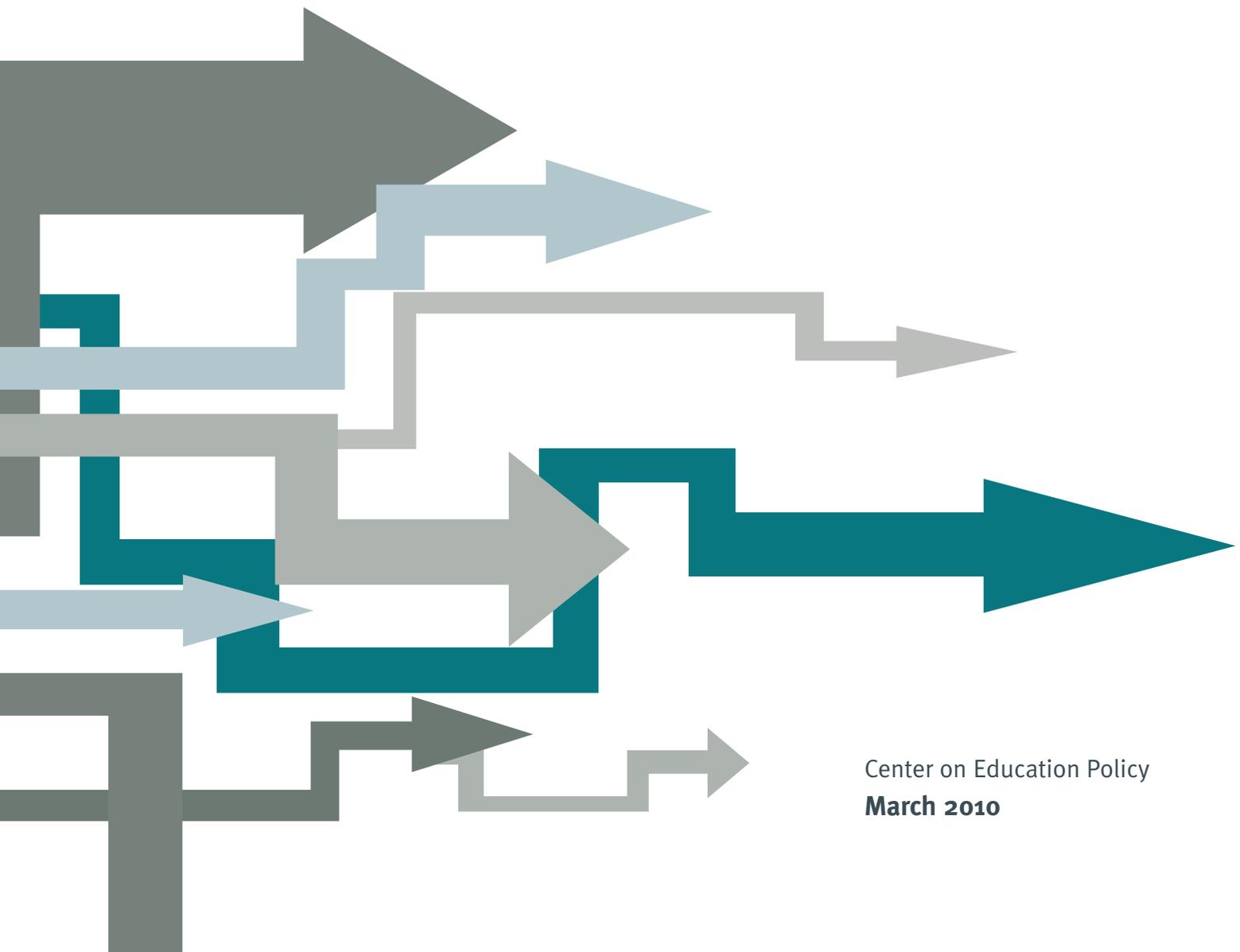


*State Test Score Trends Through 2007-08, Part 5*

# Are There Differences in Achievement Between Boys and Girls?



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## Introduction

Disparities between boys and girls in reading and mathematics achievement have long been a concern among educators. While the No Child Left Behind Act (NCLB) does not hold school systems directly accountable for making adequate yearly progress (AYP) for the male and female subgroups, as it does for racial/ethnic and other subgroups, the Act does require states and school districts to publicly report test results broken down by gender. These requirements to disaggregate and publicize test data for males and females signal a continuing national interest in monitoring and narrowing gender gaps in achievement.

This report by the Center on Education Policy, an independent nonprofit organization, looks at the achievement of boys and girls on the state reading and mathematics tests used for NCLB accountability. The report addresses four main questions:

- 1) What is the current status of performance differences between boys and girls in reading and math at various grades and achievement levels?
- 2) What trends have emerged in the achievement of boys and girls at the elementary, middle, and high school levels since 2002, the year NCLB took effect?
- 3) What trends have occurred since 2002 in the performance of male and female 4<sup>th</sup> graders at the basic, proficient, and advanced levels of achievement?
- 4) Have achievement gaps between boys and girls narrowed since 2002?

The data for these analyses were drawn from an extensive set of test data that has been collected from all 50 states by CEP with technical support from the Human Resources Research Organization (HumRRO). State education officials have verified the accuracy of the data.

## Main Findings

In general, our analyses of performance by gender on state tests found good news for girls but bad news for boys. In math, girls are doing roughly as well as boys, and the differences that do exist in some states are small and show no clear national pattern favoring boys or girls. But in reading, boys are lagging behind girls in all states with adequate data, and these gaps are greater than 10 percentage points in some states. Our research revealed several specific main findings:

- **In math, there was no consistent gender gap in 2008. Rather, there was rough parity in the percentages of boys and girls reaching proficiency at all three grade levels.** The percentages of boys and girls scoring proficient in math tended to be similar, with boys edging out girls slightly in some states and girls doing slightly better in other states. No state had a difference in math between boys and girls of more than 10 percentage points.

- **In grade 4 math, states tended to have greater shares of girls reaching the basic level and greater shares of boys reaching the advanced level.** The median percentages for girls and boys were quite similar in math at the basic, proficient, and advanced achievement levels. However, the number of states in which one gender outperformed the other varied by achievement level. In grade 4 math, more states had higher percentages of 4<sup>th</sup> grade girls reaching the basic level, while more states had higher percentages of boys reaching the advanced level. At the proficient level, the number of states in which one gender outperformed the other were roughly equal.
- **In reading, girls outperformed boys in 2008 at the elementary, middle, and high school levels.** Higher percentages of girls than boys scored at or above the proficient level on state reading tests at grade 4, grade 8, and high school; in some states, these gaps exceeded 10 percentage points.
- **In grade 4 reading, higher percentages of girls than boys reached the basic, proficient, and advanced achievement levels in 2008.** The median percentages of 4<sup>th</sup> grade girls reaching all three achievement levels—basic, proficient, and advanced—were higher than the median percentages for boys. (The median is the midpoint; half of the states with sufficient data had percentages above this point and half had percentages below.) In no state did boys outperform girls in reading at any achievement level.
- **Although reading achievement gaps between boys and girls have narrowed in many cases according to the percentage proficient indicator used for NCLB, boys have made less progress in catching up to girls according average test scores, which are a better indicator for this purpose.** Since 2002, percentages proficient gaps in reading between boys and girls have narrowed in the majority (52%) of instances analyzed across the states with sufficient data and have widened in 40% of instances. But mean (average) test scores, which are a more useful indicator of gaps because they capture improvements across the achievement spectrum, present a less positive picture. Gaps in mean test scores have widened almost as often as they have narrowed—45% of instances compared with 46%.
- **For both boys and girls, states with gains in reading and math proficiency between 2002 and 2008 far outnumbered states with declines at the elementary, middle, and high school levels.** At least 70% of the states with sufficient data posted gains in percentages proficient for both genders in all subject/grade level combinations except high school reading, where 63% of the states with data showed gains. In reading, upward trends were slightly more prevalent for boys than for girls, but in math, the numbers of rising trend lines were similar for boys and girls.
- **In a majority of the states with sufficient data, both boys and girls in grade 4 have made progress in reading and math since 2002 at the basic, proficient, and advanced achievement levels.** In general, the numbers of states with gains in the percentage of males at the three achievement levels were similar to the numbers for females.

Readers who are interested in trends for males and females in a specific state are encouraged to access the detailed state profiles of subgroup achievement trends available on CEP's Web site ([www.cep-dc.org](http://www.cep-dc.org)).

## Background on Gender Issues in Achievement

This report on state test results for males and females is the fifth in a 2009-10 series of CEP reports on student achievement trends.<sup>1</sup> Although this report does not address the reasons for differences in achievement between boys and girls, some background about these differences can provide a context for understanding the trends we found.

Studies have long noted differences in the achievement of girls and boys in reading and math. Historically, females have tended to perform better on reading tests while males have performed better on math tests, particularly at the high school level (Willingham & Cole, 1997). Although tests of general intelligence suggest no overall difference between males and females, large differences by gender are apparent in scores on specific cognitive tasks: males tend to do better at certain spatial and visual tasks while females tend to excel verbally (Dee, 2005). On the reading tests of the National Assessment of Educational Progress (NAEP), the female subgroup has consistently scored higher than the male subgroup at all grades tested (4, 8, and 12) since 1992, when the current trend lines began. In math, males have slightly outperformed females on NAEP at grades 4 and 12 and, with few exceptions, at grade 8.<sup>2</sup>

Some researchers argue that achievement gaps in math between girls and boys have lessened over time. One recent study that appeared in *Science* and received a good deal of media attention concluded that there are no longer gender differences in math performance (Hyde et al., 2008). That study sifted through large amounts of data, including SAT results and state math test scores from 7 million students. Whether the researchers looked at average performance, the scores of the most gifted children, or students' ability to solve complex math problems, the achievement of girls and boys was roughly equal. Janet Hyde, the lead researcher, concluded that "parents and teachers need to revise their thoughts" about gender gaps (University of Wisconsin-Madison, 2008). Some observers have also pointed out that gender gaps on NAEP are far smaller than gaps between racial/ethnic or income groups (Mead, 2006).

Still, concerns persist about gender gaps—particularly the lagging achievement of boys in reading—and the sources of any disparities. Gender differences in achievement have been attributed to a variety of biological and environmental factors in what essentially comes down to a nature versus nurture debate (Dee, 2005). On the biological (nature) side, evidence has been found of differences in male and female brain structures and exposure to sex hormones that appear to influence the gender-specific skill advantages (Halpern, 2000; Cahill, 2005). Recently, Burman and colleagues (2008) demonstrated that the areas of the brain associated with language work harder in girls than in boys during language tasks and that girls and boys rely on different parts of the brain when performing these tasks. However, Neisser et al. (1996) have noted that any biological differences interact with environmental factors that appear soon after birth. Furthermore, it is important to remember that not all females outperform all males on language tasks; it is only that the average is somewhat higher for females.

<sup>1</sup> This series of reports is entitled *State Test Score Trends Through 2007-08*. Part 1 examined trends since 2002 at the basic, proficient, and advanced levels of achievement for students as a whole and found that many more states had gains than declines at all three achievement levels (CEP, 2009a). Part 2 concluded that the so-called "plateau" effect—a leveling off of achievement gains after a test has been in place for several years—was neither widespread nor inevitable for the current generation of state tests (CEP, 2009b). Part 3 found that achievement gaps on state tests between different racial/ethnic groups of students and between low-income and more advantaged students have tended to narrow since 2002 (CEP, 2009c). Part 4 noted that students with disabilities have made gains since 2006 in the majority of states with data but cautioned that imprecise data make it difficult to obtain a clear picture of achievement for this group (CEP, 2009d). These reports can be downloaded from CEP's Web site at [www.cep-dc.org](http://www.cep-dc.org).

<sup>2</sup> In 1992, females slightly outperformed males on NAEP in 8<sup>th</sup> grade math, and in 1996, the gender groups achieved the same average score.

Researchers who emphasize environmental factors (nurture) often blame societal expectations based on commonly held myths about gender. For instance, girls may be socialized to believe they have low aptitude for math and will not need math skills as adults. Boys may be socialized to view reading as an activity most suitable for girls. Some researchers have suggested that textbooks and literature available at the elementary level tend to reflect the interests and inclinations of females rather than males (Bauerlein & Stotsky, 2005). Others point to gender dynamics between teachers and students. Teachers sometimes interact differently with boys and girls, and some evidence suggests that students benefit academically from having teachers who are the same gender as themselves (Dee, 2007).

Researchers still do not fully understand or totally agree on the sources of differences in academic performance between genders. Our purpose in this report is to examine how these differences emerge in state tests used for accountability purposes, to identify specific subjects or grade levels at which gaps appear to be particularly large or persistent, and to discern which trends have occurred since 2002.

## Study Methods

To answer the first study question about the current status of male-female differences in achievement, we examined state test data from school year 2007-08, the most recent year for which test results from all states were available at the time our data collection ended.

To address the other three questions about trends over time, we analyzed trend lines that began in 2002, where available, and ended in 2008. A trend line is a record of change in the performance of boys or girls at a particular achievement level in one subject and grade level in one state. For example, the change from 2002 through 2008 in the percentage of female 4<sup>th</sup> graders scoring at or above the proficient level in Florida constitutes one trend line. Some states lacked sufficient comparable data for the entire period from 2002 through 2008 because they had changed their testing programs in ways that affected comparability of test results or were missing data for other reasons. Only those states with at least three years of comparable test data for a particular subject, grade, and achievement level—the minimum span necessary to discern a trend—were included in our analyses. States with at least three years of comparable data but fewer than the full seven years were included as long as their data extended through 2007-08.

For all of our trend analyses, we calculated the average annual percentage point gain or decline for each trend line and counted the number of states showing gains or declines. (The average annual gain or decline is simply the increase or decrease in the percentage of students scoring at or above a certain achievement level divided by the number of years of testing minus one, because we are looking at the difference between two years.) For example, 58% of Florida female 4<sup>th</sup> graders scored at the proficient level or above in 2002; for 2008 the figure was 71%. The 13-point difference between 2002 and 2008 was divided by six, the number of jumps between years, for an average annual gain of 2.2 percentage points.

Our analyses of achievement by grade level focused on the percentages of boys and girls scoring at the “proficient” level on state tests at the elementary (grade 4), middle school (grade 8 in all but one state), and high school (generally grade 10 or 11) levels. The percentage proficient is the key indicator used to determine whether districts and schools have made adequate yearly progress under NCLB. Each state was required to lay out a timeline for meeting the NCLB goal of 100% of students achieving proficiency by 2014, using its own defini-

tion of what constitutes “proficiency” at various grade levels and its own system of tests, interim performance targets, academic content standards, and curriculum.

Our analyses of performance across the achievement spectrum focused on the percentages of boys and girls in grade 4 scoring at or above the three achievement levels specified by NCLB: basic, proficient, and advanced. (Students who fall below their state’s benchmark for basic achievement are considered “below basic,” a de facto fourth category.) NCLB gave states the latitude to define these achievement levels in terms of their own tests; as a result, states’ definitions vary considerably.<sup>3</sup> We limited this analysis by achievement level to one elementary grade because of the massive amount of data involved and because this was the pilot year for a process that CEP hopes to expand to the middle and high school levels in future years.

Under this approach, the percentage proficient-and-above also includes the percentage of students reaching the advanced level, and the percentage basic-and-above also includes the percentages reaching the proficient and advanced levels. (Since there is no achievement level above advanced, the percentage advanced is a discrete category.) Using these cumulative achievement categories, rather than the discrete categories of basic alone or proficient alone, is consistent with how AYP is determined under NCLB and is a simpler way to interpret trends that can become quite complex.

To analyze trends in male-female achievement gaps, we compared the average annual gains in achievement for boys and girls using two different indicators: 1) the percentage of students scoring at the proficient level on state tests, and 2) mean test scores, which are simply average test scores for groups of students that reflect achievement at all parts of the score spectrum, not just at the proficient level. For instance, if the average gain for males in reading was larger than that for females in the same state and grade level, we counted this as one instance of an achievement gap narrowing; if the average gain for males was smaller than that for females, we counted it as an instance of an achievement gap widening.

All of our achievement studies have been carried out with advice from a panel of five nationally known experts in educational testing or education policy.<sup>4</sup> More details about study methods can be found in appendix 1 to part 1 of this series of reports (CEP, 2009a).

## Male-Female Achievement Differences in 2008

To gauge the current status of performance differences by gender on state tests, we first looked at the percentage of boys and girls scoring at or above the proficient level in reading and math at the elementary (grade 4), middle (grade 8 with one exception), and high school (usually grade 10 or 11) levels. Because states have taken different approaches to defining proficiency based on their own tests and standards, it is impossible to determine a national percentage of students scoring proficient on state tests, and it is difficult to compare achievement between particular states.

<sup>3</sup> In addition, some states use different names for the three achievement levels, and some states define additional levels. More information about the process and challenges of analyzing performance by achievement level, as well as a detailed discussion of trends at three levels for students as a whole, can be found in part 1 of this series of CEP reports, *Is the Emphasis on “Proficiency” Shortchanging Higher- and Lower-Achieving Students?* (CEP, 2009a).

<sup>4</sup> Members of the expert panel include Laura Hamilton, senior behavioral scientist, RAND Corporation; Eric Hanushek, senior fellow, Hoover Institution; Frederick Hess, director of education policy studies, American Enterprise Institute; Robert L. Linn, professor emeritus, University of Colorado; and W. James Popham, professor emeritus, University of California, Los Angeles.

In the absence of a single national indicator, we obtained a “national” picture of achievement differences by comparing the 2008 percentages proficient for boys and girls in each state with sufficient data. We also examined the median percentage proficient across all of the states with sufficient data—meaning that half of these states had percentages above this figure and half had percentages below. In addition, we determined the range in percentages proficient from the lowest state to the highest. **Table 1** provides a snapshot of 2008 achievement at three grade levels.

<b>Table 1. Percentages proficient for female and male students in reading and math at three grade levels, 2008</b>						
<b>Statistic</b>	<b>Elementary school</b>		<b>Middle school</b>		<b>High school</b>	
	<b>Female</b>	<b>Male</b>	<b>Female</b>	<b>Male</b>	<b>Female</b>	<b>Male</b>
<b>Reading</b>						
Median % proficient	79%	72%	78%	70%	76%	68%
Lowest % in any state	52%	40%	34%	22%	39%	35%
Highest % in any state	93%	91%	96%	92%	98%	96%
# states with sufficient data	48		47		45	
# of states M > F	0		0		0	
# of states F > M	48		47		45	
# of states > 10 pt. difference	6		17		11	
<b>Math</b>						
Median % proficient	76%	76%	69%	68%	64%	63%
Lowest % in any state	40%	38%	20%	22%	20%	23%
Highest % in any state	94%	94%	92%	89%	93%	92%
# states with sufficient data	48*		47*		45*	
# of states M > F	16		10		26	
# of states F > M	18		24		12	
# of states > 10 pt. difference	0		0		0	

Table reads: In elementary reading, the median percentage proficient was 79% for girls and 72% for boys among the 48 states with sufficient data. In elementary reading, the lowest percentage proficient for girls in any state was 52%, and the highest was 93%. In no state did the percentage proficient for male students in elementary reading exceed the percentage proficient for female students; rather, the female percentage proficient exceeded the male percentage in all 48 states with data. In six states, the percentages proficient in elementary reading for males and females differed by more than 10 percentage points.

\*The number of states in which males outperformed females and the number in which females outperformed males do not add up to the total number of states with sufficient data because in some states, the percentages proficient for males and females were roughly equal.

Source: Center on Education Policy based on data collected from state departments of education.

**Finding:** In reading, girls outperformed boys in 2008 at the elementary, middle, and high school levels, as gauged by the higher percentages of girls reaching proficiency. In some states, these differences in percentages proficient between girls and boys exceeded 10 percentage points. In math, there was rough parity in the percentages of boys and girls reaching proficiency in 2008, with boys edging out girls slightly in some states and girls doing better in other states.

In reading, higher percentages of girls than boys scored at or above the proficient level at all three grade levels, as shown in the median rows in table 1. In middle school reading, for example, the median was 78% proficient for girls and 70% for boys among the 47 states with sufficient data. As further displayed in the shaded rows of table 1, percentages proficient in reading were greater for girls than boys in all states with sufficient data at all three grade levels.

Differences in reading proficiency were rather large in some states. In reading, girls outperformed boys by more than 10 percentage points in six states at the elementary level, seventeen states at the middle school level, and eleven states at the high school level.<sup>5</sup>

The range in percentages proficient between the highest and lowest states could be quite broad in reading, as shown in table 1. This is partly because assessments vary in difficulty, and proficiency cut scores vary widely across states. In middle school reading, for example, the percentage proficient for boys in 2008 ranged from 22% in the lowest state to 92% in the highest.

In math, percentages proficient were much more similar for males and females than in reading, as illustrated by the median rows of table 1. This finding fits with other recent research, described above, which indicates that there is no longer a male-female achievement gap in math. The 2008 median percentages proficient in math were equal for boys and girls in elementary school and very close at the upper grades, with a slight edge for girls. Unlike the reading results, no state had a difference in math between boys and girls of more than 10 points in the percentages proficient. In elementary and middle school math, states in which girls performed better than boys outnumbered states in which boys did better than girls. But in high school math, boys outperformed girls in more states. This finding is consistent with earlier research showing that average differences favoring males in math are more common in high school (Willingham & Cole, 1997).

**Finding:** In grade 4 reading, higher percentages of girls than boys reached the basic, proficient, and advanced achievement levels in 2008. In grade 4 math, states tended to have higher percentages of girls at the basic level but higher percentages of boys at the advanced level.

In addition to analyzing percentage proficient differences by grade level, we also looked at the percentages of 4<sup>th</sup> grade girls and boys reaching three achievement levels in 2008—basic-and-above, proficient-and-above, and advanced. **Table 2** gives a snapshot of the key comparisons.

<sup>5</sup> In reading, at the elementary level, the five states were Arkansas, Louisiana, Massachusetts, Missouri, and South Carolina. At the middle school level, the fifteen states were Alabama, Arkansas, Indiana, Maine, Minnesota, Missouri, Nevada, New Hampshire, New Mexico, New York, Rhode Island, South Carolina, Vermont, Washington, and West Virginia. At the high school level, the five states were Arkansas, North Dakota, South Carolina, West Virginia, and Wyoming.

**Table 2. Percentages of female and male 4<sup>th</sup> graders reaching various achievement levels, 2008**

Statistic	Basic-and-above		Proficient-and-above		Advanced	
	Female	Male	Female	Male	Female	Male
<b>Reading</b>						
Median % proficient	94%	90%	79%	72%	30%	24%
Lowest % in any state	81%	75%	52%	40%	4%	3%
Highest % in any state	100%	100%	93%	91%	57%	48%
# states with sufficient data	38*		48		47*	
# of states M > F	0		0		0	
# of states F > M			48		46	
# of states > 10 pt. difference	1		6		1	
<b>Math</b>						
Median % proficient	90%	89%	76%	76%	27%	29%
Lowest % in any state	77%	75%	40%	38%	7%	7%
Highest % in any state	100%	100%	94%	94%	59%	60%
# states with sufficient data	39*		48*		47*	
# of states M > F	3		16		33	
# of states F > M	25		18		9	
# of states > 10 pt. difference	0		0		0	

Table reads: Among the 38 states with sufficient data, the median percentage of 4<sup>th</sup> graders reading at the basic-and-above level was 94% for girls and 90% for boys. The lowest percentage basic-and-above for girls in any state was 81%, and the highest was 100%. In no state did the percentage basic-and-above for male students in elementary reading exceed the percentage for female students, and in 35 of the 38 states with data, the female percentage basic-and-above in elementary reading exceeded the male percentage. In only one state did the percentages basic-and-above for males and females in grade 4 reading differ by more than 10 percentage points.

\*The number of states in which males outperformed females and the number in which females outperformed males do not add up to the total number of states with sufficient data because in some states, the percentages proficient for males and females were roughly equal.

Source: Center on Education Policy based on data collected from state departments of education.

In reading, the medians were higher for girls than for boys at all three levels. Our analysis of individual state data uncovered variations among states and by achievement level. At the basic level, the difference in percentages between girls and boys exceeded 10 points in just one state, Hawaii. At the proficient level, six states had a gap of more than 10 percentage points.<sup>6</sup> At the advanced level, only Arkansas had a difference of this size.

In math, 4<sup>th</sup> grade boys fared somewhat better than they did in reading. The median percentages for boys and girls were quite similar or identical at all achievement levels. At the basic-and-

<sup>6</sup> These states were Arkansas, Hawaii, Louisiana, Massachusetts, Missouri, and South Carolina.

above level, boys outperformed girls in math in a few states. At the proficient-and-above level, the picture was more mixed, with boys doing better in some states and girls doing better in others. At the advanced level in math, a greater share of boys than girls met the benchmark in a sizable majority of states (33 of the 47 states with sufficient data). At all three achievement levels, these differences tended to be small, and none exceeded 10 percentage points.

## Trends in Male and Female Achievement by Grade Level

Unlike tables 1 and 2, which provided snapshots of achievement in 2008, **table 3** displays trends in proficiency for boys and girls between 2002 and 2008. Specifically, table 3 shows the number of states with gains and declines during this period in the percentage of boys and girls scoring at or above the proficient level at the elementary (grade 4), middle (grade 8 in all but one case), and high school (usually grade 10 or 11) levels.

**Table 3. Number of states showing various trends for female and male students at three grade levels on state tests, 2002–2008**

Grade level and trend	Female reading	Male reading	Female math	Male math
<b>Elementary</b>				
Gain	32	38	36	36
Decline	7	6	7	4
No change	5	0	1	4
Total # of states with data	44	44	44	44
<b>Middle</b>				
Gain	39	39	39	39
Decline	3	4	4	2
No change	1	0	0	2
Total # of states with data	43	43	43	43
<b>High school</b>				
Gain	22	26	25	24
Decline	11	8	7	8
No change	2	1	2	2
Total # of states with data	35	35	34	34
Total # and % of trend lines with gains across grades	93 (76%)	103 (84%)	100 (83%)	99 (82%)

Table reads: Of the 44 states with sufficient data to analyze trends for girls and boys in grade 4 reading, 32 states showed gains in the percentage of female students scoring proficient between 2002 and 2008, 7 states showed declines, and 5 states had no net change in this percentage. Across all three grade levels, 93 trend lines showed gains in reading for girls, compared with 103 trend lines showing gains for boys.

Source: Center on Education Policy based on data collected from state departments of education.

**Finding:** For both boys and girls, states with gains in reading and math proficiency between 2002 and 2008 far outnumbered states with declines at the elementary, middle, and high school levels. In reading, gains were slightly more common for boys than for girls; in math, similar numbers of states had gains for males and females.

As illustrated in table 3, a sizeable majority of the states with sufficient data posted gains in reading and math proficiency for both boys and girls at all three grade levels. In middle school math, for example, 39 of the 43 states with sufficient data made gains in percentages proficient for male students; the same number of states did so for female students (the sets of states were not identical).

By comparing the columns of table 3, one can also see differences between males and females in the number of trend lines with gains. In reading, slightly more states showed gains in proficiency for male students than for female students at the elementary and high school levels. For all three grade levels combined in reading, 84% of the trend lines analyzed for boys showed gains, compared with 76% of the trend lines for girls. In math, trends were very similar for boys and girls at all three grade levels.

### Trends for Male and Female 4<sup>th</sup> Graders at Three Achievement Levels

To better understand the progress of boys and girls across the broader achievement spectrum, we calculated the number of states with increases and decreases in the percentages of 4<sup>th</sup> grade boys and girls scoring at the basic-and-above, proficient-and-above, and advanced achievement levels. Although the percentage proficient-and-above is the indicator used to determine AYP, changes in the percentages scoring at the basic-and-above and advanced levels can also reveal valuable information about achievement. For example, if the percentage of males reaching the advanced level in reading has increased over time, this represents progress that would not show up if one looked only at the percentage proficient.

**Finding:** In a majority of the states with sufficient data, both boys and girls in grade 4 have made progress in reading and math since 2002 at the basic, proficient, and advanced achievement levels. In general, the numbers of states with gains in the percentage of males at the three achievement levels were similar to the numbers for females.

As **table 4** reveals, the percentages of 4<sup>th</sup> graders reaching all three achievement levels in reading and math moved upward between 2002 and 2008 for both genders in a clear majority of the states with available data. For example, of the 42 states with sufficient data, the percentage of 4<sup>th</sup> graders scoring at the advanced level in math improved in 35 states for girls and in 36 states for boys.

In general, the numbers of states with gains in the percentage of males at the three achievement levels was similar to the numbers with gains for females. The largest difference was at the proficient level for reading, where 38 states showed gains for boys, and 32 had gains for girls.

**Table 4. Number of states showing various trends for female and male students at three achievement levels on state grade 4 tests, 2002–2008**

Achievement level and trend	Female reading	Male reading	Female math	Male math
<b>Basic-and-above</b>				
Gain	21	21	28	25
Decline	9	8	6	6
No change	4	5	1	4
Total # of states with data	34	34	35	35
<b>Proficient-and-above</b>				
Gain	32	38	36	36
Decline	7	6	7	4
No change	5	0	1	4
Total # of states with data	44	44	44	44
<b>Advanced</b>				
Gain	27	27	35	36
Decline	13	12	6	5
No change	2	3	1	1
Total # of states with data	42	42	42	42
Total # and % of trend lines with gains	80 (67%)	86 (72%)	99 (82%)	97 (80%)

Table reads: Of the 34 states with sufficient data to analyze trends in grade 4 reading, 21 states showed gains in the percentage of female students scoring at the basic-and-above level between 2002 and 2008, 9 states showed declines, and 4 states had no net change in this percentage.

Source: Center on Education Policy based on data collected from state departments of education.

## Trends in Achievement Gaps between Boys and Girls

As the data presented earlier in this report illustrate, achievement for girls and boys is roughly equivalent in math, with some state-by-state variations. In reading, however, a clear achievement gap exists, with higher percentages of girls than boys reaching the basic, proficient, and advanced levels. This is cause for concern.

Have male students narrowed the reading gap since 2002? To answer this question, we looked at two indicators. First, we compared the average annual gain in the percentage of boys scoring proficient with the average annual gain for girls in the same state and grade level. Second, we examined trends in mean (average) test scores, which are useful for gap analyses because they capture movement at all levels of the achievement spectrum. For example, if high school boys made improvements in reading at the advanced level, this would show up in the mean test score indicator but not in the percentage proficient indicator. One drawback, however, was that fewer states provided us with mean score data.

**Finding:** Results are mixed as to whether boys have narrowed achievement gaps with girls in reading, depending on which indicator of achievement is used. Some progress has been made in narrowing gaps in percentages proficient, but less progress has been made in shrinking gaps in average test scores.

As **table 5** indicates, many states have made progress in narrowing percentage proficient gaps between male and female students in reading. At the high school level, for example, this gap narrowed in 22 states, widened in 11 states, and showed no change in 2 states. Overall, achievement gaps in reading narrowed in 56% of instances, widened in 36% of instances, and stayed the same in 8% of instances.

**Table 5. Number and percentage of states showing various trends in percentage proficient gaps between male and female students in reading, 2002-2008**

Trend in male-female gap in reading	Elementary school	Middle school	High school	Total # and % of trend lines
Narrowed	24 (55%)	22 (51%)	22 (63%)	68 (56%)
Widened	14 (32%)	19 (44%)	11 (31%)	44 (36%)
No change	6 (14%)	2 (5%)	2 (6%)	10 (8%)
Number of states with sufficient data	44	43	35	122

Table reads: As measured by percentages proficient, achievement gaps in reading between boys and girls narrowed at the elementary school level in 24 states (55% of the 44 the states with sufficient data), widened in 14 states (32%), and showed no change in 6 states (14%).

Source: Center on Education Policy based on data collected from state departments of education.

The picture is not quite as positive when male-female gaps are measured in terms of mean (average) test scores. By this indicator, gaps between boys and girls in reading widened across all three grade levels as often as they narrowed. **Table 6** presents the number and percentage of mean score gaps between girls and boys that narrowed, widened, or stayed the same in reading. The table also shows the comparable statistics for gaps in percentages proficient for the group of states that provided data on both indicators. Overall, mean score gaps in reading narrowed in only 45% of instances across all grade levels. Therefore, according to mean scores, boys in many states are not catching up to girls in reading performance on state tests.

In our previous studies of achievement gaps for other subgroups, we found that the mean score indicator tended to give a less rosy picture of progress than the percentage proficient indicator. In the case of boys and girls, the difference in results between the two measures is probably due to the fact that in some states, a larger proportion of boys than girls is clustered just below the proficient cut score on state tests. Therefore, when test scores improve,

**Table 6. Number and percentages of states showing various trends in gaps between male and female students in reading according to two indicators, 2002-2008**

Trend in male-female gap in reading	Mean score gaps	Percentage proficient gaps
Narrowed	42 (46%)	48 (52%)
Widened	41 (45%)	37 (40%)
No change	9 (10%)	7 (8%)
Total # of trend lines	92	92

Table reads: As measured by mean (average) scores on state tests, achievement gaps in reading between boys and girls narrowed in 42 out of 92 instances, or 46% of the time; widened in 41 instances (45%); and showed no change in 9 instances (10%).

Source: Center on Education Policy based on data collected from state departments of education.

a larger number and percentage of boys cross the threshold into the proficient category. Since more girls are already in this category, improvements in their test scores don't show up as improvements in the percentage proficient indicator.

In math, as noted earlier in this report, we did not find consistent gaps between boys and girls. In the limited number of instances where boys outperformed girls in math, our analysis of gaps using mean scores tended to confirm the percentage proficient results; the mean score and percentage proficient indicators were in agreement 82% of the time as to whether gaps had narrowed or widened. In 18% of these cases, the two indicators contradicted one another, but not always in the same direction. Sometimes, the female-male gap in math narrowed according to mean scores but widened according to percentages proficient; at other times, the pattern was reversed. By and large, in math, the two indicators were in agreement.

## Conclusion

Consistent with other recent research, our analysis of state test results by gender suggests that the most pressing issue related to gender gaps is the lagging performance of boys in reading. In many states, the percentage proficient for girls is more than 10 points higher than the percentage proficient for boys. Although this gap is not nearly as large as the gaps of 20 or 30 percentage points commonly found between racial/ethnic and income subgroups (CEP, 2009c), the male-female gaps in reading are nevertheless a cause for concern. Researchers and state officials might investigate ways in which the school environment may be changed to better address the needs of boys.

This is not to say that all boys are underperforming in reading. To the contrary, there is a great deal of overlap in the distribution of reading scores between males and females; many boys do well in reading and many do not, and the same is true of girls.

In math, we did not find a consistent pattern of one gender outperforming the other on state tests.

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