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The Relationship between the Rigor of a State's Proficiency Standard and Student Achievement in the State

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ABSTRACT

The National Center of Education Statistics conducted a mapping study that equated the percentage proficient or above on each state's NCLB reading and mathematics tests in grades 4 and 8 to the NAEP scale. Each *NAEP equivalent score* was labeled according to NAEP's achievement levels and used to compare state proficiency standards and to determine whether states have been raising their standards over time. An explicit purpose for the study was to use state proficiency scores to compare the effectiveness of schools across states, but the mapping study did not compare the rigor of a state's standard with the overall achievement in the state. This paper examined statistically and graphically the relationship of the 2013 proficiency standard with NAEP 2013 student achievement. The standard vs. achievement Pearson *r* correlation coefficient in reading was 0.28 for Grade 4 and 0.01 for grade 8. The Pearson ***r*** in mathematics was 0.30 for both grades. There is no apparent reason to postulate a relationship between student achievement and proficiency standards because student achievement is an outcome of pedagogical endeavor while proficiency standards are a product of political exercise. The rigor of a state's proficiency standard has little relationship with overall student achievement in the state. (Contains 7 references, 1 table, and 5 figures.)

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The National Center for Education Statistics has published a report entitled *Mapping State Proficiency Standards onto NAEP Scales: Results from the 2013 NAEP Reading and Mathematics Assessments* (National Center for Education Statistics, 2015). For this paper, the report will be referred to as the *mapping study*. The executive summary stated the purpose for the study.

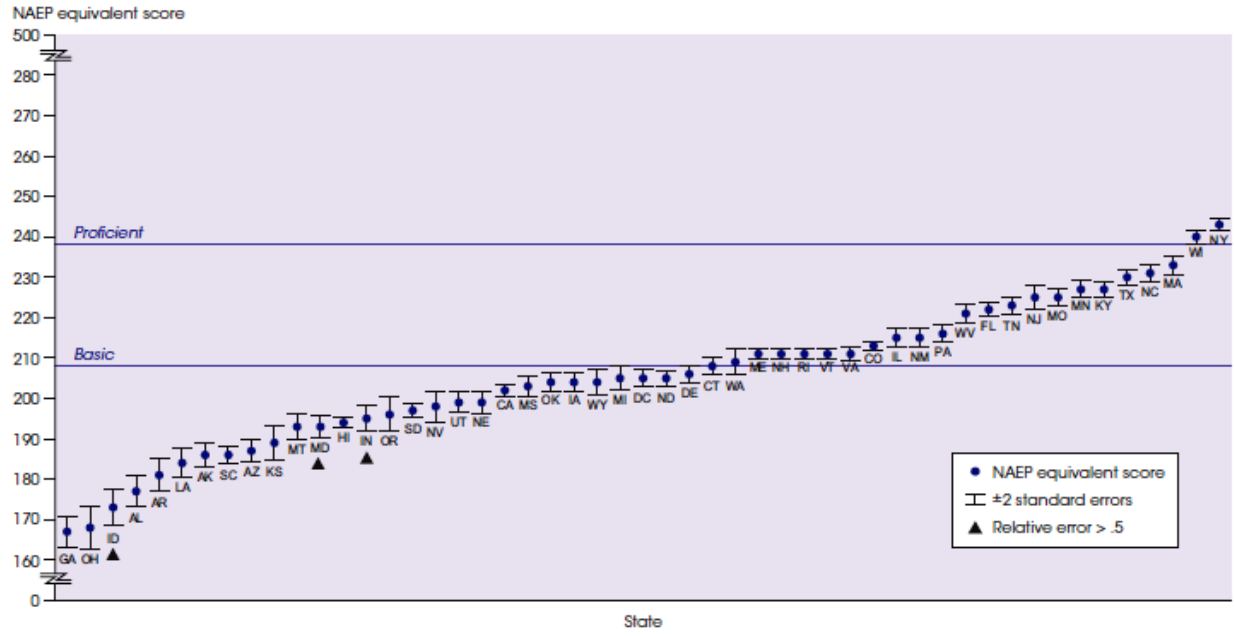
> Because [NCLB permitted] each state set its own standards, there was no assurance that students who met the standards of one state would be able to meet the standards of another state, and one *could not compare the effectiveness of schools across states* in terms of the percentages of students reported to meet the standards
>
> NCLB required NAEP participation for Title I. Knowing what percentage of a state's students performed at or above its cut point for proficiency on the state assessment, coupled with the state's performance on NAEP, allowed the National Center for Education Statistics (NCES) to estimate where the expectation each state has for what students should learn or know falls on the NAEP scales—that is, *NAEP provided a common scale on which the stringency of the various state criteria for proficiency could be compared.*

MAPPING STUDY RESULTS

The mapping procedure generated a "NAEP equivalent score" for each state's reading and mathematics proficiency standards at the fourth and eighth grades. The NAEP equivalent scores for each grade-subject were graphed by state from low to high. Figure 1, for example, illustrated the results for fourth grade reading. The graphs also indicated in which NAEP proficiency level the state's NAEP equivalent score fell.

States identified as *Basic* or as *Proficient* for each grade-subject were tallied. Finally, the tallies for 2013 were compared to counts from mapping studies conducted earlier using data from 2009 and 2011. The mapping study reported the following findings for fourth grade reading.

Figure 1. NAEP scale equivalents of state grade 4 reading standards for proficient performance, by state: 2013



SOURCE: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics, National Assessment of Educational Progress (NAEP), 2013 Reading Assessment.

> Although the wide variation in standards persists, the number of states with grade 4 reading standards at or above the NAEP *Basic* level increased from 15 in 2009 and 20 in 2011 to 25 in 2013. Although in 2009 and 2011 no state standard was in the NAEP *Proficient* range, in 2013 two states had grade 4 reading standards in that range. In mathematics, the number of states with grade 4 standards at or above the NAEP *Basic* level also increased, from 44 in 2009 to 46 in 2011 and 47 in 2013, with five states having standards in the *Proficient* range in 2013 compared with one state each in 2009 and 2011.

The mapping study used the same format to report results also for fourth grade mathematics and for eighth grade reading and mathematics. The results above are presented only to illustrate the objectives for the study:

- *To compare state proficiency standards by equating each state's standard to a common scale, namely the NAEP scale.*
- *To determine whether the states have been raising their proficiency standards over time.*

DEFINITION OF NAEP ACHIEVEMENT LEVELS

Since the mapping study used the NAEP achievement levels to label the rigor level of the state proficiency standards it is important to understand how the levels are defined. Table 1 provides some guidance (Stoneberg, 2013). It is important — even crucial — to understand that:

- NAEP uses *Proficient* to name one achievement level.
- NAEP uses *proficiency in subject* to define the *Basic* achievement level
- NAEP *Proficient* does not mean *proficiency in the subject*. NAEP *Basic* estimates grade level expectations (similar to NCLB's state proficient).

Had the National Assessment Governing Board elected to use classroom grades from "A" to "F" instead of names for NAEP achievement levels, the Board might have used "A+" for *Advanced*, "A" for *Proficient*, and "B" and "C" for *Basic*.

Table 1. English language descriptors and classroom grades that have been used to clarify the meaning of the NAEP achievement levels.

NAEP Achievement Level	English Language Descriptors Used to Explain the Meaning of the NAEP Achievement Levels	Letter Grade (A-F)	
		Stoneberg (2007)	Ravitch (2012)
Advanced		A to A+	A+
Proficient	Some of the best students you know Many words and terms above grade level Mastery of complex material Higher than grade level performance	B+ to A	A
Basic	**Proficiency in subject** (common language meaning) Overall understanding of grade appropriate text More than minimal competency	C- to B	B and C
Below Basic	Minimal competency	F to D+	Concern

EFFECTIVENESS OF SCHOOLS ACROSS STATES

The expressed justification for the mapping study was to enable comparisons of the ***effectiveness of schools across states.*** The study, however, stopped short of comparing the states' actual achievement scores with the rigor of their proficiency standards for reading and mathematics. Figures 2 through 5 compare the states' 2013 NAEP equivalent scores generated by the mapping study with the states' overall student achievement reported by the 2013 NAEP assessments of reading and mathematics in grades 4 and 8.

The standards vs. achievement Pearson ***r*** correlation coefficient in reading was 0.28 for fourth grade and 0.01 for eighth grade. The Pearson *r* in mathematics was 0.30 for the fourth and eighth grades.

There is little relationship between student achievement in a state and the state's proficiency standard. Neither statistic appears to be useful for predicting or estimating the other. Actually, there is no logical reason to postulate a relationship. Student achievement is an outcome of pedagogical activity. State proficiency standards are a product of political exercise.

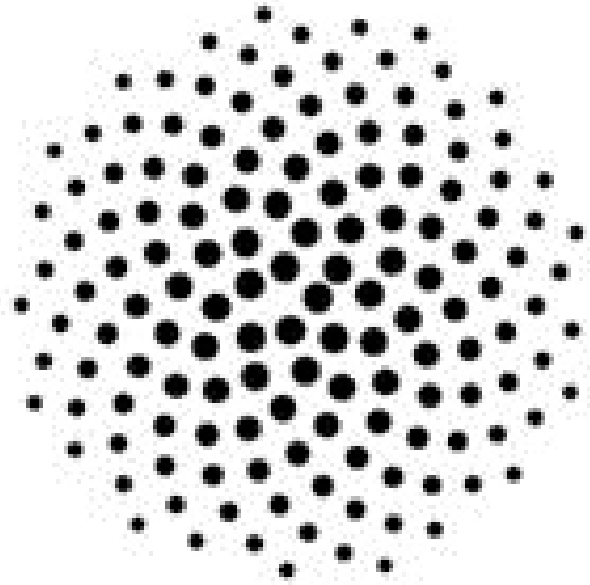


Figure 2. Two views comparing the NAEP equivalent score for a state's 2013 fourth grade reading proficiency standard with the state's NAEP average reading score on the 2013 fourth grade assessment. Top view is ordered by rigor of reading proficiency standard; bottom view is ordered by achievement (average reading score).

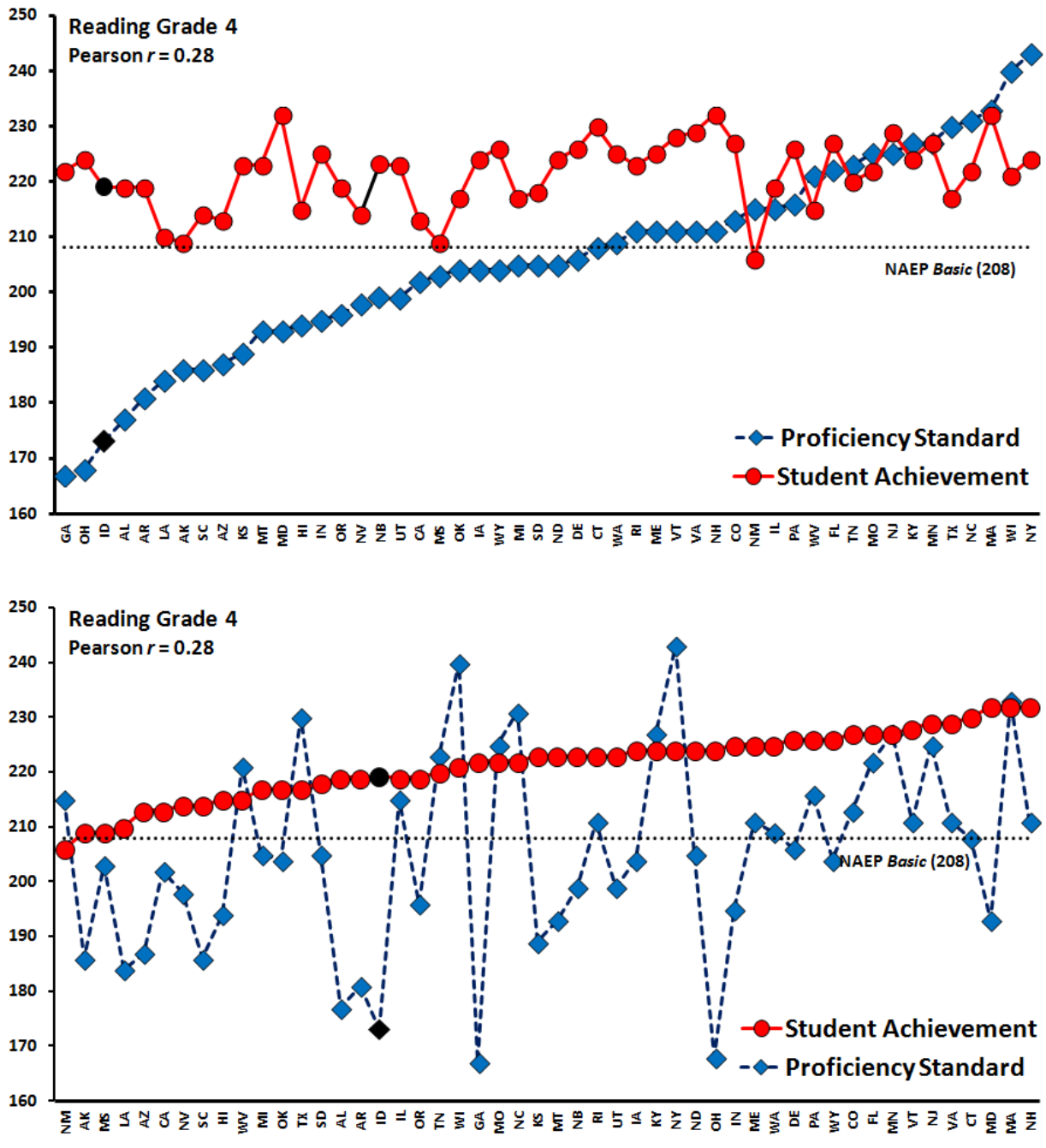


Figure 3. Two views comparing the NAEP equivalent score for a state's 2013 eighth grade reading proficiency standard with the state's NAEP average reading score on the 2013 eighth grade assessment. Top view is ordered by rigor of reading proficiency standard; bottom view is ordered by achievement (average reading score).

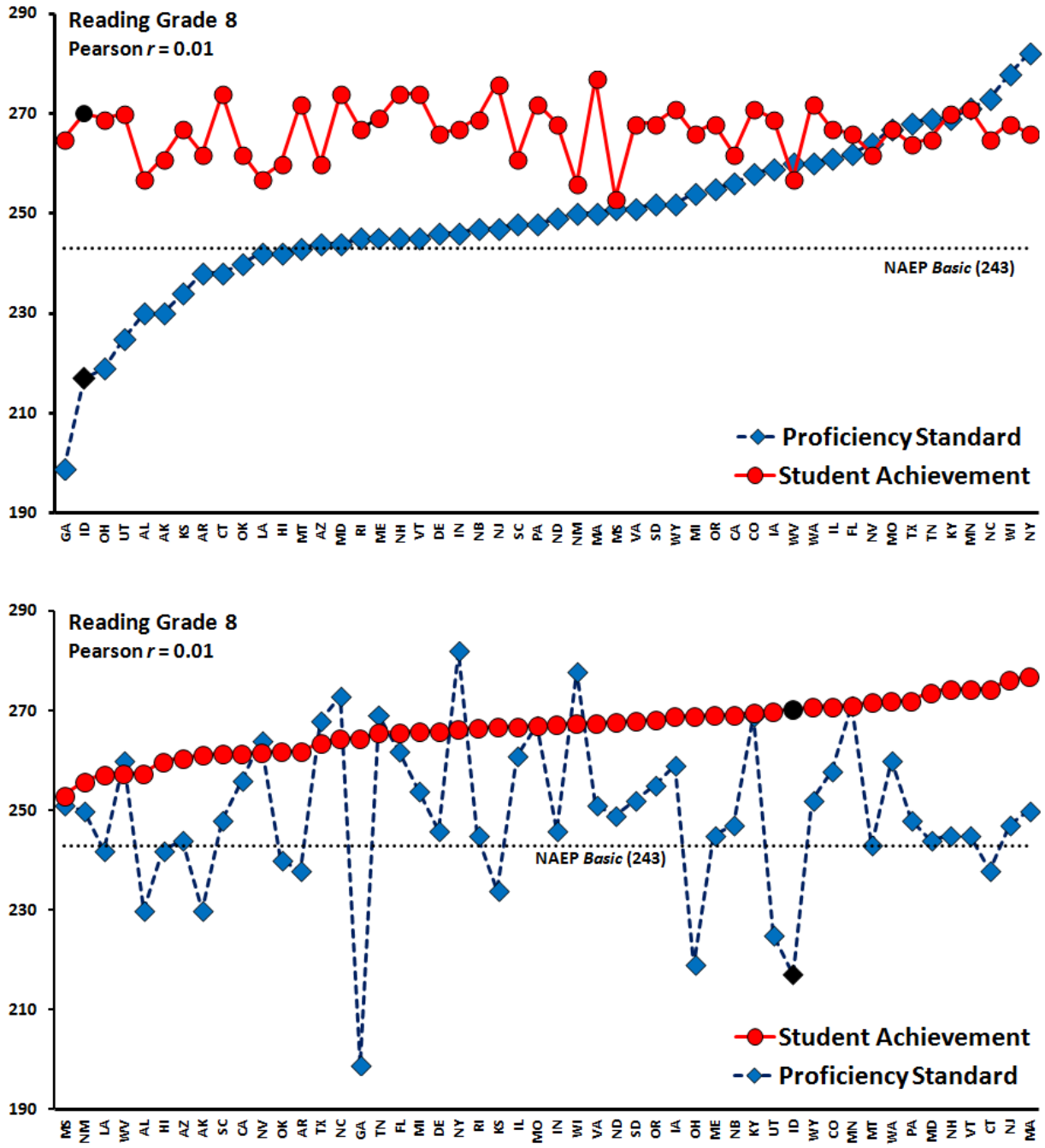


Figure 4. Two views comparing the NAEP equivalent score for a state's 2013 fourth grade mathematics proficiency standard with the state's NAEP average mathematics score on the 2013 fourth grade assessment. Top view is ordered by rigor of mathematics proficiency standard; bottom view is ordered by achievement (average mathematics score).

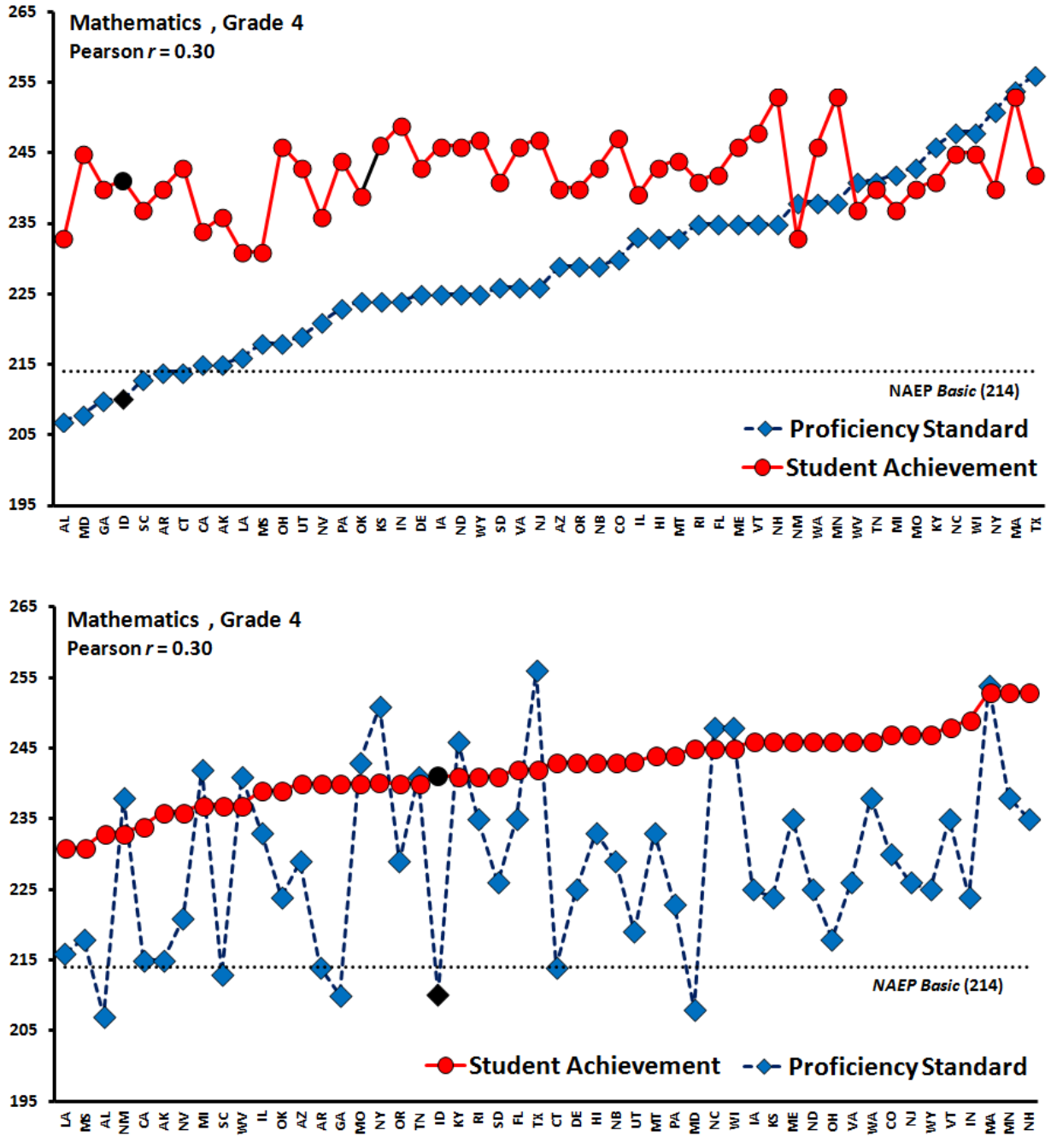
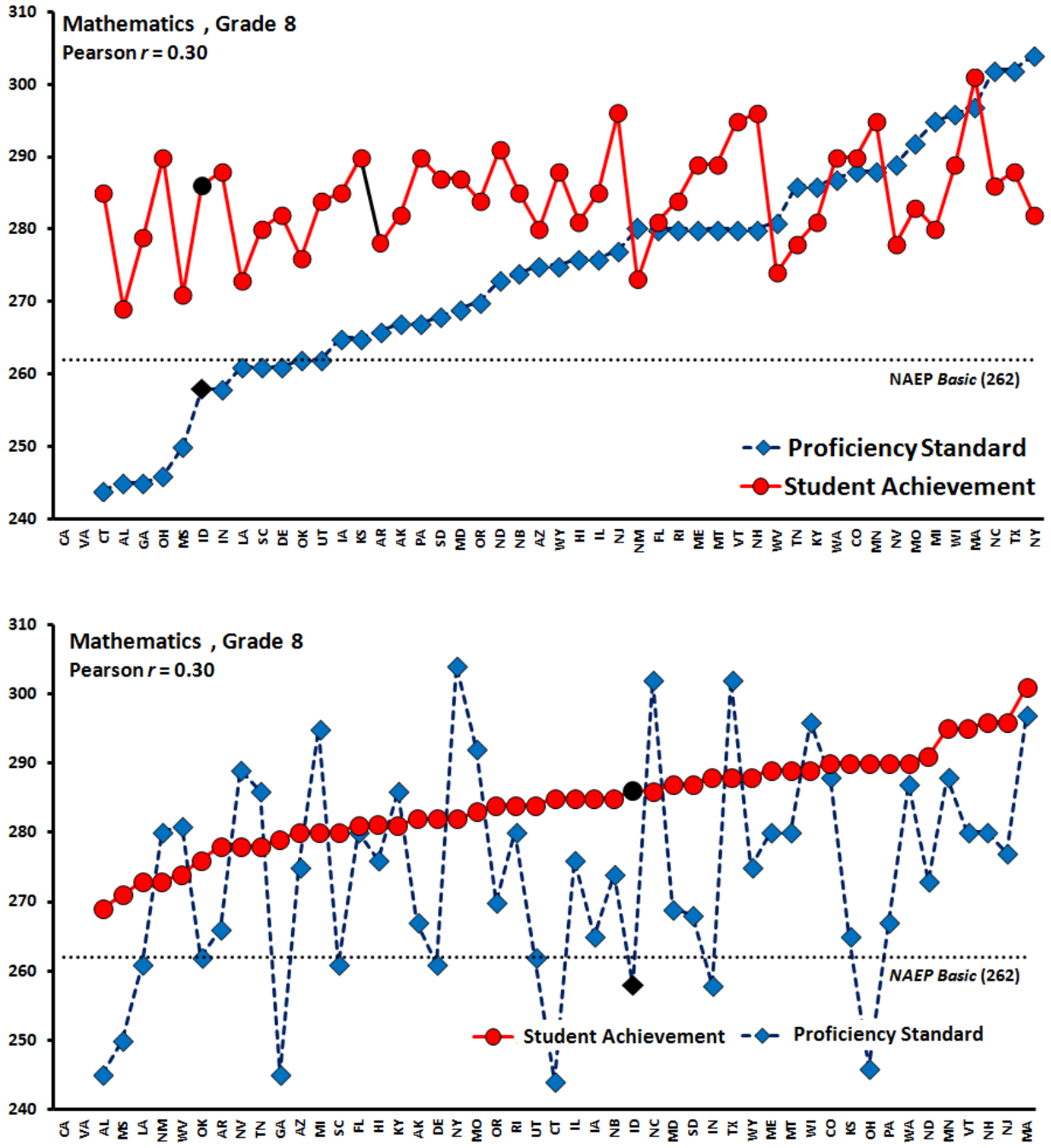


Figure 5. Two views comparing the NAEP equivalent score for a state's 2013 eighth grade mathematics proficiency standard with the state's NAEP average mathematics score on the 2013 eighth grade assessment. Top view is ordered by rigor of mathematics proficiency standard; bottom view is ordered by achievement (average mathematics score).



POLITICAL REPORTING OF MAP STUDY

The chairman of the John Lock Foundation, for example, celebrated the mapping study from a political point of view. The John Locke Foundation was created in 1990 as an independent, 501(c)(3) research institute *to work for truth, for freedom, and for the future of North Carolina*.

> Texas, Massachusetts, Wisconsin, New York, and North Carolina are in an exclusive club. Can you guess its membership policy? […] According to a recent report from the National Assessment of Educational Progress, these five states have the highest expectations for student proficiency in the country. […] All other jurisdictions were found wanting. A majority didn't even demand basic skills in 4th-grade reading. Six states — Alabama, Connecticut, Georgia, Idaho, Maryland, and Ohio — set standards so low that students in at least one of the two tested grades can rate as proficient on state reading and math exams despite the fact that they test "below basic" on NAEP exams (Hood, 2015).

It is noteworthy that *all* 50 states scored at or above the cut-score for NAEP *Basic* (i.e., met NAEP's grade-level expectation) on the 2013 NAEP assessments of reading and mathematics at grades 4 and 8, except for New Mexico (within measurement error of the cut-score) on the Grade 4 reading assessment.

What happened when actual reading achievement results on the Grade 4 NAEP 2013 assessment for the "highest expectations" state of North Carolina were compared with those of the six states that set their standards "so low"? On the 2013 NAEP reading assessment, North Carolina fourth graders did score higher than their peers in Alabama. On the other hand, Connecticut and Maryland scored higher than North Carolina, and the reading scores for Georgia, Idaho and Ohio were not significantly different from North Carolina.

CONCLUSION

The rigor of a state's proficiency standard had little to do with the overall student achievement in the state, not statistically and not logically.

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