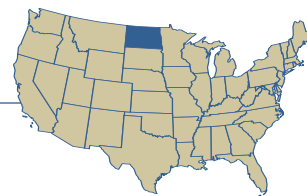


North Dakota



Introduction

This study linked data from the 2004 and 2005 administrations of North Dakota’s reading and math tests to the Northwest Evaluation Association’s Measures of Academic Progress (MAP) assessment, a computerized adaptive test used in schools nationwide. We found that North Dakota’s definitions of proficiency in reading and mathematics are generally consistent with the cut scores set by other 25 states in this study. In other words, North Dakota’s tests are about average in terms of difficulty.

Yet the difficulty level of North Dakota’s tests declined somewhat from 2004 to 2005—part of the No Child Left Behind Era—although not in all grades. There are many possible explanations for these declines (see pp. 34-35 of the main report), which were caused by learning gains on the North Dakota test not being matched by learning gains on the Northwest Evaluation Association test. One finding of this study is that North Dakota’s proficiency cut scores are now relatively easier for third-grade students than for eighth graders, particularly in mathematics (taking into account the obvious differences in subject content and children’s development). North Dakota policymakers might consider adjusting their cut scores to ensure equivalent difficulty at all grades so that parents and schools can be assured that elementary school students scoring at the proficient level are truly prepared for success later in their educational careers.

What We Studied: North Dakota State Assessment (NDSA)

North Dakota currently uses a fall assessment called the North Dakota State Assessment (NDSA), which tests reading/language arts and mathematics in grades 3 through 8 (the “NCLB grades”), and grade 11. Students are also tested for science in grades 4, 8, and 11. The current study analyzed reading and math results from a group of elementary and middle schools in which almost all students took both the state’s assessment and MAP, using the fall 2004 and fall 2005 administrations of the two tests. (The methodology section of this report explains how performance on these two tests was compared.) These linked results were then used to estimate the scores on NWEA’s scale that would be equivalent to the proficiency cut scores for each grade and subject on the North Dakota State Assessment. (A “proficiency cut score” is the score a student must achieve in order to be considered proficient.)

Part 1: How Difficult are North Dakota's Definitions of Proficiency in Reading and Math?

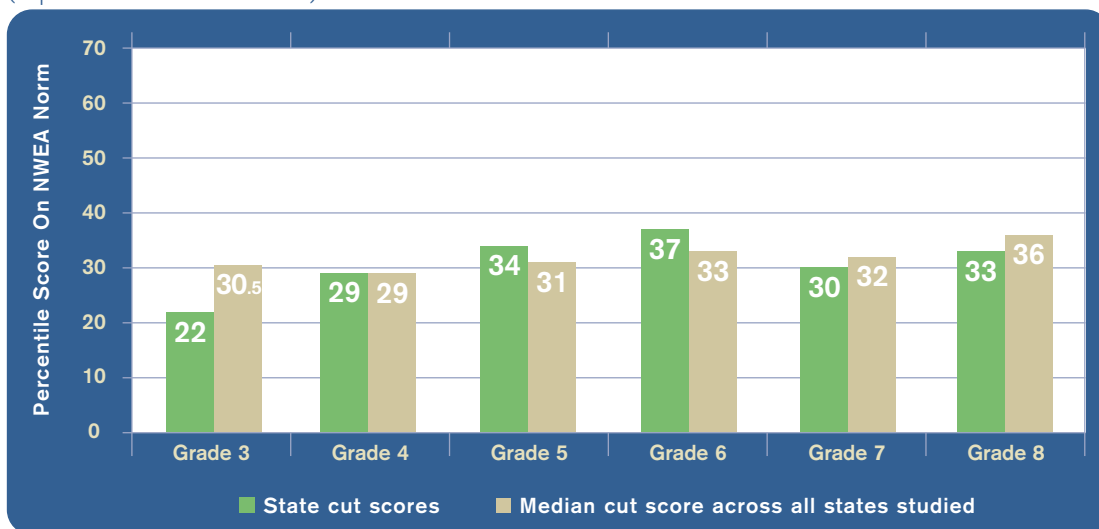
One way to evaluate the difficulty of a standard is to determine how many people attempting to attain it are likely to succeed. How do we know that a two-foot high bar is easy to jump over? We know because, if we asked 100 people at random to attempt such a jump, perhaps 80 percent would make it. How do we know a six-foot high bar is challenging? Because only one (or perhaps none) of those same 100 individuals would successfully meet that challenge. The same principle can be applied to academic standards. Common sense tells us that it is more difficult for students to solve algebraic equations with two unknown variables than it is for them to solve an equation with only one unknown variable. But we can figure out exactly how much more difficult by seeing how many eighth graders nationwide answer both types of questions correctly.

Applying that approach to this assignment, we evaluated the difficulty of North Dakota's proficiency cut scores by estimating the proportion of students in NWEA's norm group who

would perform above the North Dakota cut score on a test of equivalent difficulty. The following two figures show the difficulty of North Dakota's proficiency cut scores for reading (Figure 1) and mathematics (Figure 2) in 2005 in relation to the median cut score for all the states in the study. The proficiency cut scores for **reading** in North Dakota ranged between the 22nd and 37th percentiles, with the sixth grade being most challenging. In **mathematics**, the proficiency cut scores ranged between the 20th and 41st percentiles, with eighth grade being most challenging.

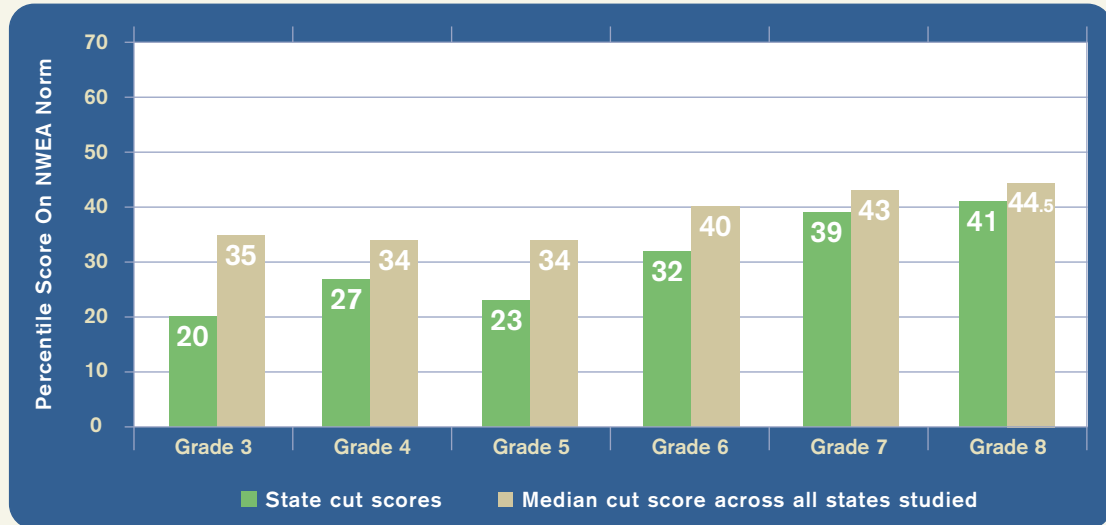
Another way of assessing difficulty is to evaluate how North Dakota's proficiency cut scores rank relative to other states in the study. Table 1 shows that the North Dakota cut scores generally rank in the lower half in difficulty among the 26 states studied for this report, and notably so in math. Its reading cut scores in grades 5 and 6 are its highest, ranking seventh and tenth, respectively.

Figure 1 – Estimate of North Dakota Reading Cut Scores in Relation to All 26 States Studied, 2005 (Expressed in MAP Percentiles)



Note: This figure compares reading test cut scores (“proficiency passing scores”) as percentiles of the NWEA norm. These percentiles are compared with the median cut score of all 26 states reviewed in this study. Only in grades 5 and 6 do North Dakota's cut scores surpass the median. The grade-3 cut score is particularly low.

Figure 2 – Estimate of North Dakota Mathematics Cut Scores in Relation to All 26 States Studied, 2005
(Expressed in MAP Percentiles)



Note: North Dakota’s math test cut scores are shown as percentiles of the NWEA norm and compared with the median cut score of all 26 states reviewed in this study. Across grades, North Dakota’s math test cut scores are below the median, with differences ranging from 3.5 to 15 points.

Table 1 – North Dakota Rank for Proficiency Cut Scores Among States in Reading and Mathematics, 2005

		Ranking (Out of 26 States)					
		Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8
Reading		20	13	7	10	18	14
Mathematics		21	20	22	19	17	13

Note: This table ranks North Dakota’s cut scores relative to the cut scores of the other 25 states in the study, with 1 being highest and 26 lowest.

Part 2: Changes in Cut Scores over Time

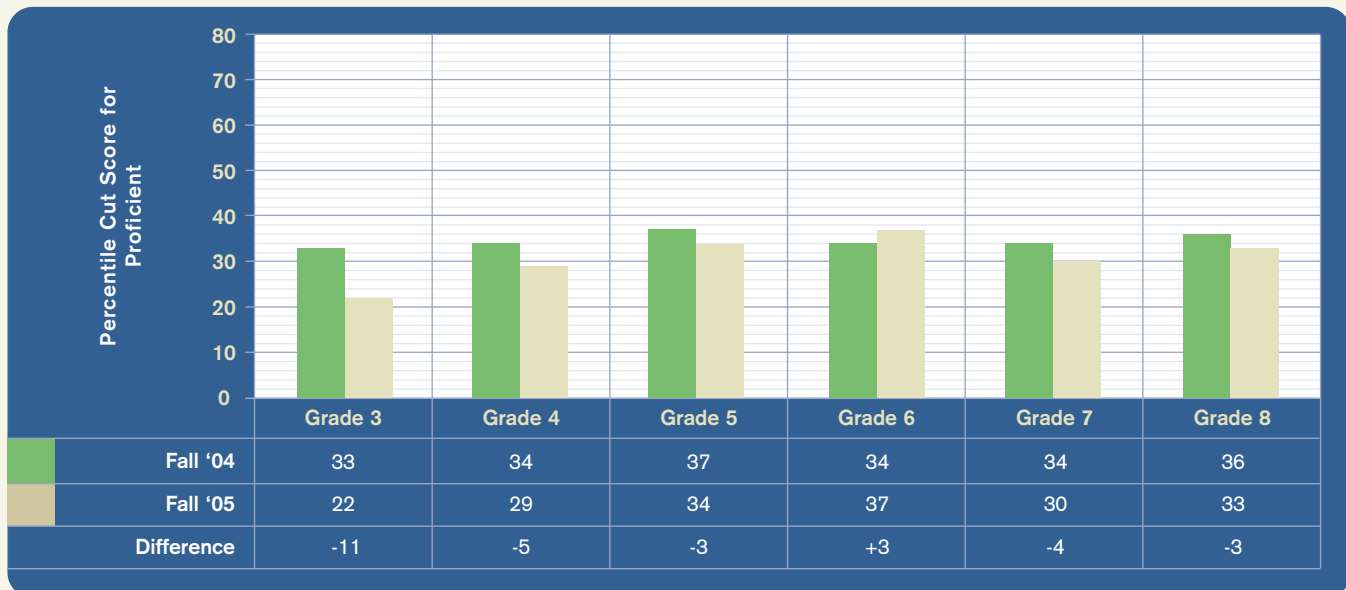
In order to measure their consistency, North Dakota's proficiency cut scores were mapped to their equivalent scores on NWEA's MAP assessment for both the 2004-05 and 2005-06 school years. Cut score estimates in both years were available in reading and mathematics for grades 3 through 8.

States may periodically re-adjust the cut scores they use to define proficiency in reading and math or may update the tests used to measure student proficiency. Such changes can impact proficiency ratings, not necessarily because student performance has changed, but because the measurements and criteria for success have changed.

Is it possible, then, to make comparisons of the proficiency scores between earlier administrations of North Dakota tests and today's? Yes. Assume that we're judging a group of fourth graders on their high-jump prowess and that we measure this

by finding how many in that group can successfully clear a three-foot bar. Now assume that we change the measure and set a new height to judge proficiency. Perhaps students must now clear a bar set at one meter. This is somewhat akin to adjusting or changing a state test and its proficiency requirements. Despite this, it is still possible to determine whether it is more difficult to clear one meter than three feet, because we know the relationship between the measures. The same principle applies here. The measures or scales used by the NDSA in 2004 and in can be linked to the scale used to report MAP, which has remained consistent over time. Just as one can compare three feet to one meter and know that a one-meter jump is slightly more difficult than a three-foot jump, one can estimate the cut score needed to pass the NDSA in 2004 and in 2005 on the MAP scale and ascertain whether the test may have changed in difficulty.

Figure 3 – Estimated Differences in North Dakota's Proficiency Cut Scores in Reading, 2004-2005 (Expressed in MAP Percentiles).



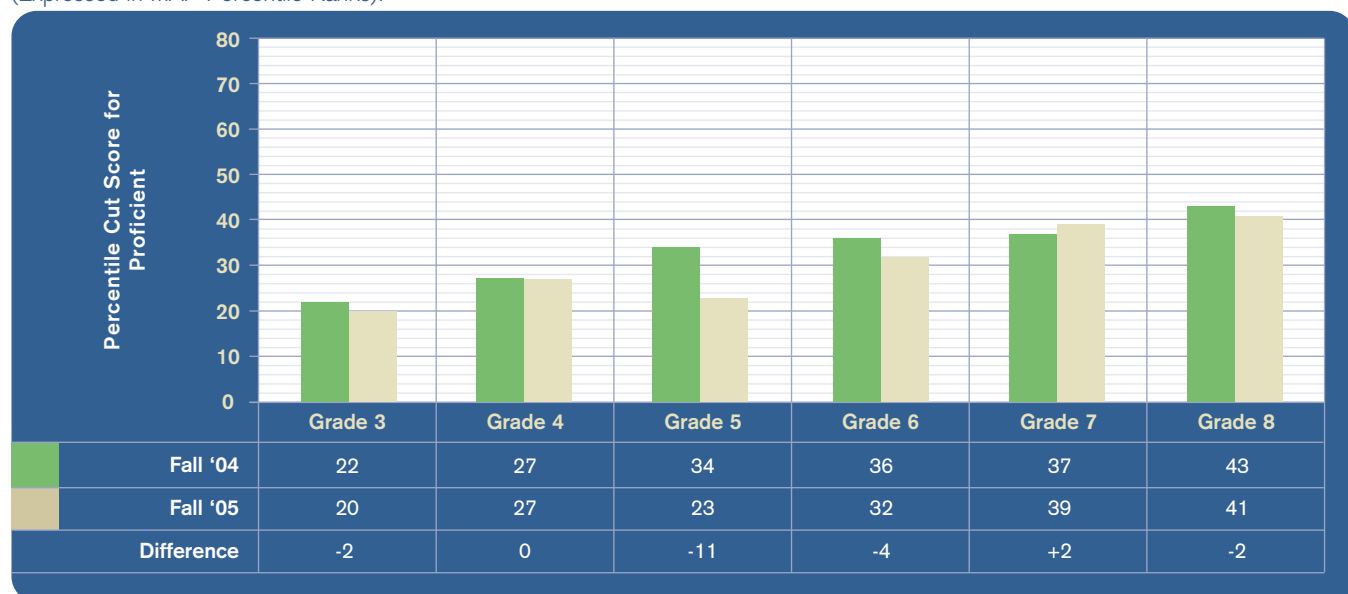
Note: This graphic shows how the difficulty of achieving proficiency reading has changed. For example, third-grade students in 2004 had to score at the 33rd percentile nationally in order to be considered proficient, while 2005 third graders only had to score at the 22nd percentile to achieve proficiency. The changes in all other grades were within the margin of error (in other words, too small to be considered substantive).

North Dakota's estimated **reading** analyses indicate a decrease in the third-grade cut score from 2004 to 2005 (see Figure 3), but no other substantive changes. Consequently, even if student performance stayed the same on an equivalent test like NWEA's MAP assessment, one would expect the third-grade reading proficiency rate in 2005 to be 11 percent higher than in 2004. (In fact, North Dakota reported no change in proficiency rating for third graders over this period.)

Thus, one could fairly say that North Dakota's third-grade test in reading and fifth-grade test in mathematics were easier to pass in 2005 than in 2004, while the remaining tests were about the same.

North Dakota's estimated **mathematics** cut scores showed a decrease in difficulty for fifth grade between the two years (Figure 4). Consequently, even if student performance stayed the same on an equivalent test like NWEA's MAP assessment, this would likely yield an 11 percent increase in the proficiency rate. (In fact, North Dakota reported no change in proficiency rate for fifth graders over this period.) No other substantive changes in math cut score cut scores were found.

Figure 4 – Estimated Differences in North Dakota's Proficiency Cut Scores in Mathematics, 2004-2005 (Expressed in MAP Percentile Ranks).



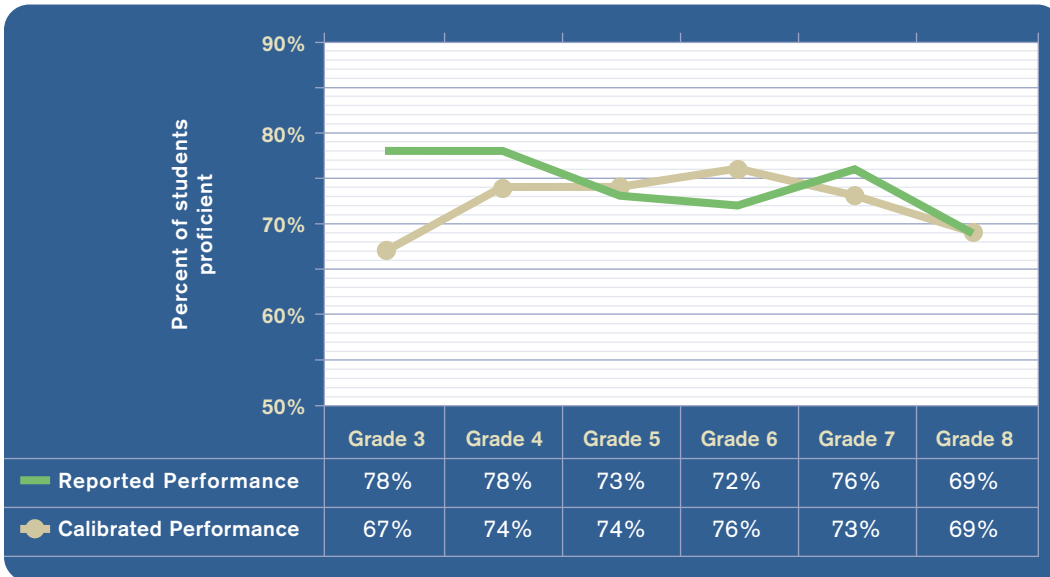
Note: This graphic shows how the difficulty of achieving proficiency has changed. For example, fifth-grade students in 2004 had to score at the 34th percentile nationally in order to be considered proficient, while in 2005 fifth graders had to score only at the 23rd percentile to achieve proficiency. The changes in all other grades were within the margin of error (in other words, too small to be considered substantive).

Part 3: Calibration across Grades

Calibrated proficiency cut scores are relatively equal in difficulty across all grades. Thus, the eighth-grade cut score is no more or less difficult for eighth graders to achieve than the third-grade cut score is for third graders. When cut scores are all calibrated to the grade-eight standard, parents and educators have some assurance that achieving the third-grade proficiency cut score puts a student on track to achieve the cut scores at eighth grade. It also provides assurance to the public that reported differences in performance across grades are a product of differences in actual educational attainment and not simply differences in the difficulty of the test.

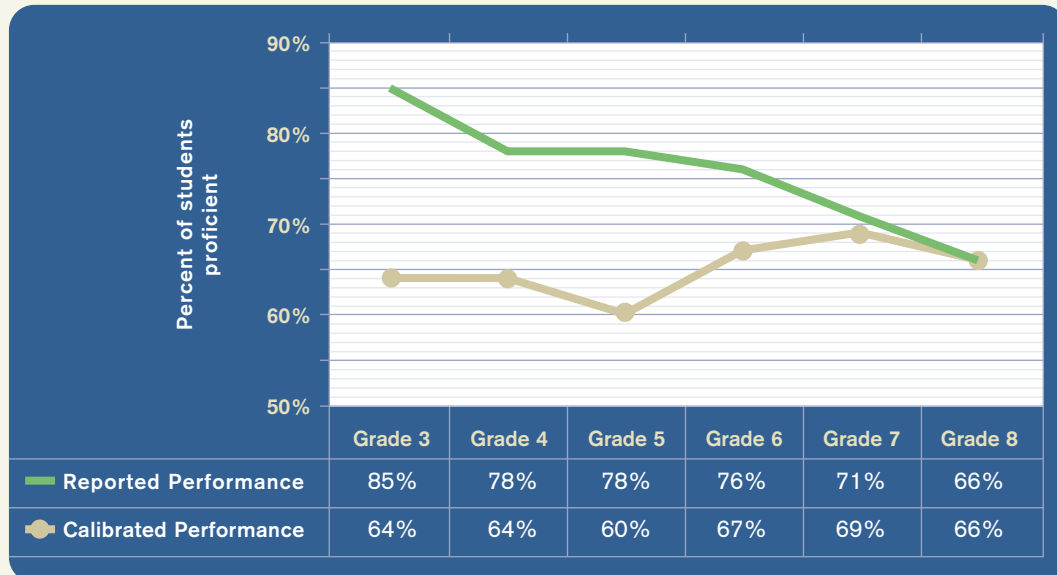
Figures 1 and 2 showed that North Dakota’s upper-grade cut scores in reading and mathematics were generally more challenging than in the lower grades, particularly for mathematics. (This was true for most states studied.) The two figures that follow show North Dakotans’ reported performance on their state test in reading (Figure 5) and mathematics (Figure 6), compared with the rate of proficiency that would be achieved if the cut scores were all calibrated to the grade-eight standard. When differences in grade-to-grade difficulty of the cut score are removed, student performance is more consistent at all grades. This would lead to the conclusion that the higher rates of mathematics proficiency that the state has reported for younger students are somewhat misleading.

Figure 5 – North Dakota Reading Performance as Reported and as Calibrated to the Grade-8 Standard, 2005



Note: This graphic shows, for example, that if North Dakota’s grade-3 reading standard was set at the same level of difficulty as its grade-8 cut score, 67 percent of third graders would achieve the proficient level, rather than the 78 percent reported by the state.

Figure 6 – North Dakota Mathematics Performance as Reported and as Calibrated to the Grade-8 Standard, 2005



Note: This graphic shows, for example, that if North Dakota's grade-3 mathematics cut score was set at the same level of difficulty as its grade-8 cut score, 64 percent of third graders would achieve the proficient level, rather than the 85 percent reported by the state.

Policy Implications

North Dakota's proficiency cut scores stand in the middle of the pack when compared to the other 25 states in this study. This finding is relatively consistent with the recent National Center for Education Statistics report, *Mapping 2005 State Proficiency Standards Onto the NAEP Scales*, which found North Dakota's standards to be in the upper-middle part of the distribution of all states studied. There appears to be a downward drift in some of the reading and mathematics cut scores, although not for all grades. Moreover, North Dakota's expectations are not smoothly calibrated across grades;

students who are proficient in third grade are not necessarily on track to be proficient by the eighth grade. North Dakota policymakers might consider adjusting their cut scores across grades so that parents and schools can be assured that elementary school students scoring at the proficient level are truly prepared for success later in their educational careers.