) = \frac{\mathrm{sd}(\mathrm{SGP}_{ij})}{\sqrt{\frac{(\sum w_s)^2}{(\sum w_s^2)}}},$$

where $\mathrm{sd}(\mathrm{SGP}_{ij})$ is the sample standard deviation of the SGPs in group *j* and *N* is the number of students in group *j*.

Combining Student Growth Percentiles Across Grades and Subjects

Many teachers, schools, and principals serve students from different grades and with results from different tested subjects. For evaluation purposes, there is a need to aggregate these SGPs and form summary measures.

Because the SGPs are expressed as percentiles, they are free from scale-specific inferences and can be combined. For any aggregate-level statistics to be provided (in this case, MGPs), all SGPs of relevant students are pooled and the average of the pooled SGPs is found. In the case of Grades 4–8 teachers, the average is a weighted average, as described earlier. Variances of these MGPs are found using the same methods described previously. More detail on reported scores can be found in the Reporting section.

Comparative Growth in Regents Exams Passed (GRE) Model

For this model, the outcome of interest is the number of Regents Exams that a student passes for the first time in the outcome or current year (in this case, 2013–14). Educators whose students pass more Regents Exams in a year than similar students will have higher scores on this metric than those of other educators. For this model, Regents Exams in the five required subject areas and up to three additional Regents Exams (for a total possible of eight Regents Exams for each student) were counted as outcomes. Once a student had passed eight Regents exams, he or she was excluded from the model.

Because the outcome can take on only positive integer values and is bounded by a minimum (a student can never pass fewer than zero Regents Exams in a year) and a maximum (a student can never have more than eight Regents Exams passed in a year), an ordered logit model is implemented. The model is fit separately for each cohort of students (students who entered Grade 9 one year ago, two years ago, and so on) for Years 1, 2, 3, and 4. Students who entered Grade 9 more than four years ago are aggregated into a single fifth run.

The linear part of the model is:

$$\boldsymbol{\eta}_i = \mathbf{X}_i \boldsymbol{\beta}^{\mathbf{c}},$$

where **X** includes the variables named in the definition of similar students as well as an intercept term, η is the latent variable that dictates the number of Regents Exams a student passes, β is the fitted parameters for the variables in *X*, the superscript *c* is used to indicate that the β coefficients depend on the cohort, and the subscript *i* is used to indicate that η and *X* are specific to an individual student.

From this, the logistic function and a series of cut points are used to map η to the outcome space, generating an estimated fraction of the time that zero through eight Regents Exams were passed by similar students. The fraction of similar students passing a particular number of Regents Exams is then given by:

$$\Pr(\delta_i = \mathrm{k}|\mathbf{X}_\mathrm{i}, \boldsymbol{\beta}^\mathrm{c}) = \frac{1}{1+\exp(-\lambda_{\mathrm{k}+1} + \mathbf{X}_\mathrm{i}\,\boldsymbol{\beta}^\mathrm{g})} - \frac{1}{1+\exp(-\lambda_\mathrm{k} + \mathbf{X}_\mathrm{i}\,\boldsymbol{\beta}^\mathrm{g})},$$

where δ is the number of Regents Exams passed this year and the λ_k are fitted cut points[3] between having passed *k–1* and *k* Regents Exams.

This set of nine values is then collapsed into the average number of Regents Exams similar students passed this year using:

$$\widehat{y_\mathrm{i}} = \sum_{\mathrm{k}=0}^{8} \Pr(\delta_i = \mathrm{k}|\mathrm{X}_\mathrm{i}, \beta^\mathrm{c}) \cdot \min(8 - \mathrm{N}_{\mathrm{i},\mathrm{yy}-1}, \mathrm{k}),$$

where $\hat{y}$ is the estimated number of Regents Exams passed by similar students and $\mathrm{N}_{\mathrm{yy}-1}$ is the number of Regents Exams passed at the initiation of this school year. In the previous equation, the first term represents the probability of a similar students having passed *k* Regents Exams this year, and the second term often multiplies that probability by *k*. A min function also is included in the second term that imposes a ceiling on the number of Regents Exams passed this year, acknowledging that the total number passed this year plus the number that had been passed at the beginning of this year ($\mathrm{N}_{\mathrm{yy}-1}$) cannot exceed eight.

Finally, values of $\hat{y}$ that are larger than two are set to two because to meet a projection larger than two Regents Exams per year, students would have to complete the eight Regents Exams counted in this model on a schedule faster than eight Regents Exams over four years. Because NYSED did not wish to encourage unnecessary Regents Exam-taking, this cap on projected Regents Exams was applied.

Using this approach, each student has an actual number of Regents Exams that he or she passed (y_i), and a number passed by similar students ($\hat{\mathrm{y}}_\mathrm{i}$); the latter is subtracted from the former to find a student-level comparative growth in Regents Exams passed (GRE):

$$\mathrm{GRE}_i = \mathrm{y}_i - \hat{\mathrm{y}}_i.$$

[3] These are sometimes also called *intercepts*.

A school or principal's score is then the mean GRE (or MGRE) for students attributed to that school or principal:

$$\mathrm{MGRE} = \frac{1}{\mathrm{n}}\sum_{\mathrm{i}=1}^{\mathrm{n}} \mathrm{GRE}_i.$$

The standard error is found by taking the sample standard deviation of the student GREs. Thus, the variance estimate is:

$$\mathrm{Var}(\mathrm{MGRE}) = \frac{1}{(\mathrm{n}-1)\mathrm{n}}\sum_{\mathrm{i}=1}^{\mathrm{n}} [\mathrm{GRE} - \mathrm{MGRE}]^2,$$

and the standard error is the square root of that. Confidence intervals are formed from the variances and point estimates in the same way as they were for MGPs.

Reporting

Results of the New York growth models are reported to districts in a series of data files as well as through an online reporting system accessible to teachers, principals, and district administrators.

Reporting for Teachers, Schools, and Principals of Grades 4–8

The main reporting metrics generated for teachers, schools, and principals of Grades 4–8 were as follows:

- **Number of Student Scores.** The number of SGPs included in an MGP.
- **Unadjusted MGP (School or Principal).** The mean of the SGPs for students attributed to the school or principal based on similar prior achievement scores only, without taking into consideration ELL, disability, economic disadvantage, or other student characteristics.
- **Unadjusted MGP (Teacher).** The weighted mean of the SGPs for students who are linked to a teacher based on similar prior achievement scores only, without taking into consideration ELL, disability, economic disadvantage, or other student characteristics. The weighted mean was calculated based on the amount of time students were enrolled in and attended a course with a teacher.
- **Adjusted MGP (School or Principal).** The mean of the SGPs for students attributed to the school or principal, based on similar prior achievement scores, *including* consideration of ELL, disability, economic disadvantage, and other student characteristics. This MGP is used to determine a school or principal's state-provided growth score and growth rating.
- **Adjusted MGP (Teacher).** Adjusted MGP is the weighted mean of the SGPs for students linked to a teacher, based on similar prior achievement scores, *including* consideration of ELL, disability, economic disadvantage, and other student characteristics. This MGP is used to determine a teacher's state-provided growth score and growth rating.
- **Lower Limit and Upper Limit.** Highest and lowest possible MGP for a 95 percent confidence range.
- **Growth Rating.** Growth rating describes the educator's HEDI (Highly Effective, Effective, Developing, Ineffective) rating on the state-provided growth subcomponent.
- **Growth Score.** Using scoring bands determined by the commissioner (for New York City only) and by statute (rest of state), a growth score of 0–20 points is assigned to each educator based on his or her overall MGP within the relevant growth rating category[4].

[4] For the 2013-14 school year and thereafter, the Commissioner will review specific scoring ranges annually before the start of each school year and recommend any changes to the Board of Regents for consideration.

Through the online reporting system, educators can also obtain MGPs based on the following subgroups:

- **Students with Disabilities.** Students identified as having disabilities by the Committee on Special Education and receiving services under the Individuals with Disabilities Education Act (IDEA), based on district-provided information.
- **ELLs.** Students identified as English Language Learners, defined as students who, by reason of foreign birth or ancestry, speak a language other than English and either (1) understand and speak little or no English or (2) score below a state-designated level of proficiency on the New York State Identification Test for English Language Learners (NYSITELL) or the New York State English as a Second Language Achievement Test (NYSESLAT), based on district-provided information.
- **Economically Disadvantaged.** Students whose families participate in economic assistance programs such as the free or reduced-priced lunch programs, Social Security Insurance, food stamps, foster care, refugee assistance, earned income tax credit, the Home Energy Assistance Program, Safety Net Assistance, the Bureau of Indian Affairs, or Temporary Assistance for Needy Families, based on district-provided information.
- **Low Achieving.** Students who achieved at performance level 1 in either mathematics or ELA on the prior-year assessment.
- **High Achieving.** Students who achieved at performance level 4 in either mathematics or ELA on the prior-year assessment.

Reporting for Grades 9–12

The main reporting metrics generated for schools and principals of Grades 9–12 are as follows:

- **Number of Student Scores (for MGP measure) or Students (for GRE measure).** These numbers refer to the SGPs included in an MGP or the number of students included in the GRE score.
- **Unadjusted Measure.** This measure is based on student growth and accounts for prior achievement scores *only*, without taking into consideration ELL, disability, economic disadvantage, or other student characteristics.
- **Adjusted Measure.** This measure is based on student growth and is adjusted for prior achievement scores and ELL, disability, economic disadvantage, and other characteristics at the student and school levels.
- **Lower Limit and Upper Limit.** Highest and lowest possible measure score for a 95 percent confidence range.
- **Growth Rating.** Growth rating describes the educator's performance category (HEDI) for each individual measure (MGP or GRE) and overall for Grades 9–12. The overall growth rating is used in a school or principal's evaluation on the state-provided growth subcomponent.
- **Growth Score.** A growth score of 0–20 points is computed for a school and principal for each individual measure (MGP and GRE) growth score and overall. The overall growth score is used in a principal's evaluation on the state-provided growth subcomponent.

As with Grades 4–8 measures, MGPs and GRE results are also reported by various categories (such as cohort, ELL, and disability subgroups).

Minimum Sample Sizes for Reporting

Minimum sample size requirements for reporting MGPs and growth ratings were determined to balance statistical reliability and availability of educator growth scores. On one hand, setting no (or a low) minimum sample size will result in the greatest number of educators receiving information; on the other hand, the quality of the information they receive may be reduced. A minimum threshold of 16 student scores or 16 students for the GRE measure was implemented. Educator scores on any measure at any level based on fewer than 16 student scores (or 16 students for the GRE measure) were not reported.

After applying this rule, the fraction of teachers, schools, and principals with reported results is shown in Table 9 for Grades 4–8 and Table 10 for Grades 9–12.

Table 9. Grades 4–8 Reporting Rates

	Number With at Least One Student Attributed	Number Meeting the Minimum Sample Size Requirement	Percentage Meeting the Minimum Sample Size Requirement
Teachers	43,274	37,937	88%
Principals	3,580	3,537	99%
Schools	3,876	3,642	94%

Table 10. Grades 9–12 Reporting Rates

	Number With at Least One Student Attributed	Number Meeting the Minimum Sample Size Requirement	Percentage Meeting the Minimum Sample Size Requirement
Principals	1,327	1,281	97%
Schools	2,082	1,443	69%

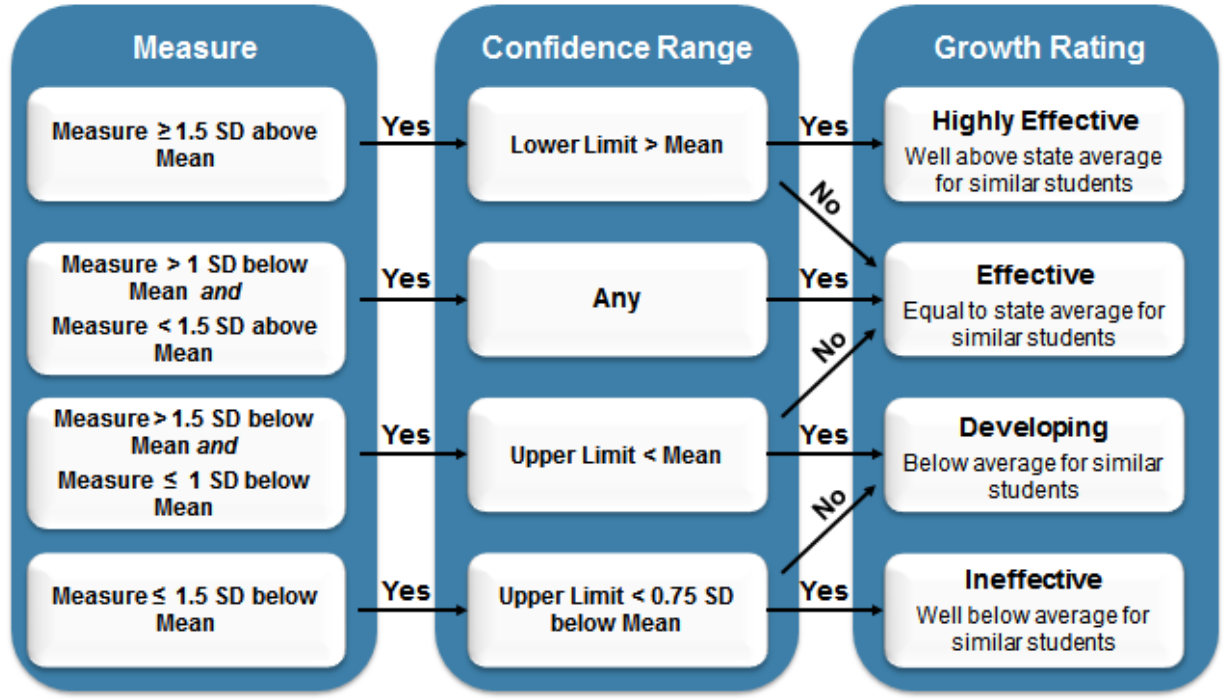
Note: As in the case of Table 8, special programs are a large fraction of the schools included in this table. When special programs are excluded, there are 1,139 schools with at least one student attributed and 1,127 (99 percent) of those are reported.

Performance Categories

To determine an educator's growth rating (HEDI category) and growth points (0–20), NYSED has developed a set of general rules that describe how similar or different a score on each measure is from the state average. The general rules used to obtain growth ratings are shown in Figure 4. Specific values used to determine growth ratings are shown in Appendix G.

Within each growth rating category, points are then assigned so that educators are approximately uniformly distributed at each HEDI point value (with higher MGPs or GRE results earning more points than lower MGPs or GRE results in that category). Additional detail about the assignment of HEDI point values can also be found in Appendix G.

Figure 4. Determining Growth Ratings



Notes: SD = Standard Deviation
Values are rounded to the nearest whole number.

For teachers, schools, and principals of Grades 4–8, the overall adjusted MGP (that is, the MGP that combines information across all applicable grade levels and subjects) and upper and lower limit MGPs were used to determine growth ratings. To determine the growth rating for a school or principal of Grades 9–12, a growth rating and score for each of the two types of metrics—the MGP measure and the GRE measure—is first found using the process shown in Figure 4. Growth scores for each Grades 9–12 measure are then averaged together and weighted by the number of students in each measure to find an overall Grades 9–12 growth rating and score.

To determine a final state-provided growth subcomponent rating for schools and principals who serve Grades 4–8 and Grades 9–12, growth ratings and scores for Grades 4–8 and Grades 9–12 are computed separately and then combined. The Grades 4–8 measure growth rating is determined using the process shown in Figure 4 and an overall Grades 9–12 growth rating and score as described previously. An overall growth subcomponent rating that includes results for both Grades 4–8 and Grades 9–12 students is then computed by averaging Grades 4–8 and Grades 9–12 growth scores by the number of students in each measure and finding the final rating.

Additional detail can be found in the resources for educators posted at http://www.engageny.org/resource/resources-about-state-growth-measures and in Appendix G.

Results

Results From Growth Models for Grades 4–8

This section provides an overview of the results of 2013–14 growth model estimation. Some comparisons to earlier year growth model results are also included. A pseudo R-squared statistic and summary statistics characterizing the SGPs, MGPs, and their precision provide an overview of model fit. Note that this section focuses on teacher-level and school-level results, although additional information on principal-level results is available in Appendix I. The appendices to this report provide more detailed information on model behavior and results, including model coefficients and variance components.

Model Fit Statistics for Grades 4–8

The R-square is a statistic commonly used to describe the goodness-of-fit for a regression model. Because the model implemented here is a mixed model and not a least squares regression, we refer to this as a *pseudo* R-square. Table 11 presents the pseudo R-square values for each grade and subject, computed as the squared correlation between the fitted values and the outcome variable.

Table 11. Grades 4–8 Pseudo R-Squared Values by Grade and Subject

Subject	Grade	2012–13		2013–14	
		Unadjusted Model	Adjusted Model	Unadjusted Model	Adjusted Model
ELA	4	0.69	0.72	0.65	0.68
	5	0.73	0.74	0.71	0.72
	6	0.75	0.76	0.72	0.73
	7	0.74	0.76	0.71	0.73
	8	0.74	0.75	0.73	0.74
Mathematics	4	0.70	0.73	0.68	0.70
	5	0.77	0.78	0.71	0.72
	6	0.79	0.80	0.73	0.74
	7	0.76	0.77	0.75	0.77
	8	0.78	0.79	0.64	0.67

Student Growth Percentiles for Grades 4–8

SGPs describe a student's current year score relative to those of other students in the data with similar prior academic histories and other measured characteristics. A student's SGP should not be expected to be higher or lower based on his or her prior-year score. The correlation between the prior-year scale score and SGP is shown in Table 12 for each grade and subject. These correlations are usually negative as a result of using the EiV approach to account for measurement variance in the prior-year scale score; the correlation need not be zero. Squaring

these values gives the percent of variation in SGPs explained by prior-year scores for any grade and subject. While prior-year test scores are generally good predictors of current year test scores, the prior-year test score is a poor predictor of current year SGPs. As shown in Table 12, prior-year test scores explain about 2 percent to 3 percent of the variation in SGPs. Because SGPs are intended to allow students to show low or high growth no matter their prior performance, this result is as expected.

Table 12. Grades 4–8 Correlation Between SGP and Prior-Year Scale Score

Grade	ELA	Mathematics
4	–0.16	–0.14
5	–0.14	–0.12
6	–0.14	–0.12
7	–0.13	–0.14
8	–0.14	–0.18

MGPs for Grades 4–8

As described earlier in this report, teachers' MGPs are aggregate educator-level statistics, computed as the weighted mean of SGPs for all students associated with a teacher or as the mean for schools or principals. In this section, we provide descriptive statistics on overall or combined MGPs.

For teachers with results for students in both ELA and mathematics, the combined MGP is an average of SGPs for both subjects. For teachers who provide instruction in only one subject, their overall or combined MGP is the same as their subject-specific MGP.

Figure 5 provides a histogram of the teacher combined MGPs for the adjusted model (including demographics). In all grades, the results are approximately normally distributed.

Figure 5. Distribution of Grades 4–8 Teacher MGPs by Grade, Adjusted Model

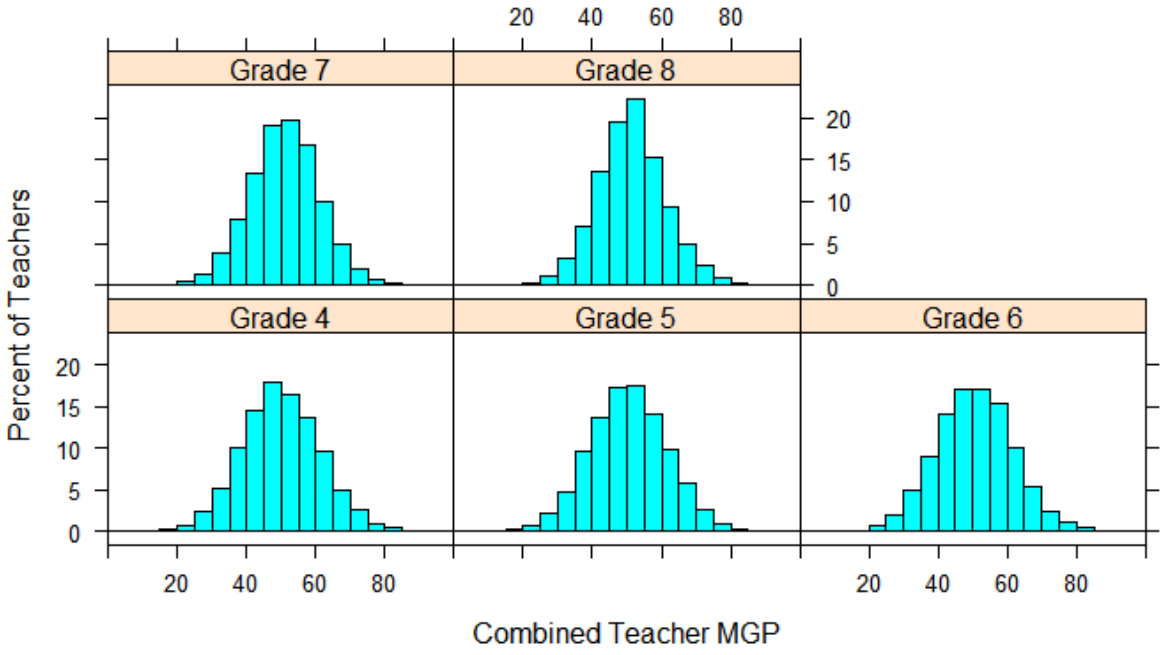
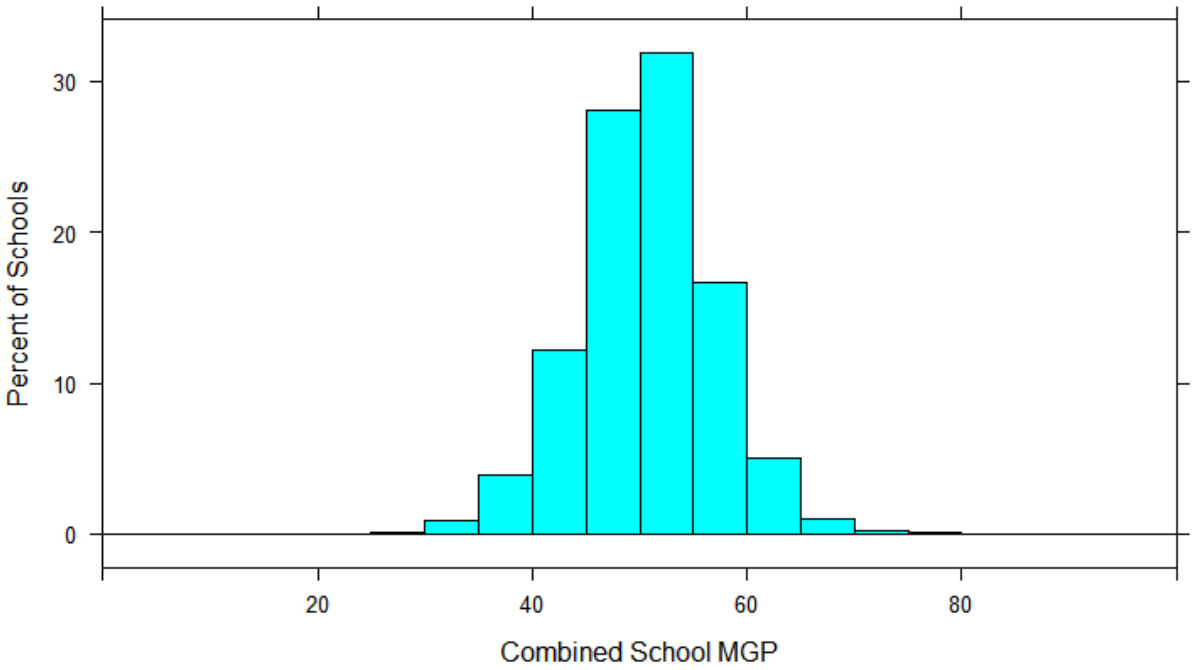


Figure 6 shows that for schools, the results are less widely distributed than for teachers.

Figure 6. Grades 4–8 Distribution of School MGPs, Adjusted Model



Precision of the MGPs for Grades 4–8

The caterpillar plot in Figure 7 is a random sample of 100 teacher MGPs taken from the 2013–14 data. The MGPs are sorted from lowest to highest, with the corresponding 95 percent confidence range showing the lower and upper limits of the MGP. Figure 8 shows the same type of plot for schools (where larger underlying samples mean that there is substantially less variation in the MGP and the error bars are narrower). These figures provide a sample of the distribution of MGPs and a typical confidence range.

Figure 7. Grades 4–8 Overall MGP With 95 Percent Confidence Interval Based on Random Sample of 100 Teachers

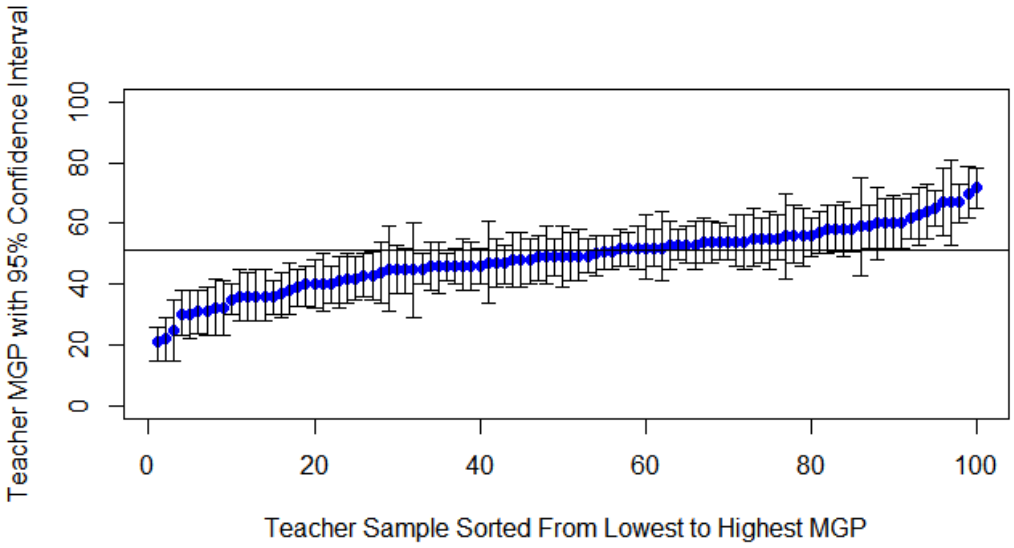
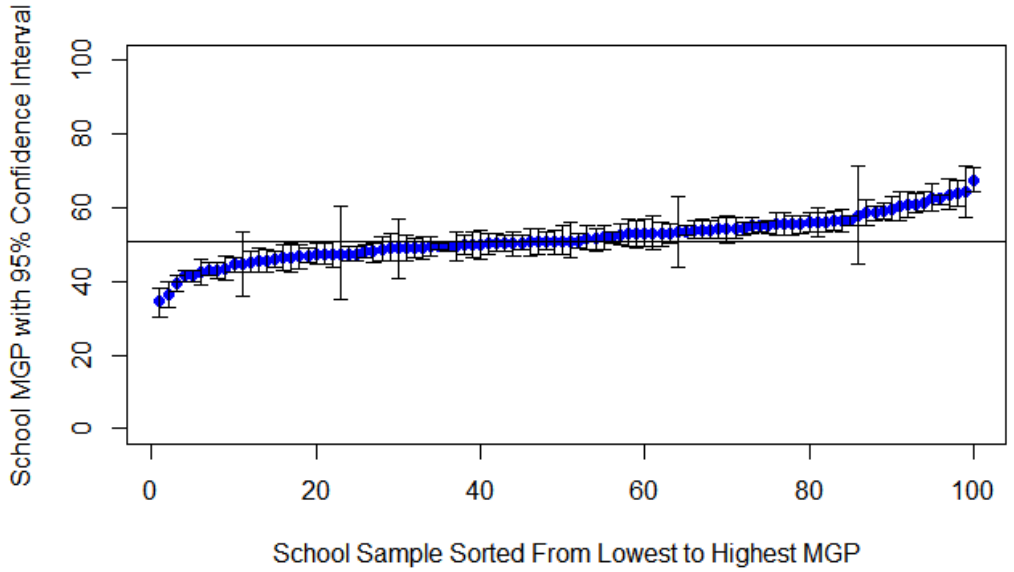


Figure 8. Grades 4–8 Overall MGP With 95 Percent Confidence Interval Based on Random Sample of 100 Schools



Figures 7 and 8 provide a means to gauge visually the precision of MGPs. However, it may also be useful to examine a reliability statistic to assess the precision of the teacher-level MGPs, specified here as ρ:

$$\rho = 1 - \left(\frac{\bar{\sigma}}{sd(\hat{\theta}_j)} \right)^2,$$

where $\bar{\sigma}$ is the mean standard error of the MGP and $sd(\hat{\theta}_j)$ is the standard deviation between teacher MGPs. In theory, the highest possible value is one, which would represent complete precision in the measure. When the ratio is zero, the variation in MGPs is explained entirely by sampling variation. Larger values of ρ are associated with more precisely measured MGPs.

Table 13 provides the mean standard errors, the standard deviations, and the values of ρ for the adjusted model by grade (again, for combined-subject MGPs). The values of the ratio (ρ) quantify imprecision in the estimates. In all grades, the statistics are closer to one than zero, indicating that the differentiation between teachers and schools seen in the measures is not largely due to measurement variance.

Table 13. Grades 4–8 Mean Standard Errors (SEs), Standard Deviation, and Value of ρ for Adjusted Model by Grade for Teachers and for Schools

Grade (Teachers)	Adjusted Mean SE	Adjusted Standard Deviation	Reliability Statistic (ρ)
4	4.2	11.2	0.86
5	4.2	11.1	0.86
6	4.1	11.2	0.86
7	3.9	10.0	0.85
8	3.9	9.8	0.84
Schools	1.9	6.2	0.90

Table 14 provides the share of educators whose MGPs are significantly above or below the state mean for that educator type, using the 95 percent confidence intervals. In all cases, the percentage exceeding the mean is larger than what would be expected by chance alone, indicating the model distinguishes between schools and teachers (2.5 percent of schools or teachers would be expected to be above and below the mean by chance alone).

Table 14. Grades 4–8 Percent of Educator MGPs Above or Below Mean at the 95 Percent Confidence Level

Level	Below Mean	Above Mean
Teacher	24%	22%
School	30%	32%

Impact Data Results for Grades 4–8

Table 15 provides the correlations of the combined-subject MGP (or for teachers with only one subject, their single-subject MGP) with five classroom or course characteristics: the three predictor variables at the individual student level NYSED's regulations permit for inclusion in the model and that were selected after discussion with New York's Task Force and other stakeholders—ELL, students with disabilities, and poverty or economic disadvantage—and the mean prior ELA or mathematics score of the students.[5] Correlations are presented for adjusted MGPs.[6]

Table 15. Grades 4–8 Teacher MGP Correlated With Class or Course Characteristics

Percentage	2012–13 Adjusted Model	2013–14 Adjusted Model
ELL students in class or course	0.05	0.03
Students with disabilities in class or course	0.05	0.08
Economically disadvantaged students in class or course	0.05	0.05
Mean prior ELA	0.02	–0.10
Mean prior mathematics	0.08	–0.10

Large correlations between MGP and classroom, course, or school characteristics would indicate systematic relationships between scores and the types of students who teachers and schools serve. A value of 0.10 or less indicates that 1 percent or less of the variance in MGPs can be predicted with that demographic variable and therefore represents results that are essentially zero. In 2013–14, all correlations all have absolute values of 0.10 or smaller.

The scatter plots shown in Figures 9 through 13 provide visual representations of the data underlying the correlations for teachers shown in Table 15, and Figures 14 through 18 provide similar images of the data underlying the school-level (principal MGP) correlation shown in Table 16.[7]

[5] For prior scores, the Z-score of the scale score is used instead of the actual scale score because many teachers have students in various grades and the scale scores are not designed to be averaged directly across grades.
[6] The impact of these demographic characteristics on the expected value of students' current test scores used to compute SGPs can be seen through the model coefficients presented in Appendix H. The inclusion of these variables serves to make SGPs for students with different demographic characteristics comparable, given the prior test scores included in the model.
[7] Results disaggregated by grade and subject are shown in Appendix I. The results in this section are combined over grades and subjects.

Figure 9. Relationship of Grades 4–8 Teacher MGP Scores to Percentage of ELL Students in Class or Course

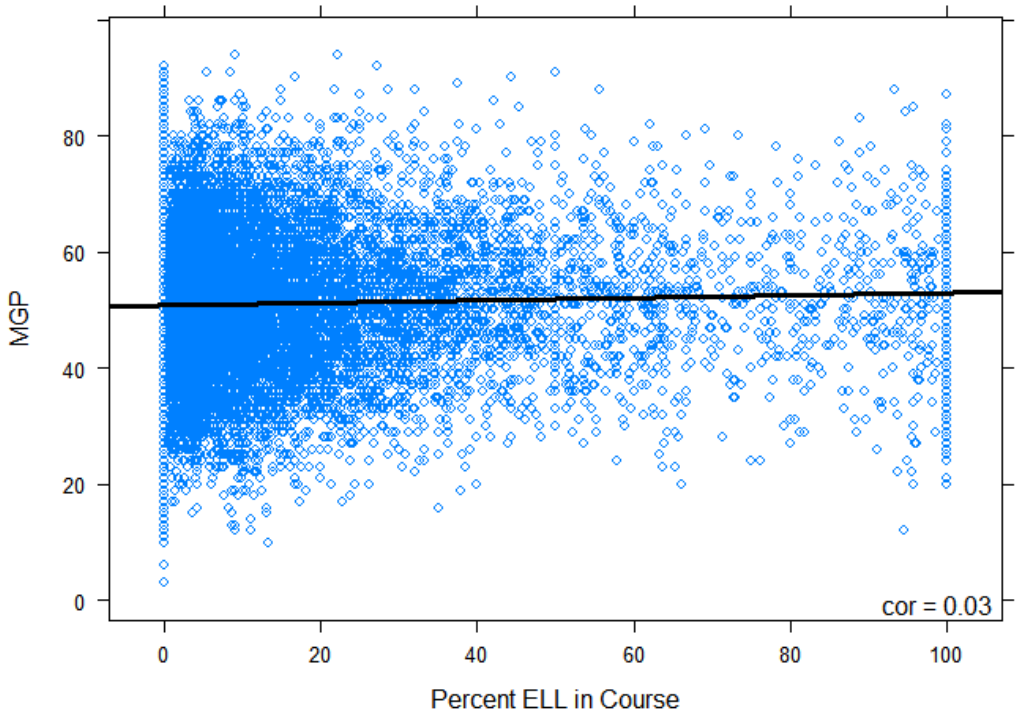


Figure 10. Relationship of Grades 4–8 Teacher MGP Scores to Percentage of Students With Disabilities in Class or Course

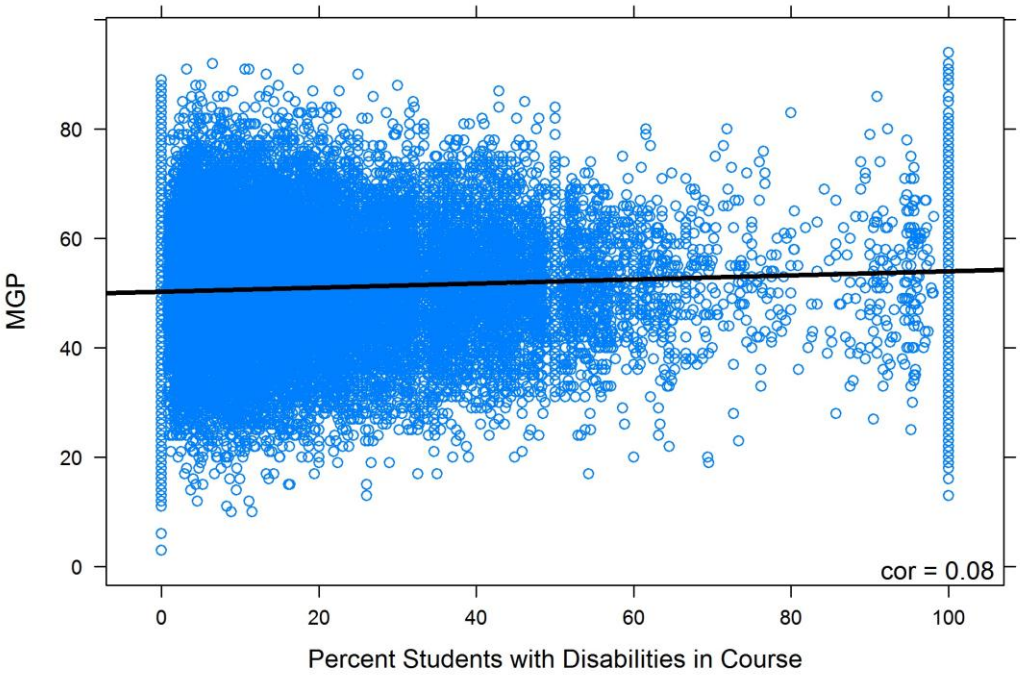


Figure 11. Relationship of Grades 4–8 Teacher MGP Scores to Percentage of Economically Disadvantaged Students in Class or Course

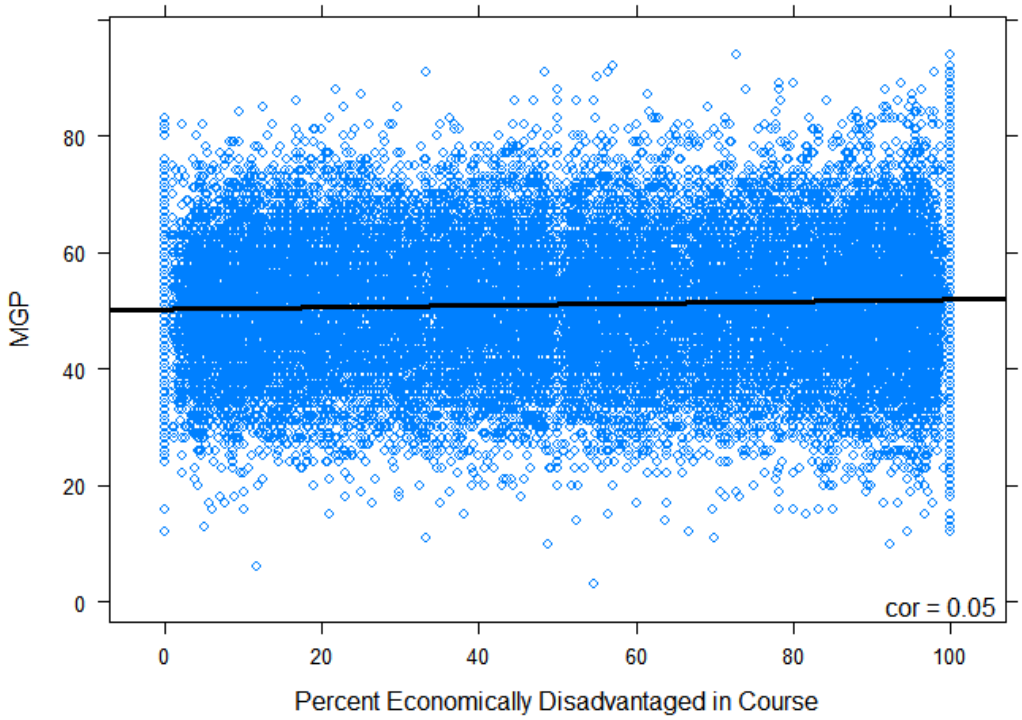


Figure 12. Relationship of Grades 4–8 Teacher MGP Scores to Mean Prior ELA Scores in Class or Course

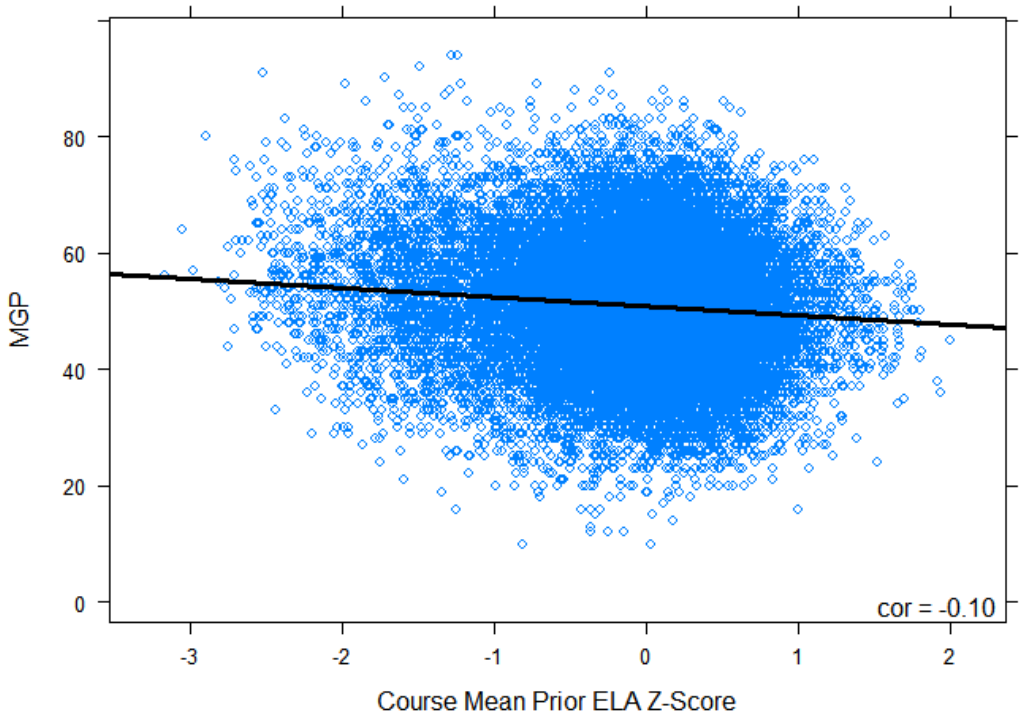


Figure 13. Relationship of Grades 4–8 Teacher MGP Scores to Mean Prior Mathematics Scores in Class or Course

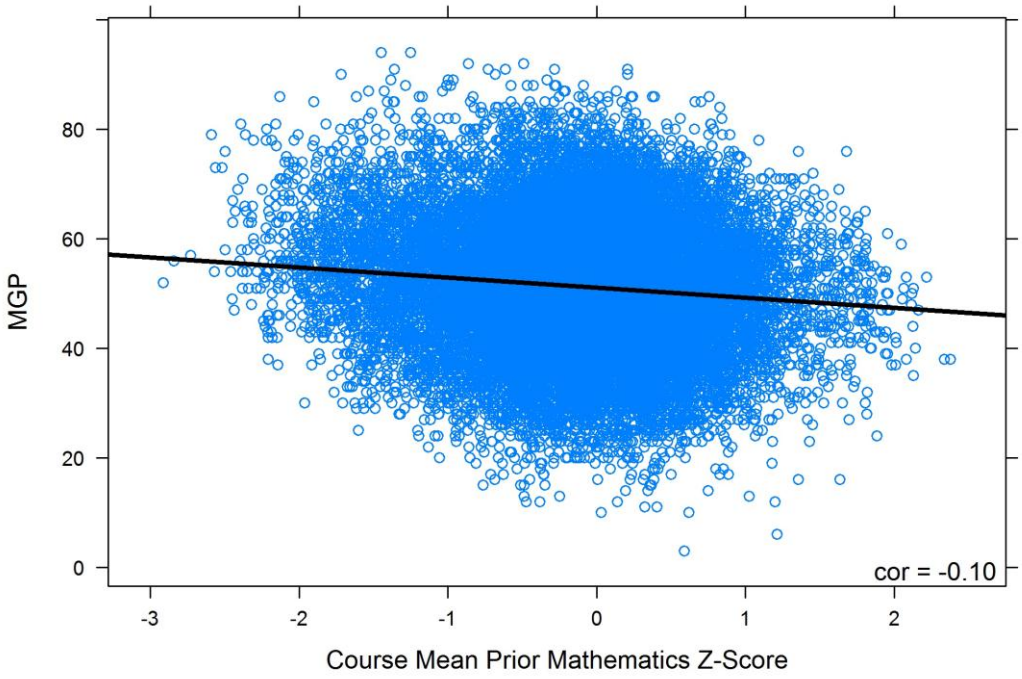


Table 16 provides the observed correlations of school MGPs with the same characteristics presented for teachers, but aggregated to the school level. Correlations decreased between 2012–13 and 2013–14, and all characteristics explain less than one-half of 1 percent of the variance in MGPs. Appendix I contains principal-level correlations.

Table 16. Grades 4–8 School MGP Correlated With School Characteristics

Percentage	2012–13 Adjusted Model	2013–14 Adjusted Model
ELL students in school	0.11	0.04
Students with disabilities in school	0.04	0.02
Economically disadvantaged students in school	0.06	0.06
Mean prior ELA score	0.16	0.01
Mean prior mathematics score	0.23	0.02

Figure 14. Relationship of Grades 4–8 School MGP Scores to Percentage of ELL Students

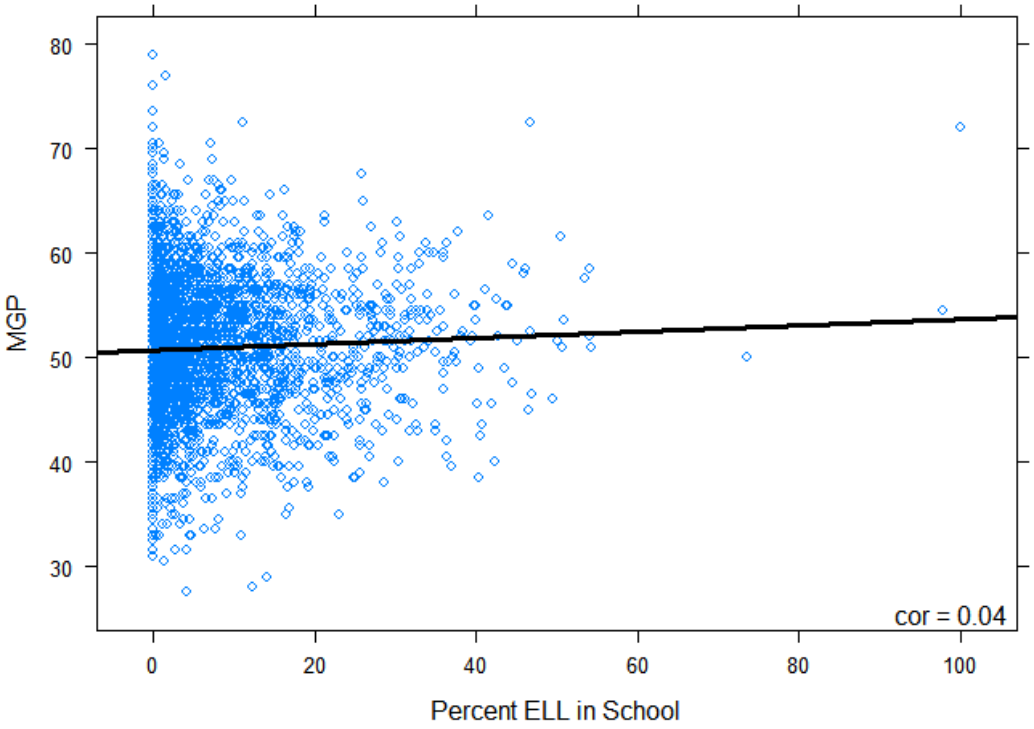


Figure 15. Relationship of Grades 4–8 School MGP Scores to Percentage of Students With Disabilities in School

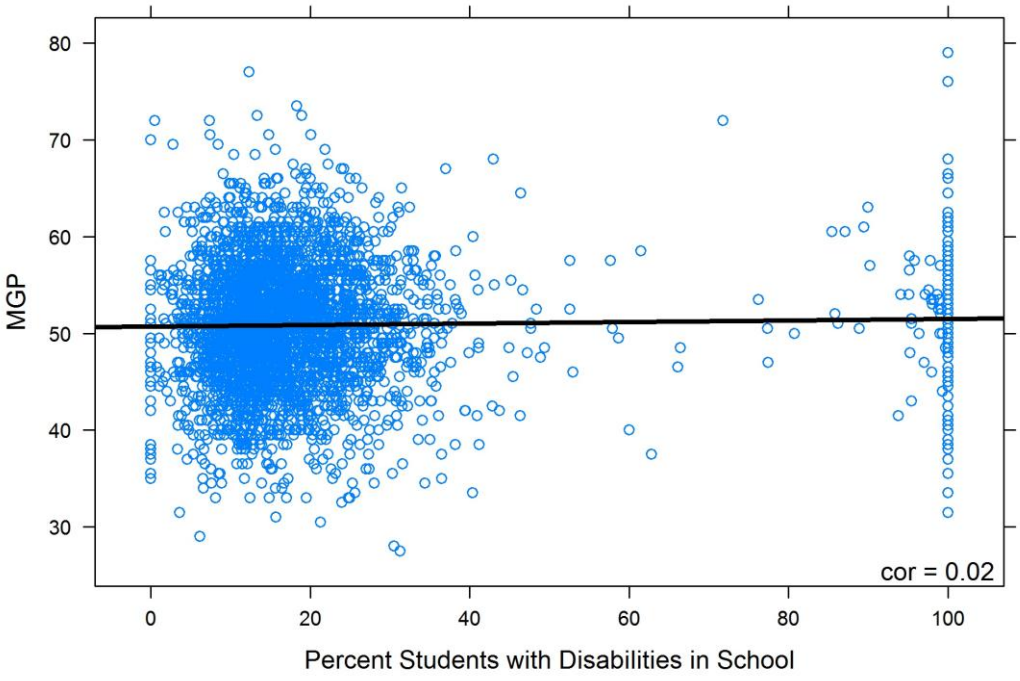


Figure 16. Relationship of Grades 4–8 School MGP Scores to Percentage of Economically Disadvantaged Students

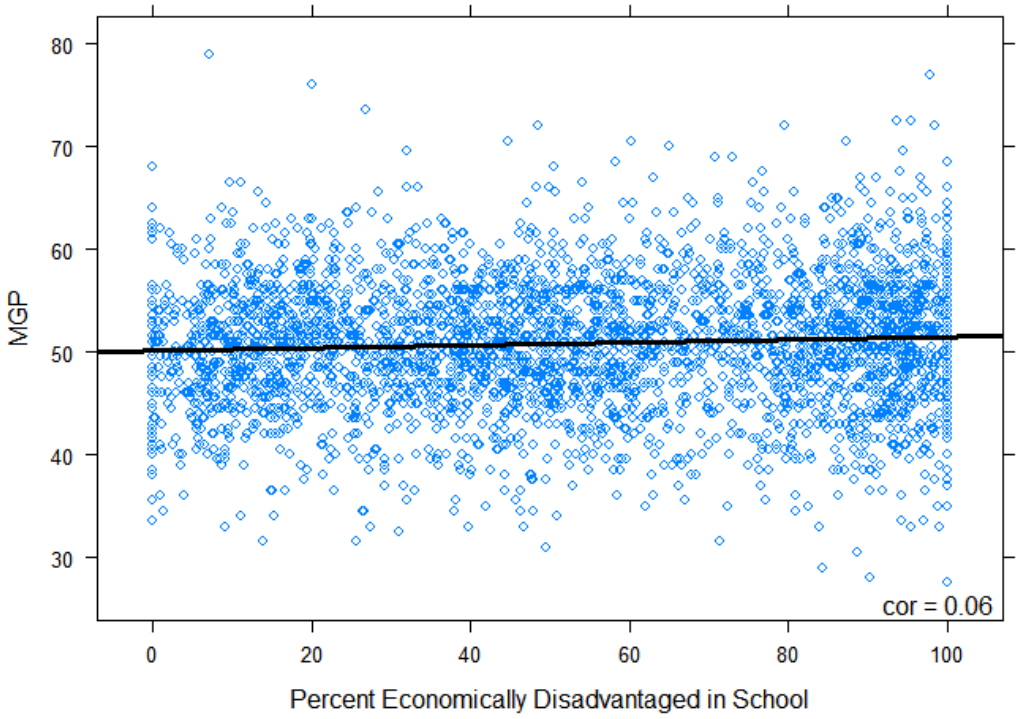


Figure 17. Relationship of Grades 4–8 School MGP Scores to Average Prior ELA Scores

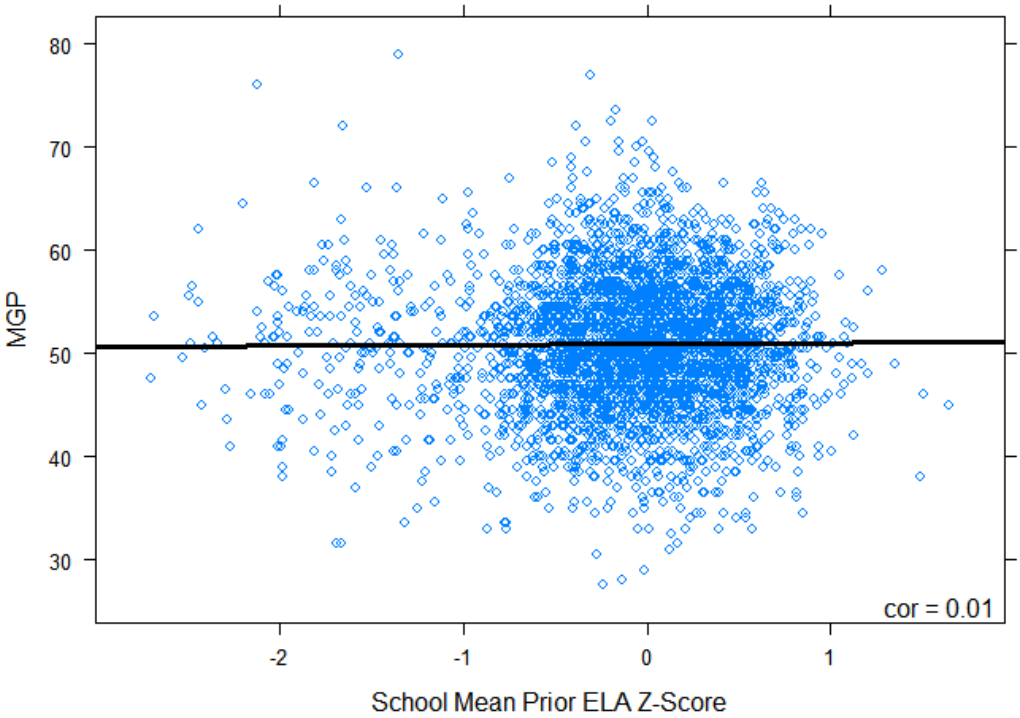
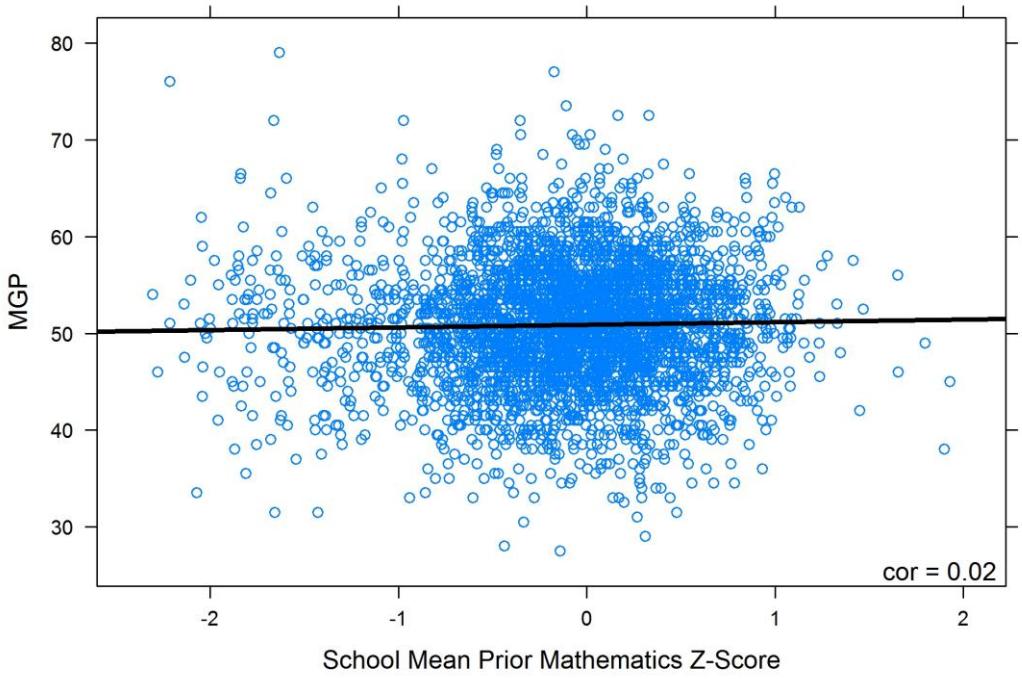


Figure 18. Relationship of Grades 4–8 School MGP Scores to Average Prior Mathematics Scores



Growth Ratings for Grades 4–8

This section describes the observed distribution of the growth ratings assigned using the rules described earlier in the results section. Table 17 shows the distribution for Grades 4–8 teachers, schools, and principals who serve students in Grades 4–8 (including, for instance, schools serving Grades 4–12) for 2011–12 to 2013–14.

Table 17. Grades 4–8 Teacher, School, and Principal Growth Ratings

School Year	Educator Level	Highly Effective	Effective	Developing	Ineffective
2011–12	Teacher	7%	77%	10%	6%
	School	6%	79%	8%	7%
2012–13	Teacher	7%	76%	11%	6%
	School	9%	75%	9%	7%
2013–14	Teacher	8%	77%	10%	6%
	Principal	6%	77%	10%	7%
	School	7%	76%	10%	7%

Stability of Growth Ratings for Grades 4–8 Over Time

For teachers who had growth ratings in 2012–13 and 2013–14, Table 18 shows the relationship between ratings across years. Table 19 shows the relationship for school-level MGPs. The results show that the ratings are stable, with about two-thirds remaining in the same growth rating category from year to year. The MGPs have a Pearson correlation coefficient of 0.42 for teachers and a correlation coefficient of 0.38 for schools between 2012–13 and 2013–14. These correlation coefficients are larger than those often reported in the literature on growth scores (e.g., see McCaffrey, Sass, Lockwood, & Mihaly, 2009), suggesting that the New York State MGPs are relatively stable compared with other growth measures.

Table 18. Grades 4–8 Teacher Growth Ratings for Teachers Present in Both 2012–13 and 2013–14

	Growth Rating 2013–14				
Growth Rating in 2012–13	**Highly Effective**	**Effective**	**Developing**	**Ineffective**	**Total**
Highly Effective	2%	5%	0%	0%	7%
Effective	5%	61%	6%	3%	76%
Developing	0%	8%	2%	1%	11%
Ineffective	0%	3%	1%	1%	6%
Total	8%	77%	9%	6%	100%

Note: Because of rounding, percentages may not add to 100.

Table 19. Grades 4–8 School Growth Ratings for Schools Present in Both 2012–13 and 2013–14

	Growth Rating 2013–14				
Growth Rating in 2012–13	**Highly Effective**	**Effective**	**Developing**	**Ineffective**	**Total**
Highly Effective	2%	6%	0%	0%	9%
Effective	5%	61%	6%	4%	75%
Developing	0%	6%	1%	1%	9%
Ineffective	0%	4%	1%	2%	7%
Total	7%	77%	9%	7%	100%

Note: Because of rounding, percentages may not add to 100.

Results for Grades 9–12

This section provides the results for the Grades 9–12 models using 2013–14 Regents Exam data.

Model Fit Statistics for Grades 9–12 Models

Table 20 shows the R-squared values for the MGP models based on ELA and Algebra Regents Exam data.

Table 20. Grades 9–12 Pseudo R-Squared Values

	2012–13		2013–14	
Subject	**Unadjusted Model**	**Adjusted Model**	**Unadjusted Model**	**Adjusted Model**
Comprehensive ELA	0.52	0.60	0.51	0.59
Integrated Algebra	0.46	0.52	0.45	0.49
ELA Common Core	—	—	0.40	0.45
Algebra 1 Common Core	—	—	0.51	0.55

The GRE model is not a linear model, so we do not provide pseudo R-squared values; instead, we evaluate the behavior of the model using impact data.

Correlation of Combined MGP With GRE Results

For Grades 9–12 in 2013–14, the correlation between a school's combined MGP and GRE results was 0.42, which may indicate that these two measures capture different aspects of student growth (one reason both measures were computed for Grades 9–12 schools and principals).

Fraction of Students Included in Measures

On average, the GRE measure includes a larger percentage of students in a Grades 9–12 school than does the combined MGP measure. Table 21 shows the percentages of students included in each measure.

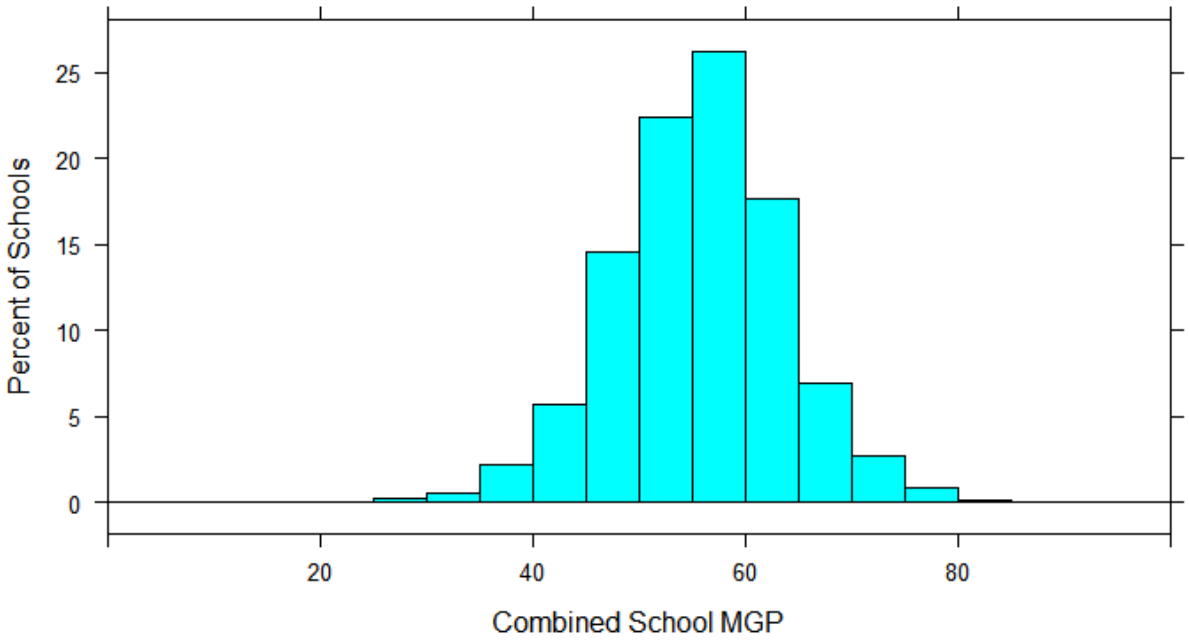
Table 21. Average Percentage of Students Included in Grades 9–12 Measures

Measure	**Mean Fraction of Students in a School Included in Measures**
MGP (ELA/Algebra)	45%
GRE	82%

Distribution of MGPs and GRE Scores for Grades 9–12

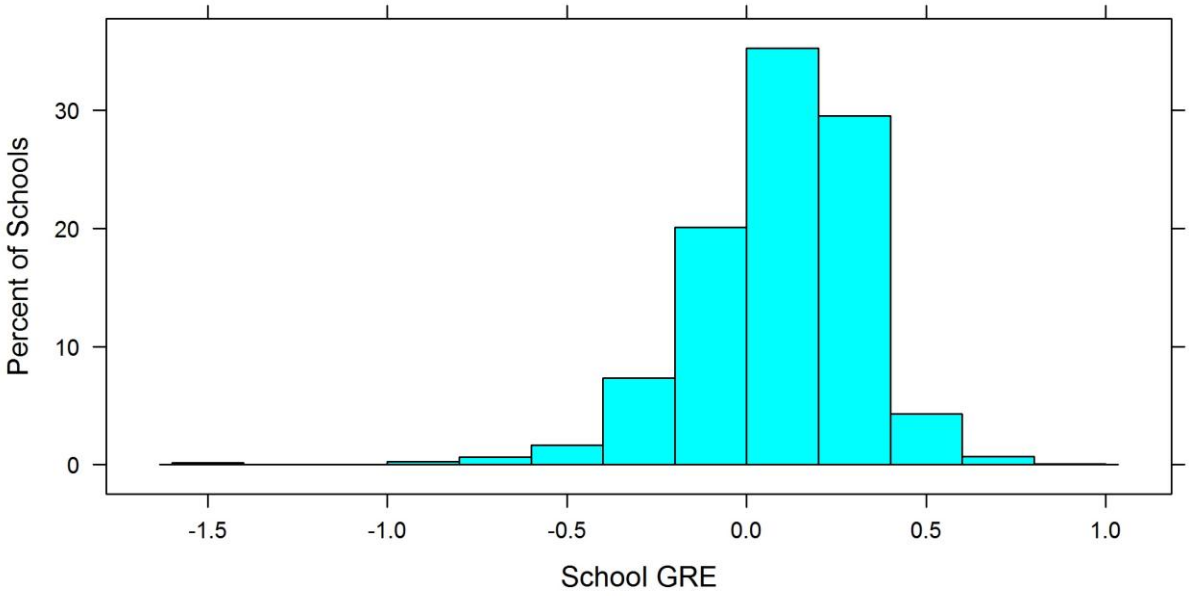
Figure 19 shows the distribution of combined school MGPs for Grades 9–12—that is, MGPs that combine information across SGPs in Algebra and ELA. The distribution is approximately normal.

Figure 19. Grades 9–12 Distribution of School MGP, Adjusted Model



The GRE model reports results as the number of Regents Exams that the average student in a school will pass compared to the number passed by similar students. For example, a GRE score of 0.25 would indicate that, on average, students in that school pass one-quarter of a Regents Exam more than do similar students. Over four years of high school, this rate per year would add up to an additional Regents Exam passed by each student. Figure 20 displays a histogram of GRE results. GRE results are somewhat skewed relative to the normal distribution.

Figure 20. Grades 9–12 Distribution of School GRE Scores, Adjusted Model



Precision of the Measures for Grades 9–12

The caterpillar plot in Figure 21 shows 100 randomly selected school MGPs and their confidence interval, giving a sense of the precision of the estimates. A second caterpillar plot in Figure 22 shows the GRE measure values and the associated confidence intervals. In both of these plots, it is apparent that the confidence intervals are small relative to the overall dispersion in the measures themselves.

Figure 21. Grades 9–12 Caterpillar Plot of School MGPs

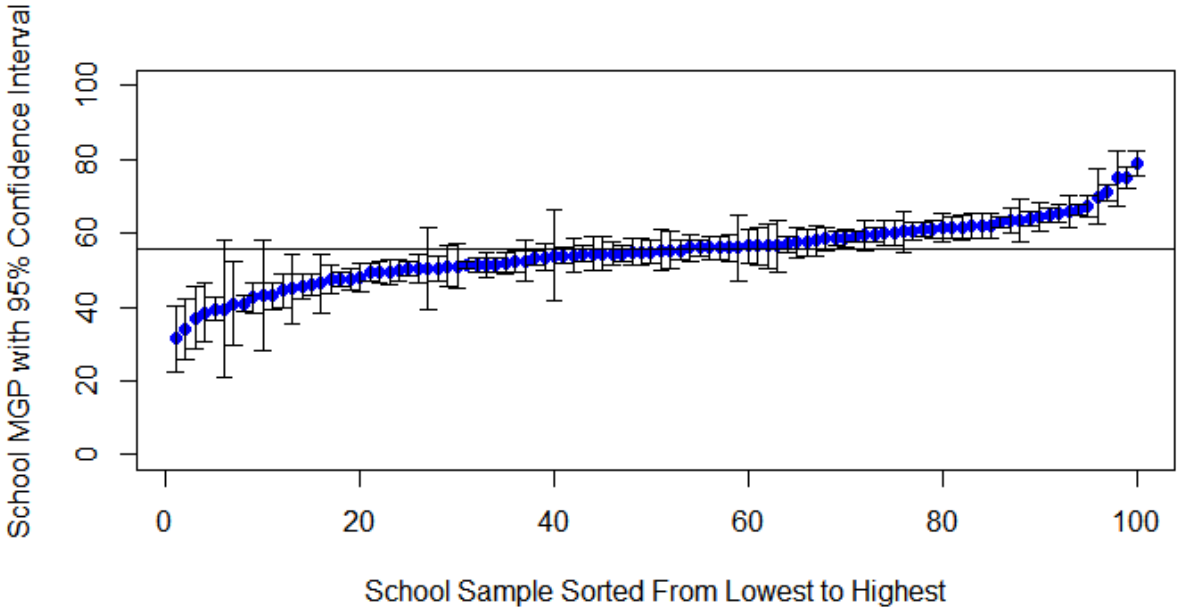


Figure 22. Grades 9–12 Caterpillar Plot of School GRE Results

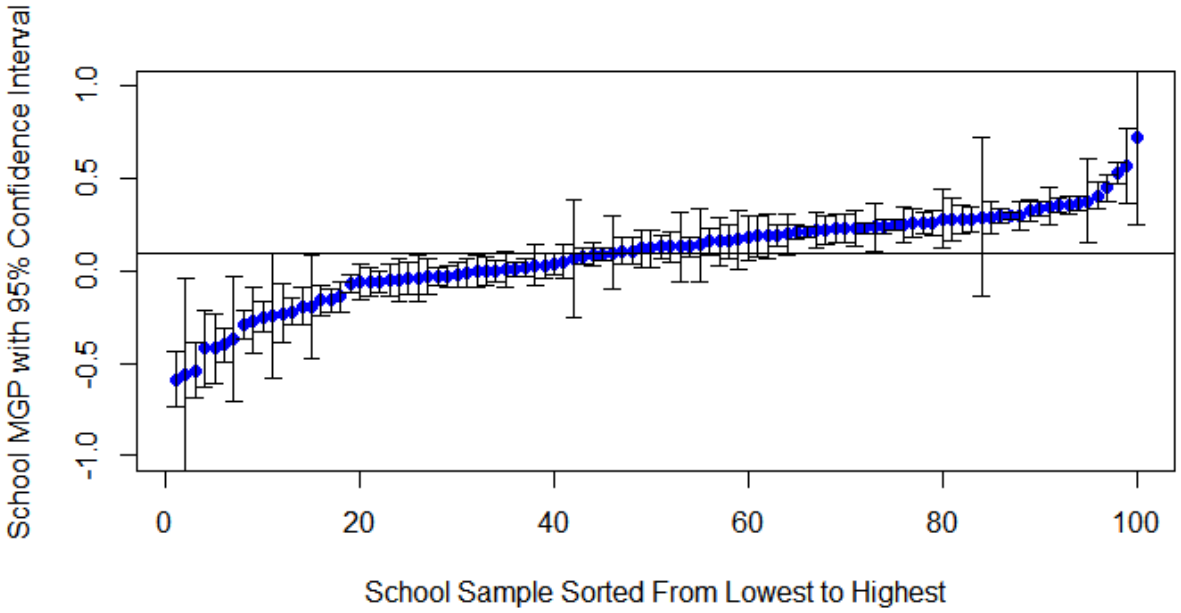


Table 22 shows the share of Grades 9–12 schools whose scores are significantly different from the mean (their confidence intervals on the caterpillar plot do not cross the average value). Once again, the share exceeds what would be expected by chance alone, indicating that the model is able to distinguish among schools.

Table 22. Percentage of Grades 9–12 School Measures Above or Below Mean at the 95 Percent Confidence Level

Educator Type and Measure	Below Mean	Above Mean
School MGP	30%	31%
School GRE	28%	38%

The reliability (ρ) statistic, which was introduced earlier as a measure of the precision of the MGP measure, is shown in Table 23 for both the GRE and MGP adjusted models for Grades 9–12 models. In both cases, the statistics are much closer to one than zero, indicating that the differentiation between schools seen in the measures is not largely due to measurement variance.

Table 23. Grades 9–12 Mean Standard Errors, Standard Deviation, and Value of ρ for Adjusted Model

Model	Adjusted Mean Standard Error	Adjusted Standard Deviation	Reliability Statistic (ρ)
MGP	2.6	8.0	0.89
GRE	0.075	0.236	0.90

Impact Data Results for Grades 9–12

Table 24 shows the correlations for the MGP and GRE adjusted models with several school-level demographic variables.[8] Several correlations for the GRE model are larger than 0.10 in absolute value. For example, schools that have a higher percentage of students with disabilities or lower achieving students receive lower GRE scores on average. Appendix I shows correlations of school characteristics with principal-level MGPs.

Table 24. Grades 9–12 School MGP Correlated With Demographic Characteristics

	2012–13		2013–14	
Percentage	MGP, Adjusted Model	GRE, Adjusted Model	MGP, Adjusted Model	GRE, Adjusted Model
ELL students in school	0.04	–0.21	0.04	0.00
Students with disabilities in school	–0.01	–0.24	–0.10	–0.29
Economically disadvantaged students in school	–0.01	–0.49	0.10	–0.03
Mean Grade 8 ELA score	0.06	0.52	0.15	0.45
Mean Grade 8 mathematics score	0.03	0.51	0.14	0.46

[8] Note that for Grades 9–12 models, prior scores are all from Grade 8 but are not all equated. Thus, they are all standardized by year and assessment before being used to compute the correlations shown in this section.

Figures 23 through 27 plot these data for MGP results, and Figures 28 through 32 plot these data for GRE results. The higher demographic correlations for the GRE measure (as compared to the MGP measure) are not surprising, given that the GRE measure is rooted in a status (or achievement) metric: passing enough Regents exams to earn a NYS diploma. At the same time, it is important to note that there is variation in school-level results at all levels of average prior achievement (as seen in the following figures), suggesting that schools can demonstrate strong results regardless of school characteristics.

Figure 23. Relationship of Grades 9–12 School MGP Scores to Percentage of ELL Students

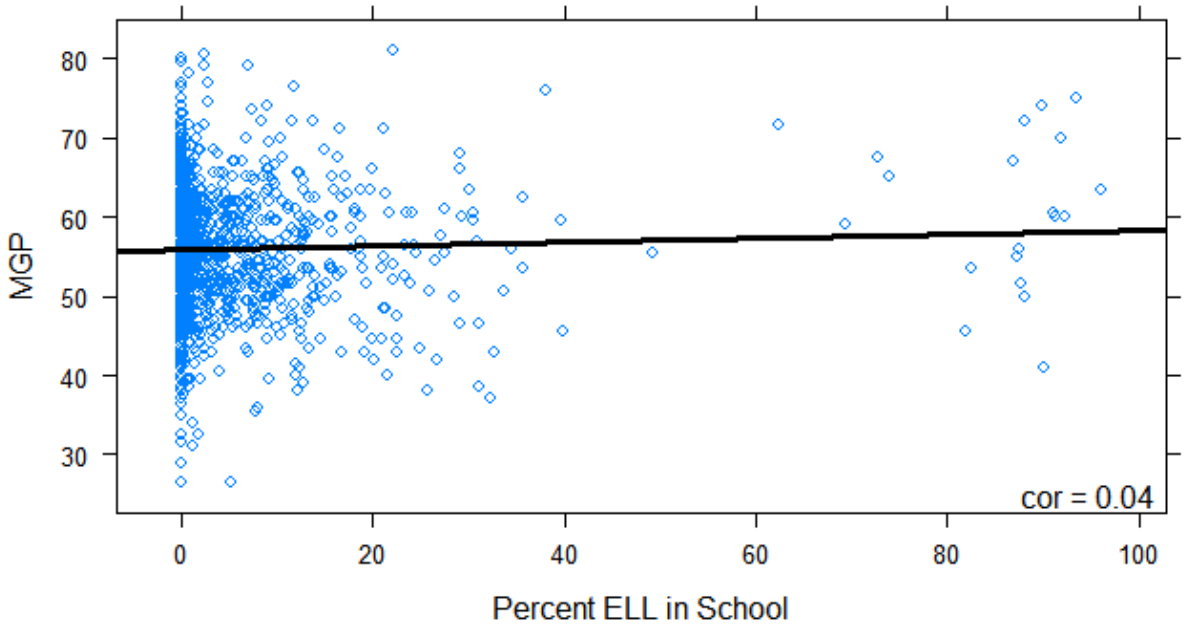


Figure 24. Relationship of Grades 9–12 School MGP Scores to Percentage of Students With Disabilities in School

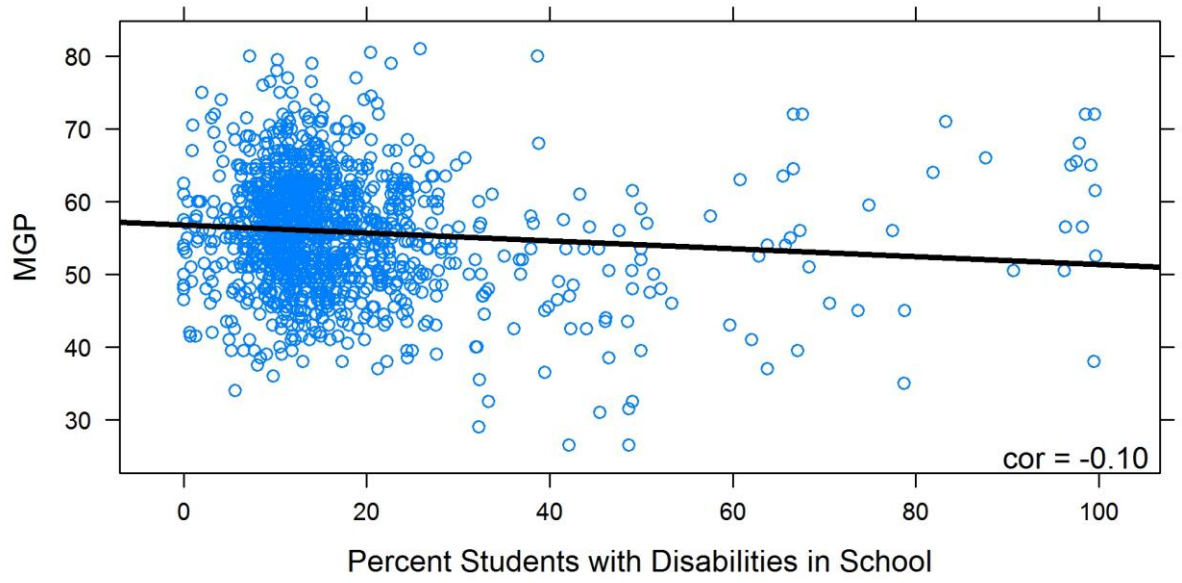


Figure 25. Relationship of Grades 9–12 School MGP Scores to Percentage of Economically Disadvantaged Students

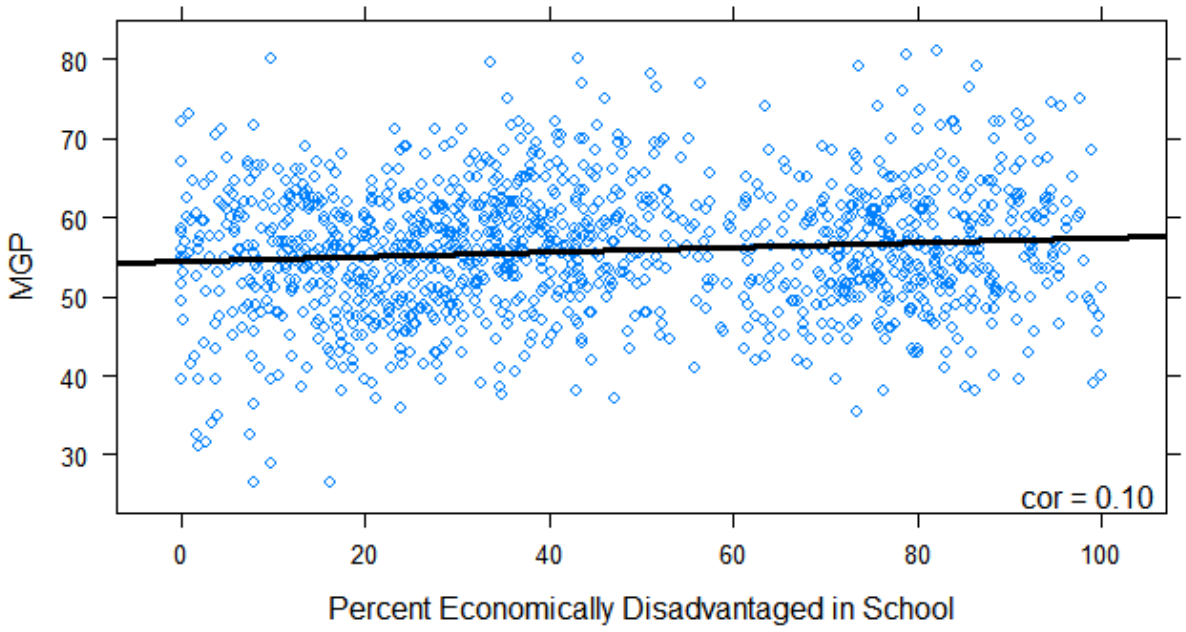


Figure 26. Relationship of Grades 9–12 School MGP Scores to Average Prior ELA Scores

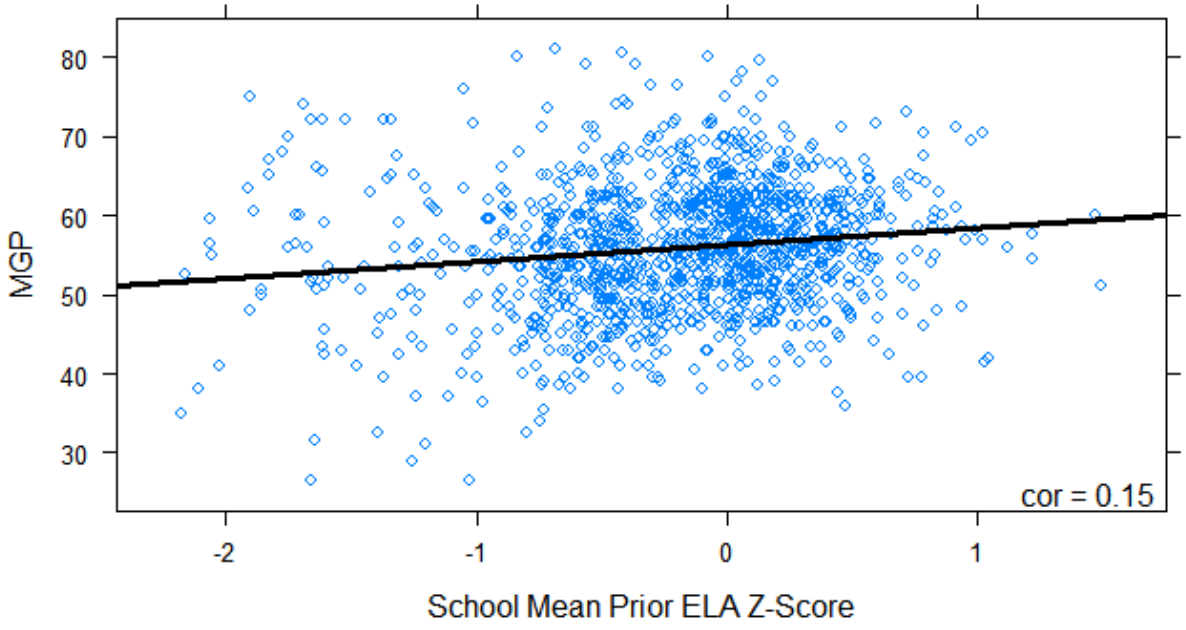


Figure 27. Relationship of Grades 9–12 School MGP Scores to Average Prior Mathematics Scores

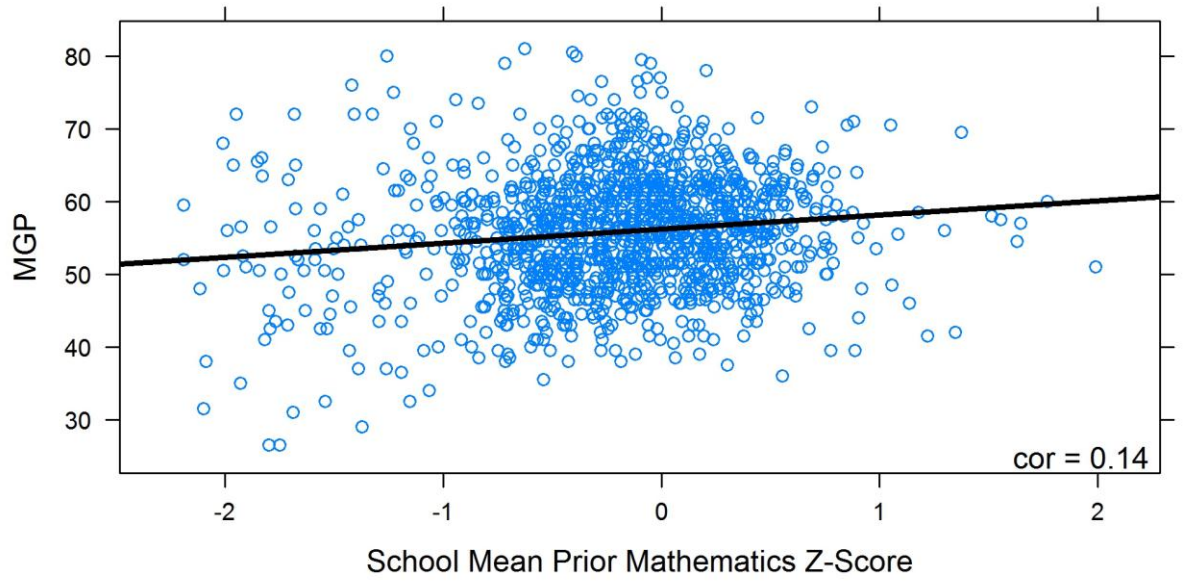


Figure 28. Relationship of Grades 9–12 School Growth in Regents Exam (GRE) Scores and Percentage of ELL Students in the School

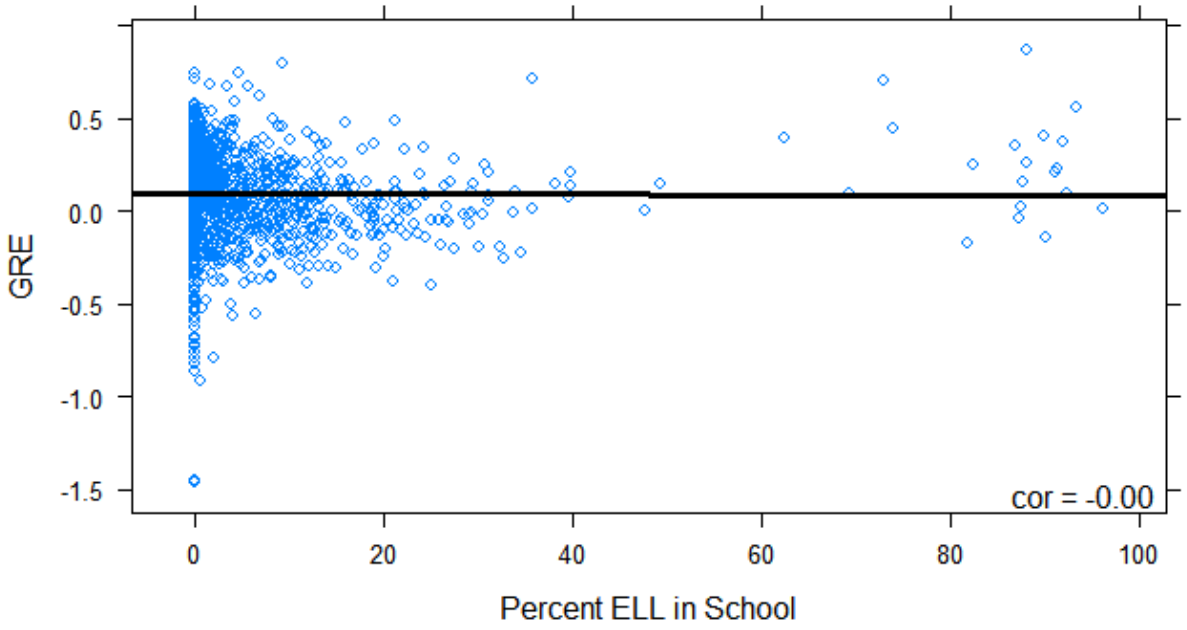


Figure 29. Relationship of Grades 9–12 School Growth in Regents Exam (GRE) Scores and Percentage of Students With Disabilities in the School

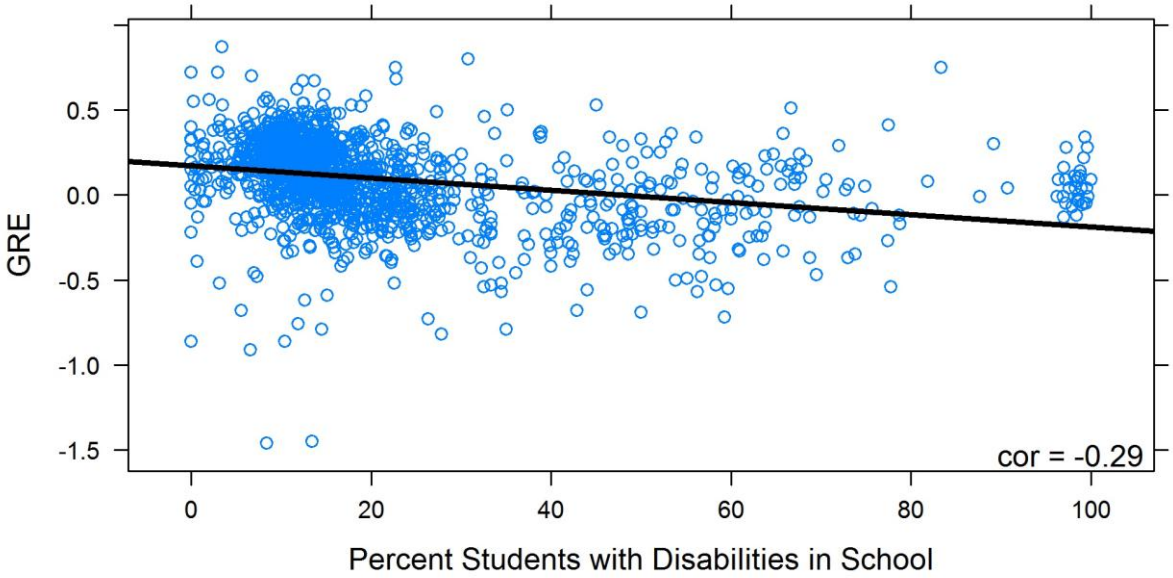


Figure 30. Relationship of Grades 9–12 School Growth in Regents Exam (GRE) Scores and Percentage of Economically Disadvantaged in the School

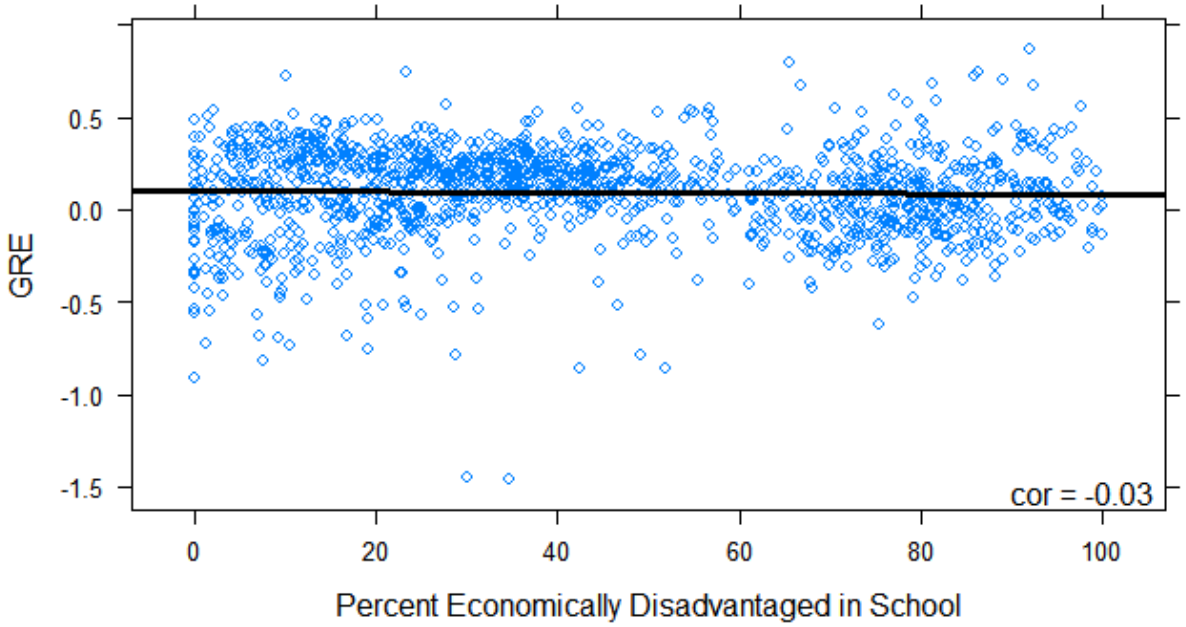


Figure 31. Relationship of Grades 9–12 School Growth in Regents Exam (GRE) Scores and Average Grade 8 ELA Scale Scores

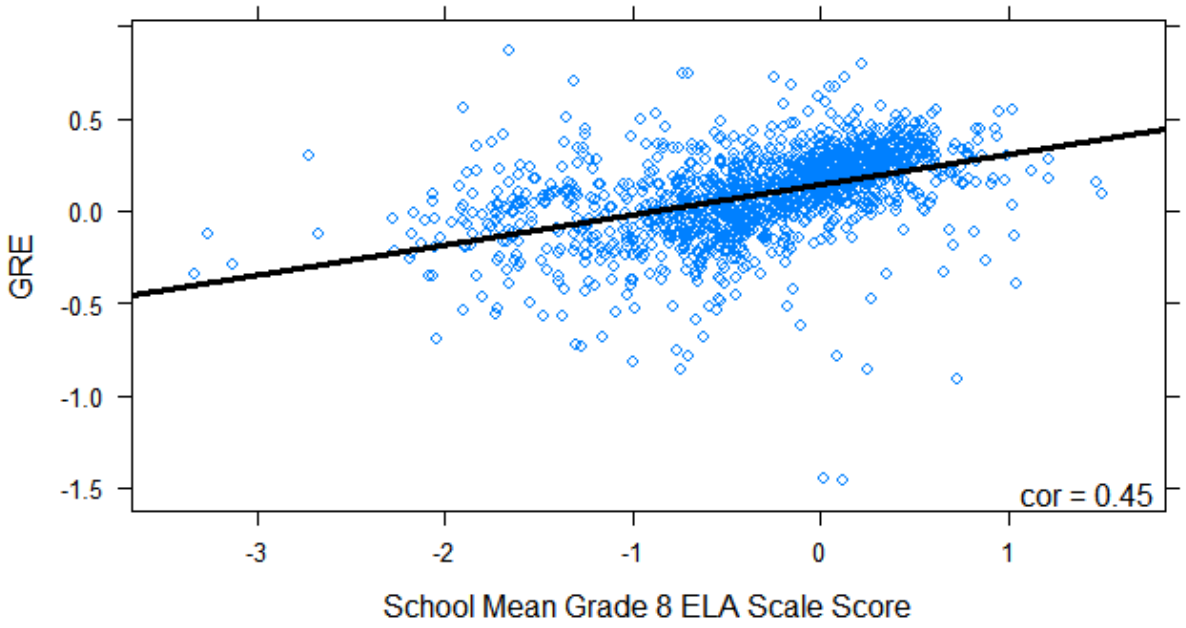
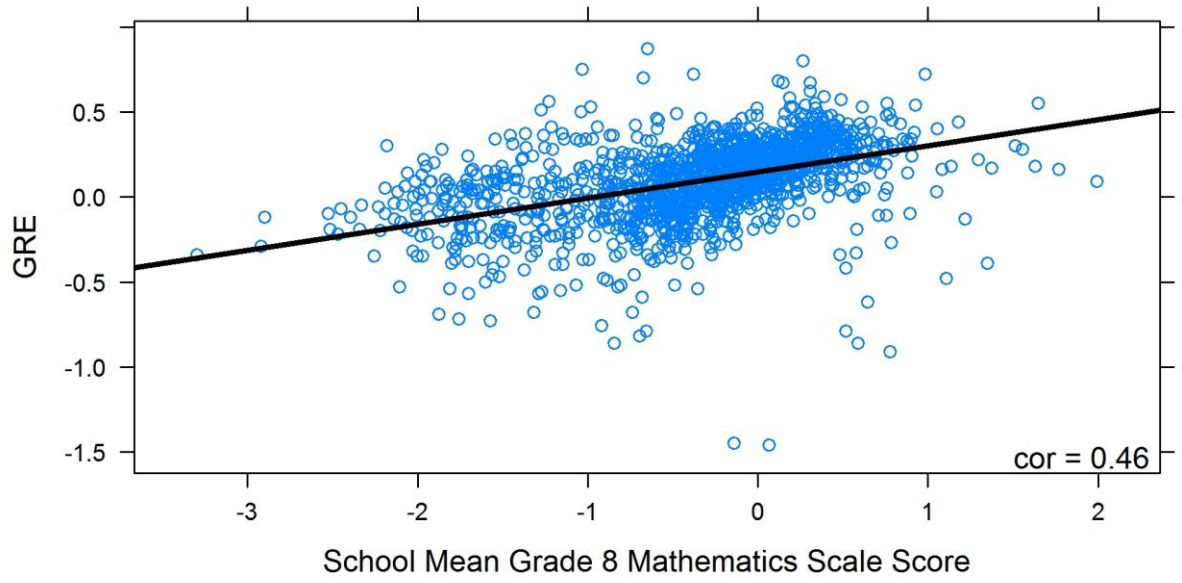


Figure 32. Relationship of Grades 9–12 School Growth in Regents Exam (GRE) Scores and Average Grade 8 Mathematics Scale Scores



Growth Ratings for Schools of Grades 9–12

Table 25 shows the distribution of growth ratings for schools and principals of all schools serving Grades 9–12 (including schools that may also serve other grades, such as Grades 4–8). Note that principal-level ratings were not computed in 2012–13.

Table 25. Distribution of Growth Ratings for Schools and Principals of Grades 9–12 in 2012–13 and 2013–14

Year	Educator Level	Highly Effective	Effective	Developing	Ineffective
2012–13	School	2%	86%	11%	2%
2013–14	Principal	3%	82%	12%	3%
	School	3%	82%	12%	4%

Note: Because of rounding, percentages may not add to 100.

For schools with growth ratings in 2012–13 and 2013–14,

Table 26 shows the relationship between school ratings across years. The results show that the ratings are stable, with about 84 percent of schools remaining in the same growth rating category from year to year.

Table 26. Grades 9–12 School Growth Ratings for Schools Present in Both 2012–13 and 2013–14

	Growth Rating 2013–14				
Growth Rating in 2012–13	Highly Effective	Effective	Developing	Ineffective	Total
Highly Effective	1%	1%	0%	0%	2%
Effective	2%	80%	4%	0%	86%
Developing	0%	7%	3%	0%	10%
Ineffective	0%	1%	1%	0%	2%
Total	3%	89%	8%	1%	100%

Note: Because of rounding, percentages may not add to 100.

Growth Ratings for Schools and Principals Serving Grades 4–8 and Grades 9–12

Some schools receive separate growth ratings for Grades 4–8 and Grades 9–12. Table 27 shows growth ratings for schools that serve only Grades 4–8 (4–8 only), schools that serve Grades 9–12 only (9–12 only), schools that serve Grades 4–12 and receive both 4–8 and 9–12 growth ratings (4–8 and 9–12), and all schools that received a growth rating (all schools). Table 28 shows similar information for principals.

Table 27. Growth Ratings for Schools in 2013–14

	Inclusion	Highly Effective	Effective	Developing	Ineffective	Number of Schools
4–8 Growth Rating	4–8 only	7%	77%	9%	7%	3,249
	4–8 and 9–12	6%	74%	12%	8%	393
	All schools	7%	76%	10%	7%	3,642
9–12 Growth Rating	9–12 only	2%	81%	13%	5%	1,050
	4–8 and 9–12	4%	83%	10%	2%	393
	All schools	3%	82%	12%	4%	1,443
Overall Growth Rating	4–8 and 9–12	2%	86%	12%	0%	393
	All schools	5%	78%	10%	6%	4,692

Note: Because of rounding, percentages may not add to 100.

Table 28. Growth Ratings for Principals in 2013–14

	Inclusion	Highly Effective	Effective	Developing	Ineffective	Number of Principals
4–8 Growth Rating	4–8 only	6%	77%	10%	7%	3,135
	4–8 and 9–12	5%	74%	12%	9%	402
	All Principals	6%	77%	10%	7%	3,537
9–12 Growth Rating	9–12 only	2%	82%	13%	3%	879
	4–8 and 9–12	4%	81%	10%	4%	402
	All Principals	3%	82%	12%	3%	1,281
Overall Growth Rating	4–8 and 9–12	1%	84%	14%	1%	402
	All Principals	5%	79%	11%	6%	4,416

Note: Because of rounding, percentages may not add to 100.

Conclusion

In 2014–15, New York State plans to maintain the MGP and GRE models used to produce educator growth measures, including the student characteristics accounted for in the models, while continuing to provide technical support to the field in the areas of data collection and reporting.

References

Betebenner, D. W. (2009). Norm- and criterion-referenced student growth. *Educational Measurement: Issues and Practices, 28*(4), 42–51.

Goldstein, H. (1995). *Multilevel statistical models.* University of Bristol, Bristol, UK: Author. Retrieved from http://www.bristol.ac.uk/cmm/team/hg/multbook1995.pdf

Greene, W. H. (2003). *Econometric analysis* (5th ed.). Upper Saddle River, NJ: Prentice Hall.

Hausman, J. (2001). Mismeasured variables in econometric analysis: Problems from the right and problems from the left. *Journal of Economic Perspectives, 15*(4), 57–67.

Henderson, C. R. (1953). Estimation of variance and covariance components. *Biometrics, 9*, 226–252.

McCaffrey, D. F., Lockwood, J. R., Koretz, D. M., & Hamilton, L. S. (2004). *Evaluating value-added models for teacher accountability*. Santa Monica, CA: RAND.

McCaffrey, D. F., Sass, T. R., Lockwood, J. R., & Mihaly, K. (2009). The intertemporal variability of teacher effect estimates. *Education, Finance and Policy, 4*(4), 572–606.

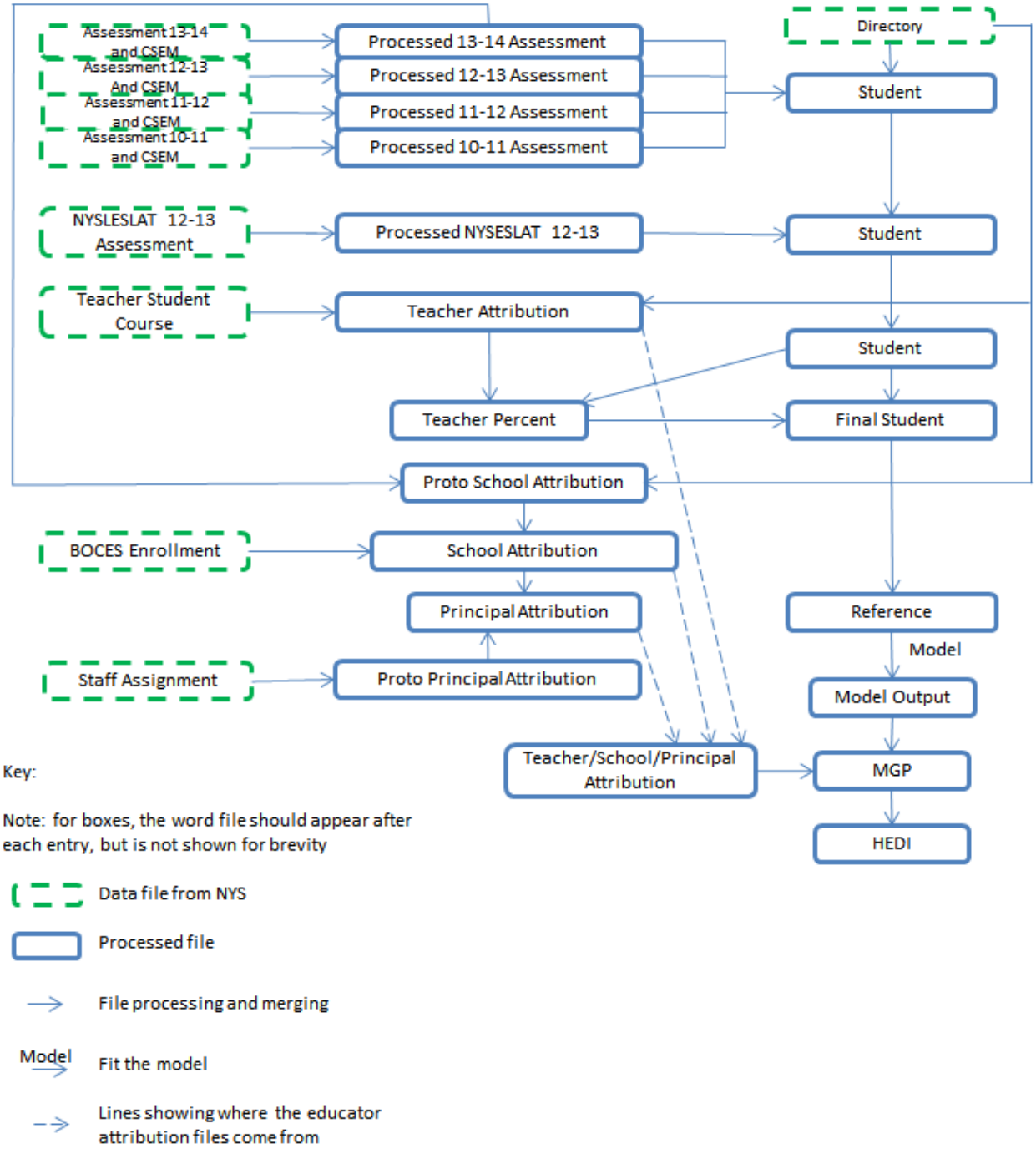
Wei, Y., & Carroll, R. J. (2009). Quantile regression with measurement error. *Journal of the American Statistical Association, 104*, 1129–1143.

Appendix A. Technical Advisory Committee Members

Participant	Affiliation*
Technical Advisory Committee	
Dan Goldhaber	University of Washington
Hamilton Lankford	State University of New York at Albany
Daniel F. McCaffrey	Educational Testing Service/RAND
Jonah Rockoff	Columbia University
Tim R. Sass	Georgia State University
Douglas Staiger	Dartmouth College
Marty West	Harvard University
James A. Wyckoff	University of Virginia

*Note that affiliations are shown as of the time of the Technical Advisory Group's meetings with New York State in 2012 and 2013.

Appendix B. Grades 4–8 Data Processing Overview



Appendix C. Grades 4–8 Item Descriptions Used in Analysis

The teacher-student-course linkage file includes information about courses taught to students. The item description provides information about which courses are relevant to state tests. Table C-1 shows the records used for growth model analysis.

Table C-1. Relevant Item Descriptions

Item Description
Grade 3 ELA
Grade 3 Math
Grade 4 ELA
Grade 4 Math
Grade 5 ELA
Grade 5 Math
Grade 6 ELA
Grade 6 Math
Grade 7 ELA
Grade 7 Math
Grade 8 ELA
Grade 8 Math

Appendix D. Model Derivation

The following describes a general case of the growth model described in this report. In New York State in 2013–14, there were no indicator variables included for specific educators and so the **Z** and **D** matrix in the following are always zero in every entry.

To describe how the model accounts for measurement variance, we first re-express the true score regression as:

$$\mathbf{y}_{\mathrm{t}}^{*} = \mathbf{X}\boldsymbol{\beta} + \sum_{r=1}^{L} \mathbf{y}_{t-r}^{*}\boldsymbol{\gamma}_{t-r} + \mathbf{Z}\boldsymbol{\theta} + \mathbf{e}. \qquad \textbf{[1]}$$

We use * to denote the variables without measurement variance. For convenience, define the matrices $\mathbf{W} = \{\mathbf{X}, \mathbf{y}_{t-1}, \mathbf{y}_{t-2}, \ldots, \mathbf{y}_{t-L}\}$, $\mathbf{W}^{*} = \{\mathbf{X}, \mathbf{y}_{t-1}^{*}, \mathbf{y}_{t-2}^{*}, \ldots, \mathbf{y}_{t-L}^{*}\}$, and $\boldsymbol{\delta}' = \{\boldsymbol{\beta}', \boldsymbol{\gamma}'\}$. Label the matrix of measurement variance disturbances $\boldsymbol{U}$ for disturbances associated with $\mathbf{y}_{t-1}, \mathbf{y}_{t-2}, \ldots, \mathbf{y}_{t-L}$, and label the vector of measurement disturbances with the dependent variable, $\mathbf{y}_{t}$, **v**, hence $\mathbf{y}_{t} = \mathbf{y}_{t}^{*} + \mathbf{v}$. Let $\boldsymbol{U}$ have the same dimension as **W**, but only the final *L* columns of $\boldsymbol{U}$ are nonzero, so $\mathbf{W} = \mathbf{W}^{*} + \mathbf{U}$. If those disturbances were observed, the parameters $\{\boldsymbol{\delta}', \boldsymbol{\theta}'\}$ can be estimated using Henderson's methods (1953) by solving the following mixed model equations:

$$\begin{pmatrix} \boldsymbol{W}^{*\prime}\boldsymbol{\Omega}^{-1}\mathbf{W}^{*} & \boldsymbol{W}^{*\prime}\boldsymbol{\Omega}^{-1}\mathbf{Z} \\ \boldsymbol{Z}'\boldsymbol{\Omega}^{-1}\mathbf{W}^{*} & \boldsymbol{Z}'\boldsymbol{\Omega}^{-1}\mathbf{Z} + \mathbf{D}^{-1} \end{pmatrix} \begin{pmatrix} \boldsymbol{\delta} \\ \boldsymbol{\theta} \end{pmatrix} = \begin{pmatrix} \boldsymbol{W}'\boldsymbol{\Omega}^{-1}\mathbf{y}_{\mathrm{t}}^{*} \\ \boldsymbol{Z}'\boldsymbol{\Omega}^{-1}\mathbf{y}_{\mathrm{t}}^{*} \end{pmatrix}. \qquad \textbf{[2]}$$

The matrix **D** is made up of *Q* diagonal blocks, one for each level in the hierarchy. Each diagonal is constructed as $\sigma_{q}^{2}\mathbf{I}_{q}$, where $\mathbf{I}_{q}$ is an identity matrix with dimension equal to the number of units at level *q*, and σ_{q}^{2} is the estimated variance of the random effects among units at level *q*. When concatenated diagonally, the square matrix **D** has dimension $m = \sum_{q=1}^{Q} J_{q}$.

Two complications intervene. First, we cannot observe **U**, and second, the unobservable nature of this term, along with the heterogeneous measurement variance in the dependent variable, renders this estimator inefficient.

Addressing the first issue, on expansion we see that:

$$\mathbf{W}'\boldsymbol{\Omega}^{-1}\mathbf{W} = (\mathbf{W}^{*\prime} + \mathbf{U}')\boldsymbol{\Omega}^{-1}(\mathbf{W}^{*} + \mathbf{U}) = \mathbf{W}^{*\prime}\boldsymbol{\Omega}^{-1}\mathbf{W}^{*} + \mathbf{U}'\boldsymbol{\Omega}^{-1}\mathbf{W}^{*} + \mathbf{W}^{*\prime}\boldsymbol{\Omega}^{-1}\mathbf{U} + \mathbf{U}'\boldsymbol{\Omega}^{-1}\mathbf{U}.$$

Taking expectation over the measurement error distributions and treating the true score matrix, $\mathbf{W}^{*}$, as fixed, we have:

$$\mathrm{E}(\mathbf{W}'\boldsymbol{\Omega}^{-1}\mathbf{W}) = \mathrm{E}\left((\mathbf{W}^{*\prime} + \mathbf{U}')\boldsymbol{\Omega}^{-1}(\mathbf{W}^{*} + \mathbf{U})\right) = \mathbf{W}^{*\prime}\boldsymbol{\Omega}^{-1}\mathbf{W}^{*} + \mathrm{E}(\mathbf{U}'\boldsymbol{\Omega}^{-1}\mathbf{U}).$$

Rearranging terms gives:

$$\mathbf{W}^{*\prime}\boldsymbol{\Omega}^{-1}\mathbf{W}^{*} = \mathrm{E}(\mathbf{W}'\boldsymbol{\Omega}^{-1}\mathbf{W}) - \mathrm{E}(\mathbf{U}'\boldsymbol{\Omega}^{-1}\mathbf{U}).$$

We also have $\mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{W}^{*} = \mathrm{E}(\mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{W})$, with the expectation taken over the measurement error distributions associated with observed **W**, and $\begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{y}_{\mathrm{t}}^{*}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{y}_{\mathrm{t}}^{*}\end{pmatrix} = \mathrm{E}\begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\end{pmatrix}$, with the expectation taken over the measurement error distributions associated with observed $\mathbf{y}_t$.

Addressing the second issue, both the right-side and left-side variables in the model equation measured with variance contribute to the heteroscedasticity. Although the correction $\mathbf{U}'\mathbf{\Omega}^{-1}\mathbf{U}$ eliminates the bias due to measurement variance associated with the independent variables, we still do not have a variance-free measure of **y** for any time period. Therefore, the residual is made up of:

$$\bar{\bar{\mathbf{y}}} - \mathbf{W}'\boldsymbol{\delta} = -\mathbf{U}'\boldsymbol{\delta} + \mathbf{v} + \mathbf{e},$$

where $\bar{\bar{\mathbf{y}}} = \mathbf{y} - \mathbf{Z}\tilde{\boldsymbol{\theta}}$, and $\tilde{\boldsymbol{\theta}}$ is the conditional mean of the random effects. The residual variance of any given observation is:

$$\sigma_{ti}^{2} = \sigma_{e}^{2} + \sum_{r=1}^{L}\delta_{t-r}^{2}\sigma_{u,t-r(i)}^{2},$$

where $\sigma_{u,t-r(i)}^{2}$ is the known measurement variance of *r* prior test scores. Now, let $\mathbf{\Omega}$ be a diagonal matrix of dimension *N* with diagonal elements σ_{ti}^{2}.

With the above, we can define the mixed model equations as:

$$\begin{pmatrix}\mathrm{E}(\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{W}) - \mathrm{E}(\mathbf{U}'\mathbf{\Omega}^{-1}\mathbf{U}) & \mathrm{E}(\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{Z})\\ \mathrm{E}(\mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{W}) & \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{Z} + \mathbf{D}^{-1}\end{pmatrix}\begin{pmatrix}\boldsymbol{\delta}\\ \boldsymbol{\theta}\end{pmatrix} = \mathrm{E}\begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\end{pmatrix}.$$

Using observed scores and measurement error variance, the mixed model equations are redefined as:

$$\begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{W} - \mathrm{E}(\mathbf{U}'\mathbf{\Omega}^{-1}\mathbf{U}) & \mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{Z}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{W} & \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{Z} + \mathbf{D}^{-1}\end{pmatrix}\begin{pmatrix}\boldsymbol{\delta}\\ \boldsymbol{\theta}\end{pmatrix} = \begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\end{pmatrix}.$$

Observed Values for $\mathbf{E}(\mathbf{U}'\mathbf{\Omega}^{-1}\mathbf{U})$

As indicated, **U** is unobserved, so solving the mixed model equation cannot be computed unless **U** is replaced with some observed values. First, the mixed model equations are redefined as:

$$\begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{W} - \mathbf{S} & \mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{Z}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{W} & \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{Z} + \mathbf{D}^{-1}\end{pmatrix}\begin{pmatrix}\boldsymbol{\delta}\\ \boldsymbol{\theta}\end{pmatrix} = \begin{pmatrix}\mathbf{W}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\\ \mathbf{Z}'\mathbf{\Omega}^{-1}\mathbf{y}_{t}\end{pmatrix},$$

where **S** is a diagonal "correction" matrix with dimensions $p \times p$ accounting for measurement variance in the predictor variables, $p = p_{\mathbf{X}} + L$, and $p_{\mathbf{X}}$ is the column dimension of **X**.

The matrix **S** is used in lieu of $E(\mathbf{U}'\mathbf{\Omega}^{-1}\mathbf{U})$ based on the following justification. Recall that we previously defined $\mathbf{\Omega}$ as $\mathrm{diag}(\sigma_{t1}^{2}, \sigma_{t2}^{2}, \ldots, \sigma_{tN}^{2})$, and the matrix of unobserved disturbances is:

$$\boldsymbol{U} = \begin{bmatrix}\mathbf{0}_{p_{\mathbf{X}}} & \mathbf{0}\\ \mathbf{0} & \boldsymbol{U}_{L}\end{bmatrix},$$

where $\mathbf{0}_{p_{\mathbf{X}}}$ is a matrix of dimension of $p_{\mathbf{X}}$ with elements of 0, and

$$\boldsymbol{U}_L = \begin{bmatrix} u_{11} & u_{12} & \dots & u_{1L} \\ u_{21} & u_{22} & \dots & u_{2L} \\ \vdots & \vdots & \ddots & \vdots \\ u_{N1} & u_{N2} & \dots & u_{NL} \end{bmatrix}$$

The theoretical result of the matrix operation yields the following symmetric matrix:

$$\mathbf{U}_{\mathrm{L}}{}'\boldsymbol{\Omega}^{-1}\mathbf{U}_{\mathrm{L}} = \begin{bmatrix} \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} u_{i1}^2 & & \dots & \\ \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} u_{i1}u_{i2} & \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} u_{i2}^2 & \dots & \\ \vdots & \vdots & \ddots & \vdots \\ \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} u_{i1}u_{iL} & \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} u_{i2}u_{iL} & \dots & \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} u_{iL}^2 \end{bmatrix}.$$

The theoretical result is limited only because we do not observe u_{ip} because it is latent. However, $E(u_{ip}u_{ip}) = \sigma_{ip}^2$, where σ_{ip}^2 is taken as the conditional standard error of measurement for student *i*. The theoretical result also simplifies because variances of measurement on different variables are by expectation uncorrelated: $E(u_{ip}u_{ip'}) = 0$ when $p \neq p'$.

Because the conditional standard error of measurement varies for each student *i* and the off-diagonals can be ignored, let **S** be:

$$\mathbf{S} = \mathrm{diag}\left(0, \dots, 0, \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} \sigma_{u,t-1(i)}^2, \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} \sigma_{u,t-2(i)}^2, \dots, \sum_{i=1}^{N} \frac{1}{\sigma_{ti}^2} \sigma_{u,t-L(i)}^2\right),$$

where $\sigma_{u,j(i)}^2$ denotes the measurement variance for the *j*th, $j = (1, 2, \dots L)$, variable measured with variance.

Appendix E. Interpolating Standard Errors of Measurement at the Lowest and Highest Obtainable Scale Scores (LOSS and HOSS)

The linear model used to produce student-level predictions $\widehat{\boldsymbol{y}}_{\boldsymbol{i}}$ can cause these predictions to fall outside the boundaries of the defined score scale. Let the floor and ceiling in the data be denoted as $\boldsymbol{\eta}_{\boldsymbol{f}}$ and $\boldsymbol{\eta}_{\boldsymbol{c}}$, respectively. It is therefore possible that $\widehat{\boldsymbol{y}}_{\boldsymbol{i}} < \boldsymbol{\eta}_{\boldsymbol{f}}$ or $\boldsymbol{\eta}_{\boldsymbol{c}} < \widehat{\boldsymbol{y}}_{\boldsymbol{i}}$. However, the observed score can never fall outside these bounds.

When a prediction falls outside the boundaries of the score scale, it can cause bias in the statistics used to characterize a student, teacher, or school. This phenomenon seems to occur as a result of the large conditional standard errors of measurement at the extreme scores, $\boldsymbol{csem}(\widehat{\boldsymbol{\theta}}_{\boldsymbol{i}})$. The following procedure is implemented to deal with these large standard errors.

Interpolation Procedure for Conditional Standard Errors of LOSS and HOSS

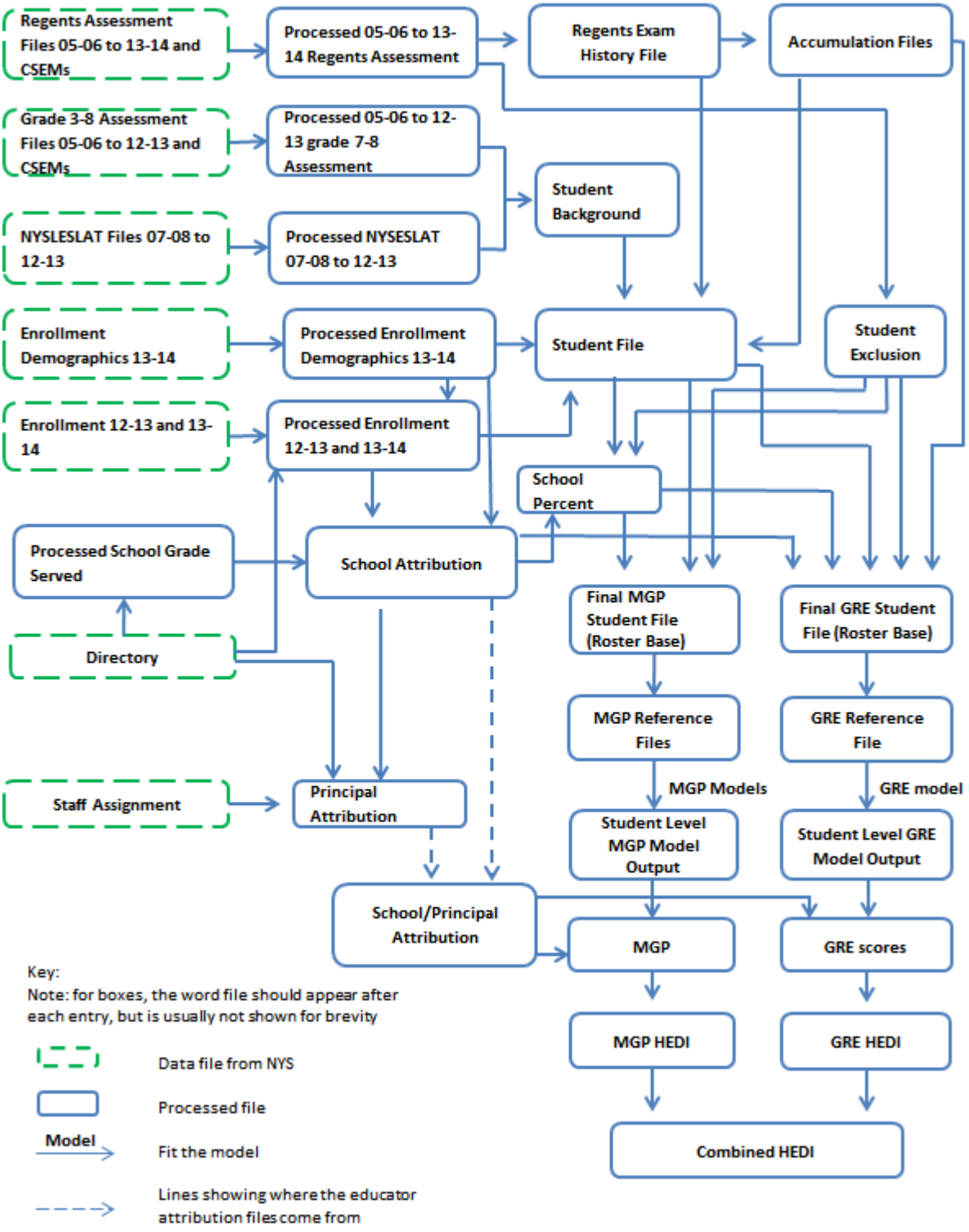
Interpolate new conditional standard errors of measurement as the "nearest neighbor" or any extreme value. Thus, for an $M = 2$ cutoff, the HOSS and score immediately below the HOSS, the SEM associated with the score two below the HOSS would be used. Similarly, the LOSS and score immediately above the LOSS would have the SEM associated with the score two above the LOSS. As *M* increases, more points are included, and the point they are set to moves in toward the middle of the scale score distribution.

Implement the linear regression using the following steps:

1. Run the regression without modification.
2. Verify that $\eta_f \leq \hat{y}_i \leq \eta_c$ for all *i*.
3. If the inequality in step 2 is true, stop; the run is complete. Otherwise, continue to step 4.
4. Set $M = 1$ and update the SEMs of the exact HOSS and LOSS scores.
5. Use the updated $\text{csem}(\hat{\theta}_i)$ in lieu of the standard error of the LOSS or HOSS in the test score data.
6. Run the growth model.
7. Verify the inequality in step 2; if it holds, stop updating. If it does not hold, increase *M* by 1 and return to step 5.

If this method does not result in the inequality in step 2 being met after $M = 7$ (i.e., after running with $M = 7$), then simply take the most recent run that did converge, set $\hat{y}_i = \eta_c$ where $\hat{y}_i > \eta_c$ and $\hat{y}_i = \eta_f$ where $\hat{y}_i < \eta_f$. For the predicted variance, use the predicted variance of the closest estimate where the inequality in step 6 does hold.

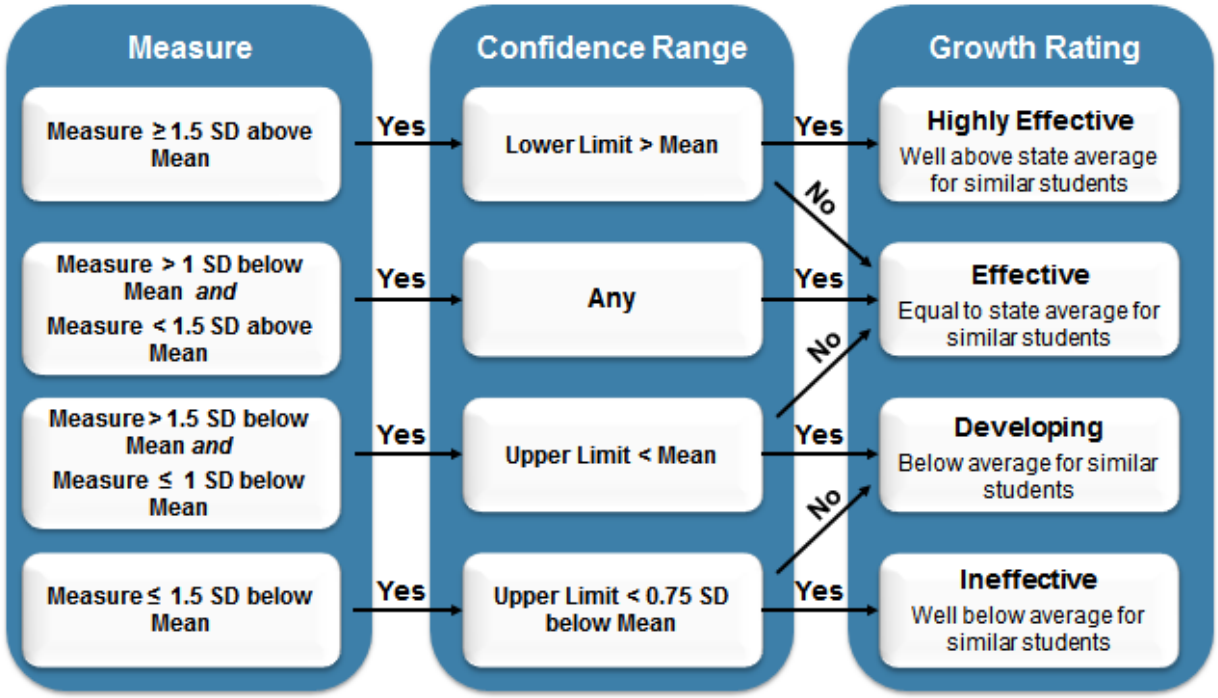
Appendix F. Grades 9–12 Data Processing Overview



Appendix G. Assigning HEDI Ratings and Points

HEDI ratings are assigned according to Figure G-1, shown in the body of the report but repeated here for reference.

Figure G-1. HEDI Rating Rules



Notes: SD = Standard Deviation
Values are rounded to the nearest whole number.

HEDI ratings are assigned in Grades 4–8 for the combined MGPs (pooled across Grades 4–8 ELA and Grades 4–8 mathematics), in Grades 9–12 for the combined growth model (pooled across ELA and Algebra), and in Grades 9–12 for the GRE model. Values used in 2013–14 to assign HEDI ratings for teachers are shown in Table G-1; for schools, in Table G-2; and for principals, in Table G-3.

Table G-1. Teacher HEDI Rating Values for 2013–14

Mean	51.0907
SD	10.80857
Highly Effective	67 ≤ MGP and confidence range lower limit > 51
Effective	67 ≤ MGP and confidence range lower limit ≤ 51
Effective	40 < MGP < 67
Effective	35 < MGP ≤ 40 and confidence range upper limit ≥51
Developing	35 < MGP ≤ 40 and confidence range upper limit < 51
Developing	MGP ≤ 35 and confidence range upper limit ≥ 43
Ineffective	MGP ≤ 35 and confidence range upper limit < 43

Table G-2. School HEDI Rating Values for 2013–14

	Grades 4–8 Growth Model	Grades 9–12 Growth Model	Grades 9–12 GRE Model
Mean	50.87795	55.86970	0.096244
SD	6.225419	7.961927	0.236486
Highly Effective	60 ≤ MGP and confidence range lower limit > 51	68 ≤ MGP and confidence range lower limit > 56	0.45 ≤ GRE and confidence range lower limit > 0.10
Effective	60 ≤ MGP and confidence range lower limit ≤ 51	68 ≤ MGP and confidence range lower limit ≤ 56	0.45 ≤ GRE and confidence range lower limit ≤ 0.10
Effective	45 < MGP < 60	48 < MGP < 68	-0.14 < GRE < 0.45
Effective	42 < MGP ≤ 45 and confidence range upper limit ≥ 51	44 < MGP ≤ 48 and confidence range upper limit ≥ 56	-0.26 < GRE ≤ -0.14 and confidence range upper limit ≥ 0.10
Developing	42 < MGP ≤ 45 and confidence range upper limit < 51	44 < MGP ≤ 48 and confidence range upper limit < 56	-0.26 < GRE ≤ -0.14 and confidence range upper limit < 0.10
Developing	MGP ≤ 42 and confidence range upper limit ≥ 46	MGP ≤ 44 and confidence range upper limit ≥ 50	GRE ≤ -0.26 and confidence range upper limit ≥ -0.08
Ineffective	MGP ≤ 42 and confidence range upper limit < 46	MGP ≤ 44 and confidence range upper limit < 50	GRE ≤ -0.26 and confidence range upper limit < -0.08

Table G-3. Principal HEDI Rating Values for 2013–14

	Grades 4–8 Growth Model	Grades 9–12 Growth Model	Grades 9–12 GRE Model
Mean	50.66469	56.09799	0.121944
SD	6.040384	7.751312	0.218698
Highly Effective	60 ≤ MGP and confidence range lower limit > 51	68 ≤ MGP and confidence range lower limit > 56	0.45 ≤ GRE and confidence range lower limit > 0.12
Effective	60 ≤ MGP and confidence range lower limit ≤ 51	68 ≤ MGP and confidence range lower limit ≤ 56	0.45 ≤ GRE and confidence range lower limit ≤ 0.12
Effective	45 < MGP < 60	48 < MGP < 68	-0.10 < GRE < 0.45
Effective	42 < MGP ≤ 45 and confidence range upper limit ≥ 51	44 < MGP ≤ 48 and confidence range upper limit ≥ 56	-0.21 < GRE ≤ -0.10 and confidence range upper limit ≥ 0.12
Developing	42 < MGP ≤ 45 and confidence range upper limit < 51	44 < MGP ≤ 48 and confidence range upper limit < 56	-0.21 < GRE ≤ -0.10 and confidence range upper limit < 0.12
Developing	MGP ≤ 42 and confidence range upper limit ≥ 46	MGP ≤ 44 and confidence range upper limit ≥ 50	GRE ≤ -0.21 and confidence range upper limit ≥ -0.04
Ineffective	MGP ≤ 42 and confidence range upper limit < 46	MGP ≤ 44 and confidence range upper limit < 50	GRE ≤ -0.21 and confidence range upper limit < -0.04

Starting from the highest MGP or GRE score in a HEDI category, educators are awarded HEDI points so that those with the highest value on the metric (MGP or GRE) in the rating category receive the highest score. The HEDI scores associated with HEDI ratings are shown in Table G-4.

Table G-4. Cut Points for HEDI Scores[9]

HEDI Rating	HEDI Score Points	HEDI Score Points in NYC
Ineffective	0–2	0–12
Developing	3–8	13–14
Effective	9–17	15–17
Highly Effective	18–20	18–20

[9] Based on the arguments presented in the NYC arbitration proceeding held on May 30 and 31 and pursuant to his authority in Education Law §3012-c(2)(a), the Commissioner imposed new proportional scoring ranges for use in NYC for the 2013–14, 2014–15, 2015–16, and 2016–17 school years. Please see the following link for additional information: http://usny.nysed.gov/rttt/teachers-leaders/plans/docs/new-york-city-appr-plan.pdf.

Scores lower than the highest score are assigned so that at any HEDI score point the number of educators with that HEDI score or higher is proportional to (or larger than) the proportion of score points in that category that are at least as large as the score point. For example, the HEDI rating Highly Effective is associated with HEDI score points 18, 19, and 20. For the educators who receive a HEDI rating of Highly Effective, at least one-third of them will receive 20 HEDI score points and at least two-thirds of them will receive 19 or 20 HEDI score points.

The tables that follow display the observed minimum and maximum MGP and GRE scores for Grades 4–8 and 9–12 MGP and GRE models.

Table G-5. Grades 4–8 Teacher HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min MGP**	**Max MGP**	**Min MGP**	**Max MGP**
0	3	28	3	23
1	29	32	24	24
2	33	35	25	25
3	29	35	26	26
4	36	36	27	27
5	37	37	28	28
6	38	38	29	29
7	39	39	30	30
8	40	40	31	31
9	36	43	32	32
10	44	45	33	33
11	46	48	34	34
12	49	50	35	35
13	51	52	29	37
14	53	55	38	40
15	56	57	36	48
16	58	61	49	55
17	62	68	56	68
18	67	68	67	68
19	69	72	69	72
20	73	94	73	94

Table G-6. Grades 4–8 School HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min MGP**	**Max MGP**	**Min MGP**	**Max MGP**
0	27.5	38.0	27.5	33.5
1	38.5	40.0	34	35.5
2	40.5	42.0	36	36.5
3	31.5	42.0	37	37.5
4	42.5	42.5	38	38
5	43.0	43.5	38.5	38.5
6	44.0	44.0	39	39
7	44.5	44.5	39.5	39.5
8	45.0	45.0	40	40
9	42.5	46.5	40.5	40.5
10	47.0	48.0	41	41
11	48.5	49.0	41.5	41.5
12	49.5	50.5	42	42
13	51.0	51.5	31.5	43.5
14	52.0	53.0	44	45
15	53.5	54.5	42.5	49
16	55.0	56.5	49.5	53
17	57.0	66.5	53.5	66.5
18	60.0	60.5	60	60.5
19	61.0	62.5	61	62.5
20	63.0	79.0	63	79

Table G-7. Grades 4–8 Principal HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min MGP**	**Max MGP**	**Min MGP**	**Max MGP**
0	27.5	38	27.5	33.5
1	38.5	40	34	35.5
2	40.5	42	36	37
3	37.5	42	37.5	37.5
4	42.5	42.5	38	38
5	43	43.5	38.5	38.5
6	44	44	39	39
7	44.5	44.5	39.5	39.5
8	45	45	40	40
9	43	46.5	40.5	40.5
10	47	48	41	41
11	48.5	49	41.5	41.5
12	49.5	50.5	42	42
13	51	51.5	37.5	43.5
14	52	53	44	45
15	53.5	54.5	43	49
16	55	56	49.5	53
17	56.5	60.5	53.5	60.5
18	60	60.5	60	60.5
19	61	62.5	61	62.5
20	63	73.5	63	73.5

Table G-8. Grades 9–12 MGP Model School HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min MGP**	**Max MGP**	**Min MGP**	**Max MGP**
0	26.5	39	26.5	31.5
1	39.5	41.5	32.5	35.5
2	42	44	36	37.5
3	36.5	44	38	38.5
4	44.5	45	39	39
5	45.5	46	39.5	40
6	46.5	46.5	40.5	40.5
7	47	47	41	41
8	47.5	48	41.5	41.5
9	44.5	50	42	42
10	50.5	52	42.5	42.5
11	52.5	54	43	43
12	54.5	55.5	43.5	44
13	56	57	36.5	46
14	57.5	59	46.5	48
15	59.5	61	44.5	54
16	61.5	63	54.5	59
17	63.5	71	59.5	71
18	68	69.5	68	69.5
19	70	71.5	70	71.5
20	72	81	72	81

Table G-9. Grades 9–12 MGP Model Principal HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min MGP**	**Max MGP**	**Min MGP**	**Max MGP**
0	26.5	39	26.5	34.5
1	39.5	42	35.5	37
2	42.5	44	37.5	38
3	40	44	38.5	38.5
4	44.5	45.5	39	39
5	46	46	39.5	39.5
6	46.5	46.5	40	40
7	47	47	41	41
8	47.5	48	41.5	41.5
9	46	50	42	42
10	50.5	52	42.5	42.5
11	52.5	54	43	43
12	54.5	55.5	43.5	44
13	56	57	40	46
14	57.5	59	46.5	48
15	59.5	61	46	54
16	61.5	63	54.5	59
17	63.5	71	59.5	71
18	68	69	68	69
19	69.5	71.5	69.5	71.5
20	72	81	72	81

Table G-10. Grades 9–12 GRE Model School HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min GRE**	**Max GRE**	**Min GRE**	**Max GRE**
0	-1.46	-0.5	-1.46	-0.82
1	-0.49	-0.34	-0.79	-0.69
2	-0.33	-0.26	-0.68	-0.55
3	-0.56	-0.25	-0.54	-0.53
4	-0.24	-0.23	-0.52	-0.47
5	-0.22	-0.21	-0.46	-0.4
6	-0.2	-0.19	-0.39	-0.38
7	-0.18	-0.16	-0.37	-0.36
8	-0.15	-0.14	-0.35	-0.33
9	-0.24	-0.07	-0.32	-0.31
10	-0.06	0.01	-0.3	-0.29
11	0.02	0.06	-0.28	-0.28
12	0.07	0.12	-0.27	-0.26
13	0.13	0.17	-0.56	-0.21
14	0.18	0.22	-0.2	-0.14
15	0.23	0.26	-0.24	0.06
16	0.27	0.33	0.07	0.22
17	0.34	0.75	0.23	0.75
18	0.45	0.47	0.45	0.47
19	0.48	0.54	0.48	0.54
20	0.55	0.87	0.55	0.87

Table G-11. Grades 9–12 GRE Model Principal HEDI Point Distribution

	HEDI Score Points		HEDI Score Points in NYC	
HEDI Points	**Min GRE**	**Max GRE**	**Min GRE**	**Max GRE**
0	-1.46	-0.35	-1.46	-0.88
1	-0.34	-0.25	-0.74	-0.42
2	-0.24	-0.21	-0.4	-0.4
3	-0.3	-0.2	-0.39	-0.37
4	-0.19	-0.18	-0.36	-0.33
5	-0.17	-0.15	-0.32	-0.31
6	-0.14	-0.14	-0.3	-0.29
7	-0.13	-0.12	-0.28	-0.27
8	-0.11	-0.1	-0.26	-0.25
9	-0.09	-0.02	-0.24	-0.24
10	-0.01	0.04	-0.23	-0.23
11	0.05	0.1	-0.22	-0.22
12	0.11	0.15	-0.21	-0.21
13	0.16	0.19	-0.3	-0.15
14	0.2	0.23	-0.14	-0.1
15	0.24	0.27	-0.09	0.1
16	0.28	0.33	0.11	0.23
17	0.34	0.75	0.24	0.75
18	0.45	0.47	0.45	0.47
19	0.48	0.53	0.48	0.53
20	0.54	0.87	0.54	0.87

When an educator has at least 16 attributed students or student scores in only one of the three growth measures (Grades 4–8 MGP, Grades 9–12 MGP, and Grades 9–12 GRE), then the HEDI rating and score based on that growth measure serves as the educator's final HEDI rating and score. However, most Grades 9–12 principals and schools have multiple HEDI ratings and scores (Grades 9–12 MGP and Grades 9–12 GRE), and some principals and schools may have multiple HEDI ratings and scores if they serve students in Grades 4–8 and 9–12. HEDI ratings and scores from the 9–12 MGP and 9–12 GRE model are first combined to create an overall Grades 9–12 HEDI rating and score. HEDI ratings and scores from the Grades 4–8 MGP model and the overall Grades 9–12 HEDI rating and score are then combined to obtain a final overall rating.

To combine HEDI ratings and scores, we use the following procedure, pooling all educators at a given level (principals or schools) across the state into a single group and using only their HEDI score from the column labeled "HEDI Score Points" in Table G-4.

1. Find the aggregate HEDI growth score using the following equation:

$$G = \frac{n_A G_A + n_B G_B}{n_B + n_B},$$

   where *G* is the growth score, *n* is the number of students attributed to a school, the subscript *A* is used to indicate one of the two HEDI scores being combined, and the subscript *B* is used to indicate the other. If either of the HEDIs is not assigned because the *n* was not at least 16, simply set *G* equal to the assigned HEDI score and continue. For example, if only n_A is greater than or equal to 16 ($n_A \geq 16, n_B < 16$), then: $G = G_A$.

   The same also holds if *A* and *B* are switched in the example. Also, if neither HEDI was assigned ($n_A < 16, n_B < 16$), set *G* to missing and not included in the final HEDI score.

2. Round *G* to the nearest integer. This integer is the HEDI score for the combination.

3. For *all* principals and schools, assign a final HEDI rating by using the cut points table, assigning the HEDI rating associated with each school or principal's final rounded HEDI points value (*G* from step 2 above) based on the column labeled "HEDI Score Points."

4. Every principal and school with two HEDI ratings and scores to combine is assigned a New York City HEDI rating and score by applying the rules for assigning scores described above to the unrounded value of *G* found in step 1. NYC ratings are then reported only to educators in NYC.

Appendix H. Model Coefficients

The tables that follow display regression model coefficients (labeled as "Effects") for the New York growth models in each grade and subject. For the Grades 4-8 models and Grades 9-12 MGP models, these model coefficients represent the predicted change in current year test scores for one unit of change in each variable shown in the table, holding other variables constant. For example, in Table H-2, holding all other variables constant, the predicted change in a student's current year ELA test score given a one point increase in a student's prior grade ELA test score is 0.748. The interpretation of a one-unit change varies by variable type. For yes/no variables, model coefficients represent the predicted change in current year test scores given a change from no to yes. For example, in Table H-2, holding all other variables constant, the predicted difference in a student's current year ELA test score if the student has a disability (compared to a student without a disability) is -4.923 points. Missing flags are also yes/no variables set to yes if the noted variable is missing and no otherwise. Variables that are percentages are on a scale from 0 to 100, and represent the change in prediction for a single percentage point increase.

Because the GRE model is of a different form (an ordered logistic regression), GRE model coefficients (labeled as "Estimates") are not interpretable as linear changes in the outcome given a one-unit change in a predictor. Instead, the predicted number of Regents Exams passed varies according to the equations in the section titled "Comparative Growth in Regents Exams Passed (GRE) Model." For example, in Table H-29, because the coefficient is positive, an increase in Grade 8 ELA scale scores from 2011–12 and prior years is associated with a higher number of GRE Exams passed in the current year. Larger positive coefficients indicate larger predicted increases in the number of Regents Exams passed in the current year.

Because of the differences in models and variable types, it is important to keep in mind that effect sizes cannot be compared directly across different types of variables.

Table H-1. Grade 4 ELA Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	21.169	0.524	0.000
Prior-Grade ELA Scale Score	0.925	0.002	0.000

Table H-2. Grade 4 ELA Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–72.349	8.260	0.000
Prior-Grade ELA Scale Score	0.748	0.004	0.000
Prior-Grade Mathematics Scale Score	0.134	0.003	0.000
Missing Flag: Prior-Grade Mathematics Scale Score	38.002	1.293	0.000
Mean Prior Score	0.042	0.004	0.000
Range Around Prior Score	0.017	0.004	0.000
New to School	–1.039	0.180	0.000
Students with Disabilities	–4.923	0.170	0.000
Gen Ed < 40% (LRE3)	–3.815	0.358	0.000
Percentage of Students with Disabilities	0.008	0.004	0.024
ELL	0.161	0.490	0.743
Percentage ELLs	–0.009	0.004	0.026
Missing Flag: Percentage Variables	13.719	1.376	0.000
Grades 2–4 NYSESLAT Scale Score	0.111	0.010	0.000
Missing Flag: Grades 2–4 NYSESLAT Scale Scores	94.193	8.242	0.000
Economically Disadvantaged	–1.158	0.131	0.000
Percentage Economically Disadvantaged	0.015	0.002	0.000

Table H-3. Grade 5 ELA Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–158.973	2.754	0.000
Prior-Grade ELA Scale Score	0.781	0.003	0.000
Two-Grades-Prior ELA Scale Score	0.335	0.005	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	223.952	3.556	0.000

Table H-4. Grade 5 ELA Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–197.434	9.093	0.000
Prior-Grade ELA Scale Score	0.689	0.004	0.000
Two-Grades-Prior ELA Scale Score	0.319	0.005	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	212.963	3.503	0.000
Prior-Grade Mathematics Scale Score	0.093	0.003	0.000
Missing Flag: Prior-Grade Mathematics Scale Score	27.637	1.188	0.000
Mean Prior Score	0.055	0.004	0.000
Range Around Prior Score	–0.002	0.004	0.703
Retained in Grade	–0.837	0.305	0.006
New to School	–0.946	0.190	0.000
Students with Disabilities	–2.595	0.163	0.000
Gen Ed < 40% (LRE3)	–0.518	0.340	0.128
ELL	0.259	0.489	0.596
Percentage of Students with Disabilities	0.027	0.004	0.000
Percentage ELLs	0.043	0.004	0.000
Missing Flag: Percentage Variables	18.206	1.337	0.000
Grades 2–4 NYSESLAT Scale Score	0.039	0.010	0.000
Missing Flag: Grades 2–4 NYSESLAT Scale Scores	30.609	8.388	0.000
Economically Disadvantaged	–0.896	0.123	0.000
Percentage Economically Disadvantaged	0.031	0.002	0.000

Table H-5. Grade 6 ELA Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–154.481	2.567	0.000
Prior-Grade ELA Scale Score	0.671	0.003	0.000
Two-Grades-Prior ELA Scale Score	0.230	0.005	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	153.599	3.021	0.000
Three-Grades-Prior ELA Scale Score	0.146	0.005	0.000
Missing Flag: Three-Grades-Prior ELA Scale Score	97.357	3.473	0.000

Table H-6. Grade 6 ELA Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–214.916	8.700	0.000
Prior-Grade ELA Scale Score	0.602	0.004	0.000
Two-Grades-Prior ELA Scale Score	0.203	0.005	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	134.575	2.988	0.000
Three-Grades-Prior ELA Scale Score	0.132	0.005	0.000
Missing Flag: Three-Grades-Prior ELA Scale Score	89.261	3.473	0.000
Prior-Grade Mathematics Scale Score	0.075	0.003	0.000
Missing Flag: Prior-Grade Mathematics Scale Score	22.550	1.161	0.000
Mean Prior Score	0.023	0.004	0.000
Range Around Prior Score	0.030	0.005	0.000
Retained in Grade	–4.942	0.409	0.000
New to School	–0.275	0.187	0.143
Students with Disabilities	–2.384	0.150	0.000
Gen Ed < 40% (LRE3)	0.259	0.332	0.436
Percentage of Students with Disabilities	–0.010	0.003	0.003
ELL	1.721	0.468	0.000
Percentage ELLs	–0.012	0.004	0.006
Missing Flag: Percentage Variables	7.515	1.291	0.000
Grades 5–6 NYSESLAT Scale Score	0.096	0.009	0.000
Missing Flag: Grades 5–6 NYSESLAT Scale Scores	79.497	7.939	0.000
Economically Disadvantaged	–1.204	0.113	0.000
Percentage Economically Disadvantaged	0.000	0.002	0.810

Table H-7. Grade 7 ELA Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–170.508	3.655	0.000
Prior-Grade ELA Scale Score	0.711	0.004	0.000
Two-Grades-Prior ELA Scale Score	0.309	0.008	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	205.984	5.140	0.000
Three-Grades-Prior ELA Scale Score	0.068	0.004	0.000
Missing Flag: Three-Grades-Prior ELA Scale Score	47.838	2.807	0.000

Table H-8. Grade 7 ELA Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–315.089	9.242	0.000
Prior-Grade ELA Scale Score	0.624	0.004	0.000
Two-Grades-Prior ELA Scale Score	0.274	0.008	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	182.270	4.981	0.000
Three-Grades-Prior ELA Scale Score	0.068	0.004	0.000
Missing Flag: Three-Grades-Prior ELA Scale Score	47.070	2.758	0.000
Prior-Grade Mathematics Scale Score	0.117	0.003	0.000
Missing Flag: Prior-Grade Mathematics Scale Score	31.491	1.031	0.000
Mean Prior Score	0.124	0.004	0.000
Range Around Prior Score	–0.021	0.005	0.000
Retained in Grade	–4.262	0.407	0.000
New to School	–1.314	0.176	0.000
Students with Disabilities	–1.020	0.152	0.000
Gen Ed < 40% (LRE3)	–0.547	0.343	0.111
Percentage of Students with Disabilities	0.044	0.004	0.000
ELL	2.848	0.518	0.000
Percentage ELLs	0.076	0.005	0.000
Missing Flag: Percentage Variables	42.720	1.447	0.000
Grades 5–6 NYSESLAT Scale Score	0.141	0.009	0.000
Missing Flag: Grades 5–6 NYSESLAT Scale Scores	117.738	8.068	0.000
Economically Disadvantaged	0.111	0.111	0.319
Percent Economically Disadvantaged	0.080	0.002	0.000

Table H-9. Grade 8 ELA Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–283.828	4.309	0.000
Prior-Grade ELA Scale Score	0.705	0.004	0.000
Two-Grades-Prior ELA Scale Score	0.427	0.009	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	281.015	5.695	0.000
Three-Grades-Prior ELA Scale Score	0.132	0.006	0.000
Missing Flag: Three-Grades-Prior ELA Scale Score	88.862	3.761	0.000

Table H-10. Grade 8 ELA Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–451.877	10.058	0.000
Prior-Grade ELA Scale Score	0.608	0.004	0.000
Two-Grades-Prior ELA Scale Score	0.412	0.009	0.000
Missing Flag: Two-Grades-Prior ELA Scale Score	270.253	5.730	0.000
Three-Grades-Prior ELA Scale Score	0.110	0.006	0.000
Missing Flag: Three-Grades-Prior ELA Scale Score	75.393	3.728	0.000
Prior-Grade Mathematics Scale Score	0.114	0.003	0.000
Missing Flag: Prior-Grade Mathematics Scale Score	30.167	1.043	0.000
Mean Prior Score	0.059	0.004	0.000
Range Around Prior Score	0.004	0.005	0.460
Retained in Grade	–4.069	0.368	0.000
New to School	–1.086	0.214	0.000
Students with Disabilities	–1.165	0.153	0.000
Gen Ed < 40% (LRE3)	–0.540	0.354	0.127
Percentage of Students with Disabilities	0.006	0.004	0.084
ELL	3.158	0.551	0.000
Percentage ELLs	0.044	0.005	0.000
Missing Flag: Percentage Variables	19.775	1.411	0.000
Grades 7–8 NYSESLAT Scale Score	0.199	0.010	0.000
Missing Flag: Grades 7–8 NYSESLAT Scale Scores	167.885	8.362	0.000
Economically Disadvantaged	–0.277	0.111	0.012
Percentage Economically Disadvantaged	0.037	0.002	0.000

Table H-11. Grade 4 Mathematics Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–0.878	0.525	0.095
Prior-Grade Mathematics Scale Score	1.016	0.002	0.000

Table H-12. Grade 4 Mathematics Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–39.872	7.810	0.000
Prior-Grade Mathematics Scale Score	0.882	0.003	0.000
Prior-Grade ELA Scale Score	0.090	0.003	0.000
Missing Flag: Prior-Grade ELA Scale Score	31.825	1.118	0.000
Mean Prior Score	0.058	0.004	0.000
Range Around Prior Score	0.009	0.005	0.000
New to School	–2.743	0.195	0.000
Students with Disabilities	–4.805	0.183	0.000
Gen Ed < 40% (LRE3)	–5.307	0.387	0.000
Percentage of Students with Disabilities	0.003	0.004	0.403
ELL	–1.860	0.511	0.000
Percentage ELLs	0.007	0.004	0.089
Missing Flag: Percentage Variables	16.542	1.281	0.000
Grades 2–4 NYSESLAT Scale Score	0.045	0.009	0.000
Missing Flag: Grades 2–4 NYSESLAT Scale Scores	36.573	7.796	0.000
Economically Disadvantaged	–1.055	0.143	0.000
Percentage Economically Disadvantaged	–0.006	0.002	0.007

Table H-13. Grade 5 Mathematics Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–151.560	2.734	0.000
Prior-Grade Mathematics Scale Score	0.802	0.003	0.000
Two-Grades-Prior Mathematics Scale Score	0.315	0.005	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	218.250	3.395	0.000

Table H-14. Grade 5 Mathematics Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–149.715	7.783	0.000
Prior-Grade Mathematics Scale Score	0.703	0.004	0.000
Two-Grades-Prior Mathematics Scale Score	0.263	0.005	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	181.595	3.405	0.000
Prior-Grade ELA Scale Score	0.106	0.003	0.000
Missing Flag: Prior-Grade ELA Scale Score	29.601	1.020	0.000
Mean Prior Score	0.067	0.004	0.000
Range Around Prior Score	0.016	0.004	0.000
Retained in Grade	–2.599	0.312	0.000
New to School	–0.926	0.195	0.000
Students with Disabilities	–3.083	0.167	0.000
Gen Ed < 40% (LRE3)	–2.369	0.350	0.000
Percentage of Students with Disabilities	0.013	0.003	0.000
ELL	–0.366	0.478	0.443
Percentage ELLs	0.044	0.004	0.000
Missing Flag: Percentage Variables	21.135	1.152	0.000
Grades 2–4 NYSESLAT Scale Score	0.017	0.008	0.044
Missing Flag: Grades 2–4 NYSESLAT Scale Scores	11.669	7.189	0.105
Economically Disadvantaged	–0.711	0.128	0.000
Percentage Economically Disadvantaged	0.010	0.002	0.000

Table H-15. Grade 6 Mathematics Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–205.295	2.631	0.000
Prior-Grade Mathematics Scale Score	0.697	0.003	0.000
Two-Grades-Prior Mathematics Scale Score	0.259	0.004	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	178.667	2.620	0.000
Three-Grades-Prior Mathematics Scale Score	0.175	0.005	0.000
Missing Flag: Three-Grades-Prior Mathematics Scale Score	120.233	3.502	0.000

Table H-16. Grade 6 Mathematics Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–208.246	7.902	0.000
Prior-Grade Mathematics Scale Score	0.592	0.004	0.000
Two-Grades-Prior Mathematics Scale Score	0.224	0.004	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	153.765	2.579	0.000
Three-Grades-Prior Mathematics Scale Score	0.136	0.005	0.000
Missing Flag: Three-Grades-Prior Mathematics Scale Score	95.874	3.471	0.000
Prior-Grade ELA Scale Score	0.110	0.003	0.000
Missing Flag: Prior-Grade ELA Scale Score	28.595	0.984	0.000
Mean Prior Score	0.074	0.004	0.000
Range Around Prior Score	0.020	0.005	0.000
Retained in Grade	–5.538	0.443	0.000
New to School	0.937	0.207	0.000
Students with Disabilities	–3.508	0.161	0.000
Gen Ed < 40% (LRE3)	–1.395	0.364	0.000
Percentage of Students with Disabilities	0.000	0.004	0.913
ELL	0.161	0.477	0.736
Percentage ELLs	0.003	0.005	0.456
Missing Flag: Percentage Variables	21.683	1.207	0.000
Grades 5–6 NYSESLAT Scale Score	0.041	0.008	0.000
Missing Flag: Grades 5–6 NYSESLAT Scale Scores	32.667	7.229	0.000
Economically Disadvantaged	–0.932	0.123	0.000
Percentage Economically Disadvantaged	–0.034	0.002	0.000

Table H-17. Grade 7 Mathematics Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–87.792	1.527	0.000
Prior-Grade Mathematics Scale Score	0.744	0.003	0.000
Two-Grades-Prior Mathematics Scale Score	0.106	0.003	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	75.383	2.092	0.000
Three-Grades-Prior Mathematics Scale Score	0.138	0.003	0.000
Missing Flag: Three-Grades-Prior Mathematics Scale Score	92.507	2.231	0.000

Table H-18. Grade 7 Mathematics Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–106.048	6.940	0.000
Prior-Grade Mathematics Scale Score	0.637	0.004	0.000
Two-Grades-Prior Mathematics Scale Score	0.096	0.003	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	66.844	2.037	0.000
Three-Grades-Prior Mathematics Scale Score	0.110	0.003	0.000
Missing Flag: Three-Grades-Prior Mathematics Scale Score	76.698	2.251	0.000
Prior-Grade ELA Scale Score	0.116	0.003	0.000
Missing Flag: Prior-Grade ELA Scale Score	30.367	0.852	0.000
Mean Prior Score	0.079	0.003	0.000
Range Around Prior Score	0.007	0.005	0.169
Retained in Grade	–6.618	0.395	0.000
New to School	–0.809	0.169	0.000
Students with Disabilities	–1.553	0.145	0.000
Gen Ed < 40% (LRE3)	–0.125	0.338	0.712
Percentage of Students with Disabilities	0.027	0.003	0.000
ELL	0.382	0.476	0.422
Percentage ELLs	0.021	0.004	0.000
Missing Flag: Percentage Variables	23.919	1.092	0.000
Grades 5–6 NYSESLAT Scale Score	0.025	0.008	0.001
Missing Flag: Grades 5–6 NYSESLAT Scale Scores	18.021	6.577	0.006
Economically Disadvantaged	–0.823	0.107	0.000
Percentage Economically Disadvantaged	–0.013	0.002	0.000

Table H-19. Grade 8 Mathematics Model Coefficients, Unadjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–152.060	2.723	0.000
Prior-Grade Mathematics Scale Score	0.773	0.005	0.000
Two-Grades-Prior Mathematics Scale Score	0.244	0.005	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	165.737	3.589	0.000
Three-Grades-Prior Mathematics Scale Score	0.079	0.006	0.000
Missing Flag: Three-Grades-Prior Mathematics Scale Score	53.385	3.842	0.000

Table H-20. Grade 8 Mathematics Model Coefficients, Adjusted Model

Effect Name	Effect	Standard Error	*p*-value
Constant Term	–265.592	9.080	0.000
Prior-Grade Mathematics Scale Score	0.654	0.006	0.000
Two-Grades-Prior Mathematics Scale Score	0.211	0.005	0.000
Missing Flag: Two-Grades-Prior Mathematics Scale Score	141.725	3.532	0.000
Three-Grades-Prior Mathematics Scale Score	0.076	0.006	0.000
Missing Flag: Three-Grades-Prior Mathematics Scale Score	54.418	3.856	0.000
Prior-Grade ELA Scale Score	0.105	0.003	0.000
Missing Flag: Prior-Grade ELA Scale Score	26.849	1.087	0.000
Mean Prior Score	0.180	0.005	0.000
Range Around Prior Score	0.050	0.007	0.000
Retained in Grade	–8.391	0.450	0.000
New to School	–2.737	0.255	0.000
Students with Disabilities	–1.368	0.183	0.000
Gen Ed < 40% (LRE3)	–3.338	0.437	0.000
Percentage of Students with Disabilities	0.043	0.004	0.000
ELL	2.271	0.621	0.000
Percentage ELLs	0.075	0.006	0.000
Missing Flag: Percentage Variables	56.831	1.555	0.000
Grades 7–8 NYSESLAT Scale Score	0.105	0.010	0.000
Missing Flag: Grades 7–8 NYSESLAT Scale Scores	84.706	8.401	0.000
Economically Disadvantaged	0.187	0.140	0.182
Percentage Economically Disadvantaged	0.028	0.003	0.000

Table H-21. Grades 9–12, Algebra Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Constant Term	–221.869	1.668	0.000
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.085	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	57.710	1.379	0.000
Grade 8 Mathematics Scale Score 2012–13	0.239	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2012–13	67.670	0.685	0.000
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.119	0.002	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	79.767	1.402	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.100	0.003	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	64.040	2.015	0.000
Grade 8 ELA Scale Score 2012–13	0.071	0.002	0.000
Missing Flag: 8 ELA Scale Score 2012–13	19.610	0.557	0.000

Table H-22. Grades 9–12, Algebra Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.072	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	48.426	1.377	0.000
Grade 8 Mathematics Scale Score 2012–13	0.222	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2012–13	63.144	0.711	0.000
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.101	0.002	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	64.888	1.516	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.054	0.004	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	33.761	2.475	0.000
Grade 8 ELA Scale Score 2012–13	0.043	0.002	0.000
Missing Flag: 8 ELA Scale Score 2012–13	12.545	0.683	0.000
Grade 7 ELA Scale Score 2011–12 and Prior	–0.002	0.004	0.544
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	1.613	2.425	0.506
Mean Prior Grade 8 Mathematics 2011–12 and Prior	0.008	0.004	0.029
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	6.413	2.528	0.011
Mean Prior Grade 8 Mathematics 2012–13	0.024	0.003	0.000
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	6.350	0.860	0.000
Count of Prior Required Regents Exams = 0	–167.359	5.363	0.000
Count of Prior Required Regents Exams = 1	–164.576	5.367	0.000
Count of Prior Required Regents Exams = 2	–163.323	5.373	0.000
Count of Prior Required Regents Exams = 3	–162.486	5.376	0.000

Effect Name	Estimate	Standard Error	*p*-value
Count of Prior Required Regents Exams = 4	–161.702	5.382	0.000
Count of Prior Required Regents Exams = 5	–161.387	5.396	0.000
Cohort 1	2.760	0.379	0.000
Cohort 2	–0.069	0.245	0.777
Cohort 3	–1.549	0.240	0.000
Cohort 4 and Higher	–2.319	0.250	0.000
School Students with Disabilities	–2.806	0.069	0.000
Gen Ed < 40% (LRE3)	–1.576	0.214	0.000
School Percentage of Students with Disabilities	–0.069	0.004	0.000
ELL	–0.420	0.194	0.031
School Percentage ELLs	0.008	0.003	0.010
NYSESLAT LS Scale Score 2011–12 and Prior	–0.009	0.003	0.001
NYSESLAT RW Scale Score 2011–12 and Prior	0.007	0.003	0.031
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	–2.681	1.959	0.171
NYSESLAT Scale Score 2012–13	0.005	0.005	0.279
Missing Flag: NYSESLAT Scale Score 2012–13	3.489	3.955	0.378
Economically Disadvantaged	–0.334	0.054	0.000
Percentage Economically Disadvantaged	–0.051	0.001	0.000
Missing Flag: School Percentage Variables	–7.751	0.328	0.000
New to School After Grade 9	0.840	0.130	0.000

Table H-23. Grades 9–12, Algebra Common Core Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Constant Term	–220.567	4.010	0.000
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.090	0.005	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	64.128	3.275	0.000
Grade 8 Mathematics Scale Score 2012–13	0.187	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2012–13	55.525	0.602	0.000
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.098	0.002	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	66.248	1.474	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.126	0.007	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	80.167	4.757	0.000
Grade 8 ELA Scale Score 2012–13	0.065	0.001	0.000
Missing Flag: 8 ELA Scale Score 2012–13	17.138	0.448	0.000

Table H-24. Grades 9–12, Algebra Common Core Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.088	0.005	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	60.309	3.370	0.000
Grade 8 Mathematics Scale Score 2012–13	0.169	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2012–13	49.640	0.662	0.000
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.103	0.003	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	67.563	1.831	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.089	0.008	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	57.315	5.100	0.000
Grade 8 ELA Scale Score 2012–13	0.043	0.002	0.000
Missing Flag: 8 ELA Scale Score 2012–13	11.823	0.642	0.000
Grade 7 ELA Scale Score 2011–12 and Prior	–0.017	0.004	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	–8.312	2.887	0.004
Mean Prior Grade 8 Mathematics 2011–12 and Prior	–0.006	0.003	0.071
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	–3.391	2.318	0.143
Mean Prior Grade 8 Mathematics 2012–13	–0.007	0.003	0.031
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	–2.303	1.120	0.040
Count of Prior Required Regents Exams = 0	–192.529	6.703	0.000
Count of Prior Required Regents Exams = 1	–191.796	6.709	0.000
Count of Prior Required Regents Exams = 2	–191.426	6.733	0.000
Count of Prior Required Regents Exams = 3	–191.587	6.777	0.000

Effect Name	Estimate	Standard Error	*p*-value
Count of Prior Required Regents Exams = 4	–191.755	6.840	0.000
Count of Prior Required Regents Exams = 5	–193.013	7.042	0.000
Cohort 1	–0.608	0.984	0.537
Cohort 2	–2.019	0.891	0.023
Cohort 3	–3.464	0.906	0.000
Cohort 4 and Higher	–2.257	0.956	0.018
School Students with Disabilities	–1.309	0.073	0.000
Gen Ed < 40% (LRE3)	–1.874	0.299	0.000
School Percentage of Students with Disabilities	–0.089	0.005	0.000
ELL	0.196	0.241	0.417
School Percentage ELLs	–0.032	0.003	0.000
NYSESLAT LS Scale Score 2011–12 and Prior	–0.007	0.005	0.161
NYSESLAT RW Scale Score 2011–12 and Prior	0.022	0.006	0.000
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	10.192	3.396	0.003
NYSESLAT Scale Score 2012–13	0.023	0.004	0.000
Missing Flag: NYSESLAT Scale Score 2012–13	19.172	3.488	0.000
Economically Disadvantaged	–0.102	0.050	0.042
Percentage Economically Disadvantaged	–0.065	0.001	0.000
Missing Flag: School Percent Variables	–8.033	0.777	0.000
New to School After Grade 9	0.935	0.285	0.001

Table H-25. Grades 9–12, ELA Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Constant Term	–400.005	3.677	0.000
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.103	0.001	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	68.111	0.981	0.000
Grade 8 Mathematics Scale Score 2012–13	0.091	0.015	0.000
Missing Flag: 8 Mathematics Scale Score 2012–13	24.752	6.317	0.000
Grade 7 ELA Scale Score 2011–12 and Prior	0.045	0.001	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	30.559	0.933	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.390	0.003	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	250.350	1.662	0.000
Grade 8 ELA Scale Score 2012–13	0.314	0.017	0.000
Missing Flag: 8 ELA Scale Score 2012–13	96.522	6.657	0.000

Table H-26. Grades 9–12, ELA Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.024	0.002	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	16.908	1.246	0.000
Grade 8 Mathematics Scale Score 2012–13	0.007	0.015	0.659
Missing Flag: 8 Mathematics Scale Score 2012–13	0.581	6.280	0.926
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.033	0.002	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	20.241	1.337	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.296	0.003	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	190.520	1.708	0.000
Grade 8 ELA Scale Score 2012–13	0.255	0.018	0.000
Missing Flag: 8 ELA Scale Score 2012–13	71.075	6.822	0.000
Grade 7 ELA Scale Score 2011–12 and Prior	0.028	0.001	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	20.543	0.888	0.000
Mean Prior Grade 8 ELA 2011–12 and Prior	0.067	0.005	0.000
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	36.441	6.650	0.000
Mean Prior Grade 8 ELA 2012–13	0.015	0.002	0.000
Missing Flag: Mean Prior Grade 8 ELA 2012–13	4.853	0.656	0.000
Count of Prior Required Regents Exams = 0	–499.442	40.017	0.000
Count of Prior Required Regents Exams = 1	–495.677	40.017	0.000
Count of Prior Required Regents Exams = 2	–492.314	40.017	0.000
Count of Prior Required Regents Exams = 3	–488.986	40.017	0.000
Count of Prior Required Regents Exams = 4	–489.450	40.017	0.000
Count of Prior Required Regents Exams = 5	–486.507	40.019	0.000
Cohort 1	–3.538	0.810	0.000
Cohort 2	0.637	0.228	0.005
Cohort 3	0.018	0.218	0.933
Cohort 4 and Higher	–2.286	0.224	0.000
School Students with Disabilities	–4.865	0.072	0.000
Gen Ed < 40% (LRE3)	–4.465	0.275	0.000
School Percentage of Students with Disabilities	–0.023	0.004	0.000
ELL	–2.605	0.207	0.000
School Percentage ELLs	0.062	0.004	0.000
NYSESLAT LS Scale Score 2011–12 and Prior	–0.001	0.003	0.718
NYSESLAT RW Scale Score 2011–12 and Prior	0.003	0.003	0.316
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	0.249	1.986	0.900

Effect Name	Estimate	Standard Error	*p*-value
NYSESLAT Scale Score 2012–13	0.232	0.048	0.000
Missing Flag: NYSESLAT Scale Score 2012–13	198.618	40.461	0.000
Economically Disadvantaged	–0.436	0.052	0.000
Percentage Economically Disadvantaged	–0.018	0.001	0.000
Missing Flag: School Percentage Variables	2.360	5.743	0.681
New to School After Grade 9	0.508	0.115	0.000

Table H-27. Grades 9–12, ELA Common Core Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Constant Term	–456.757	5.057	0.000
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.117	0.004	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	78.732	3.045	0.000
Grade 8 Mathematics Scale Score 2012–13	0.139	0.019	0.000
Missing Flag: 8 Mathematics Scale Score 2012–13	51.119	7.350	0.000
Grade 8 ELA Scale Score 2011–12 and Prior	0.403	0.007	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	261.561	4.668	0.000
Grade 8 ELA Scale Score 2012–13	0.362	0.022	0.000
Missing Flag: 8 ELA Scale Score 2012–13	102.703	7.905	0.000
Grade 7 ELA Scale Score 2011–12 and Prior	0.046	0.004	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	31.627	2.748	0.000

Table H-28. Grades 9–12, ELA Common Core Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error	*p*-value
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.046	0.006	0.000
Missing Flag: 8 Mathematics Scale Score 2011–12 and Prior	32.691	4.134	0.000
Grade 8 Mathematics Scale Score 2012–13	0.047	0.020	0.019
Missing Flag: 8 Mathematics Scale Score 2012–13	24.178	7.547	0.001
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.024	0.007	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	14.840	4.401	0.001
Grade 8 ELA Scale Score 2011–12 and Prior	0.308	0.007	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	200.552	4.967	0.000
Grade 8 ELA Scale Score 2012–13	0.316	0.022	0.000
Missing Flag: 8 ELA Scale Score 2012–13	89.917	8.181	0.000
Grade 7 ELA Scale Score 2011–12 and Prior	0.035	0.004	0.000

Effect Name	Estimate	Standard Error	*p*-value
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	25.952	2.788	0.000
Mean Prior Grade 8 ELA 2011–12 and Prior	–0.012	0.019	0.533
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	–10.221	12.344	0.408
Mean Prior Grade 8 ELA 2012–13	0.098	0.008	0.000
Missing Flag: Mean Prior Grade 8 ELA 2012–13	28.553	2.294	0.000
Count of Prior Required Regents Exams = 0	–384.977	61.252	0.000
Count of Prior Required Regents Exams = 1	–380.763	61.250	0.000
Count of Prior Required Regents Exams = 2	–377.552	61.248	0.000
Count of Prior Required Regents Exams = 3	–374.402	61.252	0.000
Count of Prior Required Regents Exams = 4	–375.856	61.252	0.000
Count of Prior Required Regents Exams = 5	–370.635	61.291	0.000
Cohort 1	2.706	2.750	0.325
Cohort 2	–1.218	1.337	0.362
Cohort 3	–2.758	1.324	0.037
Cohort 4 and Higher	–4.277	1.379	0.002
School Students with Disabilities	–5.175	0.235	0.000
Gen Ed < 40% (LRE3)	–2.841	1.025	0.006
School Percentage of Students with Disabilities	–0.022	0.013	0.099
ELL	–4.136	0.782	0.000
School Percentage ELLs	–0.003	0.012	0.769
NYSESLAT LS Scale Score 2011–12 and Prior	0.006	0.009	0.539
NYSESLAT RW Scale Score 2011–12 and Prior	0.014	0.011	0.192
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	13.126	7.249	0.070
NYSESLAT Scale Score 2012–13	0.037	0.070	0.599
Missing Flag: NYSESLAT Scale Score 2012–13	29.965	59.759	0.616
Economically Disadvantaged	–0.278	0.156	0.074
Percentage Economically Disadvantaged	0.005	0.004	0.233
Missing Flag: School Percentage Variables	0.000	—	—
New to School After Grade 9	0.329	0.363	0.365

— Indicates standard errors that are not defined because the variable was redundant.

Table H-29. Grades 9–12, GRE, Year in School 1 Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–24.995	0.285
Intercept 2	–26.492	0.286
Intercept 3	–31.619	0.291
Intercept 4	–33.847	0.294
Intercept 5	–37.854	0.419
Intercept 6	–40.252	1.041
Grade 8 ELA Scale Score 2011–12 and Prior	0.015	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	3.597	0.087
Grade 7 ELA Scale Score 2011–12 and Prior	0.010	0.001
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	6.789	0.346
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.021	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	6.160	0.089
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.014	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	9.091	0.226

Table H-30. Grades 9–12, GRE, Year in School 1 Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–34.034	*
Intercept 2	–35.591	*
Intercept 3	–40.712	*
Intercept 4	–42.938	*
Intercept 5	–46.944	*
Intercept 6	–49.342	*
Grade 8 ELA Scale Score 2012–13	0.013	0.000
Missing Flag: Grade 8 ELA Scale Score 2012–13	3.507	0.092
Grade 7 ELA Scale Score 2011–12 and Prior	0.010	0.001
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	6.683	0.362
Grade 8 Mathematics Scale Score 2012–13	0.024	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2012–13	6.856	0.096
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.015	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	10.083	0.239
Mean Prior Grade 8 ELA 2011–12 and Prior	–0.005	0.002
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	0.000	—
Mean Prior Grade 8 ELA 2012–13	0.019	0.001

Effect Name	Estimate	Standard Error
Missing Flag: Mean Prior Grade 8 ELA 2012–13	14.870	*
Mean Prior Grade 8 Mathematics 2011–12 and Prior	–0.008	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	0.000	—
Mean Prior Grade 8 Mathematics 2012–13	–0.015	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	–13.913	*
Count of Prior Regents Exams = 0	3.040	*
Count of Prior Regents Exams = 1	2.740	*
Count of Prior Regents Exams = 2	2.444	*
Count of Prior Regents Exams = 3	1.789	*
Count of Prior Regents Exams = 4	1.981	*
Count of Prior Regents Exams = 5	0.000	—
Students with Disabilities	0.155	0.016
Gen Ed < 40% (LRE3)	–0.353	0.061
Percentage of Students with Disabilities	–0.025	0.001
ELL	–0.021	0.060
Percentage ELLs	–0.009	0.001
NYSESLAT LS Scale Score 2011–12 and Prior	0.001	0.002
NYSESLAT RW Scale Score 2011–12 and Prior	0.008	0.002
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	6.025	1.247
NYSESLAT Scale Score 2012–13	0.008	0.001
Missing Flag: NYSESLAT Scale Score 2012–13	6.588	0.821
Economically Disadvantaged	–0.210	0.012
Percentage Economically Disadvantaged	–0.005	0.000
Missing Flag: School Percentage Variables	0.000	—
New to School After Grade 9	0.000	—

* Indicates standard errors not estimated by the statistical software.

— Indicates standard errors that are not defined because the variable was redundant.

Table H-31. Grades 9–12, GRE, Year in School 2 Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–25.815	0.177
Intercept 2	–26.942	0.178
Intercept 3	–28.481	0.180
Intercept 4	–31.256	0.181
Intercept 5	–34.440	0.189
Intercept 6	–37.316	0.288
Grade 8 ELA Scale Score 2011–12 and Prior	0.014	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	8.844	0.242
Grade 7 ELA Scale Score 2011–12 and Prior	0.007	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	5.119	0.269
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.014	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	9.025	0.181
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.005	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	3.496	0.187

Table H-32. Grades 9–12, GRE, Year in School 2 Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–17.773	*
Intercept 2	–19.019	*
Intercept 3	–20.669	*
Intercept 4	–23.481	*
Intercept 5	–26.660	*
Intercept 6	–29.535	*
Grade 8 ELA Scale Score 2011–12 and Prior	0.007	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12	4.773	0.247
Grade 7 ELA Scale Score 2011–12 and Prior	0.003	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	2.340	0.271
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.009	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	5.240	0.191
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.001	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	0.375	0.191
Mean Prior Grade 8 ELA 2011–12 and Prior	–0.014	0.002
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	–13.615	*
Mean Prior Grade 8 ELA 2012–13	0.005	0.001

Effect Name	Estimate	Standard Error
Missing Flag: Mean Prior Grade 8 ELA 2012–13	1.523	1.069
Mean Prior Grade 8 Mathematics 2011–12 and Prior	0.004	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	0.000	—
Mean Prior Grade 8 Mathematics 2012–13	0.004	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	0.431	1.073
Count of Prior Regents Exams = 0	2.052	0.284
Count of Prior Regents Exams = 1	2.950	0.284
Count of Prior Regents Exams = 2	3.201	0.284
Count of Prior Regents Exams = 3	2.720	0.285
Count of Prior Regents Exams = 4	1.953	0.293
Count of Prior Regents Exams = 5	0.000	—
Students with Disabilities	–0.127	0.015
Gen Ed < 40% (LRE3)	–0.613	0.052
Percentage of Students with Disabilities	–0.024	0.001
ELL	–0.305	0.047
Percentage ELLs	–0.006	0.001
NYSESLAT LS Scale Score 2011–12 and Prior	–0.002	0.001
NYSESLAT RW Scale Score 2011–12 and Prior	0.009	0.001
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	4.612	0.423
NYSESLAT Scale Score 2012–13	0.005	0.018
Missing Flag: NYSESLAT Scale Score 2012–13	3.345	*
Economically Disadvantaged	–0.120	0.011
Percentage Economically Disadvantaged	–0.007	0.000
Missing Flag: School Percentage Variables	0.000	—
New to School After Grade 9	–0.017	0.021

* Indicates standard errors not estimated by the statistical software.

— Indicates standard errors that are not defined because the variable was redundant.

Table H-33. Grades 9–12, GRE, Year in School 3 Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–10.336	0.143
Intercept 2	–11.461	0.144
Intercept 3	–13.449	0.145
Intercept 4	–15.791	0.146
Intercept 5	–18.130	0.150
Intercept 6	–20.691	0.205
Intercept 7	–22.165	0.335
Intercept 8	–24.563	1.010
Grade 8 ELA Scale Score 2011–12 and Prior	0.011	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	7.023	0.212
Grade 7 ELA Scale Score 2011–12 and Prior	–0.003	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	–1.792	0.126
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.008	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	4.867	0.155
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.002	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	1.094	0.166

Table H-34. Grades 9–12, GRE, Year in School 3 Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–2.947	0.801
Intercept 2	–4.544	0.801
Intercept 3	–7.036	0.801
Intercept 4	–9.464	0.801
Intercept 5	–11.806	0.802
Intercept 6	–14.366	0.814
Intercept 7	–15.839	0.856
Intercept 8	–18.237	1.281
Grade 8 ELA Scale Score 2011–12 and Prior	0.004	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12	2.660	0.225
Grade 7 ELA Scale Score 2011–12 and Prior	–0.003	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	–1.603	0.130
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.003	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	1.370	0.171
Grade 7 Mathematics Scale Score 2011–12 and Prior	–0.003	0.000

Effect Name	Estimate	Standard Error
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	–2.225	0.175
Mean Prior Grade 8 ELA 2011–12 and Prior	–0.002	0.002
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	–2.639	*
Mean Prior Grade 8 ELA 2012–13	0.008	0.001
Missing Flag: Mean Prior Grade 8 ELA 2012–13	2.983	0.750
Mean Prior Grade 8 Mathematics 2011–12 and Prior	–0.002	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	–9.098	*
Mean Prior Grade 8 Mathematics 2012–13	0.001	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	–1.253	0.754
Count of Prior Regents Exams = 0	0.980	0.057
Count of Prior Regents Exams = 1	2.758	0.058
Count of Prior Regents Exams = 2	4.182	0.057
Count of Prior Regents Exams = 3	4.317	0.055
Count of Prior Regents Exams = 4	2.069	0.055
Count of Prior Regents Exams = 5	0.000	—
Students with Disabilities	–0.436	0.016
Gen Ed < 40% (LRE3)	–0.569	0.061
Percentage of Students with Disabilities	–0.014	0.001
ELL	–0.674	0.053
Percentage ELLs	0.003	0.001
NYSESLAT LS Scale Score 2011–12 and Prior	–0.001	0.001
NYSESLAT RW Scale Score 2011–12 and Prior	0.004	0.001
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	2.196	0.426
NYSESLAT Scale Score 2012–13	0.002	0.002
Missing Flag: NYSESLAT Scale Score 2012–13	0.000	—
Economically Disadvantaged	0.016	0.012
Percentage Economically Disadvantaged	–0.003	0.000
Missing Flag: School Percent Variables	0.000	—
New to School After Grade 9	0.137	0.033

* Indicates standard errors not estimated by the statistical software.

— Indicates standard errors that are not defined because the variable was redundant.

Table H-35. Grades 9–12, GRE, Year in School 4 Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	5.424	0.239
Intercept 2	3.959	0.239
Intercept 3	2.589	0.239
Intercept 4	0.990	0.242
Intercept 5	–0.894	0.260
Intercept 6	–3.625	0.473
Grade 8 ELA Scale Score 2011–12 and Prior	–0.008	0.000
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	–4.588	0.282
Grade 7 ELA Scale Score 2011–12 and Prior	–0.006	0.000
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	–3.364	0.301
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.003	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	1.512	0.245
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.001	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	0.436	0.273

Table H-36. Grades 9–12, GRE, Year in School 4 Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–20.800	1.338
Intercept 2	–22.904	1.338
Intercept 3	–24.476	1.338
Intercept 4	–26.110	1.339
Intercept 5	–27.996	1.342
Intercept 6	–30.726	1.399
Grade 8 ELA Scale Score 2011–12 and Prior	0.001	0.001
Missing Flag: Grade 8 ELA Scale Score 2011–12	0.511	0.330
Grade 7 ELA Scale Score 2011–12 and Prior	0.000	0.001
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	0.219	0.354
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.006	0.000
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	3.543	0.306
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.000	0.000
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	0.320	0.327
Mean Prior Grade 8 ELA 2011–12 and Prior	0.012	0.003
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	4.944	2.849
Mean Prior Grade 8 ELA 2012–13	–0.002	0.001

Effect Name	Estimate	Standard Error
Missing Flag: Mean Prior Grade 8 ELA 2012–13	–0.182	0.887
Mean Prior Grade 8 Mathematics 2011–12 and Prior	–0.005	0.002
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	0.375	2.086
Mean Prior Grade 8 Mathematics 2012–13	0.005	0.001
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	0.690	0.889
Count of Prior Regents Exams = 0	1.371	0.037
Count of Prior Regents Exams = 1	2.798	0.035
Count of Prior Regents Exams = 2	3.830	0.033
Count of Prior Regents Exams = 3	4.072	0.027
Count of Prior Regents Exams = 4	3.077	0.021
Count of Prior Regents Exams = 5	0.000	—
Students with Disabilities	–0.473	0.024
Gen Ed < 40% (LRE3)	–0.441	0.081
Percentage of Students with Disabilities	–0.008	0.001
ELL	–0.254	0.058
Percentage ELLs	0.005	0.001
NYSESLAT LS Scale Score 2011–12 and Prior	–0.001	0.001
NYSESLAT RW Scale Score 2011–12 and Prior	0.000	0.001
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	–1.614	0.522
NYSESLAT Scale Score 2012–13	0.001	0.152
Missing Flag: NYSESLAT Scale Score 2012–13	9.767	0.000
Economically Disadvantaged	0.166	0.018
Percentage Economically Disadvantaged	0.004	0.000
Missing Flag: School Percentage Variables	–10.149	*
New to School After Grade 9	0.576	0.052

* Indicates standard errors not estimated by the statistical software.

— Indicates standard errors that are not defined because the variable was redundant.

Table H-37. Grades 9–12, GRE, Year in School 5+ Model Coefficients, Unadjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–7.144	0.469
Intercept 2	–8.405	0.470
Intercept 3	–9.708	0.473
Intercept 4	–11.329	0.484
Intercept 5	–13.362	0.566
Grade 8 ELA Scale Score 2011–12 and Prior	0.001	0.001
Missing Flag: Grade 8 ELA Scale Score 2011–12 and Prior	1.043	0.553
Grade 7 ELA Scale Score 2011–12 and Prior	0.001	0.001
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	0.968	0.516
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.005	0.001
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	2.345	0.516
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.003	0.001
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	1.266	0.509

Table H-38. Grades 9–12, GRE, Year in School 5+ Model Coefficients, Adjusted Model

Effect Name	Estimate	Standard Error
Intercept 1	–7.552	2.653
Intercept 2	–8.967	2.653
Intercept 3	–10.322	2.654
Intercept 4	–11.952	2.656
Intercept 5	–13.985	2.672
Grade 8 ELA Scale Score 2011–12 and Prior	0.002	0.001
Missing Flag: Grade 8 ELA Scale Score 2011–12	1.217	0.665
Grade 7 ELA Scale Score 2011–12 and Prior	0.002	0.001
Missing Flag: Grade 7 ELA Scale Score 2011–12 and Prior	1.460	0.599
Grade 8 Mathematics Scale Score 2011–12 and Prior	0.002	0.001
Missing Flag: Grade 8 Mathematics Scale Score 2011–12 and Prior	1.325	0.593
Grade 7 Mathematics Scale Score 2011–12 and Prior	0.001	0.001
Missing Flag: Grade 7 Mathematics Scale Score 2011–12 and Prior	0.926	0.581
Mean Prior Grade 8 ELA 2011–12 and Prior	0.003	0.006
Missing Flag: Mean Prior Grade 8 ELA 2011–12 and Prior	11.162	*
Mean Prior Grade 8 ELA 2012–13	–0.006	0.003
Missing Flag: Mean Prior Grade 8 ELA 2012–13	0.426	1.839
Mean Prior Grade 8 Mathematics 2011–12 and Prior	–0.002	0.004

Effect Name	Estimate	Standard Error
Missing Flag: Mean Prior Grade 8 Mathematics 2011–12 and Prior	–9.624	*
Mean Prior Grade 8 Mathematics 2012–13	0.004	0.003
Missing Flag: Mean Prior Grade 8 Mathematics 2012–13	–0.663	1.832
Count of Prior Regents Exams = 0	1.956	0.154
Count of Prior Regents Exams = 1	2.972	0.149
Count of Prior Regents Exams = 2	3.458	0.146
Count of Prior Regents Exams = 3	3.656	0.143
Count of Prior Regents Exams = 4	3.267	0.141
Count of Prior Regents Exams = 5	0.000	—
Students with Disabilities	–0.224	0.055
Gen Ed < 40% (LRE3)	–0.302	0.137
Percentage of Students with Disabilities	–0.011	0.002
ELL	–0.331	0.114
Percentage ELLs	0.003	0.002
NYSESLAT LS Scale Score 2011–12 and Prior	0.002	0.001
NYSESLAT RW Scale Score 2011–12 and Prior	–0.004	0.002
Missing Flag: NYSESLAT Scale Scores 2011–12 and Prior	–1.334	0.988
NYSESLAT Scale Score 2012–13	0.000	—
Missing Flag: NYSESLAT Scale Score 2012–13	0.000	—
Economically Disadvantaged	0.346	0.045
Percentage Economically Disadvantaged	0.000	0.001
Missing Flag: School Percentage Variables	0.000	—
New to School After Grade 9	0.546	0.103

* Indicates standard errors not estimated by the statistical software.

— Indicates standard errors that are not defined because the variable was redundant.

Appendix I. Additional Impact Correlation Tables (Grades 4–8 by Grade and Subject and Grades 4–8 and 9–12 Principal)

Table I-1. Impact Correlations by Grade for ELA

Grade	Percent ELL	Percent Students With Disabilities	Percent Economically Disadvantaged	Mean Prior Scale Score
4	0.04	0.10	0.06	0.03
5	0.08	0.04	0.06	0.08
6	0.03	0.07	0.03	–0.01
7	0.12	0.06	0.10	–0.02
8	0.08	0.06	0.03	0.00

Table I-2. Impact Correlations by Grade for Mathematics

Grade	Percent ELL	Percent Students With Disabilities	Percent Economically Disadvantaged	Mean Prior Scale Score
4	0.05	0.05	0.04	0.16
5	0.04	0.07	0.05	0.09
6	0.00	0.01	–0.01	0.08
7	0.02	–0.02	0.01	0.16
8	0.03	0.02	0.01	0.18

Table I-3. Principal Impact Correlations

Model	Percent ELL	Percent Students With Disabilities	Percent Economically Disadvantaged	Mean Prior ELA*	Mean Prior Mathematics*
4–8 Growth Model (MGPs)	0.05	0.00	0.04	0.01	0.03
9–12 Growth Model (MGPs)	0.03	–0.13	0.06	0.14	0.12
9–12 Growth in Regents Exams Passed (GRE)	–0.04	–0.29	–0.19	0.41	0.42

* Values in this column represent the correlation between the measure and the average prior grade achievement for Grades 4–8 measures and the correlation between the measure and the average prior Grade 8 achievement for Grades 9–12 measures.

ABOUT AMERICAN INSTITUTES FOR RESEARCH

Established in 1946, with headquarters in Washington, D.C., American Institutes for Research (AIR) is an independent, nonpartisan, not-for-profit organization that conducts behavioral and social science research and delivers technical assistance both domestically and internationally. As one of the largest behavioral and social science research organizations in the world, AIR is committed to empowering communities and institutions with innovative solutions to the most critical challenges in education, health, workforce, and international development.

LOCATIONS

Domestic

Washington, D.C.

Atlanta, GA

Baltimore, MD

Chapel Hill, NC

Chicago, IL

Columbus, OH

Frederick, MD

Honolulu, HI

Indianapolis, IN

Naperville, IL

New York, NY

Rockville, MD

Sacramento, CA

San Mateo, CA

Waltham, MA

International

Egypt

Honduras

Ivory Coast

Kyrgyzstan

Liberia

Tajikistan

Zambia

1000 Thomas Jefferson Street NW
Washington, DC 20007-3835
202.403.5000 | TTY 877.334.3499

www.air.org

Making Research Relevant

4058_1/15