Making Connections

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# Examining school-level reading and math proficiency trends and changes in achievement gaps for grades 3–8 in Florida, Mississippi, and North Carolina

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## Key findings

This study used growth curve modeling to investigate trends in reading and math proficiency in each state over a four- to six-year period for grades 3–8. It found that:

- The school-level percentage of students who scored proficient in reading and math increased in Florida, Mississippi, and North Carolina; the percentage also increased for most racial/ethnic and economic subgroups.
- Achievement gaps decreased for most racial/ethnic and economic subgroups across grades, subjects, and states.
- Proficiency achievement gaps remained large across grades, subjects, and states despite significant decreases.

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## Summary

The 2001 authorization of the No Child Left Behind Act and its standards and accountability requirements generated interest among state education agencies in Florida, Mississippi, and North Carolina, which are served by the Regional Educational Laboratory Southeast, in monitoring changes in student reading and math proficiency at the school level. This study was requested by governing board members representing North Carolina, members of the Improving Literacy Research Alliance (which includes representatives from Florida) and, members of the Improving Schools in Mississippi Research Alliance. All three of these states monitor and report changes in performance for schools. However, this study goes beyond reporting averages to examine school-level academic performance using a growth curve modeling approach. This approach can provide stakeholders with a deeper understanding of trends in student proficiency at the school level, by grade at the school level, and among key demographic groups to allow for more accurate policy responses.

This study uses growth curve modeling to investigate trends in student reading and math proficiency on state accountability assessments for grades 3–8. Growth curve modeling makes it possible to determine if growth rates in reading and math proficiency are statistically significant and if the differences in proficiency growth rates between grades and subgroups differ in statistically significant ways.

Using four to six years of publicly available school-level data between school years 2007/08 and 2013/14 from each state department of education, this study assessed trends in three areas. First, it estimated trends in average school-level student growth rates in reading and math proficiency on the statewide assessment and examined whether these growth rates varied across grades 3 through 8. Second, it calculated average school-level student growth rates in reading and math proficiency for racial/ethnic subgroups and economic subgroups (eligibility for the federal school lunch program, a proxy for economic disadvantage) in grades 3–8. Third, it examined whether there were any statistically significant decreases in achievement gaps by grade between White and Black students, between White and Hispanic students, and between economic subgroups. This information was then used to estimate reading and math proficiency gaps that remained at the end of the period studied.

In general, average school-level student academic proficiency rates increased for most subgroups across grades and subjects in all three states. In addition, reading and math achievement gaps decreased for most subgroups; however, achievement gaps remained large despite the decreases. More findings include:

- The school-level percentage of students who scored proficient in reading and math increased in all three states—Florida, Mississippi, and North Carolina—over the period studied.
- School-level growth rates in student reading and math proficiency differed by grade level in each state, though most grades showed a statistically significant increase over the period examined.
- School-level growth rates in student reading and math proficiency differed across racial/ethnic subgroups, though most subgroups showed a statistically significant increase.
- The reading and math proficiency achievement gaps between White and Black students and White and Hispanic students decreased in most grades in all three states; however, the gaps still exceeded 10 percentage points.

- Average school-level proficiency rates in reading and math differed by grade between economic subgroups in Florida and Mississippi, with most grade-economic subgroup combinations showing a significant increase. These data were not available for North Carolina.
- The achievement gap in reading and math proficiency between economic subgroups decreased in all grades in Florida and Mississippi; however, the gaps still exceed 13 percentage points.

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## Why this study?

A key goal of the 2001 authorization of the No Child Left Behind Act (No Child Left Behind Act, 2002) was to close achievement gaps among student subgroups by having all students achieve academic proficiency, as defined by each state, by 2013/14. To reach this goal, states were required to develop a system of grade-level standards, assessments aligned to those standards, and accountability measures for all public schools. At least 95 percent of grade 3–8 students were required to be assessed on these standards yearly.

In response to this legislation, and with the goal of eliminating achievement gaps, state education agencies in Florida, Mississippi, and North Carolina, which are served by Regional Educational Laboratory (REL) Southeast, expressed interest in better understanding trends in school-level reading and math proficiency based on their state standards. More specifically, governing board members representing North Carolina, members of the Improving Literacy Research Alliance (which includes representatives from Florida), and members of the Improving Schools in Mississippi Research Alliance were particularly interested in understanding trends in school level academic performance using more sophisticated measures of change than are currently employed in their states.

***Statistical approaches, such as growth curve modeling, allow for the exploration of average growth rates and variation in growth rates in academic achievement across schools, grades, and student subgroups to determine whether the observed growth rates are statistically significant***

When assessing achievement trends, states often calculate average student achievement each year and report these values across years (No Child Left Behind Act, 2002). Although this approach is computationally straightforward, it provides only one piece of information —the annual average—for a state or a school. Other statistical approaches, such as growth curve modeling (defined in box 1), are more computationally complex but allow for the exploration of average growth rates and variation in growth rates in academic achievement across schools, grades, and student subgroups to determine whether the observed growth rates are statistically significant. A statistically significant finding indicates that there is less than a 5 percent probability that the estimated growth rate is equal to zero. In other words, a statistically significant finding provides information about whether there is clear evidence that performance changed over time. Growth curve modeling can also determine whether two growth rates are statistically different from one another. This information can then be used to determine whether racial/ethnic or economic subgroup achievement gaps have increased, decreased, or remained stable.

## What the study examined

This study used growth curve modeling (defined in box 1) to provide stakeholders in Florida, Mississippi, and North Carolina with information on school-level trends in student reading and math proficiency rates on the state accountability assessments for grades 3–8. This approach provides a direct test of whether a change in proficiency over time has occurred and whether subgroups of students differ in their rate of change. This approach provides a deeper understanding of trends in school-level academic achievement, which can help decisionmakers determine which schools need additional support or resources.

The following research questions were examined separately for Florida, Mississippi, and North Carolina:

- What was the average school-level growth rate in student reading and math proficiency on the statewide assessment over the period studied, and did growth rates vary among grades 3–8?

- What was the average school-level growth rate in student reading and math proficiency for racial/ethnic subgroups and for economic subgroups (students who were eligible for the federal school lunch program, a proxy for economic disadvantage, and students who were not eligible) by grade?
- Was there a statistically significant decrease in the proficiency achievement gap by grade between White and Black students, White and Hispanic students, and between economic subgroups? How large were the achievement gaps at the end of the study period by subject and grade?

Four to six years of data between school years 2007/08 and 2013/14 were examined for each state. Key terms are defined in box 1. Box 2 describes the study data and analytic method; appendix A describes them in detail.

***Growth curve modeling provides a direct test of whether a change in proficiency over time has occurred and whether subgroups of students differ in their rate of change***

### Box 1. Key terms

***Decrease in achievement gap.*** Differences in proficiency growth rates between racial/ethnic or economic subgroups are used to determine whether the achievement gap between the subgroups decreased. A decrease in an achievement gap can occur in several ways. First, a decrease could occur if the majority subgroup shows a decrease in its proficiency growth rate and the minority subgroup shows either an increase in their growth rate, no change in their growth rate, or a slower rate of decrease. Second, decreases in achievement gaps could occur if the growth rate for the majority subgroup remains stable while the growth rate for the minority subgroup increases. Finally, a decrease in an achievement gap could occur if the growth rate for the majority subgroup increases and the minority subgroup shows a faster rate of increase.

***Economic subgroup.*** Growth rates for reading and math proficiency are reported separately for subgroups of students who were eligible for the federal school lunch program and those who were not.

***Growth curve modeling.*** Growth curve modeling is a statistical approach that aids in characterizing change over time. Growth curve models provide an estimated rate of growth. In this study, growth curve modeling is used to explore the average reading and math proficiency growth rates across grades and subgroups by subject to determine whether the observed growth rates are statistically different from zero. It can also determine whether two growth rates (for example, of different racial/minority or economic subgroups) are statistically different from each other to investigate changes in academic achievement gaps between those groups.

***Proficiency growth rate.*** The estimated increase (or decrease) over time in the percentage of students in each school who tested proficient in reading or math on the annual state assessment based on results from the growth curve model. Growth rates are also reported by grade level, race/ethnicity, and economic subgroup in each state.

## Box 2. Data and analytic method

### Data

This study used publicly available data on the percentage of students who scored proficient in reading and math in Florida, Mississippi, and North Carolina from each state's department of education website including, when available:

- School-level average of the percentage of students who scored proficient in reading or math by grade.
- School-level average of the percentage of students who scored proficient in reading or math by racial/ethnic group and by grade.
- School-level average of the percentage of students who scored proficient in reading or math for subgroups of students who were and students who were not eligible for the federal school lunch program and by grade.

Four to six years of data between school years 2007/08 and 2013/14 were collected, depending on how long the most current version of the state assessment had been in use (see table). Descriptions of the assessments used for each state can be found in appendix A.

### Analytic method

Growth curve modeling is a statistical approach that aids in characterizing change over time. Such models indicate whether the estimated rate of growth is statistically different from zero. An estimated growth rate that is not statistically different from zero suggests that there is no clear evidence of growth over the time period studied. For more on growth curve modeling methods, see appendix A.

**Availability of state academic outcome data on percentage of students proficient in reading and math, by state, subject, years, grade span, and subgroup**

| State | Subject | Grade span | Data available for school years | Data available for racial/ethnic subgroups[a] | Data available for students who were or were not eligible for the federal school lunch program |
|---|---|---|---|---|---|
| Florida | Reading | 3–8 | 2010/11–2013/14 | ✔ | ✔ |
| | Math | 3–7[b] | 2010/11–2013/14 | ✔ | ✔ |
| Mississippi | Reading | 3–8 | 2007/08–2012/13 | ✔ | ✔ |
| | Math | 3–8 | 2007/08–2012/13 | ✔ | ✔ |
| North Carolina | Reading | 3–8 | 2008/09–2011/12 | ✔ | — |
| | Math | 3–8 | 2008/09–2011/12 | ✔ | — |

✔ is yes, — is not available.

**a.** The racial/ethnic subgroups of interest included any subgroup that accounted for a minimum of 10 percent of the population. In the Florida and North Carolina models, White, Black, and Hispanic subgroups were included. However, in Mississippi, the proportion of Hispanic students was 2.5 percent, and this subgroup was therefore dropped from the Mississippi analyses.

**b.** The Florida legislature enacted a policy during the 2012/13 school year allowing grade 8 students to replace the Florida Comprehensive Assessment Test in math with the Algebra I end-of-course exam. Because this resulted in a substantial and artificial drop in performance between the 2011/12 and 2012/13 school years, grade 8 was excluded when analyzing Florida's math performance.

**Source:** Information obtained from Florida, Mississippi, and North Carolina's state department of education websites.

## What the study found

This section describes school-level trends in student reading and math proficiency growth rates in Florida, Mississippi, and North Carolina. Growth rates described as increasing or decreasing reflect a rate of change that is statistically different from zero. Growth rates described as stable indicate that the rate of change was found to be nonsignificant, suggesting no clear evidence of growth over the time period studied. Identified differences between growth rates reflect rates that are statistically different from one another. The results reported in this section are presented in the same order for each state: overall school-level growth rates in student academic proficiency; the differences in growth rates in grades 3 through 8; growth rates for racial/ethnic subgroups (that is, White, Black, and Hispanic) and economic subgroups (students who were and those who were not eligible for the federal school lunch program) by grade; and differences in growth rates between racial/ethnic subgroups and economic subgroups, which are used to determine whether the White–Black, White–Hispanic, and economic subgroup achievement gaps decreased over time.

***Because this study used school-level longitudinal data, school-level growth rates reflect changes in school-level average proficiency and not changes in proficiency for the same students over time***

Significant decreases in achievement gaps between racial/ethnic and economic subgroups can occur in several ways and are noted here. First, a decrease could occur if the majority subgroup (that is, White or students not eligible for the federal school lunch program) shows a decrease in proficiency and the minority subgroup (that is, Black, Hispanic, or students eligible for the federal school lunch program) shows either an increase in proficiency, no change in proficiency, or a slower rate of decrease. Second, decreases in achievement gaps could occur if proficiency for the majority subgroup remained stable while proficiency for the minority subgroup increased, or third, if all subgroups increase in proficiency but the minority subgroups increase at a faster rate. Throughout the report, when a decrease in an achievement gap is reported, the way the decrease occurred is specified.

It is important to note that this study used school-level longitudinal data rather than student-level longitudinal data. Therefore, school-level growth rates reflect changes in school-level average proficiency and not changes in proficiency for the same students over time. As a result, small schools are weighted the same as large schools in the analysis, whereas in an analysis using student-level data schools would be weighted based on the number of students at each school. Also phrases such as "White students' proficiency growth rate" should not be interpreted as referring to the average proficiency for White students but to the average school-level proficiency growth rate for White students. In addition, results are presented by state, and no comparisons are made across states because of differences in state proficiency standards. Results for all estimated growth models can be found in appendix A.

### Florida school-level achievement trend findings, 2010/11–2013/14

A total of 68 achievement trends were estimated in Florida to answer the first two research questions. Two trends were estimated to examine school-level reading and math proficiency growth rates, 11 trends were estimated for each of grades 3–8 to examine differences in reading and math proficiency between grades, and 55 trends were estimated for racial/ethnic and economic subgroups by grade to examine differences in reading and math proficiency between these subgroups by grade (table 1 and see tables A2 and A3 in appendix A). Out of the 68 trends estimated, Florida schools showed statistically significant increases

**Table 1. Florida average school-level proficiency growth rates for racial/ethnic subgroups and economic subgroups, by subject and grade, 2010/11–2013/14**

| Grade and student subgroup | Reading proficiency | | | Math proficiency | | |
|---|---|---|---|---|---|---|
| | Direction of growth[a] | Average annual growth rate (percentage point) | Average growth over period studied (percentage point) | Direction of growth[a] | Average annual growth rate (percentage point) | Average growth over period studied (percentage point) |
| Grade 3 | | | | | | |
| White | – | –0.38 | –1.14 | 0 | –0.18 | –0.54 |
| Black | + | 0.31 | 0.93 | + | 1.01 | 3.03 |
| Hispanic | 0 | 0.02 | 0.06 | + | 0.72 | 2.16 |
| Not eligible for school lunch program | – | –1.20 | –3.60 | – | –0.55 | –1.65 |
| Eligible for school lunch program | + | 0.16 | 0.48 | + | 0.80 | 2.40 |
| Grade 4 | | | | | | |
| White | 0 | –0.14 | –0.42 | + | 1.45 | 4.35 |
| Black | + | 0.58 | 1.74 | + | 1.91 | 5.73 |
| Hispanic | + | 0.35 | 1.05 | + | 1.92 | 5.76 |
| Not eligible for school lunch program | – | –0.44 | –1.32 | + | 0.86 | 2.58 |
| Eligible for school lunch program | + | 0.41 | 1.23 | + | 1.95 | 5.85 |
| Grade 5 | | | | | | |
| White | + | 0.35 | 1.05 | – | –0.26 | –0.78 |
| Black | + | 0.73 | 2.19 | + | 0.18 | 0.54 |
| Hispanic | + | 0.89 | 2.67 | + | 0.23 | 0.69 |
| Not eligible for school lunch program | 0 | –0.03 | –0.09 | – | –0.49 | –1.47 |
| Eligible for school lunch program | + | 0.75 | 2.25 | + | 0.12 | 0.36 |
| Grade 6 | | | | | | |
| White | 0 | 0.04 | 0.12 | 0 | –0.22 | –0.66 |
| Black | + | 1.65 | 4.95 | + | 0.51 | 1.53 |
| Hispanic | + | 0.72 | 2.16 | 0 | –0.08 | –0.24 |
| Not eligible for school lunch program | 0 | 0.00 | 0.00 | 0 | –0.27 | –0.81 |
| Eligible for school lunch program | + | 0.89 | 2.67 | + | 0.16 | 0.48 |
| Grade 7 | | | | | | |
| White | – | –0.99 | –2.97 | 0 | –0.03 | –0.09 |
| Black | – | –0.29 | –0.87 | + | 0.37 | 1.11 |
| Hispanic | – | –0.29 | –0.87 | 0 | –0.12 | –0.36 |
| Not eligible for school lunch program | – | –0.90 | –2.70 | – | –0.51 | –1.53 |
| Eligible for school lunch program | – | –0.33 | –0.99 | + | 0.36 | 1.08 |
| Grade 8 | | | | | | |
| White | + | 0.64 | 1.92 | na | na | na |
| Black | + | 1.50 | 4.50 | na | na | na |
| Hispanic | + | 1.28 | 3.84 | na | na | na |
| Not eligible for school lunch program | + | 1.01 | 3.03 | na | na | na |
| Eligible for school lunch program | + | 1.27 | 3.81 | na | na | na |

na is not applicable.

**a.** Describes the direction of growth in proficiency as significantly decreasing (represented by –), significantly increasing (represented by +), or as not significantly different from zero (represented by 0).

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

in proficiency growth rates in 40 trends, no clear change in 15 trends, and statistically significant decreases in 13 trends (see table 1 and tables A2 and A3). Florida schools showed significant decreases in White–Black, White–Hispanic, and economic subgroup achievement gaps in most grades, though relatively large gaps remained in 2013/14.

***Average school-level reading and math proficiency growth rates increased from 2010/11 through 2013/14.*** The average school-level student reading proficiency rate on the 2010/11 Florida Comprehensive Assessment Test version 2.0 was 54.35 percent, and it increased an average of 0.27 percentage point annually through 2013/14. Although the increase is significant, a total average increase in school-level reading proficiency of less than 1 percentage point from 2010/11 to 2013/14 could be considered only a slight positive trend (see table A1 in appendix A).

A similar pattern was observed in Florida in math: the average school-level student math proficiency rate on the state achievement test was 52.11 percent in 2010/11, and it increased 0.53 percentage point, on average, annually through 2013/14 (see table A1). This significant growth rate equates to a total average increase in school-level math proficiency of 1.59 percentage points from 2010/11 to 2013/14.

***Florida schools showed significant decreases in White–Black, White–Hispanic, and economic subgroup achievement gaps in most grades, though relatively large gaps remained in 2013/14***

***Average school-level proficiency growth rates in reading and math differed by grade.*** In 2010/11 across grades 3–8, slightly more than 50 percent of Florida students in an average school scored proficient in reading on the state achievement test. Over the four years studied, average annual school-level proficiency growth rates increased 0.24–1.12 percentage points in grades 4–6 and 8, decreased 0.45 percentage point in grade 7, and remained stable in grade 3 (see table A2 and figure A1 in appendix A).

As with reading, the average school-level proficiency rate in math in Florida in 2010/11 across grades 3–7[1] was slightly above 50 percent. However, growth rates by grade did not follow the same trend in math as in reading: the average annual school-level math proficiency growth rate rose 0.54 percentage point in grade 3 and 1.68 percentage points in grade 4, but remained stable in grades 5–7 over 2010/11–2013/14 (see table A2 and figure A1 in appendix A).

***School-level reading and math proficiency growth rates increased in most grades for White, Black, and Hispanic students and for students eligible for the federal school lunch program.*** In Florida, growth in school-level proficiency rates (defined in box 1) by racial/ethnic subgroups (White, Black, and Hispanic) were estimated for grades 3–8 over 2010/11–2013/14.

Average annual school-level proficiency growth rates among Black students increased significantly by 0.31–1.65 percentage points in reading and 0.18–1.91 percentage points in math in all grades with the exception of reading in grade 7, where proficiency growth rates decreased significantly by 0.29 percentage point annually (see table 1 and figures A4 and A5 in appendix A).

Hispanic students' proficiency growth rates in reading and math increased in more than half the grades examined. Average annual proficiency growth rates among Hispanic students increased significantly by 0.35–1.28 percentage points in reading for grades 4–6 and 8 and by 0.23–1.92 percentage points in math for grades 3–5. The remaining grades

showed decreases in growth or remained stable (see table 1 and figures A4 and A5 inn appendix A). Among Hispanic students in grade 7, average annual proficiency growth rates in reading decreased 0.29 percentage point. Proficiency growth rates remained stable in reading for grade 3 and in math for grades 6 and 7 over the four-year period studied.

White students' proficiency growth rates in reading and math were more variable than those of Black and Hispanic students. White students' reading proficiency rates over 2010/11–2013/14 increased 0.35 percentage point annually in grade 5 and 0.64 percentage point annually in grade 8, and math proficiency growth rates increased 1.45 percentage points annually in grade 4. In several grades White students' proficiency growth rates in reading and math decreased. White students' average annual proficiency growth rates decreased 0.99 percentage point in grade 7 reading, 0.38 percentage point in grade 3 reading, and 0.26 percentage point in grade 5 math. White students' proficiency growth rates were stable in grades 4 and 6 reading and grades 3, 6, and 7 math.

***In Florida schools, although decreases in the White–Black and White–Hispanic achievement gaps were observed, the 2013/14 estimated reading and math proficiency achievement gaps remained large; the White–Black academic proficiency achievement gap exceeded 20 percentage points, and the White–Hispanic gap was 10–15 percentage points***

Growth in academic proficiency rates for student economic subgroups was also estimated by school for grades 3–8 from 2010/11 through 2013/14. Average annual proficiency for students who were eligible for the federal school lunch program increased 0.16–1.27 percentage points in reading and 0.12–1.95 percentage points in math for all grades with the exception of grade 7, which showed a significant annual decrease of 0.33 percentage point annually in reading (see table 1 and figures A10 and A11 in appendix A). In contrast, the average annual proficiency growth rate for students who were not eligible for the federal school lunch program decreased 0.44 percentage point in reading in grade 4, 1.20 percentage points in grade 3, and 0.90 percentage point in grade 7 (see table 1 and figure A10 in appendix A). Math proficiency also decreased for grades 3, 5, and 7 (see table 1 and figure A11 in appendix A). Proficiency remained stable for grade 5 and 6 reading and grade 6 math.

***From 2010/11 through 2013/14 differences in proficiency growth rates between student subgroups decreased achievement gaps in reading and math between White and Black students, White and Hispanic students, and students who were and students who were not eligible for the federal school lunch program across most grades; however, relatively large gaps remained in 2013/14.*** Differences in academic proficiency growth rates across racial/ethnic subgroups and economic subgroups are used to determine whether achievement gaps between those groups decreased.

In all grades, differences between White and Black students' proficiency growth rates in reading and math resulted in a decrease in the achievement gap between those subgroups. In several grades and subject areas (grades 4 and 6 in reading and grades 3, 6, and 7 in math), proficiency growth rates remained stable among White students and increased among Black students (see table 1). In other grades and subject areas (grades 5 and 8 in reading and grade 4 in math), proficiency growth rates increased among White students but increased faster among Black students. In grade 3 reading and grade 5 math, proficiency growth rates decreased among White students and increased among Black students. Proficiency growth rates decreased among both White and Black students in grade 7 reading, but decreased at a slower rate for Black students than for White students. These differences between the proficiency growth rates for White and Black students led to a decrease in the White–Black achievement gap of 1.14–4.83 percentage points in reading and 1.20–3.57 in math across grades 3–8 from 2010/11 through 2013/14 (table 2).

**Table 2. Florida average percentage point decrease in school-level proficiency achievement gaps, by subject and grade, 2010/11–2013/14**

| Grade | Reading | | | Math | | |
|---|---|---|---|---|---|---|
| | Between White and Black students (percent of 2010/11 gap) | Between White and Hispanic students (percent of 2010/11 gap) | Between students eligible and those not eligible for the school lunch program (percent of 2010/11 gap) | Between White and Black Students (percent of 2010/11 gap) | Between White and Hispanic Students (percent of 2010/11 gap) | Between students eligible and those not eligible for the school lunch program (percent of 2010/11 gap) |
| 3 | 2.07 (8.01) | 1.20 (7.44) | 4.08 (17.35) | 3.57 (14.27) | 2.70 (20.61) | 4.05 (18.22) |
| 4 | 1.74 (7.05) | 1.47 (11.02) | 2.55 (11.99) | 1.38 (5.93) | 1.41 (12.61) | 3.27 (15.96) |
| 5 | 1.14 (4.66) | 1.62 (11.50) | 2.34 (10.90) | 1.32 (5.01) | 1.47 (12.04) | 1.83 (8.60) |
| 6 | 4.83 (18.00) | 2.04 (15.09) | 2.67 (12.62) | 2.19 (8.77) | 0.42[a] (3.72) | 1.29 (6.46) |
| 7 | 2.10 (8.45) | 2.10 (15.75) | 1.71 (8.55) | 1.20 (4.67) | –0.27[a] (2.40) | 2.61 (13.26) |
| 8 | 2.58 (10.58) | 1.92 (14.47) | 0.78 (4.09) | na | na | na |

na is not applicable.

**Note:** Each cell in the table reports the average percentage point decrease in the specified achievement gap and the percentage of the 2010/11 gap the decrease represents by grade and subject. For example, the first cell of the table reports that the White-Black reading proficiency achievement gap in grade 3 decreased by 2.07 percentage points from 2010/11 through 2013/14. This 2.07 percentage point decrease represents 8.01 percent of the 2010/11 White-Black reading proficiency achievement gap.

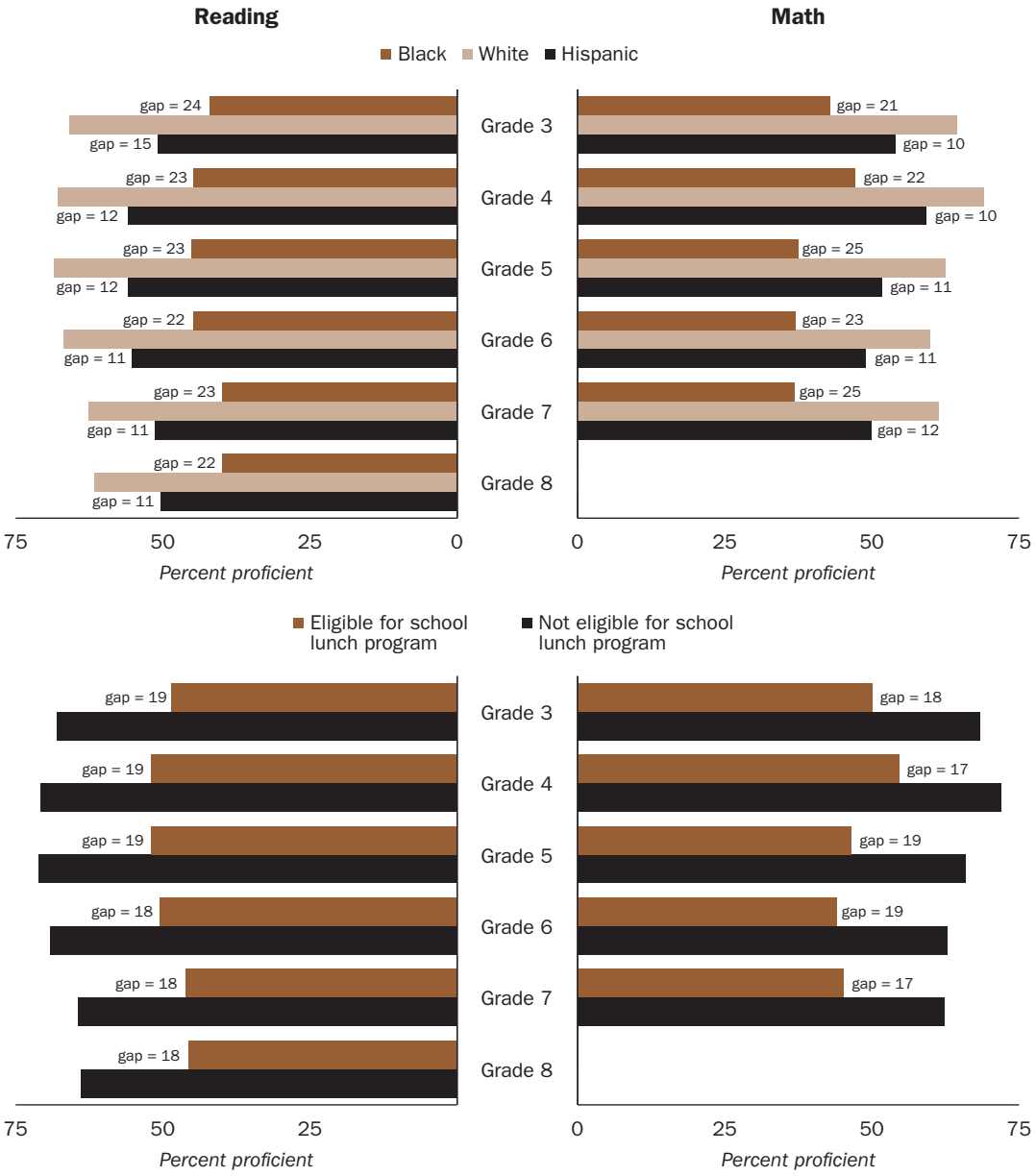
**a.** Differences between the estimated growth rates for the two subgroups were not statistically significant. Therefore, the reported percentage point decrease does not reflect a significant decrease in the achievement gap.

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

Similarly, differences between academic proficiency growth rates for White and Hispanic subgroups were observed in reading for grades 3–8 and in math for grades 3–5. In grades 4 and 6 in reading and grade 3 in math, proficiency growth rates remained stable among White students and increased among Hispanic students (see table 1). In three other grades—grades 5 and 8 in reading and grade 4 in math—proficiency growth rates increased among White students but increased faster among Hispanic students. In the remaining grades—grades 3 and 7 in reading, and grade 5 in math—proficiency growth rates decreased among White students and decreased at a slower rate (grade 7 reading), remained stable (grade 3 reading), or increased (grade 5 math) among Hispanic students. These differences between the proficiency growth rates for White and Hispanic students led to a decrease in the White–Hispanic achievement gap of 1.20–2.10 percentage points in reading for grades 3–8 and 1.41–2.70 percentage points in math for grades 3–5 from 2010/11 through 2013/14 (see table 2). No change in the White–Hispanic math achievement gap was observed in grades 6 and 7.

Although decreases in the White–Black and White–Hispanic achievement gaps were observed, the 2013/14 estimated reading and math proficiency achievement gaps between these subgroups remained large. Specifically, the White–Black academic proficiency achievement gap in 2013/14 exceeded 20 percentage points (22–24 percentage points in reading and 21–25 percentage points in math), and the White–Hispanic academic proficiency achievement gap was 10–15 percentage points across reading and math (figure 1).

**Figure 1. Florida reading and math proficiency rates in 2013/14 for racial/ethnic subgroups and economic subgroups, and subgroup percentage point achievement gaps, by grade**




**Note:** Achievement gaps noted in the top panel reflect White–Black and White–Hispanic achievement gap differences.

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

Differences in proficiency growth rates in reading and math between economic subgroups were observed in all grades. In several grades (grades 3, 4, and 7 in reading and grades 3, 5, and 7 in math), proficiency growth rates decreased among students not eligible for the federal school lunch program and increased among eligible students, with the exception of grade 7 reading where proficiency growth rates decreased at a slower rate among eligible students compared to students not eligible for the school lunch program (see table 1). In two other grades (grades 5 and 6 in reading and grade 6 in math) proficiency growth rates

remained stable among students who were not eligible and rose among eligible students. In the remaining grades and subjects (grade 8 reading and grade 4 math) proficiency growth rates increased in both subgroups but increased at a faster rate among eligible students.

These differences in growth rates led to a decrease in the achievement gap between these economic subgroups of 0.78–4.08 percentage points in reading and 1.29–4.05 percentage points in math across grades 3–8 from 2010/11 through 2013/14 (see table 2). Although decreases in this gap were observed, the 2013/14 estimated proficiency achievement gap between these subgroups remained large, at 17–19 percentage points across reading and math in grades 3–8 (see figure 1).

### Mississippi school-level achievement trend findings, 2007/08–2012/13

***Mississippi schools showed statistically significant increases in all of the estimated achievement trends; however, large achievement gaps remained in 2012/13***

A total of 62 achievement trends were estimated in Mississippi to answer the first two research questions. Two trends were estimated to examine school-level reading and math proficiency growth rates, 12 trends were estimated for each of grades 3–8 to examine differences in reading and math proficiency between grades, and 48 trends were estimated for racial/ethnic and economic subgroups by grade to examine differences in reading and math proficiency between these subgroups by grade (table 3 and see tables A4 and A5 in appendix A). Mississippi schools showed statistically significant increases in all of the 62 estimated achievement trends. Differences in growth rates for racial/ethnic and economic subgroups were observed over 2007/08–2012/13, and significant decreases in achievement gaps were found in most grades. However, large achievement gaps remained in 2012/13.

***Average school-level proficiency growth rates in reading and math increased from 2007/08 through 2012/13.*** The average school-level student reading proficiency rate on the 2007/08 Mississippi Curriculum Test, second edition, was 44.35 percent, and it increased an average of 2.13 percentage points annually through 2012/13 (see table A1 in appendix A). This significant growth rate equates to a total average increase in school-level reading proficiency of 10.65 percentage points from 2007/08 to 2012/13.

A similar pattern was observed in math: the average school-level student math proficiency rate in 2007/08 was 50.55 percent, and it increased an average of 2.60 percentage points annually (see table A1 in appendix A). This significant growth rate equates to a total average increase in school-level math proficiency of 13 percentage points from 2007/08 to 2012/13.

***Average school-level proficiency growth rates in reading and math differed in grades 3–8.*** In 2007/08 average school-level proficiency rates on the MCT2 reading assessment ranged from 42 to 46 percent across all grades (see tables A4 and A5 and figure A2 in appendix A). Over the six years studied (2007/08–2012/13), average school-level student proficiency growth rates in reading increased 1.59–1.95 percentage points annually in grades 3–5 and 8. In addition, average school-level proficiency growth rates increased annually by 2.37 percentage points in grade 6 and 3.86 percentage points in grade 7. The largest average increase in school-level reading proficiency growth rates was seen in grade 7.

The average school-level proficiency rate on the 2007/08 state assessment was slightly higher in math than in reading and ranged from 49 percent to 52 percent across grades 3–8 (see tables A4 and A5 and figure A2 in appendix A). The average school-level proficiency growth

**Table 3. Mississippi average school-level proficiency growth rates for racial/ethnic subgroups and economic subgroups, by subject and grade, 2007/08–2012/13**

| Grade and student subgroup | Reading proficiency | | | Math proficiency | | |
|---|---|---|---|---|---|---|
| | Direction of growth[a] | Average annual growth rate (percentage point) | Average growth over period studied (percentage point) | Direction of growth[a] | Average annual growth rate (percentage point) | Average growth over period studied (percentage point) |
| Grade 3 | | | | | | |
| White | + | 0.76 | 3.80 | + | 2.03 | 10.15 |
| Black | + | 2.09 | 10.45 | + | 2.35 | 11.75 |
| Not eligible for school lunch program | + | 1.47 | 7.35 | + | 2.07 | 10.35 |
| Eligible for school lunch program | + | 1.98 | 9.90 | + | 2.68 | 13.40 |
| Grade 4 | | | | | | |
| White | + | 0.99 | 4.95 | + | 1.47 | 7.35 |
| Black | + | 2.36 | 11.80 | + | 2.78 | 13.90 |
| Not eligible for school lunch program | + | 1.58 | 7.90 | + | 2.20 | 11.00 |
| Eligible for school lunch program | + | 2.35 | 11.75 | + | 2.70 | 13.50 |
| Grade 5 | | | | | | |
| White | + | 0.96 | 4.80 | + | 1.81 | 9.05 |
| Black | + | 2.45 | 12.25 | + | 2.11 | 10.55 |
| Not eligible for school lunch program | + | 1.77 | 8.85 | + | 1.91 | 9.55 |
| Eligible for school lunch program | + | 2.33 | 11.65 | + | 2.42 | 12.10 |
| Grade 6 | | | | | | |
| White | + | 0.97 | 4.85 | + | 1.33 | 6.65 |
| Black | + | 2.62 | 13.10 | + | 2.33 | 11.65 |
| Not eligible for school lunch program | + | 2.07 | 10.35 | + | 1.64 | 8.20 |
| Eligible for school lunch program | + | 2.87 | 14.35 | + | 2.69 | 13.45 |
| Grade 7 | | | | | | |
| White | + | 2.83 | 14.15 | + | 1.67 | 8.35 |
| Black | + | 4.52 | 22.60 | + | 3.34 | 16.70 |
| Not eligible for school lunch program | + | 3.51 | 17.55 | + | 2.74 | 13.70 |
| Eligible for school lunch program | + | 4.40 | 22.00 | + | 3.38 | 16.90 |
| Grade 8 | | | | | | |
| White | + | 0.90 | 4.50 | + | 3.96 | 19.80 |
| Black | + | 2.56 | 12.80 | + | 5.48 | 37.04 |
| Not eligible for school lunch program | + | 1.52 | 7.60 | + | 4.04 | 20.20 |
| Eligible for school lunch program | + | 2.47 | 12.35 | + | 5.44 | 27.20 |

na is not applicable.

**a.** Describes the direction of growth in proficiency as significantly decreasing (represented by –) or significantly increasing (represented by +).

**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

rates in math increased 2.13–2.22 percentage points annually in grades 3–6. Increases in proficiency growth rates were also observed in grades 7 and 8. In grade 7, math proficiency growth rates increased 2.87 percentage points annually. The largest average increase in math proficiency growth rates (4.70 percentage points annually) occurred in grade 8.

***School-level reading and math proficiency growth rates increased for all racial/ethnic subgroups and for students eligible for the federal school lunch program across grades 3–8.*** In Mississippi, growth in school-level reading and math proficiency for two racial/

ethnic subgroups (White and Black) was estimated for grades 3–8 over six years (2007/08–2012/13).[2] Both White and Black students' reading and math proficiency growth rates increased across all grades over the period studied, but they increased more among Black students. Among White students proficiency growth rates increased 0.76–2.83 percentage points annually in reading and 1.33–3.96 percentage points annually in math across all grades. Among Black students proficiency growth rates increased more, at 2.09–4.52 percentage points annually in reading and 2.11–5.48 percentage points annually in math (see table 3 and figures A6 and A7 in appendix A).

A similar pattern was observed in proficiency growth rates for student economic subgroups. Proficiency growth rates in reading and math increased in both subgroups from 2007/08 through 2012/13 across grades 3–8. Among students who were not eligible for the federal school lunch program proficiency growth rates increased 1.47–3.51 percentage points annually in reading and 1.64–4.04 percentage points in math across all grades (see table 3 and figures A12 and A13 in appendix A). Among eligible students proficiency growth rates increased even more, at 1.98–4.40 percentage points annually in reading and 2.42–5.44 percentage points in math.

***In Mississippi schools, both White and Black students' reading and math proficiency growth rates increased across all grades over the period studied, but they increased more among Black students***

*From 2007/08 through 2012/13 differences in proficiency growth rates between subgroups decreased achievement gaps in reading and math between White and Black students and between students eligible and those who were not eligible for the federal*

**Table 4. Mississippi average percentage point decrease in school-level proficiency achievement gaps, by subject and grade, 2007/08–2012/13**

| | Reading | | Math | |
|---|---|---|---|---|
| Grade | Between White and Black students (percent of 2007/08 gap) | Between students eligible and those not eligible for the school lunch program (percent of 2007/08 gap) | Between White and Black students (percent of 2007/08 gap) | Between students eligible and those not eligible for the school lunch program(percent of 2007/08 gap) |
| 3 | 6.65 (29.78) | 2.55 (11.37) | 1.60[a] (8.32) | 3.05 (15.81) |
| 4 | 6.85 (32.28) | 3.85 (17.52) | 6.55 (30.69) | 2.50 (12.67) |
| 5 | 7.45 (31.89) | 2.80 (12.70) | 1.50[a] (7.65) | 2.55 (13.19) |
| 6 | 8.25 (35.81) | 4.00 (18.66) | 5.00 (21.81) | 5.25 (24.98) |
| 7 | 8.45 (40.35) | 4.45 (20.48) | 8.35 (43.63) | 3.20 (16.93) |
| 8 | 8.30 (31.69) | 4.75 (21.61) | 7.60 (38.31) | 7.00 (35.62) |

**a.** Differences between the estimated growth rates for the two subgroups were not statistically significant. Therefore, the reported percentage point decrease does not reflect a significant decrease in the achievement gap.

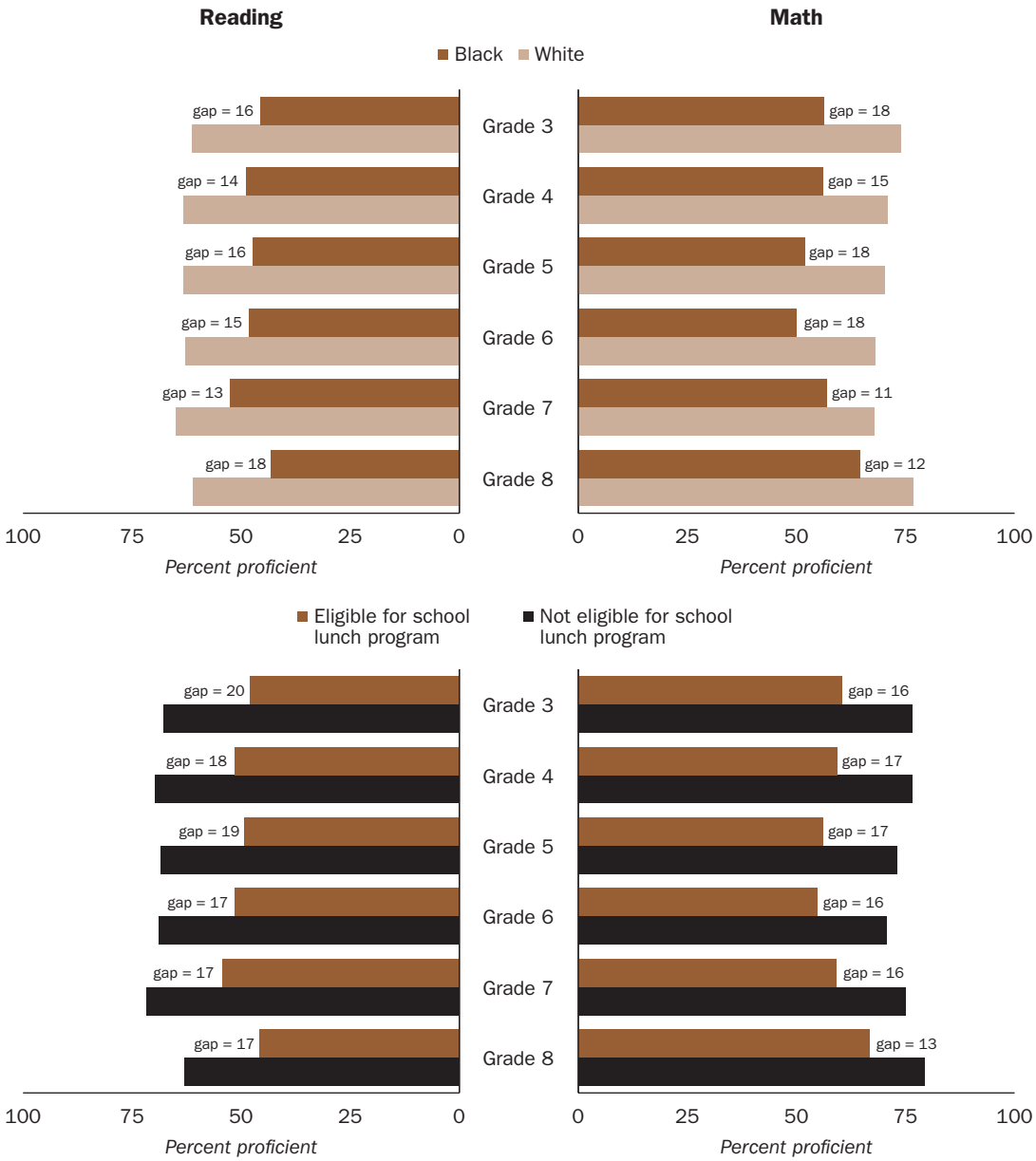
**Note:** Each cell in the table reports the average percentage point decrease in the specified achievement gap and the percent of the 2007/08 gap the decrease represents by grade and subject. For example, the first cell of the table reports that the White-Black reading proficiency achievement gap in grade 3 decreased by 6.65 percentage points from 2007/08 through 2012/13. This 6.65 percentage point decrease represents 29.78 percent of the 2007/08 White–Black reading proficiency achievement gap.

**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

***school lunch program across most grades; however, large gaps remained in 2012/13.*** In reading, proficiency growth rates increased across all grades for both White and Black students, but they increased faster among Black students (see table 3). This pattern was also observed in math for all grades except grades 3 and 5, which showed comparable proficiency growth rates among White and Black students.

All grades with differences between White and Black students' proficiency growth rates (all but grades 3 and 5 in math) showed decreases in the White–Black student achievement gap of 6.65–8.45 percentage points in reading and 5.00–8.35 percentage points in math

**Figure 2. Mississippi reading and math proficiency rates in 2012/13 for racial/ethnic subgroups and economic subgroups, and subgroup percentage point achievement gaps, by grade**




**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

from 2007/08 through 2012/13 (table 4). Despite the observed achievement gap decreases, the estimated White–Black student achievement gap in 2012/13 ranged from 11 percentage points to 18 percentage points in reading and math (figure 2).

Differences in reading and math proficiency growth rates between economic subgroups were observed across all grades (see table 3). Both subgroups showed increases in proficiency growth rates from 2007/08 through 2012/13; however, proficiency growth rates increased at a faster rate among students eligible for the school lunch program than among students who were not eligible, decreasing the achievement gap by 2.55–4.75 percentage points in reading and 2.50–7.00 percentage points in math across grades 3–8 in the years 2007/08–2012/13 (see table 4). Despite this achievement gap decrease, these two subgroups still differed by 13–20 percentage points in reading and math in 2012/13 (see figure 2).

### North Carolina school-level achievement trend findings, 2008/09–2011/12

*In North Carolina, the average school-level student reading proficiency rate on the 2008/09 end-of-grade test was 66.19 percent, and it increased 1.12 percentage points annually through 2011/12*

A total of 50 achievement trends were estimated in North Carolina to answer the first two research questions. Two trends were estimated to examine school-level reading and math proficiency growth rates, 12 trends were estimated for each of grades 3–8 to examine differences in reading and math proficiency between grades, and 36 trends were estimated for racial/ethnic subgroups by grade to examine differences in reading and math proficiency between these subgroups by grade (table 5 and see tables A6 and A7 in appendix A). Schools in North Carolina showed statistically significant increases in 47 of the 50 estimated achievement trends. Differences in growth rates for racial/ethnic subgroups were observed over 2008/09–2011/12, and significant decreases in achievement gaps were found in all grades. However, large achievement gaps remained in 2011/12.

***Average school-level proficiency growth rates in reading and math increased from 2008/09 to 2011/12.*** The average school-level student reading proficiency rate on the 2008/09 North Carolina end-of-grade test was 66.19 percent, and it increased 1.12 percentage points annually through 2011/12 (see table A1 in appendix A). This significant growth rate equates to a total average increase in school-level reading proficiency of 3.36 percentage points from 2008/09 to 2011/12.

A similar pattern was observed in math: the average school-level proficiency rate was 77.84 percent in 2008/09, and it increased 0.88 percentage point annually (see table A1 in appendix A). This significant growth rate equates to a total increase in school-level math proficiency of 2.64 percentage points from 2008/09 to 2011/12.

***Average school-level growth in proficiency rates on the North Carolina end-of-grade reading and math tests differed for grades 3–8.*** In 2008/09 the average school-level percentage of students who scored proficient on the North Carolina end-of-grade reading assessment in grades 3–8 ranged from 63 percent to 71 percent (see tables A6 and A7 and figure A3 in appendix A). Over the four years studied (2008/09–2011/12), average school-level student proficiency growth rates in reading increased 0.79–1.49 percentage points annually in grades 3–8. Proficiency growth rates in grades 5–8 were comparable and were larger than the growth rates for grades 3 and 4 (see table A6 in appendix A).

The 2008/09 average school-level proficiency rate was slightly higher in math than in reading and ranged from 75 percent to 80 percent across grades (see tables A6 and A7

**Table 5. North Carolina average school-level proficiency growth rates for racial/ethnic subgroups by subject and grade, 2008/09–2011/12**

| Grade and student subgroup | Reading proficiency | | | Math proficiency | | |
|---|---|---|---|---|---|---|
| | Direction of growth[a] | Average annual growth rate (percentage point) | Average growth over period studied (percentage point) | Direction of growth[a] | Average annual growth rate (percentage point) | Average growth over period studied (percentage point) |
| Grade 3 | | | | | | |
| White | + | 0.49 | 1.47 | 0 | –0.12 | –0.36 |
| Black | + | 1.81 | 5.43 | + | 0.73 | 2.19 |
| Hispanic | + | 1.88 | 5.64 | + | 1.11 | 3.33 |
| Grade 4 | | | | | | |
| White | + | 0.67 | 2.01 | + | 0.49 | 1.47 |
| Black | + | 1.26 | 3.78 | + | 1.98 | 5.94 |
| Hispanic | + | 1.54 | 4.62 | + | 1.81 | 5.43 |
| Grade 5 | | | | | | |
| White | + | 0.74 | 2.22 | 0 | 0.27 | 0.81 |
| Black | + | 2.25 | 6.75 | + | 1.44 | 4.32 |
| Hispanic | + | 2.53 | 7.59 | + | 1.46 | 4.38 |
| Grade 6 | | | | | | |
| White | + | 0.99 | 2.97 | + | 0.44 | 1.32 |
| Black | + | 1.71 | 5.13 | + | 1.07 | 3.21 |
| Hispanic | + | 2.38 | 7.14 | + | 1.77 | 5.31 |
| Grade 7 | | | | | | |
| White | + | 0.82 | 2.46 | 0 | 0.34 | 1.02 |
| Black | + | 1.44 | 4.32 | + | 1.34 | 4.02 |
| Hispanic | + | 2.10 | 6.30 | + | 2.17 | 6.51 |
| Grade 8 | | | | | | |
| White | + | 0.78 | 2.34 | + | 0.78 | 2.34 |
| Black | + | 1.71 | 5.13 | + | 1.79 | 5.37 |
| Hispanic | + | 2.03 | 6.09 | + | 1.88 | 5.64 |

**a.** Describes the direction of growth in proficiency as significantly decreasing (represented by –), significantly increasing (represented by +), or as not significantly different from zero (represented by 0).

**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

and figure A3 in appendix A). The proficiency growth rates increased 0.42–1.43 percentage points annually. Grade 3 demonstrated the least growth (0.42 percentage point annually), and grades 4 (1.25 percentage points annually) and 8 (1.43 percentage points annually) demonstrated the most. Growth rates in grades 5–7 (0.81–0.97 percentage point annually) were comparable.

***School-level student reading and math proficiency growth rates almost always increased for all racial/ethnic subgroups across grades 3–8.*** Growth in school-level student reading and math proficiency rates among racial/ethnic subgroups (White, Black, and Hispanic) were estimated for grades 3–8 over four years (2008/09–2011/12). White students' proficiency growth rates increased 0.49–0.99 percentage point annually in reading and 0.44–0.78 percentage point annually in math across all grades, with the exception of grades 3, 5, and 7, which demonstrated no changes in math proficiency (table 5 and see figures A8 and figure A9 in appendix A). In contrast, Black and Hispanic students' average annual

proficiency growth rates in reading and math increased across all grades. Specifically, proficiency growth rates increased 1.26–2.25 percentage points in reading and 0.73–1.98 percentage points in math annually among Black students and increased 1.54–2.53 percentage points in reading and 1.11–2.17 percentage points in math annually across all grades among Hispanic students (see table 5 and figures A8 and A9).

***From 2008/09 through 2011/12 differences in proficiency growth rates between subgroups decreased achievement gaps in reading and math between White and Black and White and Hispanic students across all grades; however, large gaps remained in 2011/12.*** In all grades, White and Black students' proficiency growth rates increased in reading and math from 2008/09 through 2011/12 with the exception of grades 3, 5, and 7 in math, where White students' proficiency remained stable. However, proficiency growth rates in reading and math increased at a faster rate among Black students than among White students for all grades (see table 5). The same pattern was observed between White and Hispanic students' proficiency growth rates in reading and math, including math in grades 3, 5, and 7 where proficiency growth rates remained stable among White students and increased significantly among Hispanic students (see table 5).

***In North Carolina schools in all grades, White and Black students' proficiency growth rates increased in reading and math from 2008/09 through 2011/12 with the exception of grades 3, 5, and 7 in math, where White students' proficiency remained stable***

The differences in proficiency growth rates led to a decrease in the White–Black achievement gap of 1.77–4.53 percentage points in reading and 1.89–4.47 percentage points in math across grades 3–8 from 2008/09 through 2011/12 (table 6). Similarly, decreases in the White–Hispanic achievement gap of 2.61–5.37 percentage points in reading and 3.30–5.49 percentage points in math were observed across grades 3–8.

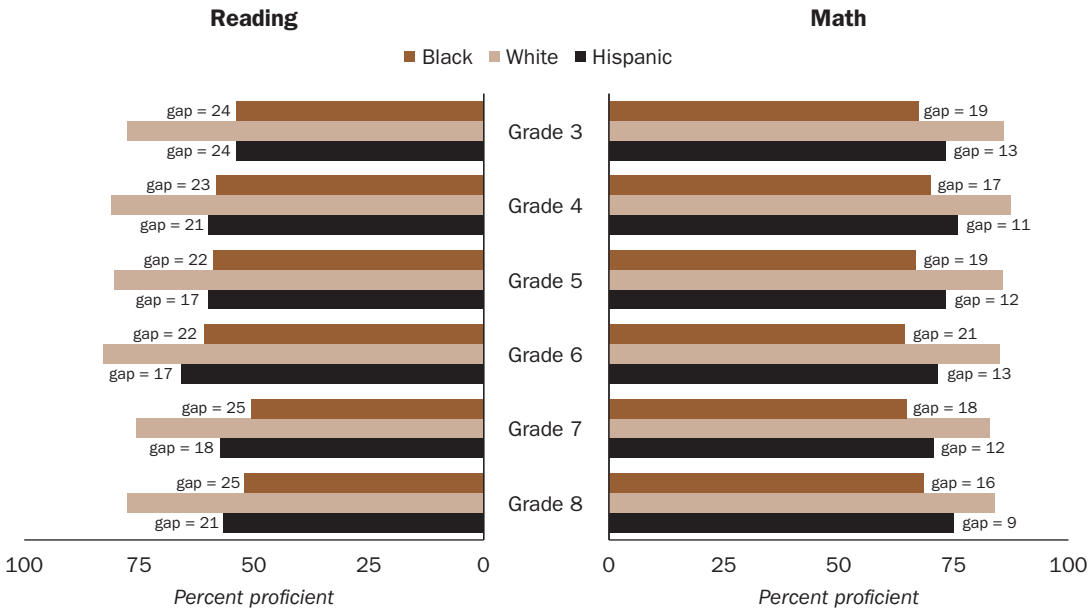
**Table 6. North Carolina average percentage point decrease in school-level academic reading and math proficiency achievement gaps, by grade, 2008/09–2011/12**

| | Reading | | Math | |
|---|---|---|---|---|
| Grade | Between White and Black students (percent of 2008/09 gap) | Between White and Hispanic students (percent of 2008/09 gap) | Between White and Black students (percent of 2008/09 gap) | Between White and Hispanic students (percent of 2008/09 gap) |
| 3 | 3.96 (14.31) | 4.17 (14.96) | 2.55 (12.07) | 3.69 (22.54) |
| 4 | 1.77 (7.22) | 2.61 (11.06) | 4.47 (20.59) | 3.96 (25.76) |
| 5 | 4.53 (17.38) | 5.37 (20.77) | 3.51 (15.60) | 3.57 (22.31) |
| 6 | 2.16 (8.98) | 4.17 (19.75) | 1.89 (8.37) | 3.99 (23.04) |
| 7 | 1.86 (6.88) | 3.84 (17.34) | 3.00 (14.33) | 5.49 (31.12) |
| 8 | 2.79 (9.89) | 3.75 (15.23) | 3.03 (16.29) | 3.30 (26.79) |

**Note:** Each cell in the table reports the average percentage point decrease in the specified achievement gap and the percent of the 2008/09 gap the decrease represents by grade and subject. For example, the first cell of the table reports that the White-Black reading proficiency achievement gap in grade 3 decreased by 3.96 percentage points from 2008/09 through 2011/12. This 3.96 percentage point decrease represents 14.31 percent of the 2008/09 White-Black reading proficiency achievement gap.

**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

**Figure 3. North Carolina reading and math proficiency rates in 2011/12 for racial/ethnic subgroups, by grade**




**Note:** Achievement gaps reflect White–Black and White–Hispanic achievement gap differences.

**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

Despite these decreases in the White–Black and White–Hispanic achievement gaps, the 2011/12 estimated achievement gaps in reading and math between these racial/ethnic subgroups remained large. Specifically, the White–Black proficiency gap in 2011/12 exceeded 15 percentage points (22–25 percentage points in reading and 16–21 percentage points in math), and the White–Hispanic proficiency gap was 17–24 percentage points in reading and 9–13 percentage points in math (figure 3).

***Despite the observed decreases in proficiency growth rates between racial/ethnic and economic subgroups, proficiency achievement gaps of 10–25 percentage points remained; at the current rate, it would take roughly 15–40 years to eliminate these gaps***

## Implications of the study findings

The average school-level percentage of students who scored proficient in reading and math increased over the four- to six-year period studied in each state for most subgroups of students considered. Increases in reading and math proficiency rates were observed in most grades in Florida, and all grades in Mississippi and North Carolina. Average reading and math proficiency rates also increased for all racial/ethnic and economic subgroups in all grades and states, with a few exceptions in Florida and North Carolina. Despite decreases in achievement gaps, large gaps remained at the end of the study period.

Differences in proficiency growth rates between racial/ethnic and economic subgroups showed that proficiency achievement gaps between White–Black, White–Hispanic, and economic subgroups decreased significantly in all grades and states, with a few exceptions in Florida and North Carolina. Despite the observed decreases, proficiency achievement gaps of 10–25 percentage points remained at the end of the period studied. At the current rate, it would take roughly 15–40 years to eliminate these achievement gaps, highlighting the substantial and persistent achievement gaps that plague states.

Several extensions of the current study could further explore student achievement trends. For example, research could explore the variability in growth rates among schools to identify schools with large increases or decreases in proficiency rates. School-level predictors, such as the concentration of minority students, changes in demographic composition, or urbanicity, could be included in these models to explain the variability in growth rate. Other studies could investigate school-level residuals (that is, the difference between predicted and observed school achievement) to identify schools with growth rates that exceed their predicted growth rate. This process could identify schools within grade, racial/ethnic subgroups, or economic subgroups that could be studied further to identify promising practices.

## Limitations of the study

This study estimated achievement trends using school-level averages for each grade and for subgroups within each grade that represent different groups of students over time. Therefore, interpretation of results reflects growth in schools or subgroups within schools and not students. It is possible that if the demographic composition of a school, grade, or subgroup changed substantially from one year to the next, the estimated trend for that school, grade, or subgroup could reflect the change in demographics and not true change. In addition, it is possible that achievement trends would be different if trends in scaled scores as opposed to proficiency had been explored.

# Appendix A. Details on the analyses

This appendix provides details on the study data sources and methods.

## Data sources

Data from the Florida Comprehensive Assessment Test version 2.0 (FCAT 2.0) was available for a four-year time span (2010/11–2013/14). The FCAT 2.0 measures student achievement in reading and math based on the Next Generation Sunshine State Standards. Scores on FCAT 2.0 are reported as developmental scale scores that range from 140 to 302 for FCAT 2.0 Reading and 140 to 298 for FCAT 2.0 Math and achievement levels that range from 1 (lowest) to 5 (highest) with level 3 and above indicating proficiency. In the current analysis the school-level average developmental scale scores and the percentage of students scoring proficient (achievement level 3 and above) by grade and subgroup were retrieved from the Florida demographic database found on the Florida Department of Education website (https://app1.fldoe.org/FCATDemographics/). Additional information on the FCAT 2.0 can be found at http://www.fldoe.org/accountability/assessments/k-12-student-assessment/history-of-fls-statewide-assessment/fcat-2-0/index.stml.

Data from the Mississippi Curriculum Test, second edition (MCT2) was available for a six-year time span (2007/08–2012/13). The MCT2 measures student achievement in language arts and math based on the 2006 Mississippi Language Arts Framework–Revised and 2007 Mississippi Math Framework–Revised. Scores on the MCT2 are reported as scale scores that range from 104 to 189 for language arts and 107 to 189 for math and performance level descriptors that contain four levels: minimal, basic, proficient, and advanced. School-level average scale scores and the percentage of students with a performance level of proficient or advanced were retrieved from public reports files found on the Mississippi Department of Education website (http://reports.mde.k12.ms.us/). Additional information on the MCT2 can be found at http://www.mde.k12.ms.us/OSA/MCT2.

Data from North Carolina's reading and math end-of-grade (EOG) tests were available for a four-year time span (2008/09–2011/12). The EOG measures reading comprehension and math based on the Standard Course of Study. Scores on the EOG are reported as developmental scale scores that range from 300 to 389 for reading comprehension and math and achievement levels that range from 1 (lowest) to 4 (highest) with level 3 and above indicating proficiency. Average scale scores and average percent proficient (level 3 and above) at the school-level by grade and subgroup were retrieved from the state or local education agency and school test performance website (http://www.ncpublicschools.org/accountability/reporting/leaperformancearchive/). Additional information on the EOG can be found at http://www.ncpublicschools.org/accountability/testing/technotesarchive.

## Growth curve analyses

Research question 1 used a multilevel random effects growth curve model with time nested in schools to answer all research questions. The unit of analysis for all models was average school-level student proficiency rates in reading or math at the end of the year. Time was centered at the first time point. All growth models were estimated using HLM6 software (Raudenbush, Bryk, Cheong, & Congdon, 2004).

The following equation was used to answer research question 1:

$$Y_{ti} = \beta_{00} + \beta_{10}(T_{ti}) + u_{0i} + u_{1i}(T_{ti}) + e_{ti}$$

where $Y_{ti}$ is the mean reading or math proficiency rate at time $t$ for school $i$; $T_{ti}$ is a dummy coded variable for the measurement occasion at time $t$ for school $i$ (centered at the first time point); and $e_{ti}$ is the school-level residual. The $u_{0i}$ and $u_{1i}$ terms represent the school-level intercept and growth random effects estimates. The residual and school-level random effect terms are assumed to be uncorrelated with the covariates in the model. This model was estimated separately for reading and math in Florida, Mississippi, and North Carolina (table A1).

For the second part of research question 1, dummy coded variables for grade (grade 3 served as the referent) and grade by time interactions were included to test for differences in intercept and slope between grade 3 and the other grades using the following equation:

$$Y_{ti} = \beta_{00} + \beta_{10}(T_{ti}) + \beta_{20}(G4_{ti}) + \beta_{30}(G5_{ti}) + \beta_{40}(G6_{ti}) + \beta_{50}(G7_{ti}) + \beta_{60}(G8_{ti}) + \beta_{70}(GT4_{ti}) + \beta_{80}(GT5_{ti}) + \beta_{90}(GT6_{ti}) + \beta_{100}(GT7_{ti}) + \beta_{110}(GT8_{ti}) + u_{0i} + u_{1i}(T_{ti}) + u_{2i}(G4_{ti}) + u_{3i}(G5_{ti}) + u_{4i}(G6_{ti}) + u_{5i}(G7_{ti}) + u_{6i}(G8_{ti}) + u_{7i}(GT4_{ti}) + u_{8i}(GT5_{ti}) + u_{9i}(GT6_{ti}) + u_{10i}(GT7_{ti}) + u_{11i}(GT8_{ti}) + e_{ti}$$

where the dependent variable $Y_{ti}$ is the mean percent proficient in reading and math at time $t$ for school $i$; $\beta_{00}$ reflects grade 3 mean proficiency at the first available time point; $T_{ti}$

**Table A1. Model results from the growth curve model used to answer research question 1, by subject and state**

| Parameter | Reading proficiency[a] | | Math proficiency[b] | |
|---|---|---|---|---|
| | Fixed effect coefficient | Random effect variance coefficient | Fixed effect coefficient | Random effect variance coefficient |
| Florida | | | | |
| Intercept | 54.35 | 318.99 | 52.11 | 314.76 |
| Growth | 0.27 | 2.18 | 0.53 | 4.85 |
| Level-1 error | na | 46.75 | na | 82.13 |
| Mississippi | | | | |
| Intercept | 44.35 | 228.34 | 50.55 | 262.57 |
| Growth | 2.13 | 3.03 | 2.60 | 5.38 |
| Level-1 error | na | 89.43 | na | 120.28 |
| North Carolina | | | | |
| Intercept | 66.19 | 239.07 | 77.84 | 195.40 |
| Growth | 1.12 | 2.00 | 0.88 | 2.73 |
| Level-1 error | na | 53.17 | na | 82.13 |

na is not applicable.

**Note:** All coefficients are significant at $p < .001$.

**a.** $n$ = 3,033 in Florida; $n$ = 763 in Mississippi; $n$ = 2,028 in North Carolina.

**b.** $n$ = 3,001 in Florida; $n$ = 763 in Mississippi; $n$ = 2,008 in North Carolina.

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14; Mississippi Department of Education public reports website, 2007/08–2012/13; and North Carolina Department of Education State/local education agency and School Test Performance website, 2007/09–2011/12.

is a dummy coded variable for the measurement occasion at time $t$ for school $i$ (centered at the first time point); $\beta_{10}$ reflects the mean growth rate for grade 3; $G4_{ti}$–$G8_{ti}$ are dummy coded variables indicating grade; $\beta_{20}$–$\beta_{60}$ reflect the intercept deflections for each of grades 4–8 from grade 3; $GT4_{ti}$–$GT8_{ti}$ are grade by time interactions for each grade; $\beta_{70}$–$\beta_{110}$ reflect the slope deflections for each of grades 4–8 from grade 3; and $e_{ti}$ is the school-level residual (model results reported in tables A2, A4, and A6). Results from this model do not provide information about whether growth rates vary between grades 4–8; therefore pairwise contrast tests between grades 4–8 for intercepts and slopes were estimated (tables A3, A5, and A7).The Benjamini-Hochberg correction was used to control for the false discovery rate that can occur when testing multiple comparisons (Benjamini & Hochberg, 1995). This correction was also used to control for the false discovery rate in all subsequent multilevel random effects growth curve models.

In addition to reporting all model results, this appendix includes line graphs depicting average changes in reading and math proficiency over the four- to six-year period studied for each state by grade (figures A1–A3), for each racial/ethnic subgroup by grade (figures A4–A9), and for each economic subgroup by grade (figures A10–A13) to aid the reader in understanding the results from the growth curve models.

**Table A2. Florida growth curve model results comparing trends between grades, by subject**

| Parameter | Fixed effect coefficient[a] | Random effect variance coefficient |
|---|---|---|
| Reading ($n$ = 3,033) | | |
| *Intercept* | | |
| Intercept (Grade 3) | 53.03*** | 347.64*** |
| Grade 4 | 2.30*** | 12.10*** |
| Grade 5 | 1.68*** | 22.20*** |
| Grade 6 | 2.00*** | 61.27*** |
| Grade 7 | 3.31*** | 63.81*** |
| Grade 8 | –0.77 | 59.29*** |
| *Growth* | | |
| Growth (Grade 3) | –0.14 | 3.76*** |
| Grade 4 | 0.38*** | 1.05*** |
| Grade 5 | 0.75*** | 3.44*** |
| Grade 6 | 0.90*** | 4.96*** |
| Grade 7 | –0.31* | 4.57*** |
| Grade 8 | 1.26*** | 3.29*** |
| Level-1 error | na | 38.78 |

| Parameter | Fixed effect coefficient[a] | Random effect variance coefficient |
|---|---|---|
| Math ($n$ = 3,001)[b] | | |
| *Intercept* | | |
| Intercept (Grade 3) | 52.03*** | 327.26*** |
| Grade 4 | 1.00*** | 46.79*** |
| Grade 5 | –1.24*** | 47.91*** |
| Grade 6 | –0.14 | 145.07*** |
| Grade 7 | 3.28*** | 152.98*** |
| *Growth* | | |
| Growth (Grade 3) | 0.54*** | 11.49*** |
| Grade 4 | 1.14*** | 6.40*** |
| Grade 5 | –0.60*** | 8.67*** |
| Grade 6 | –0.43** | 13.07*** |
| Grade 7 | –0.49** | 11.14*** |
| Level-1 error | na | 57.99 |

na is not applicable.

***Significant** at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$.

**a.** All parameters remain significant after applying Benjamini-Hochberg correction.

**b.** The Florida legislature enacted a policy during the 2012/13 school year allowing grade 8 students to replace Florida Comprehensive Assessment Test math with the Algebra I end-of-course exam. Because this resulted in a substantial and artificial drop in performance between the 2011/12 and 2012/13 school years, grade 8 was excluded when analyzing Florida's math performance.

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

## Table A3. Florida contrast test results comparing performance across grades 4–8, by subject

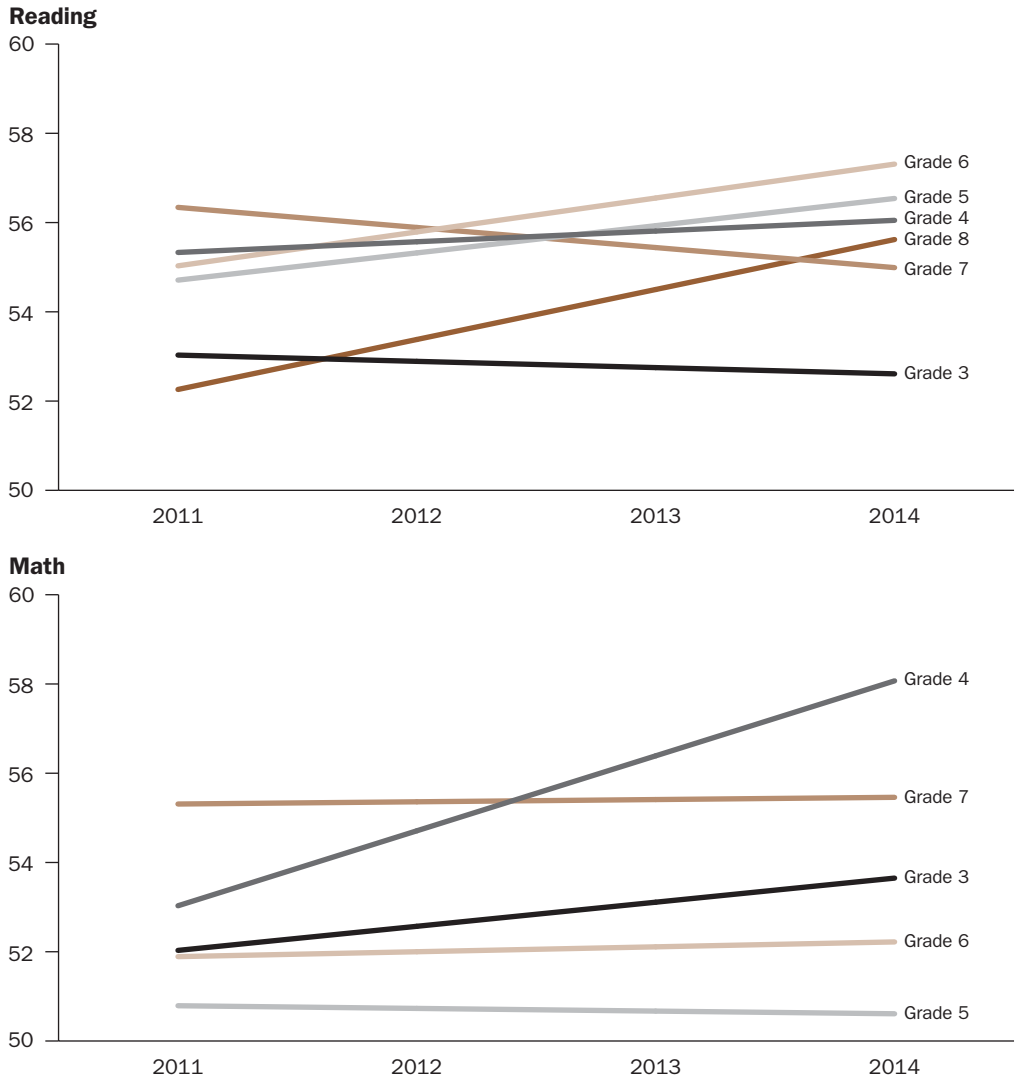
| Contrast tested | Reading | | | Math | | |
|---|---|---|---|---|---|---|
| | Difference between coefficients | Chi-square | *p*-value | Difference between coefficients | Chi-square | *p*-value |
| Intercept G4 to G5 | 0.62 | 12.96 | <.001* | 2.24 | 86.49 | <.001* |
| Intercept G4 to G6 | 0.30 | 0.57 | >.50 | 1.14 | 4.64 | .03* |
| Intercept G4 to G7 | –1.02 | 6.58 | .01* | –2.29 | 18.05 | <.001* |
| Intercept G4 to G8 | 3.06 | 60.67 | < .001* | na | na | na |
| Intercept G5 to G6 | –0.32 | 0.68 | >.50 | –1.10 | 4.51 | .03* |
| Intercept G5 to G7 | –1.63 | 17.10 | <.001* | –4.52 | 74.30 | <.001* |
| Intercept G5 to G8 | 2.45 | 38.80 | <.001* | na | na | na |
| Intercept G6 to G7 | –1.31 | 27.57 | <.001* | –3.42 | 126.50 | <.001* |
| Intercept G6 to G8 | 2.79 | 114.37 | <.001* | na | na | na |
| Intercept G7 to G8 | 4.08 | 272.79 | <.001* | na | na | na |
| Slope G4 to G5 | –0.37 | 16.29 | <.001* | 1.74 | 221.32 | <.001* |
| Slope G4 to G6 | –0.52 | 16.74 | <.001* | 1.57 | 91.81 | <.001* |
| Slope G4 to G7 | 0.68 | 28.49 | <.001* | 1.62 | 99.24 | <.001* |
| Slope G4 to G8 | –0.88 | 46.86 | <.001* | na | na | na |
| Slope G5 to G6 | –0.15 | 1.51 | .22 | –0.17 | 1.16 | .28 |
| Slope G5 to G7 | 1.06 | 67.89 | <.001* | –0.11 | 0.51 | >.50 |
| Slope G5 to G8 | –0.81 | 16.19 | <.001* | na | na | na |
| Slope G6 to G7 | 1.21 | 87.74 | <.001* | 0.06 | 0.12 | >.50 |
| Slope G6 to G8 | –0.36 | 7.16 | .01* | na | na | na |
| Slope G7 to G8 | –1.57 | 144.21 | <.001* | na | na | na |

na is not applicable.

**p*-value determined significant after applying Benjamini-Hochberg Correction.

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Figure A1. Florida fitted school-level reading and math proficiency means for grades 3–8**




**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

## Table A4. Mississippi growth curve model results comparing trends between grades, by subject

| Parameter | Fixed effect coefficient[a] | Random effect variance coefficient |
|---|---|---|
| Reading (*n* = 763) | | |
| *Intercept* | | |
| Intercept (Grade 3) | 43.72*** | 231.03*** |
| Grade 4 | 1.98*** | 24.52*** |
| Grade 5 | 0.38 | 38.06*** |
| Grade 6 | 2.05*** | 69.71*** |
| Grade 7 | –1.40* | 87.43*** |
| Grade 8 | –0.01 | 74.44*** |
| *Growth* | | |
| Growth (Grade 3) | 1.59*** | 4.93** |
| Grade 4 | 0.18 | 1.49 |
| Grade 5 | 0.28 | 3.58* |
| Grade 6 | 0.78*** | 4.94 |
| Grade 7 | 2.27*** | 3.72 |
| Grade 8 | 0.36* | 3.38 |
| Level-1 error | na | 75.53 |

| Parameter | Fixed effect coefficient[a] | Random effect variance coefficient |
|---|---|---|
| Math (*n* = 763) | | |
| *Intercept* | | |
| Intercept (Grade 3) | *51.51*** | *285.18*** |
| Grade 4 | –1.05 | 80.27*** |
| Grade 5 | –2.34*** | 116.29*** |
| Grade 6 | –1.55* | 121.86*** |
| Grade 7 | –0.01 | 174.16*** |
| Grade 8 | –2.08* | 253.51*** |
| *Growth* | | |
| Growth (Grade 3) | 2.22*** | 8.75*** |
| Grade 4 | –0.03 | 4.11*** |
| Grade 5 | –0.09 | 7.84*** |
| Grade 6 | –0.03 | 8.13*** |
| Grade 7 | 0.65** | 10.62*** |
| Grade 8 | 2.48*** | 14.31*** |
| Level-1 error | na | 92.27 |

na is not applicable.

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

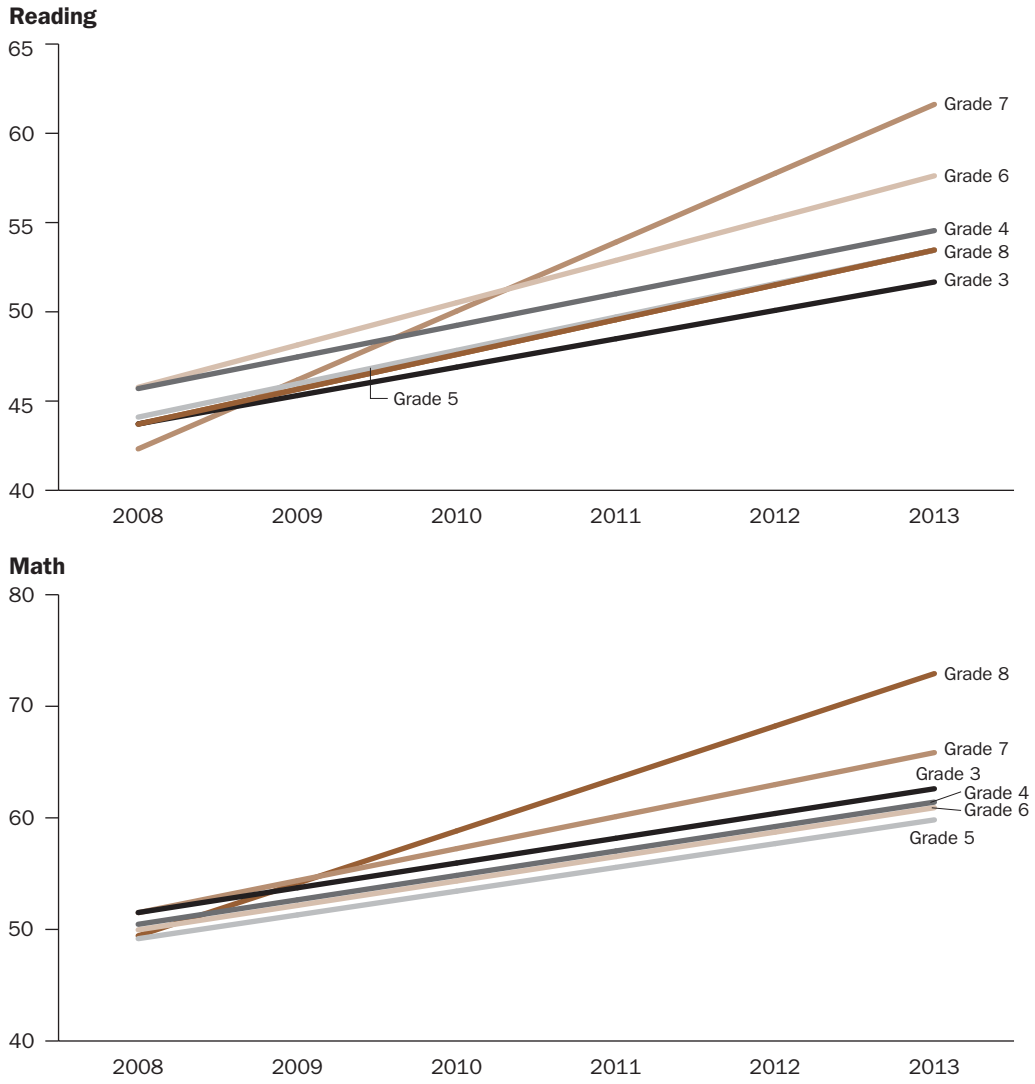
## Table A5. Mississippi contrast test results comparing performance across grades 4–8, by subject

| | Reading | | | Math | | |
|---|---|---|---|---|---|---|
| Contrast tested | Difference between coefficients | Chi-square | *p*-value | Difference between coefficients | Chi-square | *p*-value |
| Intercept G4 to G5 | 1.60 | 10.75 | .001* | 1.29 | 5.08 | .02* |
| Intercept G4 to G6 | –0.07 | 0.01 | >.50 | 0.50 | 0.48 | >.50 |
| Intercept G4 to G7 | 3.38 | 22.57 | <.001* | –1.04 | 1.40 | .23 |
| Intercept G4 to G8 | 1.99 | 8.29 | .004* | 1.03 | 1.05 | .31 |
| Intercept G5 to G6 | –1.67 | 10.22 | .002* | –0.79 | 1.59 | .20 |
| Intercept G5 to G7 | 1.78 | 7.42 | .01* | –2.33 | 8.24 | .004* |
| Intercept G5 to G8 | 0.39 | 0.38 | >.50 | –0.26 | 0.08 | >.50 |
| Intercept G6 to G7 | 3.45 | 34.14 | <.001* | –1.54 | 4.70 | .03 |
| Intercept G6 to G8 | 2.06 | 12.56 | <.001* | 5.30 | 0.39 | >.50 |
| Intercept G7 to G8 | –1.39 | 6.71 | .01* | 2.07 | 10.38 | .002* |
| Slope G4 to G5 | –0.10 | 0.41 | >.50 | 0.06 | 0.10 | >.50 |
| Slope G4 to G6 | –0.60 | 9.37 | .003* | –0.00 | 0.00 | >.50 |
| Slope G4 to G7 | –2.10 | 101.41 | <.001* | –0.69 | 7.51 | .006* |
| Slope G4 to G8 | –0.19 | 0.84 | >.50 | –2.51 | 89.00 | < .001* |
| Slope G5 to G6 | –0.50 | 8.04 | .01* | –0.06 | 0.10 | >.50 |
| Slope G5 to G7 | –1.99 | 106.19 | <.001* | –0.74 | 10.13 | .002* |
| Slope G5 to G8 | –0.08 | 0.17 | >.50 | –2.57 | 103.76 | <.001* |
| Slope G6 to G7 | –1.49 | 66.26 | <.001* | –0.68 | 10.66 | .002* |
| Slope G6 to G8 | 0.42 | 5.15 | .02* | –2.50 | 123.23 | <.001* |
| Slope G7 to G8 | 1.90 | 115.84 | <.001* | –1.82 | 81.26 | <.001* |

**p*-value determined significant after applying Benjamini-Hochberg Correction.

**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

**Figure A2. Mississippi fitted school-level reading and math proficiency means for grades 3–8**




**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

## Table A6. North Carolina growth curve model results comparing trends between grades, by subject

| Parameter | Fixed effect coefficient[a] | Random effect variance coefficient |
|---|---|---|
| Reading (*n* = 2,031) | | |
| *Intercept* | | |
| Intercept (Grade 3) | 63.33*** | 237.13*** |
| Grade 4 | 4.89*** | 8.92*** |
| Grade 5 | 3.58*** | 24.44*** |
| Grade 6 | 7.43*** | 51.22*** |
| Grade 7 | 0.23 | 54.26*** |
| Grade 8 | 2.89*** | 55.42*** |
| *Growth* | | |
| Growth (Grade 3) | 1.06*** | 4.21*** |
| Grade 4 | –0.27* | 1.47** |
| Grade 5 | 0.43*** | 4.52*** |
| Grade 6 | 0.32* | 4.18*** |
| Grade 7 | 0.11 | 5.52*** |
| Grade 8 | 0.13 | 6.79*** |
| Level-1 error | na | 38.98 |

| Parameter | Fixed effect coefficient[a] | Random effect variance coefficient |
|---|---|---|
| Math (*n* = 2,010) | | |
| *Intercept* | | |
| Intercept (Grade 3) | 79.39*** | 125.68*** |
| Grade 4 | 0.47* | 13.14*** |
| Grade 5 | –1.25*** | 30.67*** |
| Grade 6 | –4.10*** | 175.55*** |
| Grade 7 | –3.74*** | 192.23*** |
| *Grade 8* | –1.38* | 204.91*** |
| *Growth* | | |
| Growth (Grade 3) | 0.42*** | 3.85*** |
| Grade 4 | 0.83*** | 1.46*** |
| Grade 5 | 0.48*** | 4.53*** |
| Grade 6 | 0.39* | 5.61*** |
| Grade 7 | 0.55** | 8.28*** |
| Grade 8 | 1.01*** | 5.42*** |
| Level-1 error | na | 38.37 |

na is not applicable.

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

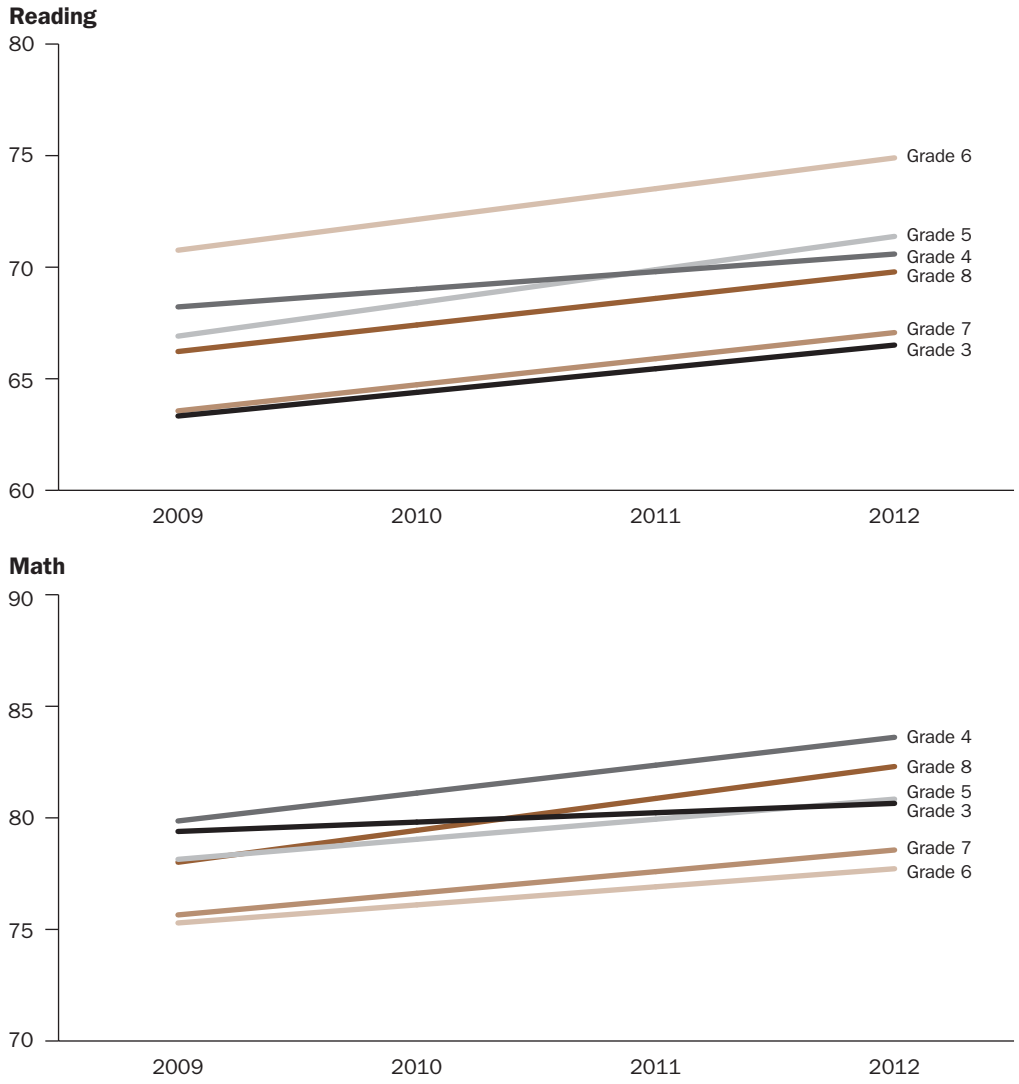
## Table A7. North Carolina contrast test results comparing performance across grades 4–8, by subject

| Contrast tested | Reading | | | Math | | |
|---|---|---|---|---|---|---|
| | Difference between coefficients | Chi-square | *p*-value | Difference between coefficients | Chi-square | *p*-value |
| Intercept G4 to G5 | 1.31 | 37.07 | < .001* | 1.72 | 51.31 | < .001* |
| Intercept G4 to G6 | –2.54 | 30.20 | < .001* | 4.56 | 54.12 | < .001* |
| Intercept G4 to G7 | 4.66 | 91.05 | < .001* | 4.20 | 43.76 | < .001* |
| Intercept G4 to G8 | 2.00 | 16.43 | < .001* | 1.85 | 7.97 | .01* |
| Intercept G5 to G6 | –3.85 | 69.73 | < .001* | 2.84 | 21.27 | < .001* |
| Intercept G5 to G7 | 3.34 | 47.00 | < .001* | 2.49 | 15.34 | < .001* |
| Intercept G5 to G8 | 0.69 | 1.95 | .16 | 0.13 | 0.04 | > .50 |
| Intercept G6 to G7 | 7.20 | 550.59 | < .001* | –0.36 | 1.08 | .30 |
| Intercept G6 to G8 | 4.54 | 186.67 | < .001* | –2.71 | 50.98 | < .001* |
| Intercept G7 to G8 | –2.66 | 75.07 | < .001* | –2.36 | 47.10 | < .001* |
| Slope G4 to G5 | –0.70 | 37.57 | < .001* | 0.36 | 8.80 | .003* |
| Slope G4 to G6 | –0.59 | 14.32 | < .001* | 0.44 | 6.92 | .01* |
| Slope G4 to G7 | –0.38 | 5.82 | .02* | 0.28 | 2.57 | .10 |
| Slope G4 to G8 | –0.40 | 6.17 | .012* | –0.17 | 0.96 | > .50 |
| Slope G5 to G6 | 0.11 | 0.48 | > .50 | 0.08 | 0.23 | > .50 |
| Slope G5 to G7 | 0.32 | 4.01 | .04 | –0.08 | 0.19 | > .50 |
| Slope G5 to G8 | 0.30 | 3.39 | .06 | –0.53 | 8.90 | .003* |
| Slope G6 to G7 | 0.21 | 1.67 | .19 | –0.16 | 0.88 | > .50 |
| Slope G6 to G8 | 0.19 | 1.25 | .26 | –0.61 | 12.45 | < .001* |
| Slope G7 to G8 | –0.02 | 0.02 | > .50 | –0.45 | 6.89 | .01* |

**p*-value determined significant after applying Benjamini-Hochberg Correction.

**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

**Figure A3. North Carolina fitted school-level reading and math proficiency means for grades 3–8**




**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

Research questions 2 and 3 also used random effects growth curve modeling with time nested in school to test for subgroup differences within grade. Two models were estimated, one model that estimated differences in achievement for racial/ethnic subgroups and the other that estimated economic subgroup differences.

In the racial/ethnic subgroup models, dummy coded variables for Black and Hispanic, with White serving as the referent. In addition, Black by time ($BT_{ti}$) and Hispanic by time ($HT_{ti}$) interactions were included using the following equation:

$$Y_{ti} = \beta_{00} + \beta_{10}(T_{ti}) + \beta_{20}(Black_{ti}) + \beta_{30}(Hispanic_{ti}) + \beta_{40}(BT_{ti}) + \beta_{50}(HT_{ti}) + u_{0i} + u_{1i}(T_{ti}) + u_{2i}(Black_{ti}) + u_{3i}(Hispanic_{ti}) + u_{4i}(BT_{ti}) + u_{5i}(HT_{ti}) + e_{ti}$$

This model was estimated separately for each grade by state and subject (tables A8, A10, and A11 report model coefficients by state and subject, figures A4–A9 report the estimated proficiency trends by state and subject to aid in understanding results from the growth curve models).

In the federal school lunch eligibility subgroup models, *SLP* and *SLPT* (interaction between federal school lunch eligibility and time) were included as dummy coded variables to test intercept and slope differences for eligible students compared with noneligible students using the following equation (noneligible served as the referent):

$$Y_{ti} = \beta_{00} + \beta_{10}(T_{ti}) + \beta_{20}(SLP_{ti}) + \beta_{30}(SLPT_{ti}) + u_{0i} + u_{1i}(T_{ti}) + u_{2i}(SLP_{ti}) + u_{3i}(SLPT_{ti}) + e_{ti}$$

This model was estimated separately for each grade by state and subject in Florida and Mississippi (tables A13 and A14 report model coefficients by state and subject, figures A10–A13 report the estimated proficiency trends by state and subject to aid in understanding results from the growth curve models).

## Table A8. Florida growth curve model results comparing percent proficient for racial/ethnic subgroups, by grade and subject

| | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Coefficient[a] | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error |
| Reading | | | | | | | | | | | | |
| | *n* = 2,113 | | *n* = 2,102 | | *n* = 2,104 | | *n* = 1,111 | | *n* = 1,034 | | *n* = 1,035 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept (White) | 66.93*** | 0.35 | 68.17*** | 0.33 | 67.38*** | 0.34 | 66.67*** | 0.51 | 65.54*** | 0.52 | 59.74*** | 0.55 |
| Black | –25.83*** | 0.40 | –25.09*** | 0.41 | –24.48*** | 0.40 | –26.83*** | 0.52 | –24.84*** | 0.52 | –24.39*** | 0.49 |
| Hispanic | –16.13*** | 0.37 | –13.34*** | 0.37 | –14.09*** | 0.36 | –13.52*** | 0.20 | –13.33*** | 0.46 | –13.27*** | 0.44 |
| *Growth* | | | | | | | | | | | | |
| Growth (White) | –0.38*** | 0.11 | –0.14 | 0.11 | 0.35** | 0.11 | 0.04 | 0.13 | –0.99*** | 0.13 | 0.64*** | 0.14 |
| Black | 0.69*** | 0.17 | 0.72*** | 0.18 | 0.38* | 0.18 | 1.61*** | 0.20 | 0.70*** | 0.19 | 0.86*** | 0.20 |
| Hispanic | 0.40** | 0.16 | 0.49** | 0.17 | 0.54*** | 0.17 | 0.68*** | 0.19 | 0.70*** | 0.19 | 0.64*** | 0.19 |
| Math | | | | | | | | | | | | |
| | *n* = 2,179 | | *n* = 2,167 | | *n* = 2,169 | | *n* = 1,175 | | *n* = 1,096 | | | |
| *Intercept* | | | | | | | | | | | | |
| Intercept (White) | 64.87*** | 0.38 | 64.57*** | 0.38 | 63.25*** | 0.37 | 60.45*** | 0.56 | 61.46*** | 0.58 | na | na |
| Black | –25.01*** | 0.40 | –23.28*** | 0.41 | –26.35*** | 0.40 | –24.96*** | 0.48 | –25.72*** | 0.47 | na | na |
| Hispanic | –13.10*** | 0.36 | –11.18*** | 0.36 | –12.21*** | 0.36 | –11.29*** | 0.42 | –11.26*** | 0.42 | na | na |
| *Growth* | | | | | | | | | | | | |
| Growth (White) | –0.18 | 0.13 | 1.45*** | 0.13 | –0.26* | 0.13 | –0.22 | 0 .15 | –0.03 | 0.15 | na | na |
| Black | 1.19*** | 0.19 | 0.46* | 0.19 | 0.44* | 0.19 | 0.73*** | 0.20 | 0.40* | 0.20 | na | na |
| Hispanic | 0.90*** | 0.18 | 0.47** | 0.18 | 0.49** | 0.18 | 0.14 | 0.20 | –0.09 | 0.19 | na | na |

na is not applicable.

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Table A9. Florida contrast test results comparing performance across racial/ethnic subgroups, by grade and subject**

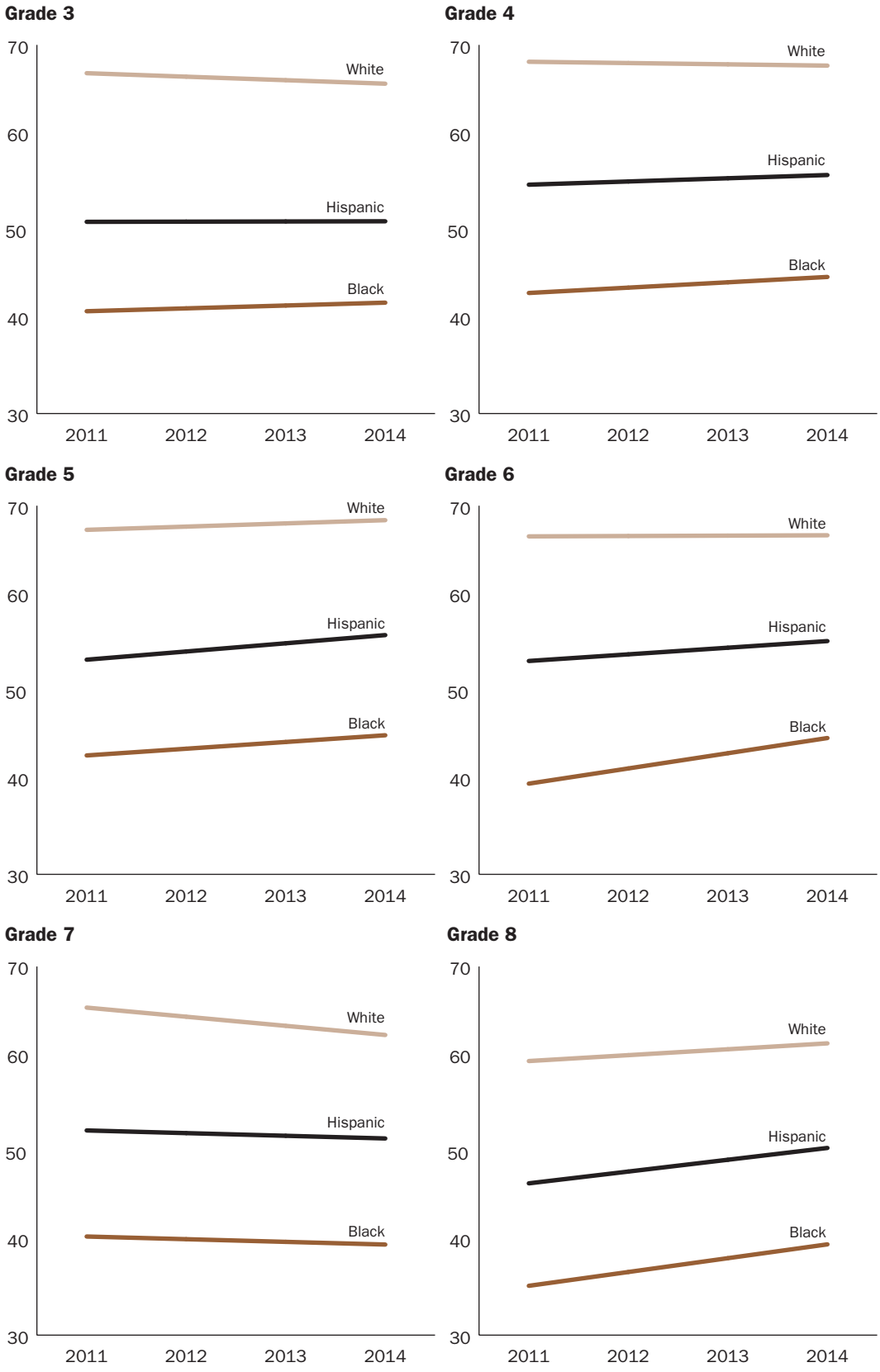
| Contrast tested | Reading | | | Math | | |
|---|---|---|---|---|---|---|
| | Difference between coefficients | Chi-square | *p*-value | Difference between coefficients | Chi-square | *p*-value |
| Grade 3 | | | | | | |
| Intercept Black to Hispanic | –9.70 | 544.87 | < .001* | –11.91 | 839.55 | < .001* |
| Slope Black to Hispanic | 0.29 | 2.58 | .10 | 0.29 | 2.29 | .126 |
| Grade 4 | | | | | | |
| Intercept Black to Hispanic | –11.75 | 740.18 | < .001* | –12.10 | 866.56 | < .001* |
| Slope Black to Hispanic | 0.23 | 1.52 | .22 | –0.02 | 0.00 | > .50 |
| Grade 5 | | | | | | |
| Intercept Black to Hispanic | –10.39 | 616.93 | < .001* | –14.14 | 1256.80 | < .001* |
| Slope Black to Hispanic | –0.16 | 0.82 | > .50 | –0.04 | 0.05 | > .50 |
| Grade 6 | | | | | | |
| Intercept Black to Hispanic | –13.31 | 719.55 | < .001* | –13.66 | 926.31 | < .001* |
| Slope Black to Hispanic | 0.93 | 20.85 | < .001* | 0.59 | 8.52 | .004* |
| Grade 7 | | | | | | |
| Intercept Black to Hispanic | –11.50 | 504.84 | < .001* | –14.46 | 1051.12 | < .001* |
| Slope Black to Hispanic | 0.01 | 0.00 | > .50 | 0.49 | 6.19 | .01* |
| Grade 8 | | | | | | |
| Intercept Black to Hispanic | –11.12 | 513.61 | < .001* | na | na | na |
| Slope Black to Hispanic | 0.22 | 1.17 | .28 | na | na | na |

na is not applicable.

**p*-value determined significant after applying Benjamini-Hochberg Correction.

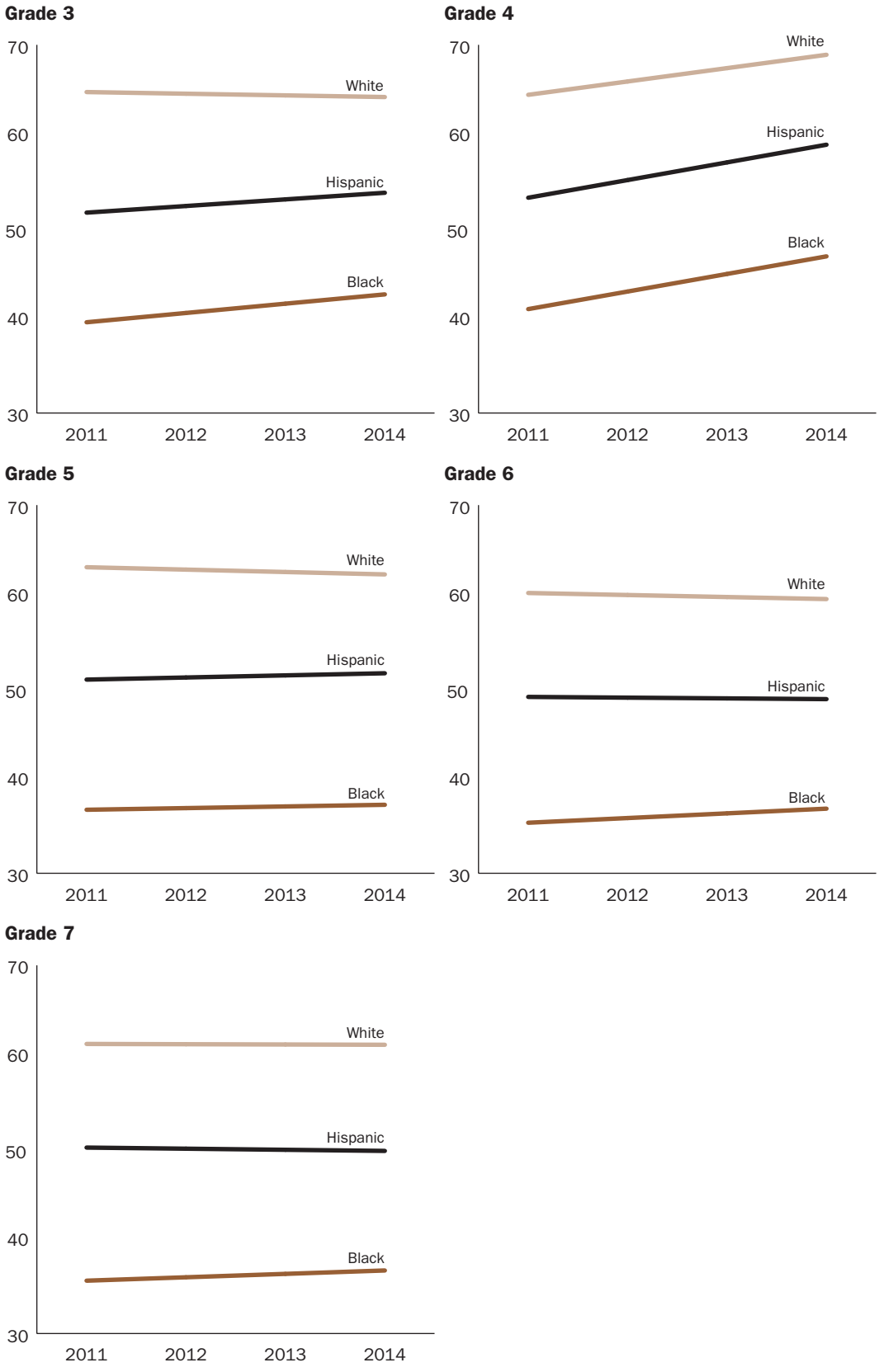
**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Figure A4. Florida fitted school-level reading proficiency means for racial/ethnic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Figure A5. Florida fitted school-level math proficiency means for racial/ethnic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

## Table A10. Mississippi growth curve model results comparing percent proficient for racial/ethnic subgroups, by grade and subject

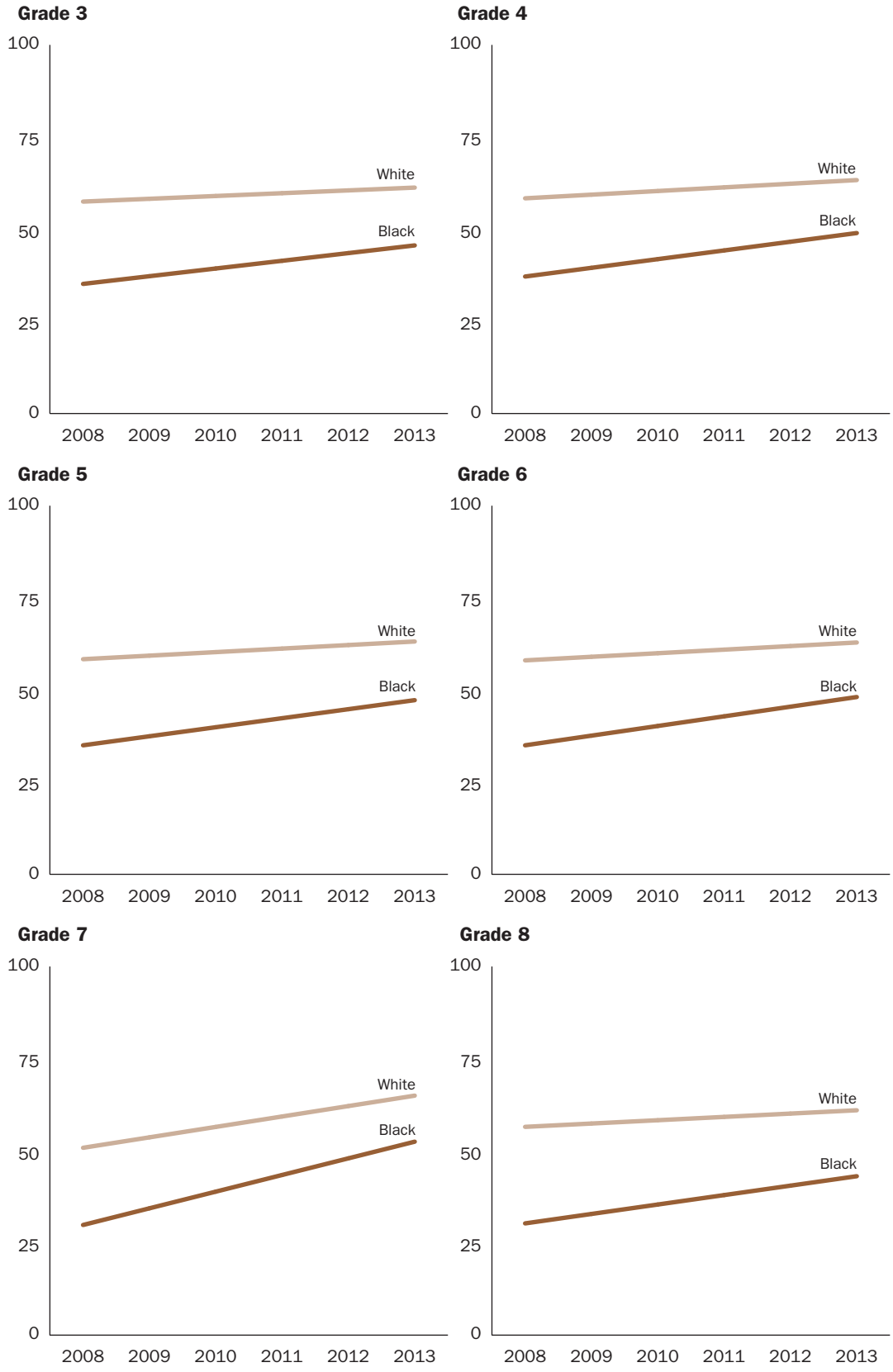
| | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Parameter | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error |
| Reading | | | | | | | | | | | | |
| | *n* = 485 | | *n* = 485 | | *n* = 485 | | *n* = 424 | | *n* = 324 | | *n* = 328 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept (White) | 57.49*** | 0.80 | 58.38*** | 0.86 | 58.36*** | 0.82 | 58.04*** | 0.83 | 50.82*** | 1.00 | 56.5*** | 0.82 |
| Black | –22.33*** | 0.87 | –21.22*** | 0.91 | –23.36*** | 0.86 | –23.04*** | 0.86 | –20.94*** | 0.96 | –26.19*** | 0.90 |
| *Growth* | | | | | | | | | | | | |
| Growth (White) | 0.76*** | 0.20 | 0.99*** | 0.20 | 0.96*** | 0.21 | 0.97*** | 0.23 | 2.83*** | 0.22 | 0.90*** | 0.21 |
| Black | 1.33*** | 0.25 | 1.37*** | 0.25 | 1.49*** | 0.26 | 1.65*** | 0.28 | 1.69*** | 0.27 | 1.66*** | 0.26 |
| Math | | | | | | | | | | | | |
| | *n* = 485 | | *n* = 482 | | *n* = 485 | | *n* = 424 | | *n* = 324 | | *n* = 329 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept (White) | 63.70*** | 0.89 | 63.47*** | 0.88 | 61.06*** | 0.89 | 61.28*** | 0.89 | 59.35*** | 0.96 | 56.88*** | 1.15 |
| Black | –19.22*** | 0.89 | –21.34*** | 0.90 | –19.61*** | 0.87 | –22.93*** | 0.91 | –19.14*** | 0.90 | –19.84*** | 1.05 |
| *Growth* | | | | | | | | | | | | |
| Growth (White) | 2.03*** | 0.21 | 1.47*** | 0.26 | 1.81*** | 0.23 | 1.33*** | 0.22 | 1.67*** | 0.27 | 3.96*** | 0.24 |
| Black | 0.32 | 0.27 | 1.31*** | 0.27 | 0.30 | 0.27 | 1.00*** | 0.28 | 1.67*** | 0.31 | 1.52*** | 0.28 |

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

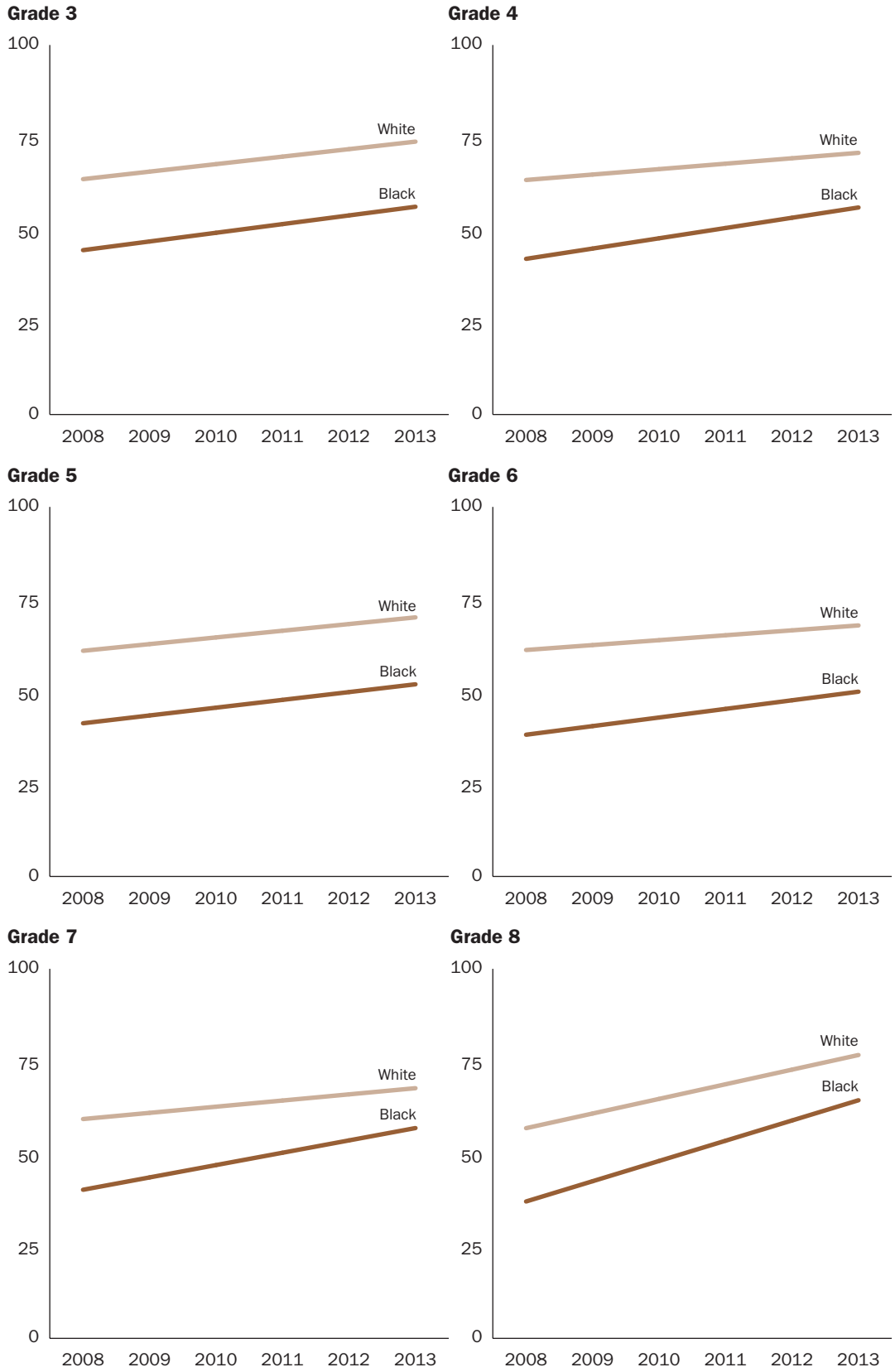
**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

**Figure A6. Mississippi fitted school-level reading proficiency means for racial/ethnic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

**Figure A7. Mississippi fitted school-level math proficiency means for racial/ethnic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

## Table A11. North Carolina growth curve model results comparing percent proficient for racial/ethnic subgroups, by grade and subject

| Parameter | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error |
| Reading | | | | | | | | | | | | |
| | *n* = 1,420 | | *n* = 1,416 | | *n* = 1,410 | | *n* = 710 | | *n* = 698 | | *n* = 711 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept (White) | 76.1*** | 0.35 | 79.03*** | 0.35 | 78.26*** | 0.35 | 79.78*** | 0.48 | 73.20*** | 0.57 | 75.17*** | 0.60 |
| Black | –27.68*** | 0.64 | –24.51*** | 0.65 | –26.06*** | 0.67 | –24.06*** | 0.81 | –27.02*** | 0.80 | –28.21*** | 0.81 |
| Hispanic | –27.87*** | 0.80 | –23.60*** | 0.82 | –25.86*** | 0.82 | –21.11*** | 0.97 | –22.14*** | 1.03 | –24.63*** | 0.96 |
| *Growth* | | | | | | | | | | | | |
| Growth (White) | 0.49*** | 0.14 | 0.67*** | 0.15 | 0.74*** | 0.15 | 0.99*** | 0.17 | .82*** | 0.18 | 0.78*** | 0.18 |
| Black | 1.32*** | 0.22 | 0.59** | 0.23 | 1.51*** | 0.23 | 0.72** | 0.27 | 0.62* | 0.27 | 0.93*** | 0.28 |
| Hispanic | 1.39*** | 0.27 | 0.87*** | 0.27 | 1.79*** | 0.28 | 1.39*** | 0.31 | 1.28*** | 0.33 | 1.25*** | 0.32 |
| Math | | | | | | | | | | | | |
| | *n* = 1,407 | | *n* = 1,401 | | *n* = 1,397 | | *n* = 719 | | *n* = 695 | | *n* = 700 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept (White) | 86.25*** | 0.30 | 85.82*** | 0.31 | 84.92*** | 0.30 | 83.61*** | 0.47 | 81.76*** | 0.56 | 81.60*** | 0.68 |
| Black | –21.12*** | 1.08 | –21.71*** | 1.05 | –22.50*** | 1.08 | –22.57*** | 1.33 | –20.93*** | 1.31 | –18.60*** | 1.24 |
| Hispanic | –16.37*** | 0.121 | –15.37*** | 1.22 | –16.00*** | 1.27 | –17.32*** | 1.45 | –17.64*** | 1.50 | –12.32*** | 1.42 |
| *Growth* | | | | | | | | | | | | |
| Growth (White) | –0.12 | 0.15 | 0.49** | 0.16 | 0.27 | 0.15 | 0.44* | 0.18 | 0.34 | 0.19 | 0.78*** | 1.9 |
| Black | 0.85*** | 0.23 | 1.49*** | 0.23 | 1.17*** | 0.23 | 0.63* | 0.27 | 1.00*** | 0.28 | 1.01*** | 0.26 |
| Hispanic | 1.23*** | 0.25 | 1.32*** | 0.26 | 1.19*** | 0.26 | 1.33*** | 0.30 | 1.83*** | 0.31 | 1.10*** | 0.29 |

*Significant at $p < .05$; **significant at $p < .01$; ***significant at $p < .001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

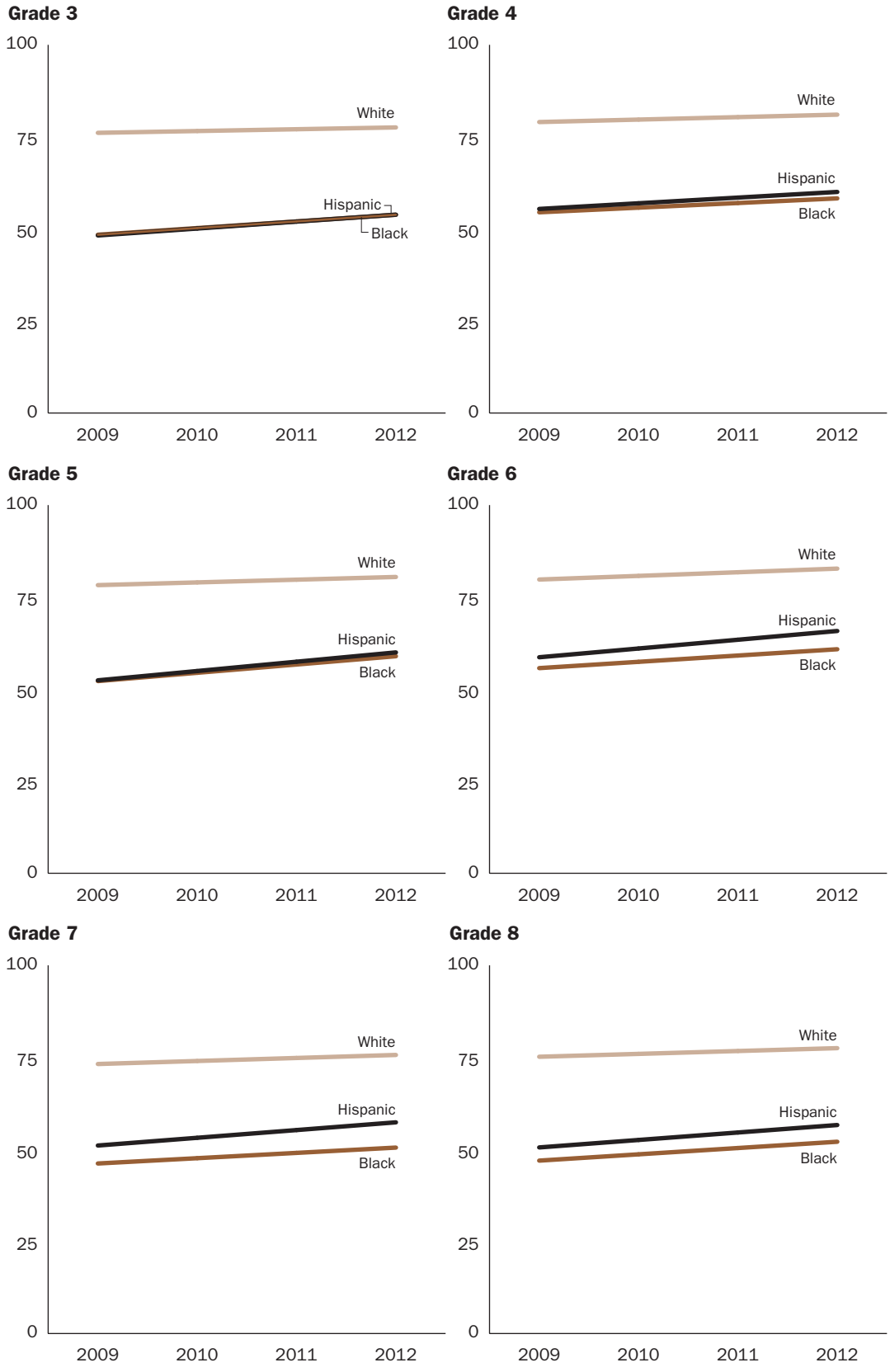
## Table A12. North Carolina contrast test results comparing performance across racial/ethnic subgroups, by grade and subject

| Contrast tested | Reading | | | Math | | |
|---|---|---|---|---|---|---|
| | Difference between coefficients | Chi-square | *p*-value | Difference between coefficients | Chi-square | *p*-value |
| Grade 3 | | | | | | |
| Intercept Black to Hispanic | –0.20 | 0.06 | > .50 | 4.75 | 13.10 | < .001* |
| Slope Black to Hispanic | 0.08 | 0.08 | > .50 | 0.38 | 1.96 | .16 |
| Grade 4 | | | | | | |
| Intercept Black to Hispanic | 0.90 | 1.16 | .28 | 6.35 | 28.29 | < .001* |
| Slope Black to Hispanic | 0.28 | 1.06 | .30 | 0.17 | 0.45 | > .50 |
| Grade 5 | | | | | | |
| Intercept Black to Hispanic | 0.20 | 0.06 | > .50 | 6.50 | 25.11 | < .001* |
| Slope Black to Hispanic | 0.29 | 1.05 | .31 | 0.01 | 0.002 | > .50 |
| Grade 6 | | | | | | |
| Intercept Black to Hispanic | 2.95 | 9.34 | .003* | 5.25 | 13.95 | < .001* |
| Slope Black to Hispanic | 0.68 | 4.72 | .03* | 0.71 | 5.68 | .02* |
| Grade 7 | | | | | | |
| Intercept Black to Hispanic | 4.88 | 22.97 | < .001* | 3.29 | 4.87 | .03* |
| Slope Black to Hispanic | 0.66 | 3.57 | .06 | 0.83 | 6.87 | .01* |
| Grade 8 | | | | | | |
| Intercept Black to Hispanic | 3.58 | 13.60 | < .001* | 6.28 | 21.9 | < .001* |
| Slope Black to Hispanic | 0.32 | 0.93 | > .50 | 0.09 | 0.11 | > .50 |

**p*-value determined significant after applying Benjamini-Hochberg Correction.

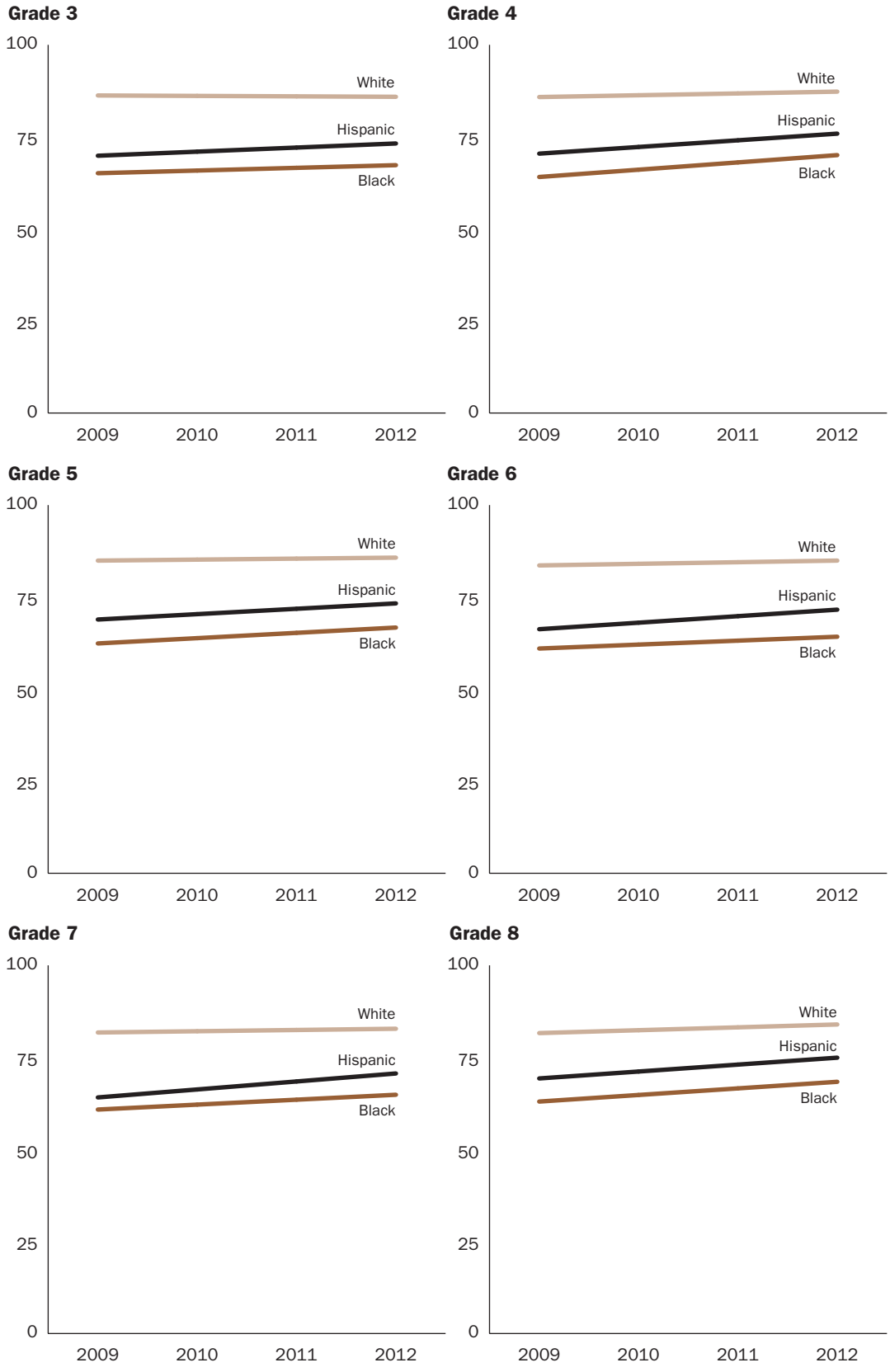
**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

**Figure A8. North Carolina fitted school-level reading proficiency means for racial/ethnic subgroups, by grade**




**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

**Figure A9. North Carolina fitted school-level math proficiency means for racial/ethnic subgroups, by grade**




**Source:** Authors' analysis of data obtained from North Carolina Department of Education State/local education agency and School Test Performance website, 2008/09–2011/12.

**Table A13. Florida growth curve model results comparing proficiency for students eligible for the school lunch program, by grade and subject**

| Parameter | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error |
| Reading | | | | | | | | | | | | |
| | *n* = 2,126 | | *n* = 2,116 | | *n* = 2,118 | | *n* = 1,132 | | *n* = 1,055 | | *n* = 1,050 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept | 71.59*** | 0.31 | 72.00*** | 0.30 | 71.23*** | 0.31 | 69.05*** | 0.51 | 67.14*** | 0.54 | 60.92*** | 0.57 |
| Eligible for school lunch program | –23.51*** | 0.30 | –21.26*** | 0.29 | –21.47*** | 0.29 | –21.15*** | 0.41 | –20.00*** | 0.42 | –19.07*** | 0.14 |
| *Linear slope* | | | | | | | | | | | | |
| Intercept | –1.20*** | 0.13 | –0.44*** | 0.11 | –0.03 | 0.12 | 0.00 | 0.15 | –0.90*** | 0.15 | 1.01*** | 0.41 |
| Eligible for school lunch program | 1.36*** | 0.15 | 0.85*** | 0.14 | 0.78*** | 0.14 | 0.89*** | 0.17 | 0.57*** | 0.17 | 0.26 | 0.17 |
| Math | | | | | | | | | | | | |
| | *n* = 2,191 | | *n* = 2,183 | | *n* = 2,182 | | *n* = 1,196 | | *n* = 1,119 | | | |
| *Intercept* | | | | | | | | | | | | |
| Intercept | 69.91*** | 0.35 | 69.29*** | 0.35 | 67.39*** | 0.35 | 63.50*** | 0.55 | 63.74*** | 0.56 | na | na |
| Eligible for school lunch program | –22.23*** | 0.30 | –20.49*** | 0.30 | –21.27*** | 0.29 | –19.98*** | 0.40 | –19.69*** | 0.40 | na | na |
| *Linear slope* | | | | | | | | | | | | |
| Intercept | –0.55*** | 0.14 | 0.86*** | 0.14 | –0.49*** | 0.13 | –0.27 | 0.15 | –0.51** | 0.16 | na | na |
| Eligible for school lunch program | 1.35*** | 0.15 | 1.09*** | 0.15 | 0 .61*** | 0.14 | 0.43** | 0.17 | 0.87*** | 0.17 | na | na |

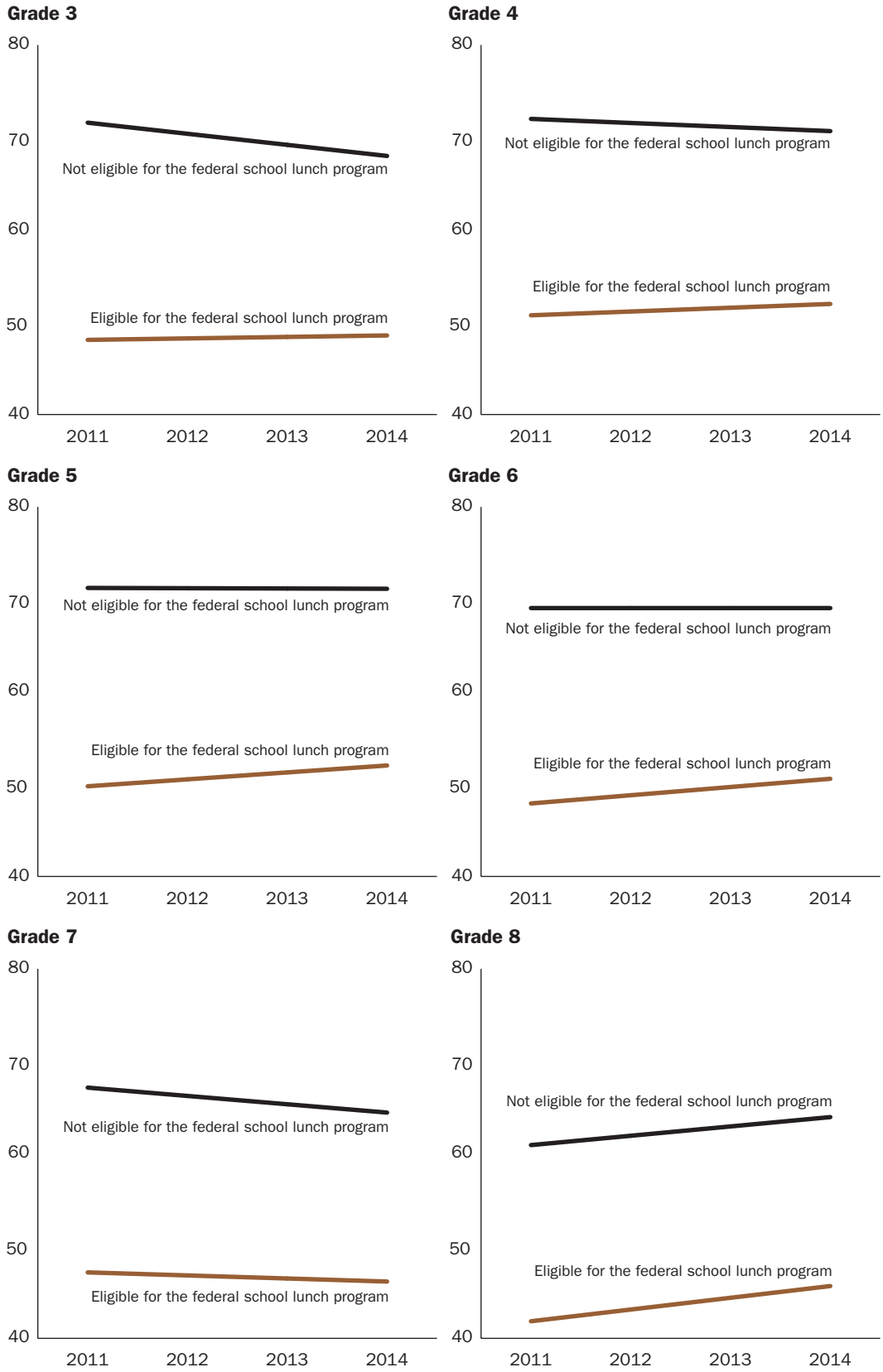
na is not applicable.

*Significant at $p < 0.05$; **significant at $p < 0.01$; ***significant at $p < 0.001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

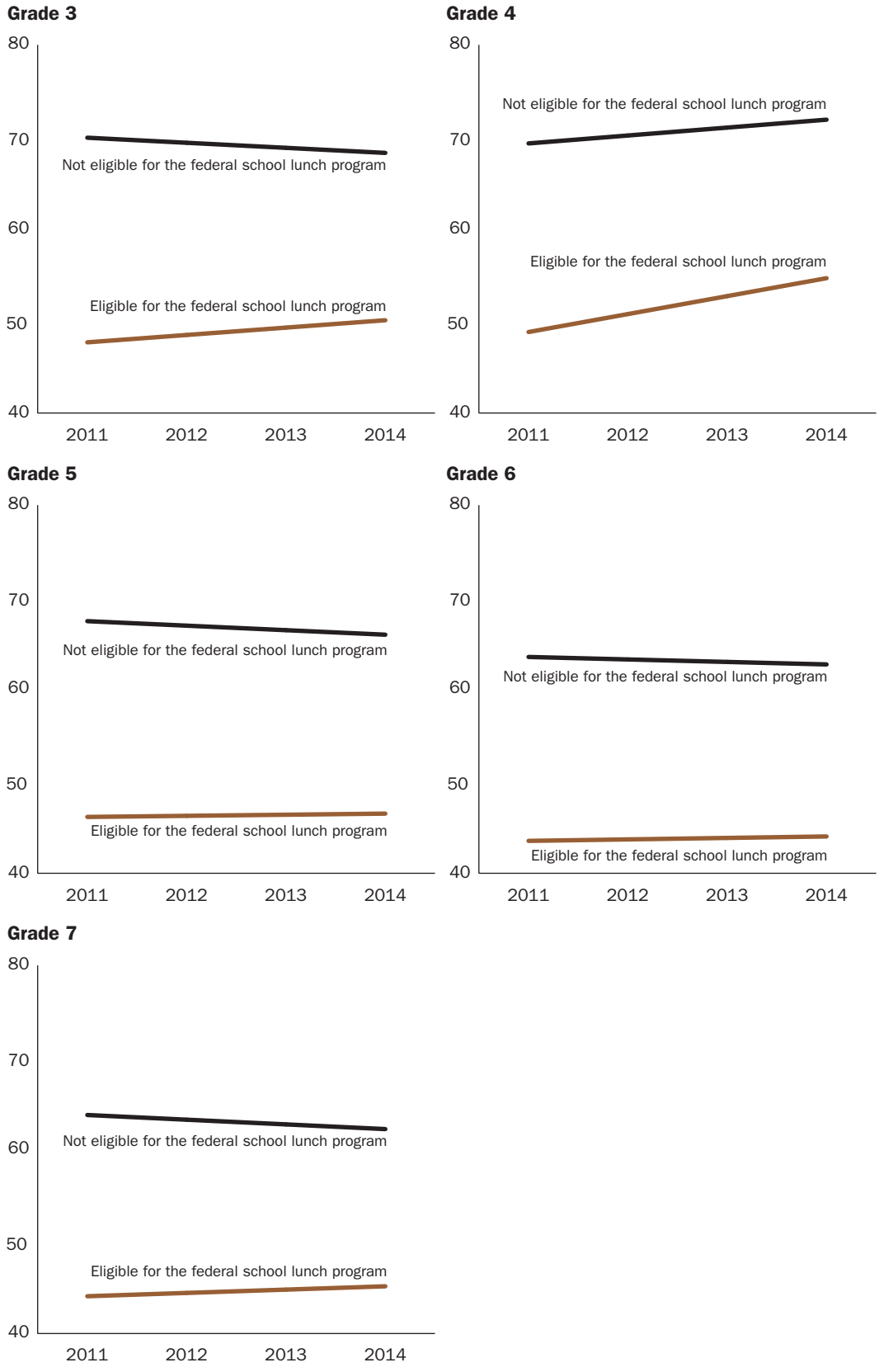
**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Figure A10. Florida fitted school-level reading proficiency means for economic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Figure A11. Florida fitted school-level math proficiency means for economic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Florida Department of Education demographic database website, 2010/11–2013/14.

**Table A14. Mississippi growth curve model results comparing percent proficient for students eligiblet for the federal school lunch program, by grade and subject**

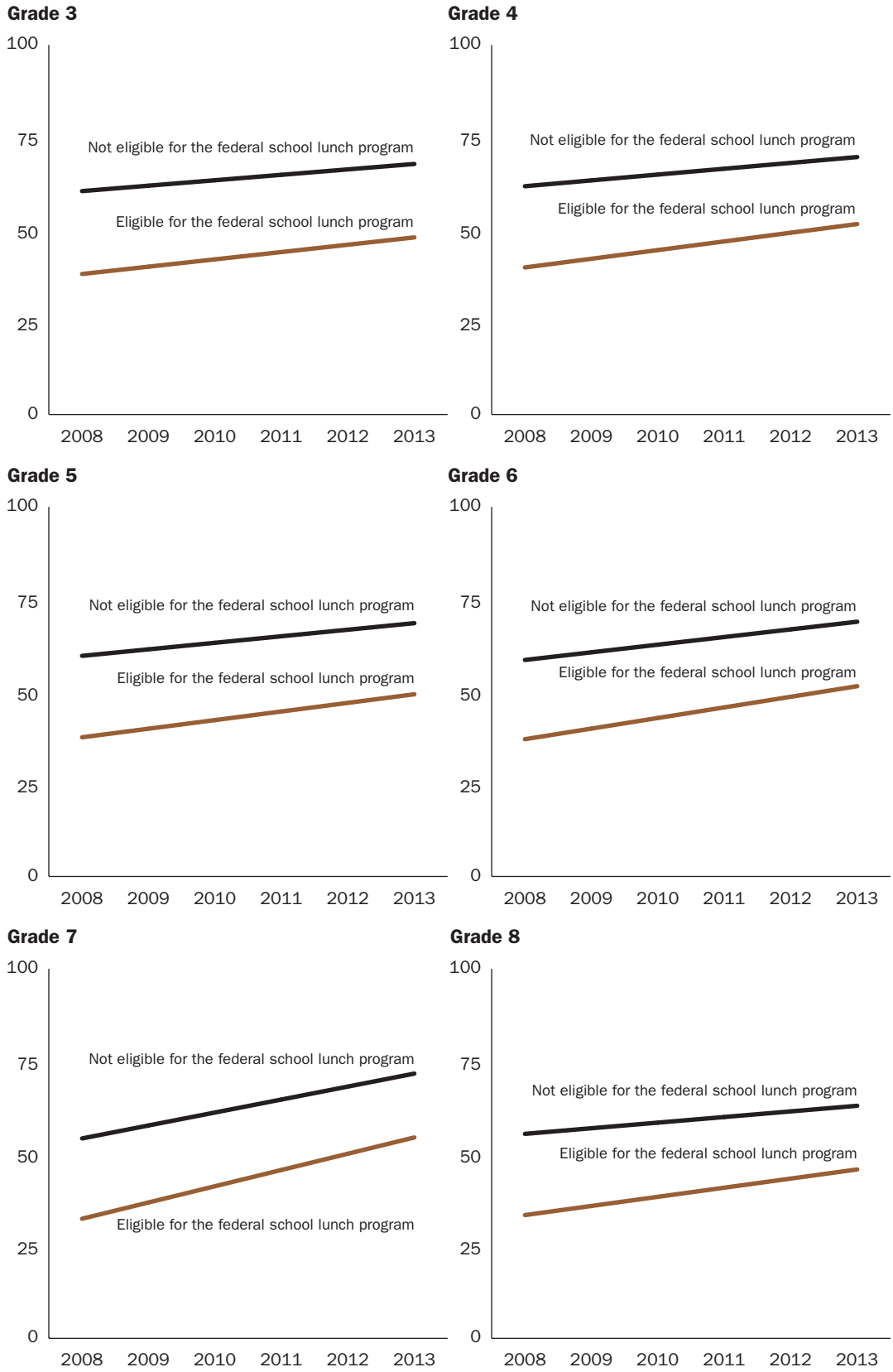
| Parameter | Grade 3 | | Grade 4 | | Grade 5 | | Grade 6 | | Grade 7 | | Grade 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error | Coefficient | Standard error |
| Reading | | | | | | | | | | | | |
| | *n* = 485 | | *n* = 486 | | *n* = 485 | | *n* = 424 | | *n* = 325 | | *n* = 328 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept | 60.46*** | 0.76 | 61.80*** | 0.85 | 59.69*** | 0.85 | 58.58*** | 0.88 | 54.10*** | 0.92 | 55.34*** | 0.89 |
| Eligible for school lunch program | –22.43*** | 0.72 | –21.98*** | 0.75 | –22.04*** | 0.72 | –21.44*** | 0.70 | –21.73*** | 0.71 | –21.98*** | 0.73 |
| *Linear slope* | | | | | | | | | | | | |
| Intercept | 1.47*** | 0.22 | 1.58*** | 0.22 | 1.77*** | 0.22 | 2.07*** | 0.23 | 3.51*** | 0.22 | 1.52*** | 0.20 |
| Eligible for school lunch program | 0.51* | 0.22 | 0.77*** | 0.23 | 0.56* | 0.23 | 0.80*** | 0.23 | 0.89*** | 0.27 | 0.95*** | 0.20 |
| Math | | | | | | | | | | | | |
| | *n* = 485 | | *n* = 483 | | *n* = 485 | | *n* = 424 | | *n* = 325 | | *n* = 329 | |
| *Intercept* | | | | | | | | | | | | |
| Intercept | 66.18*** | 0.82 | 65.45*** | 0.89 | 63.39*** | 0.89 | 62.35*** | 0.88 | 61.17*** | 1.00 | 59.08*** | 1.08 |
| Eligible for school lunch program | –19.29*** | 0.72 | –19.73*** | 0.76 | –19.34*** | 0.72 | –21.02*** | 0.70 | –18.90*** | 0.74 | –19.65*** | 0.74 |
| *Linear slope* | | | | | | | | | | | | |
| Intercept | 2.07*** | 0.22 | 2.20*** | 0.22 | 1.91*** | 0.25 | 1.64*** | 0.22 | 2.74*** | 0.23 | 4.04*** | 0.25 |
| Eligible for school lunch program | 0.61** | 0.23 | 0.50* | 0.22 | 0.51* | 0.24 | 1.05*** | 0.23 | 0.64** | 0.24 | 1.40*** | 0.22 |

*Significant at $p < 0.05$; **significant at $p < 0.01$; ***significant at $p < 0.001$.

**a.** All significant parameters remain significant after applying Benjamini-Hochberg correction.

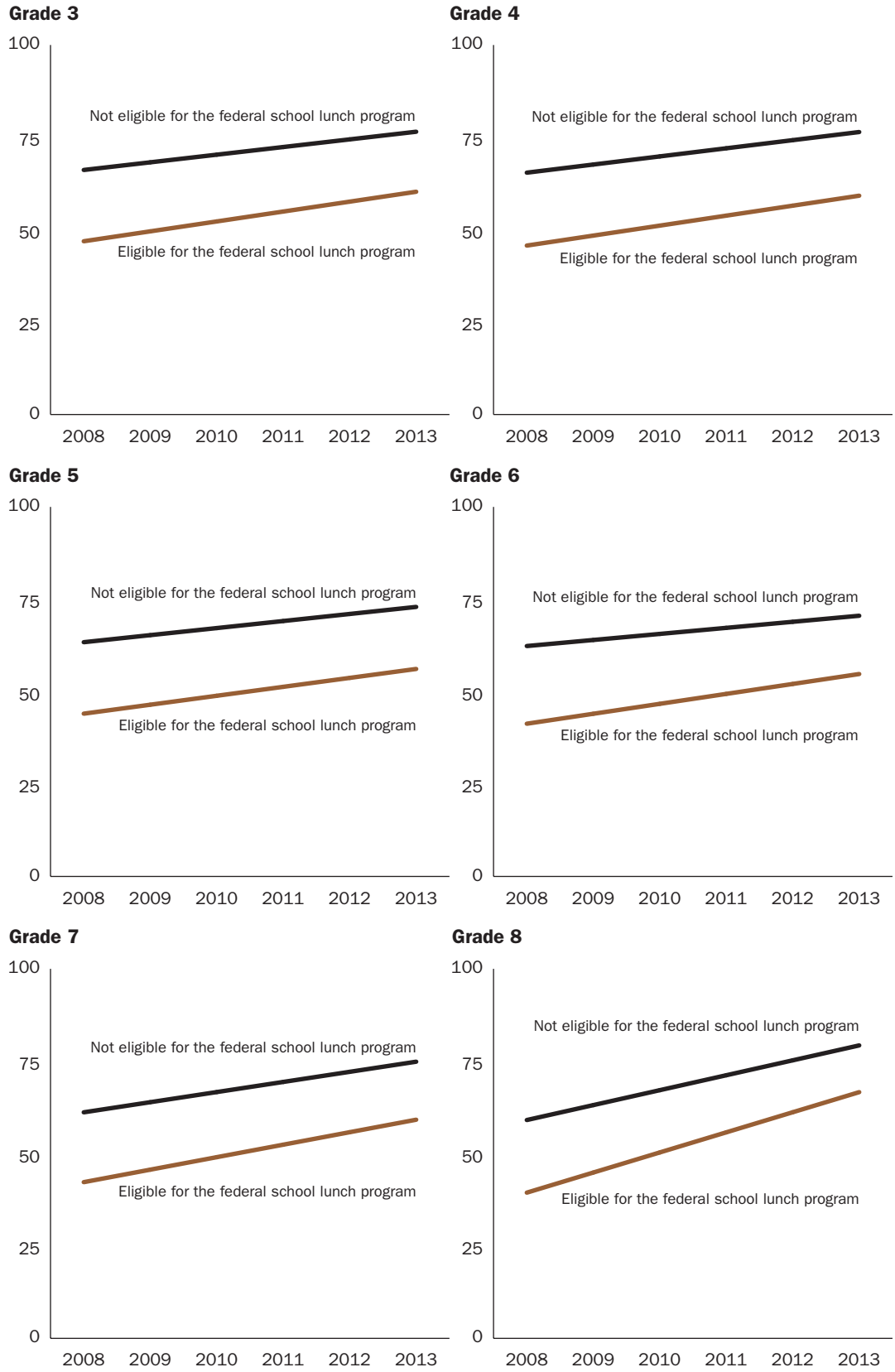
**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

**Figure A12. Mississippi fitted school-level reading proficiency means for economic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

**Figure A13. Mississippi fitted school-level math proficiency means for economic subgroups, by grade**




**Source:** Authors' analysis of data obtained from Mississippi Department of Education public reports website, 2007/08–2012/13.

## Notes

1. The Florida legislature enacted a policy during the 2012/13 school year allowing grade 8 students to replace FCAT Math with the Algebra I End-of-Course exam. Because this resulted in a substantial and artificial drop in performance between the 2011/12 and 2012/13 school years, grade 8 was excluded when analyzing Florida's math performance.
2. The racial/ethnic subgroups of interest included any subgroup that accounted for a minimum of 10 percent of the population. Because the proportion of Hispanic students in Mississippi was 2.5 percent, the group was dropped from the Mississippi analyses.

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Benjamini, Y., & Hochberg, Y. (1995). Controlling the false discovery rate: A practical and powerful approach to multiple testing. *Journal of the Royal Statistical Society*, Series B, *57*(1), 289–300.

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