

# Policy BRIEF

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## Calibrating Performance Standards Across State Lines: How PARCC Predicts College Readiness

As many states consider the potential costs and benefits of using the new Partnership for Assessment of Readiness for College and Careers (PARCC) exam to assess the achievement of high school students, a recent analysis from Mathematica Policy Research shows that:

- The new exam designed by PARCC is effective in identifying students who are ready for college.
- Compared with the PARCC exam, Massachusetts’s existing statewide assessment—one of the most rigorous in the country—does equally well in predicting college outcomes. However, in math, PARCC’s “college-ready” standard is higher than the “proficiency” standard used by the Massachusetts Comprehensive Assessment System (MCAS). The PARCC standard is a better predictor of students’ ability to earn “B” grades in college.
- The results of Mathematica’s study in Massachusetts suggest that the PARCC exam may outperform other state assessment systems in identifying college readiness.

### BACKGROUND

At its launch in 2011, PARCC consisted of 24 states and the District of Columbia, working together to design and build the next generation of statewide student achievement tests. PARCC’s goal was to develop assessments aligned with the new Common Core State Standards and to provide “an educational GPS” that indicates not only whether students are prepared to advance to the next grade, but also whether they are on the path to success in college and in their careers.<sup>1</sup> As the PARCC system was developed, however, the consortium of states has had trouble maintaining support

for the new exams. Today, PARCC consists of just 11 states and Washington, DC. Three of those states (Arkansas, Mississippi, and Ohio) are planning to leave the consortium in the next school year, and a fourth state, Massachusetts, is undecided.

To date, state decisions to leave the PARCC consortium have been made without reliable evidence showing whether the PARCC exams meet their stated design objectives. A key question has remained unanswered: does PARCC do a better job than existing state assessments in predicting whether students are ready for college and careers?

The MCAS test is known as one of the nation's most rigorous statewide assessments, setting a high bar for the PARCC exam. For Mathematica's study, hundreds of students enrolled in Massachusetts public colleges and universities took high school PARCC or MCAS exams. Mathematica then analyzed the relationships between the results on these exams and the students' first-year college performance, including their grades and their need for remedial coursework.

### PARCC SCORES PREDICT COLLEGE GRADES AND THE NEED FOR REMEDIAL COURSEWORK

We found that the PARCC exam predicts college grades: students with higher PARCC scores tend to receive higher grades in college. The relationship between PARCC scores and college grades is similar to the correlation for the MCAS test, and both exams predict college grades as well as SAT scores do (Figure 1). Similarly, PARCC scores provide statistically significant predictions regarding which students need remedial coursework in college.

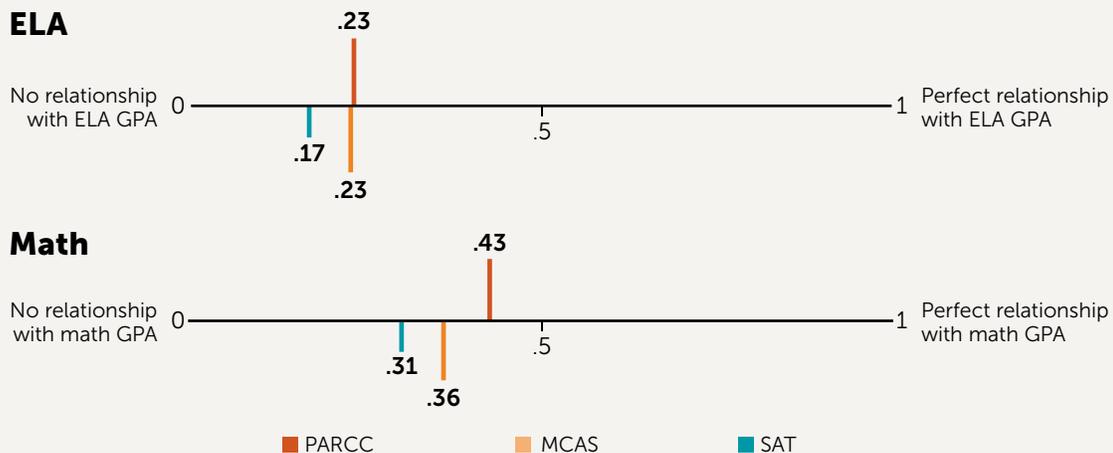
Producing correlations that are similar to those for MCAS and the SAT is an indicator that the PARCC exam does identify whether students are prepared for college—one of its main goals.

### STUDENTS DEEMED COLLEGE-READY BY THE PARCC EXAM HAVE MORE THAN A 75 PERCENT CHANCE OF EARNING A "C" AVERAGE IN COLLEGE

The PARCC consortium has defined "college and career readiness" to mean that a graduating high school student should have at least a 75 percent chance of earning a 2.0 GPA in college; the exam establishes standards for test performance intended to identify which students are "college-ready" in this sense. Our study shows that PARCC achieves this goal. In our data, 93 percent of students who meet the PARCC "college-ready" standard in English language arts (ELA) and 84 percent of those meeting the standard in math are predicted to earn at least "C" grades in their first-year college courses in the relevant subject. On average, students who are deemed college-ready in ELA earn a 2.76 GPA in first-year college courses in English, and students deemed college-ready in math earn a 2.81 GPA in first-year college courses in math (Figure 2).

**The PARCC standards also predict whether students will earn a "B" or higher in college.** Over 40 percent of students in PARCC's college-ready group in ELA earn at least a 3.0 GPA, as do nearly half

### Correlations between college GPA and MCAS, PARCC, or SAT scores



ELA = English language arts.

Figure 1

of students (48 percent) who meet PARCC’s college-ready standard in math (Figure 2). In addition, students in the college-ready group are 24 percentage points more likely to earn a 3.0 GPA than students rated as “proficient” on the MCAS math test. PARCC’s college-ready group in math was also less likely to need remediation than the group rated “proficient” in math on the MCAS test.

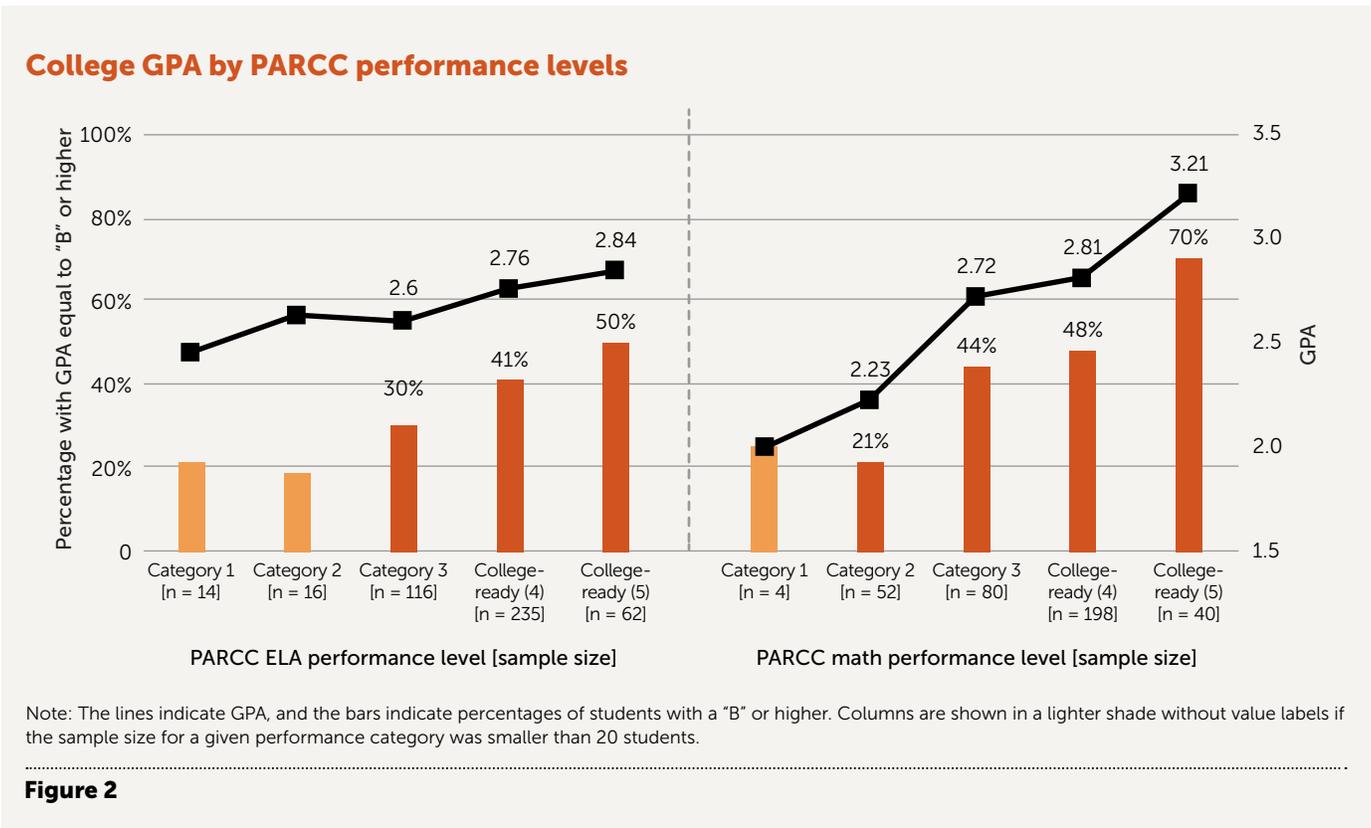
**MCAS is unusually rigorous, suggesting PARCC may outperform state assessment systems outside of Massachusetts. Several features of the MCAS exam are also similar to the PARCC exam system.**

**Similar test structures.** The PARCC exams have been explicitly designed to align with Common Core State Standards—to measure whether students have a deep understanding of academic subjects. Accordingly, they include questions with open-ended responses as well as more conventional components with multiple-choice questions. The MCAS exam, which has also been aligned with the Common Core standards, likewise uses a combination of

multiple-choice and short-answer questions. This similarity in structure and content may help to explain why MCAS does as well as the PARCC exam in predicting students’ college readiness. Assessments that are missing one of these elements—close alignment with the Common Core standards, or a variety of question types that include open-ended answers—may not be as accurate in predicting students’ college success.

**High performance standards.** In addition to having a high quality state assessment, Massachusetts is known for setting high standards for proficiency. In particular, the MCAS proficiency standard for math in grades 4 and 8 is better aligned with the definition of proficiency set by the National Assessment of Educational Progress (NAEP), compared with most other states’ standards.<sup>2</sup>

**Many state assessments rate a much larger percentage of students as proficient compared with the NAEP, indicating that state standards are relatively low.** Figure 3 compares 2012–2013 statewide proficiency rates in 8th-grade math



**Figure 2**

with the proficiency rates on the 2013 NAEP math test in each state. Of the original 25 PARCC consortium members, Massachusetts has the smallest gap between the NAEP proficiency standard and the standard set by the state exam.

Despite this, the MCAS proficiency standard in math does not do as well as the PARCC college-ready standard in predicting students' performance in college. Given that many states have much lower proficiency standards than the MCAS, it is likely that existing assessments outside of Massachusetts would see even more of a divergence from PARCC's results.

### A BENCHMARK STUDY

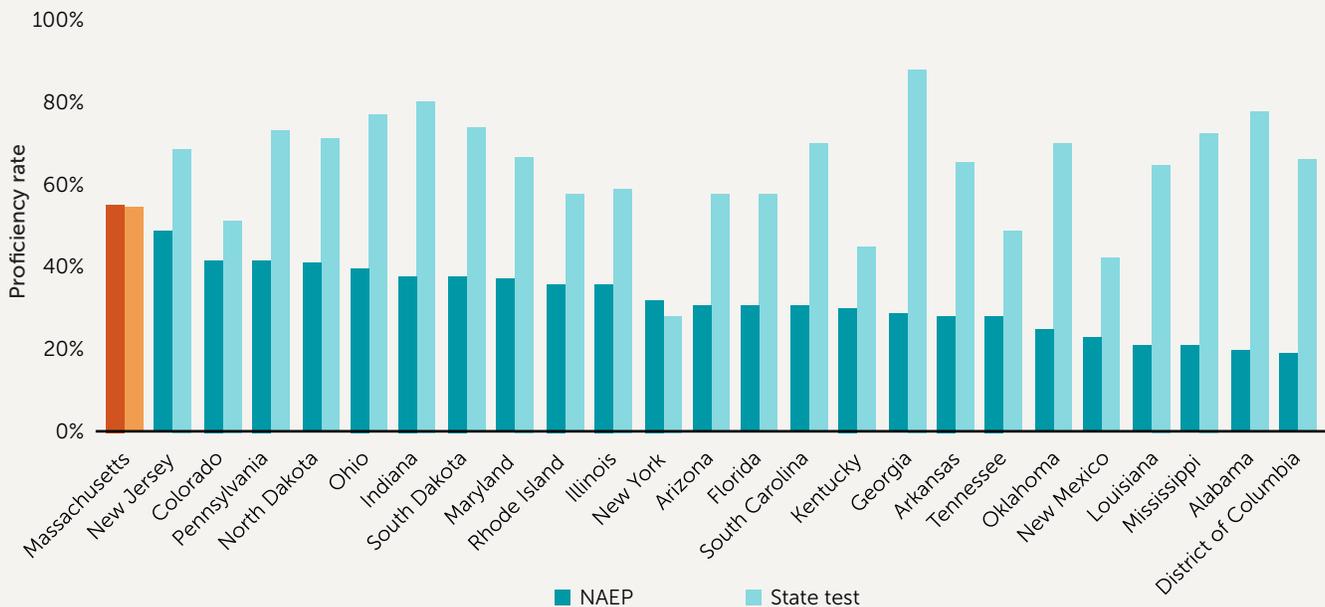
As states debate whether to leave the PARCC consortium, keep their current assessments, or adopt an entirely new system, this study provides evidence that the new PARCC exams can accurately predict students' college outcomes. In the study, the PARCC test performed as well as the MCAS and the SAT, both of which are highly regarded exams that have long been trusted to provide meaningful information about

students' academic performance and preparation for college.

If the current Massachusetts proficiency standards fall somewhat short of identifying students who are fully prepared to succeed at college-level math coursework, it is likely that the proficiency standards used in other state assessment systems fall far short of real college readiness. States that keep their standards low are giving their students overly optimistic information about their preparation and setting them up for disappointment in college.

The only way to know whether state standards are too low, however, is for other states to follow Massachusetts's lead and conduct independent, empirical evaluations of their state assessments. A study like this one cannot definitively answer all questions about states' choice of assessments—examination systems may differ with respect to cost, complexity, time burden, effects on classroom practice, and other factors. But these findings provide important and timely evidence to decision makers seeking to choose an exam system for the 2015–2016 school year and beyond.

**Mathematics proficiency rates in 8th grade, by state, with MCAS results highlighted (2013)**



**Figure 3**

## ABOUT THE STUDY

This study, commissioned by the Massachusetts Executive Office of Education, uses a random assignment design to measure whether scores on the MCAS and PARCC tests can identify students who will succeed in college. The study sample consisted of 866 first-year college students who graduated from a Massachusetts high school and later enrolled at one of 11 public in-state campuses participating in the study. At each campus, students who volunteered to participate were randomly assigned to complete one of seven test components of either the MCAS or PARCC exam (Table 1). The study only included the PARCC exams that best align with the content of the 10th-grade MCAS tests—our results do not provide evidence about the predictive ability of other PARCC high school exams, such as PARCC’s other end-of-course math exams and the ELA exam designed for 11th-grade students.

The random assignment design ensures that the students taking PARCC assessments were not systematically different from the students taking MCAS assessments. Because equivalent groups of students completed each test component, we could compare these groups to determine which test best predicts students’ success in college, as measured by GPA and the need for first-year remedial coursework.

Students in the study had all completed or nearly completed their first year of college when they took the MCAS or PARCC exam, so technically, the study is only able to measure the *concurrent* validity of MCAS or PARCC test scores relative to college grades. However, because our data include students’ 10th-grade MCAS scores, we could directly compare high school MCAS scores to study-administered MCAS scores in the sample, examining whether the two sets of scores are similar. The correlation between MCAS scores at these two points in time is reasonably strong (0.71 in math and 0.51 in ELA). In addition, the correlation between 10th-grade MCAS scores and college GPA in the tested subject (0.31 in math and 0.20 in ELA) is very similar to the correlation we observed between study-administered MCAS scores and GPA (0.32 in math and 0.19 in ELA) in our data. This suggests that study-administered MCAS scores are providing a reasonably good approximation of MCAS scores in high school.

## ENDNOTES

<sup>1</sup> <http://www.parcconline.org/assessments>. Accessed October 1, 2015.

<sup>2</sup> Bandeira de Mello, V., G. Bohrnstedt, C. Blankenship, and D. Sherman. “Mapping State Proficiency Standards onto NAEP Scales: Results from the 2013 NAEP Reading and Mathematics Assessments.” Washington, DC: U.S. Department of Education, National Center for Education Statistics, 2015.

### MCAS and PARCC test components in the study

Test component	Description
MCAS Math (grade 10)	10th-grade MCAS exam in math (paper-based test mode)
MCAS ELA (grade 10)	10th-grade MCAS exam in ELA (paper-based test mode)
PARCC Integrated Math II (performance-based)	End-of-course exam in math (paper-based test mode)
PARCC Integrated Math II (end-of-year)	
PARCC ELA (grade 10, performance-based)	10th-grade exam in ELA (paper-based test mode)
PARCC ELA (grade 10, end-of-year)	
PARCC Algebra II (end-of-year)	Advanced algebra end-of-course assessment (paper-based test mode)

Table 1

