ISSUES&ANSWERS REL 2011–No. 102

REL NORTHEAST & ISLANDS
Regional Educational Laboratory At Education Development Center, Inc.

How student and school characteristics are associated with performance on the Maine High School Assessment

Summary

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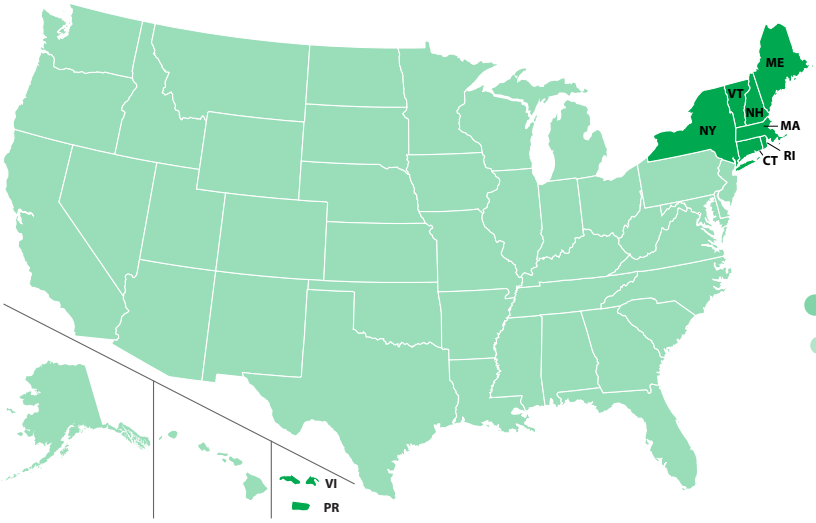

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February 2011

This report was prepared for the Institute of Education Sciences (IES) under Contract ED-06-CO-0025 by Regional Educational Laboratory Northeast and Islands administered by Education Development Center, Inc.. The content of the publication does not necessarily reflect the views or policies of IES or the U.S. Department of Education nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Hoyle, C.D., O'Dwyer, L.M., and Chang, Q. 2011. *How student and school characteristics are associated with performance on the Maine High School Assessment.* (Issues & Answers Report, REL 2011–No. 102). Washington, DC: U.S. Department of Education, Institute of Education Sciences, National Center for Education Evaluation and Regional Assistance, Regional Educational Laboratory Northeast and Islands. Retrieved from http://ies.ed.gov/ncee/edlabs.

This report is available on the regional educational laboratory web site at http://ies.ed.gov/ncee/edlabs.

Summary

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How student and school characteristics are associated with performance on the Maine High School Assessment

Using multilevel regression models to examine how student characteristics, student prior achievement measures, and school characteristics are associated with performance on the Maine High School Assessment, the study finds statistically significant relationships between several of these variables and assessment scores in reading, writing, math, and science.

The Maine Department of Education wanted to use longitudinal data from its data system to better understand whether and how student and school characteristics are associated with student performance on the state-mandated Maine High School Assessment (MHSA). It was particularly interested in understanding the factors associated with changes in test scores between the beginning of grade 10 and the end of grade 11. The MHSA, which comprises the College Board's SAT tests in critical reading, writing, and math and a science assessment, is administered in the spring of grade 11 to determine whether Maine high schools have made adequate yearly progress.

The following research question guided this study:

- How are student characteristics, student prior achievement measures, and school characteristics associated with students' grade 11 Maine High School Assessment scores in reading, writing, math, and science?

The Maine Department of Education provided data on MHSA scores, characteristics, and prior achievement measures for all grade 11 students in Maine in 2007/08. The prior achievement measures examined were grade 8 Maine Educational Assessment (MEA) scores in reading, writing, math, and science and grade 10 Preliminary SAT/National Merit Scholarship Qualifying Test (PSAT) verbal, math, and writing scores.

Data on school characteristics were either provided directly by the Maine Department of Education or gathered from publicly available data. The data consisted of percentage of racial/ethnic minority students, economically disadvantaged students, students in special education, English language learner students, and students who drop out; student–teacher ratio; mean years of teaching; cohort size; school location; whether the school made adequate yearly progress in reading and math in 2007; and whether the school was classified as Title I in 2007.

Multilevel regression modeling, which allows individual and group characteristics to be included in models of individual outcomes, was used to analyze the associations.

In the primary model used to address the research question, statistically significant relationships were found between some student and school characteristics and grade 8 MEA and grade 10 PSAT scores and grade 11 MHSA scores in reading, writing, math, and science, holding all other variables constant.

The major findings related to student characteristics as predictors of MHSA domain scores are:

- Gender was a significant predictor in all four MHSA domains. Male students were predicted to have significantly higher MHSA scores in reading (–0.052 standard deviation), math (–0.088 standard deviation), and science (–0.183 standard deviation) than female students. Female students were predicted to have significantly higher MHSA writing scores (0.060 standard deviation) than male students.

- Economically disadvantaged students were predicted to have significantly lower MHSA scores in reading (–0.035 standard deviation), writing (–0.061 standard deviation), and math (–0.039 standard deviation) than non–economically disadvantaged students.

- Students in special education were predicted to have significantly lower MHSA scores in reading (–0.065 standard deviation), writing (–0.117 standard deviation), and math (–0.105 standard deviation) than general education students.

- English language learner students were predicted to have significantly lower MHSA scores in reading (–0.061 standard deviation), writing (–0.102 standard deviation), and science (–0.100 standard deviation) than non–English language learner students.

The major findings related to prior achievement on the MEA and PSAT as predictors of MHSA domain scores are:

- With three exceptions, grade 8 MEA and grade 10 PSAT scores were significantly related to MHSA scores. Within each MHSA domain, the most recent measure of prior achievement with the closest match in content was the strongest predictor:

    - The strongest predictors of MHSA reading scores were grade 10 PSAT verbal and writing scores.

    - The strongest predictor of MHSA writing scores was PSAT writing scores.

    - The strongest predictor of MHSA math scores was grade 10 PSAT math scores.

    - The strongest predictor of MHSA science scores was grade 8 MEA science scores.

The major findings related to school characteristics as predictors of MHSA domain scores are:

- Students in schools with higher percentages of grade 11 economically disadvantaged students were predicted to have significantly lower MHSA reading scores.

- Students in schools with higher percentages of grade 11 students in special

education were predicted to have significantly lower MHSA science scores.

- Students in schools with higher percentages of students in cohort who drop out were predicted to have significantly higher MHSA reading scores.

- Students in schools with higher student–teacher ratios were predicted to have significantly lower MHSA scores in reading, writing, and math.

- Students in schools with larger grade 11 cohorts were predicted to have significantly higher MHSA math scores.

- Compared with students in rural schools, students in suburban schools were predicted to have significantly higher MHSA writing scores.

- Students in schools that made adequate yearly progress in reading in 2007 were predicted to have significantly higher MHSA writing and math scores.

Because the PSAT is a preliminary assessment for the SAT, which is used for the reading, writing, and mathematics domains of the MHSA and was administered in the beginning of grade 10, the strong relationship between PSAT scores and MHSA scores could influence both the magnitude of the multilevel regression coefficients associated with the other variables and the overall interpretation of the model. To the extent that student characteristics, grade 8 MEA scores, and school characteristics relate to grade 10 PSAT scores as well as grade 11 MHSA scores, the regression coefficients for the remaining predictor variables may be attenuated relative to a model that does not include PSAT scores. Indeed, when PSAT scores are included in the model, the coefficients for the non-PSAT variables can, to some extent, be interpreted as the relationship between those variables and the change in achievement between grades 10 and 11. This is particularly the case with respect to the MHSA reading, writing, and math scores.

The findings from this study will inform further efforts by the Maine Department of Education to understand the association between student and school factors and high school achievement. To the extent that MHSA scores, student characteristics, PSAT scores, school characteristics, and unmeasured factors remain the same, results of the current study can be generalized to other cohorts of Maine students who complete all four sections of the MHSA in grade 11.[1] Results from this study could also be used to identify students and schools likely to benefit most from additional assistance. Because this is a descriptive rather than an experimental study, the findings are not sufficient to support causal inferences.

February 2011

Note

1. In 2009, the grade 8 assessment in Maine changed from the MEA, taken by the 2007/08 cohort of students, to the New England Common Assessment Program (NECAP). Despite the potential differences between the MEA and the NECAP, grade 8 MEA scores represent measures of achievement prior to students' entry to their respective high schools and are therefore still of interest to the Maine Department of Education as it examines how information in its evolving longitudinal data system can be used to improve the education of students in Maine.