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A LEVEL PLAYING FIELD?



How College Readiness Standards Change the Accountability Game

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Foreword

Much of the conversation around high-achieving students to date has centered on how to serve the needs of the nation's top tenth. While their progress is important and recognized in our *High Flyers* study, these students are generally concentrated in low-poverty, suburban schools. In reality, every school in the country has its own top tenth, and those children represent the best hopes of each of their respective communities, whether that be a neighborhood in Harlem, a small town on the Mississippi Delta, a remote village in Alaska, an Iowa university town, or a Silicon Valley suburb. What happens to every school's top tenth has a profound impact on their communities, and collectively, it portends a much larger impact on the continued prosperity of our nation, and our promise that every hard working, bright citizen has an equal opportunity to achieve the American dream.

In this study, my colleagues Michael Dahlin and Beth Tarasawa report on the progress of this diverse and interesting group of students. They studied the academic growth over a three-year period of 35,000 high-achieving elementary and middle schools students and the results reveal a great deal about how schools met the needs of their own high achievers. Of particular interest were the growth and performance of students from high-poverty schools relative to their peers from wealthier schools.

Their findings offer some reassurance. The vast majority of the 35,000 students, even those attending high-poverty schools, maintained growth that kept them on track for college. Further, they found that the poverty rate of a given school had little effect on its high-achieving cohort; for the most part high-poverty schools produced as much growth for their students as their wealthier counterparts. In fact, students attending one of the high-poverty schools in the sample would have a 45% probability of achieving above-average growth in mathematics and a 50% chance of above average growth in reading.

Nevertheless, because of pre-existing achievement gaps, the top students in high-poverty schools generally trailed their peers in the suburbs in academic performance, despite the fact that their growth was on par. The persistence of this gap is unfortunate and it will likely limit some of these students' college choices and the amount of financial aid that they receive. The need to find ways to reduce the achievement gap between the top tenth in high- and low-poverty schools remains compelling if we are to meet our commitment to offer all students, including the best students, the opportunity to reach their full potential.

Our researchers also found immense variance in the amount of growth that all schools, both high- and low-poverty, produced with their own top tenth. The top quartile of schools produced growth that is more than double that of the worst quartile. While this variance would greatly improve the college and future prospects for some students, other well-qualified student prospects are crippled if they happen to end up in one of the sample's lowest-growth schools. Evidence from the current study suggests that 75th percentile growth would be required of high-poverty schools to eliminate the current gap in college readiness rates between high- and low-poverty schools.

Perhaps the best news coming from this study is that many high-poverty schools meet and exceed that target. The top high-poverty schools show growth that not only equals the best low-poverty schools but also dwarfs the meager returns achieved by the worst ones. In fact, the 22 high-poverty elementary schools with the best growth rates entirely erased and surpassed their achievement gap relative to the 27 low-poverty schools with the lowest growth rates. And the 13 high-poverty middle schools with the highest rates of growth closed and surpassed their achievement gap relative to the 16 low-poverty schools with the lowest growth rates. Students fortunate enough to attend one of these schools get a great boost for their middle school and high school years.

Moving forward, this study encourages policymakers to reframe the national discussion about how to best serve high achievers by recognizing that the nation's "elite students" should not be defined solely as the top 1%, 5%, or 10% in the standardized testing pool, and that each and every school has its own group of elite students. Improving the academic achievement of these elite students not only promotes American competitiveness, but also contributes to building a fairer and more just society.

So what array of policies should be considered to address these needs? The movement toward a Common Core of standards, grounded in college and career readiness, is a step in the right direction. The proficiency standards adopted by most states under No Child Left Behind (NCLB) were inconsistent, generally ranging between low and way too low. Moving to a common set of standards aligned to college readiness serves all students well, but especially helps high achievers by providing some assurance that the curriculum is aligned to their needs and aspirations.

We should go further by recognizing the top performers in each school as a subgroup when setting accountability policy and evaluating school programs. Often lost in the rancor around NCLB's punitive accountability approach was its laudable intent to focus the energies of schools on addressing the needs of subgroups that are typically neglected. NCLB's use of subgroup identification to assure schools act to address the educational needs of these groups proved an important and effective lever in addressing achievement gaps. While one might not consider the high achievers within a school disadvantaged, there is a compelling public interest in assuring that the top-performing students in each and every school, many of whom will be minority students or students who come from low-income families, have access to the kind of education that will allow them to fully reach their potential. These are the students who will one day assume positions of leadership in business, the academy, and their respective communities, and we benefit from having leaders in those positions who have top-notch academic preparation. Thus, the academic performance of this group should matter—it should affect the school's accountability score within their state, just as the performance of other subgroups do.

We should also recognize that high-poverty schools face certain challenges that schools in low-poverty areas do not. In particular, high-poverty schools may need additional resources to offer accelerated and advanced programs. High-poverty schools may also need to focus more effort on addressing critical elements of Conley's Four Key Dimensions of College Readiness (2007), particularly the academic behaviors (self-management skills, time management, persistence) and the contextual skills and awareness (college culture, affording college, admission procedures and requirements) that may require special attention for students in these settings to maximize their potential.

America's history is a story of possibilities, of greatness that arises from modest circumstances. My own grandfather, who was born before the turn of the 20th century, came from a poor family, graduated from eighth grade, and made a successful career as a licensed pharmacist. He never set foot on a college campus; pharmacy did not require that in 1910. While this is still a nation filled with opportunities, the days are long past when a young person can become a pharmacist without a pharmacy degree, or an attorney without attending law school. Success requires a great education. The young people we studied, the top performers in their schools, represent the best of their respective communities and the elite of the next generation. They will be, if given the opportunity to achieve their full potential, the pharmacists, attorneys, scientists, entrepreneurs, and engineers who will see us through the 21st century. Let's not overlook them.

Executive Summary

In September 2011, the Kingsbury Center at Northwest Evaluation Association (NWEA) and the Thomas B. Fordham Institute released one of the first longitudinal studies of high-achieving students entitled *Do High Flyers Maintain Their Altitude?* In that study, authors Xiang, Dahlin, Cronin, Theaker, and Durant (2011) found that most high-achieving students maintained their status over time, but that a significant proportion fell from the high-achieving ranks, some far enough to jeopardize their access to college and merit assistance.

In this follow-up, the academic growth of 35,000 elementary and middle school students in 31 states, all of them high achievers within their own schools, were followed over a three-year period. Of particular interest to us were the growth and performance of high-achieving students from high-poverty schools, where “growth” focused on change over time and “performance” focused on single points of time. As the focus of accountability has shifted from basic proficiency to college and career readiness, we wondered whether high-poverty schools’ students were “on track” to meet this higher standard by the end of high school. To study this, we compared a sample of NWEA schools’ achievement scores in elementary and middle school grades, and their associated probability of being on track to meet ACT® college readiness benchmarks at the end of high school.

The study yielded several major findings and policy implications:

Finding One—While the vast majority of high achievers were on track to be college ready, significant achievement gaps existed between students in poor schools and students in wealthy schools.

As expected, high achievers in the low-poverty middle schools were better prepared than those in high-poverty schools; 95% of the high achievers attending wealthy schools were on track to meet ACT college readiness benchmarks, while 85% of high achievers from poor schools also crossed this threshold. These proportions remained essentially constant across all three years that they were tracked.

Policy Implication: To close the achievement gap, high-poverty schools will need to offer their high achievers accelerated and advanced programs that are standard fare in wealthier schools. Because many students in high-poverty schools come from families without college experience, schools may need to move beyond basics to address critical elements of Conley’s Four Key Dimensions of College Readiness (2007), particularly the academic behaviors (self-management skills, time management, persistence) and the contextual skills and awareness (college culture, affording college, admission procedures and requirements) that may require special attention for students in these settings to maximize their potential. This kind of programming may require additional resources.

Finding Two—The average rates of academic growth by high achievers in wealthy and poor schools were nearly equivalent.

Only modest differences in growth rates were observed among all high achievers, with poorer schools producing trivially smaller growth in math achievement and poorer elementary schools showing slightly larger growth rates in reading achievement. This suggests that moving a child from a poor school to a wealthier school was not likely to have any noticeable impact on that student’s academic growth rate, particularly with respect to reading skills.

Policy Implication: For years a mythology has persisted that implies parents must move to the suburbs or enroll their children in charter or private schools to get a quality education. For this sample at least, the myth is busted, and the results provide solid evidence that accountability policies that are based on students’ academic progress are a better measure of school effectiveness than the proficiency-driven approach of NCLB. Status measures are useful for identifying top student populations, and these benchmarks provide parents with an essential means for assessing whether their children are making progress toward their personal academic goals. School accountability policies should not be based on status measures (such as proficiency rates or college readiness rates), since these measures are largely controlled by socioeconomic factors beyond school control. Rather, schools should be held accountable for student growth rates.

Finding Three—Within high- and low-poverty schools, growth rates varied tremendously; some schools showed extraordinary growth and others showed abysmal growth.

The consequences of these differences were enormous for the students at these schools. For example, the top quartile of high-poverty elementary schools produced growth rates that entirely erased and surpassed the achievement gap relative to the wealthiest schools with the lowest growth rates. This same pattern was true for middle schools as well. In other words, the quality of the school mattered a great deal more than the poverty rate of the school in determining student growth.

Policy Implication: In order to ensure that high achievers receive adequate resources within their schools, regardless of school poverty, we should recognize the top performers in each school as a subgroup when setting accountability policy and evaluating school programs. In general, educational policy employs subgroup identification to assure that schools act to mitigate that group's disadvantages, and policy is an appropriate lever for that purpose. But educational policy is also used to address issues of a compelling national interest. Employing policy to assure that each community's best performing children get the attention from schools that will be needed to achieve their potential, not only serves children well, it also guarantees that we develop the next generation of experts and leaders in business, science, medicine, and politics. For that reason, this subgroup's results should affect the school's accountability score within their state, just as the performance of other subgroups do.



A LEVEL PLAYING FIELD?

How College Readiness Standards Change the Accountability Game

Introduction

There is broad agreement among educators, policymakers, governmental officials, and business leaders that the United States must raise educational achievement in order to compete in the knowledge-based global economy. Canada, Korea, Japan, New Zealand, Ireland, Norway, France, Belgium, and Australia, all have college graduation rates that exceed the United States (Organisation for Economic Co-operation and Development [OECD], 2009). Furthermore, according to recent studies by the Georgetown Center on Education and the Workforce, by 2025 the U.S. will need at least 20 million more college-educated workers to remain internationally competitive (Carnevale, Smith, Stone, Kotamraju, Steuernagel, & Green, 2011). Achieving the Georgetown Center's imperative requires that we improve current college completion rates substantially, and this cannot be accomplished without improving the college completion rates of students coming from low-income families.

Recent federal education initiatives reflect the urgency to raise collective national education achievement. Programs such as Race to the Top (RTT) and the movement to Common Core standards represent an effort to refocus teachers' emphasis on the success of all students by shifting the focus from relatively low proficiency standards (Durant & Dahlin, 2011; Cronin, Dahlin, Adkins, & Kingsbury, 2007) to benchmarks that are more in line with college readiness requirements. These benchmarks are essentially a new iteration of a status metric that raises the expectations for students. Additionally, the move to shift accountability policies toward using growth measures (i.e., how much a student improves) vs. performance measures (i.e., how highly a student scores on a particular test) fundamentally changes the calculus used for accountability. Specifically, the introduction of student growth as an important factor in teacher

evaluation through RTT is a very strong incentive for teachers to focus their efforts on all students, as pushing a few bubble students above a proficiency bar will no longer be sufficient to produce positive results.

If the goal is for a far larger number of students to be college ready, then RTT and implementation of the Common Core standards are steps in the right direction. Reaching this goal will require focused effort to improve the performance of low-performing students, most of whom will not meet higher standards without some form of intervention. But in that process, the nation cannot afford to ignore the educational needs of high-performing students, who may not reach their full potential within school systems that devote disproportionate time to the lowest performers. **More importantly, if we are to truly close the achievement gap, it will not only require that we move low-performing students up to some level of proficiency, it also requires that we offer all high-performing students, but particularly those from low-income families, the resources and opportunities that will permit them to reach their full potential.** While families of means may obtain these resources from suburban, charter, or private schools, low-income families will largely rely on their neighborhood public schools for the education of their children.

In an effort to shed light on the progress that high-achieving learners are making in our nation's schools, this study focused its attention on the highest achieving students in a large sample of diverse schools. **What makes the study unique is that rather than apply a single definition of high achievement on all schools in the sample, we instead selected the top 10% of students in each school for analysis. After all, while student achievement may vary significantly across schools, each and every school has its own top 10th and the success schools have with their high achievers is important to the nation's future.** To explore the achievement patterns

of this “top 10th”, we analyzed how high-achieving students from low- and high-poverty schools perform in relation to two measures: the first a benchmark of college readiness using projected ACT scores and the second measures their academic growth over time. Researchers at the Kingsbury Center had unique access to Northwest Evaluation Association’s (NWEA) Growth Research Database (GRD) and embarked on this research to provide a snapshot of the college readiness of the country’s best and brightest students from a wide variety of public schools, including both traditional and charter/magnet schools. The study was designed to inform and stimulate discussions around reforming educational policy to ensure that all high-achieving students, particularly those with the highest economic need, have access to the educational resources to achieve their educational aspirations.

Background: College Readiness and School Accountability

Regardless of the state of the economy, it remains a priority for our nation to continue to make progress toward improving the college and career readiness of our students. For the past decade, those efforts have been primarily focused on holding schools accountable for increasing rates of proficiency through the NCLB Act. These efforts have coincided with substantive improvements in mathematics achievement in fourth and eighth grades as measured by the National Center for Education Statistics (NCEP). Fourth grade mathematics scores have improved by 15 points since the year prior to implementation of NCLB. While all performance ranges have shown improvement, the greatest improvements have come from lower-achieving students performing at the 10th and 25th percentiles. Gains at eighth grade have been similar; average scale scores have improved by 13 points since 2000 and improvements have once again been larger among lower-performing students. But the implementation of NCLB did not coincide with large gains in reading achievement. Fourth grade reading scores improved only slightly between 2002 and 2011, and scores of high achievers (90th percentile and above) improved by a single point. Low-achieving students (10th and 25th percentiles) showed a slightly greater improvement of four scale score points. Unfortunately, eighth grade reading

scores have remained stagnant across all achievement ranges during the same period (Snyder, 2011).

Some critics of NCLB contend we have divested resources from our highest achieving students to focus attention on the lowest performing students. While achievement trends would seem to indicate that the law may be associated with higher rates of improvement among low performers than high performers, Loveless, Duffett, and Farkas (2008) recognize that making the case for causation is difficult. Nevertheless, 81% of teachers responding to their survey reported that they spent more one-on-one time with low-achieving students while only 5% reported spending more time with high achievers. Sixty percent of teachers also responded that low-performing students were their top priority.

Since the Obama-Biden Administration’s proposal for the re-authorization of the Elementary and Secondary Education Act (ESEA), there has been greater discussion of “college and career ready” standards. Such discussions focus on the development of accountability systems (e.g., Council of Chief State School Officers) that evaluate schools, teachers, and students relative to such standards with assessments to measure college readiness (e.g., Educational Testing Services). While there is no single consensus definition of the term, Conley (2007) describes college readiness as the level of preparation students need to succeed in a general education class at a postsecondary institution that offers a four-year degree. Roughly 30% of the U.S. population holds a bachelor’s degree; that proportion has essentially held steady since 1995 and the U.S. college completion rate remains near the average of other OECD countries (OECD, 2009). Furthermore, even though more low-income students are enrolling in college, graduation odds are especially low for these students (Complete College America, 2011). President Obama’s goal, to have the U.S. lead the world in college completion rates, would require a near doubling of the current college completion rate to 60%. Current rates of college completion are far below these goals, and to meet this goal we would need to assure that nearly every high-achieving student (and most average achievers as well) has the academic skill set and access to the financial resources needed to graduate. More importantly, we will not reach this goal without greatly improving the college graduation rates of students from low-income households.

Decades of educational research suggest that schools will struggle to meet these standards for many of their students. The vast variation in poverty rates across schools in America are associated with differences in achievement that date from the start of kindergarten. Schools are often criticized for reinforcing inequality or actually producing inequality themselves. There are multiple indicators that point to schools as a domain for inequality. Economically advantaged schools are associated with higher standardized test performance, greater teacher retention rates, and increased access to advanced placement curricula and extracurricular activities. In most states, economically advantaged schools also enjoy access to more resources, whether that is more resources from the state and local tax base, or other sources of funds like parent fundraising. These resources can be used to lower student-teacher ratios, purchase resources such as textbooks, and make investments in facilities that can be leveraged to improve learning (Condrón & Roscigno, 2003; Corcoran, 1995; Kozol, 2005; Saporito & Sohoni, 2007).

As early as 1966, James Coleman, commissioned by the U.S. Office of Education, found that low-income students attending middle-income schools had higher rates of achievement and progress over time than low-income students attending high-poverty schools (Coleman, 1966). Coleman's findings were extended by other studies which found that students' educational outcomes in mathematics and reading are also impacted by the parents' educational and socioeconomic background (Chaplin, 2002; Covay & Carbonaro, 2010; Freeman & Condrón, 2011; Lareau, 2000; Lucas & Berends, 2002, 2007; Mathews, 1998). Moreover, dramatic differences in skills are observed before students enter the classroom and before schools have a chance to make a difference. For example, Downey, von Hippel, and Hughes (2008) found 21% of the variation in students' reading and 25% of the variation in students' math scores was attributable to non-school factors at the start of kindergarten.

While parental, student, and neighborhood factors contributed to the majority of the observed performance difference between students in low- and high-poverty schools, there are systematic disparities in school quality that also promote student achievement gaps. Prior research suggests that teachers are the most influential school factor affecting student achievement (Aaronson,

Barrow, & Sander, 2007; Rockoff, 2004). But schools serving disadvantaged students have more difficulty attracting and retaining teachers (Lankford, Leob, & Wyckoff, 2002; Hanushek, Kain, & Rivkin, 2004). Research has also found disparities in teacher qualifications in schools serving primarily minority and/or economically disadvantaged populations (Clotfelter, Ladd, & Vigdor, 2005; Lankford et al., 2002). Additionally, pressures from accountability policies can encourage turnover in schools serving high-poverty students, particularly among highly competent teachers who would be desirable candidates for schools in the suburbs (Feng, Figlio, & Sass, 2010). These conditions conspire to place the most promising students of poverty into schools that may be seriously disadvantaged in terms of support, resources, and teaching talent. But despite the inequities in resources, some research has also highlighted how many schools serving low-income students are successfully closing the achievement gap (Downey et al., 2008; Kannapel, Clements, Taylor, & Hibpshman, 2005; Reeves, 2003).

In regard to public policy, educational reform in this century's first decade has focused on improving equity by holding states accountable to move all students, regardless of income or minority group status, to a standard of proficiency. What constitutes proficiency, however, was left to each state to define as it saw fit and states implemented their own tests. This led to great variability in state standards and student performance (Durant & Dahlin, 2011; Cronin et al., 2007). While NAEP reported modest reductions in achievement gaps that coincided with implementation of NCLB (Snyder, 2011), the status-based or proficiency-based models associated with the NCLB Act encountered much criticism. Indeed, some evidence suggests that proficiency-based models encourage school administrators and teachers to focus on students near the proficiency bar, potentially diverting their attention away from high achievers who already satisfy status requirements (e.g., Ballou & Springer, 2008; Loveless et al., 2008). If this is the case, an unforeseen side effect of NCLB may be that the high-poverty schools that are most likely to be impacted by the Act's sanctions have the greatest incentive to divert resources toward "bubble students" who have the best prospects of moving from below to above the proficiency bar. The problem could be magnified in high-poverty schools, which have proven to be far more likely than low-poverty schools to be impacted by the accountability sanctions of NCLB.

While this risk is obvious, prior research has not offered unequivocal support for this claim. Ballou and Springer (2008) found, for example, that student achievement gains after NCLB’s implementation were not confined to those students near the proficiency cut score, and that high-achieving students also showed improvement.

Nevertheless, RTT and other reform efforts do change the calculus, substituting proficiency-based models with growth-based ones that put every student’s progress into play. In fact, 12 states make student growth the primary factor in teacher evaluations (“Teacher,” 2012). However, if we expect similar growth from all schools (implicit in a purely growth-based system), student achievement gaps between high- and low-poverty schools would likely remain, primarily because the gaps already exist when the students enter school. Further, the value-added models in use are normative—they produce estimates that show the growth of schools or teachers relative to others in the same district. Thus, while the move to growth models might be a useful metric for use in evaluating schools, this approach would not be a sufficient measure of a school’s progress toward achieving the President’s goals related to college and career readiness and to produce higher levels of achievement in high-poverty schools. Growth models represent a necessary but insufficient measure of achievement in terms of equity.

While the incorporation of growth measures in addition to proficiency indicators provides a more complex evaluation of school impact, the use of standardized test data for high-stakes decisions remains controversial. Furthermore, *school context* characteristics should also be considered in school evaluation (Xiang & Hauser, 2010). Of course

the Common Core standards are just now starting to be implemented by schools and the associated standards are still in development. And while many states have begun to integrate value-added measures in their accountability systems to meet RTT requirements, these efforts are also in the very early stages of implementation. Thus, our goal here is primarily to document the current state of affairs as it relates to the progress of the top 10th in high- and low-poverty schools. We attempted to shed light on these issues by investigating two key research questions: 1) How do projected college readiness measures vary among high achievers in high- and low-poverty schools? And 2) How do high achievers grow over time in high- and low-poverty schools? **By limiting our sample to the top 10th in each school, we hope to illustrate how policy reform would play out for the best and brightest students within her/his school environment. An understanding in growth variation within and across low- and high-poverty schools offers insight for the design of accountability systems where policymakers must balance individual student, teacher, and school-level goals and performance measures.**

Data and Methods

In this study, we examined achievement trends in math and reading for students who performed in the top 10% of their individual grades and schools on a national assessment of student achievement, the Northwest Evaluation Association’s Measures of Academic Progress® (MAP®).¹ We tracked the performance and growth of an elementary school cohort from third grade to fifth grade,

COHORT	Subject	Sample Size	2007-08	2008-09	2009-10
			Year 1 Grade	Year 2 Grade	Year 3 Grade
ELEMENTARY SCHOOL COHORT	Reading	18,609	Grade 3	Grade 4	Grade 5
	Mathematics	17,438	Grade 3	Grade 4	Grade 5
MIDDLE SCHOOL COHORT	Reading	17,274	Grade 6	Grade 7	Grade 8
	Mathematics	14,160	Grade 6	Grade 7	Grade 8

Table 1: School-defined Cohorts

STATE	READING				MATHEMATICS			
	Elementary Cohort		Middle School Cohort		Elementary Cohort		Middle School Cohort	
	Schools	Students	Schools	Students	Schools	Students	Schools	Students
AZ	23	378	8	421	24	423	8	445
CA	17	391	1	69	16	384	1	59
CO	47	701	22	680	51	730	19	564
DE	6	125	3	106	6	121	4	187
IA	29	529	19	415	31	561	19	497
IL	73	1,446	18	809	72	1,423	16	640
IN	71	1,268	34	1,633	70	1,281	31	1,422
KS	29	476	17	626	32	500	17	472
KY	26	468	7	324	27	470	9	383
MA	12	125	1	18	15	186	1	18
MD	76	1,384	30	1,414	0	0	0	0
ME	8	179	12	405	8	198	10	356
MI	43	718	28	629	43	700	25	541
MN	131	2,746	34	1,646	129	2,716	36	1,725
MT	9	149	4	86	10	161	4	90
NC	4	72	2	44	4	68	2	44
ND	14	175	2	58	14	184	3	68
NE	1	9	0	0	1	8	0	0
NH	16	319	22	744	15	296	23	619
NM	30	510	5	128	27	437	3	72
NV	9	127	3	135	9	121	3	128
NY	1	8	0	0	1	9	0	0
OH	4	50	1	36	4	55	1	15
OR	1	13	0	0	1	13	0	0
PA	4	69	1	67	4	60	2	134
SC	183	4,227	79	4,303	188	4,343	72	3,712
TN	1	12	0	0	1	12	0	0
WA	69	1,175	24	1,115	66	1,160	21	676
WI	43	680	33	1,192	48	741	33	1,169
WY	6	80	7	139	6	77	5	93
VA	0	0	1	32	0	0	1	31
TOTALS	986	18,609	418	17,274	923	17,438	369	14,160

Table 2: Number of Schools and Students within Sample by State

and a middle school cohort from sixth grade to eighth grade. Performance was defined by students' observed scores on the MAP assessments as single points in time. Growth was defined as students' observed changes in scores over time. Data came from NWEA's Growth Research Database, a longitudinal repository containing MAP assessment results. The full repository includes data from 4,800 school systems and approximately five million students.

Sample

Our sample included two intact cohorts²—one at the elementary level and the other at the middle school level, as shown in Table 1. The elementary school cohort was composed of an intact cohort of third grade students who performed within the top 10% in their school who were also enrolled in the same school and participated in testing in the fall of third grade and end of fifth grade. In all, this cohort included approximately 17,000 (math) and 19,000 (reading) high achievers from about 1,000 schools in 31 states (precise counts shown in Table 2). Students' academic achievement was measured at the beginning of the third grade school year, again at the end of third grade, the end of fourth grade, and finally at the end of fifth grade, for four total measurements. Only students with test information at all four test terms were included. The middle school cohort included sixth grade students who performed in the top 10% within their schools, who were enrolled in the same school, and participated in testing at the beginning of sixth grade and end of eighth

grade. Their achievement was measured at the beginning of sixth grade, the end of sixth grade, the end of seventh grade, and the end of eighth grade. Only students with test information at all four test terms were included. In all, the cohort consisted of approximately 17,000 high achievers in reading and 14,000 high achievers in math, from 400 schools (see Table 2). Only public schools were included in the sample, however, about 5% of the elementary schools and 6% of the middle schools were charters or magnet schools.

The racial/ethnic distributions for these cohorts are shown in Table 3³, where they are compared to national distributions for elementary and secondary students. The percentages of Hispanic/Latino and African American students within our samples of high achievers were lower than these groups' representation within the general population, and white students were overrepresented. These differences may be explained by the fact that the sample was restricted to the top 10% of students, which may have skewed the representation of minority students, or by the selection of schools for the sample. While we cannot claim that the sample of schools represents the nation as a whole, the sample is still informative because it represents a large and diverse population of schools and can provide insight into the growth trends of high achievers and how they were influenced by school poverty factors.⁴

For purposes of analysis, we aggregated the sample of students into two groups based on student race and

	WHITE	BLACK	HISPANIC	ASIAN/PACIFIC ISLANDER	AMERICAN INDIAN/ALASKA NATIVE
NATIONAL*	55.8	17.0	21.2	4.8	1.2
ELEMENTARY MATH	80.5	5.7	5.1	5.0	0.8
MIDDLE MATH	84.0	5.1	4.2	4.2	1.0
ELEMENTARY READING	78.6	7.0	5.8	5.0	0.9
MIDDLE READING	82.5	6.0	4.2	4.9	0.9

Table 3: National vs. Cohort Racial/Ethnic Distributions (percentages of total)

*National distribution for 2007-08, as reported by the Institute of Educational Statistics at: http://nces.ed.gov/pubs2010/2010015/tables/table_7_1a.asp

ethnicity, Whites and Asian/Pacific Islander students were classified as non-minority for this study; and African American, Hispanic, and Native American students were classified as minority. Table 4 illustrates the gender and minority composition of the two cohorts. In mathematics, the majorities of high achievers were male, though for reading, the compositions were more evenly split between the two genders.

Variables

Measures of Academic Progress (MAP) Assessment

MAP tests are a series of computerized adaptive assessments offered in mathematics, reading, language usage, and science that are typically administered to students in grades two through ten. MAP assessments have the following properties:

- **Equal-interval measurement.** NWEA assessments are scaled using a one-dimensional Rasch model grounded in Item Response Theory (IRT) and reported on an equal interval scale⁵ (NWEA, 2011). The use of an equal-interval scale makes it possible to measure the academic growth of students over time.
- **Cross-grade scale.** MAP is designed to have a cross-grade scale, which makes it possible to track growth across a single assessment over time.⁶
- **Low standard error of measurement.** Because of the adaptive design of MAP, high- and low-performing students receive more items targeted to their current level of achievement than they would receive on

fixed-form assessments. Since the items are better targeted to the student’s achievement level, standard errors of measurement are lower at all points of the achievement distribution. Relative to this study, standard errors at the point of the scale used for identification of high-performing learners—the 90th percentile—are approximately the same as standard errors for scores at the middle of the distribution, which makes the test’s measurement of performance more precise. This precision helps when measuring growth because of the improved accuracy of each measure in the series. The precision across the achievement continuum is also particularly helpful when analyzing growth of a specialized population, like the high-performing students in this study.

- **Less risk of score regression toward the mean.** Fixed-form tests have a relatively high risk of regression toward the mean because their content is typically targeted to the middle of the achievement distribution, which makes them subject to ceiling effect (“topping out” on a test) and because their scoring exacts a relatively high penalty on inadvertent errors. Adaptive tests have lower risk of regression to the mean because they offer more appropriately targeted items to high-performing students and exact relatively small penalties for inadvertent errors.⁷
- **Curriculum alignment.** All MAP assessments are created from a single, commonly scaled item pool. Items are taken from this common pool, with item selection for each assessment considering the relationship between the items and the state’s content standards.

COHORT	SUBJECT	FEMALE	MALE	MINORITY	NON-MINORITY
ELEMENTARY	Math	39.5%	60.5%	16.2%	83.8%
	Reading	52.3%	47.7%	18.0%	82.0%
MIDDLE SCHOOL	Math	40.1%	59.9%	12.5%	87.5%
	Reading	51.7%	48.3%	13.8%	86.2%

Table 4: Gender and Ethnicity of High Achievers

School Poverty

We categorized high-poverty schools as those that were in the top quartile of schools with the greatest reported poverty levels in our sample, as measured by National Center for Education Statistics (NCES)-reported free/reduced price lunch eligibility rates. For most analyses, students from the quartile of schools with the lowest free and reduced lunch rates within the sample were classified as low-poverty school students, while students from the quartile of schools with the highest free and reduced lunch rates were classified as high-poverty school students.⁸ High-poverty schools were those with free/reduced lunch eligibility rates at or higher than 47% (48% for the mathematics sample), whereas low-poverty schools were those with free/reduced lunch eligibility rates at or below 16% (18% for the mathematics sample). However, for the Hierarchical Linear Modeling (HLM) analysis, actual school poverty rates were used, rather than grouping schools into categories of “high” or “low.”

College Readiness

College readiness status for the middle school cohort was estimated based on estimates from a recent NWEA linking study (2012), in which MAP assessment scale scores were linked to the scale scores associated with the college readiness benchmarks of the ACT, PLAN[®], and EXPLORE[®] assessments. Students who meet the ACT benchmarks have been found (ACT, 2010) to have at least a 50% probability of achieving a B or better grade in freshman college courses in associated subjects (e.g., ACT math connects to freshman college math courses, ACT Reading tests the type of reading typically required in entry-level social sciences courses). Students who met the college readiness benchmarks on the EXPLORE and PLAN tests taken in the elementary grades would project, if they showed the typical growth reflected in the NWEA norms (NWEA, 2011), to meet ACT college readiness benchmarks by the end of high school. Middle school cohort students whose math or reading MAP tests scores met or exceeded the equivalent EXPLORE college readiness benchmarks were deemed “on track” for college readiness by the time they finished high school. We estimated the proportions of various groups who were “on track” for college readiness, comparing across high- and low-poverty schools.

Methodology

Growth Analyses

In this study, we used HLM to evaluate whether school poverty rates significantly predicted student growth in the sample. HLM is an alternative to Ordinary Least Squares (OLS) regression, sometimes preferred when a clear hierarchical or nested structure exists within the data. OLS models typically fail to adequately account for these nested effects; hence, they may produce downwardly biased estimates of error variance, implying greater precision and statistical certainty than is warranted.

The following three-level HLM was used to model the relationship between school poverty rate and school achievement and growth. It was applied separately to the elementary and middle school cohorts to examine performance and growth rates for elementary school reading, elementary school mathematics, middle school reading, and middle school mathematics.

Level One: Test Events (repeated measures)

Level One was an individual growth model of academic achievement at time t for student i in school j .

$$Y_{tij} = \pi_{0ij} + \pi_{1ij} (\text{ACADEMIC.YEAR})_{tij} + e_{tij}$$

Level Two: Students (individual growth trajectory)

In order to focus on the relationships between school poverty rate and school achievement and growth, no student level variables were included.

$$\pi_{0ij} = \beta_{00j} + r_{0ij}$$

$$\pi_{1ij} = \beta_{10j} + r_{1ij}$$

Level Three: Schools

$$\beta_{00j} = \gamma_{000} + \gamma_{001} X_{(\text{FRL}\%)}_j + \mu_{00j}$$

$$\beta_{10j} = \gamma_{100} + \gamma_{101} X_{(\text{FRL}\%)}_j + \mu_{10j}$$

Data and Methodological Limitations

There are some data and methodological limitations worth noting. For purposes of this study, the quartile of schools with the highest poverty rates within the sample were defined as high poverty. The threshold for that definition was a reported free and reduced lunch rate of 47%. It should be noted this may not be a universally accepted definition of a high-poverty school, because in some of these schools half or more of the students may not meet this definition. Thus we emphasize that the schools are high-poverty relative to others in the sample, and that the results in schools with extremely high-poverty rates (say 80% or more), might differ.

With any study of high achievers, the definitions/ measures of achievement are not perfect. Students' observed achievement scores invariably contain measurement error. In the current study, "high achievers" were defined as the top 10% of performers within their schools, as measured by NWEA MAP assessments of reading and math. Measurement error within these assessments means that some small percentage of these students might not actually maintain that ranking on a retest, since, if it was possible to measure their true achievement, they might actually fall below the top 10% threshold. Similarly, some small percentage of students

who were not included might actually crack the top 10% of students at their school, if their true achievement scores could be known. Mathematically, we know that those numbers should balance out—the number of high achievers mistakenly left out should be about the same as the number who were mistakenly included. This should have minimal impact on our analyses looking at growth rates, and indeed, we found few differences in growth rates across the various comparison groups in our study. However, this could have an impact on our analyses looking at college readiness status, since it is possible that some of our "high achievers" would not have been so designated, were it possible to measure their true scores, both at the beginning, and at the points when they were evaluated as being "on track" for college readiness. Still, if this phenomenon contributed significantly to our pattern of findings, then one would expect it to apply equally across comparison groups (e.g., high- vs. low-poverty schools), preserving the integrity of the observed patterns of comparison.

Studies on high-achieving students may also be impacted by regression toward the mean. In particular, because this project studied the rate at which high achievers reached and maintained their status above the ACT college readiness benchmark over time, one could argue that some part of the change in this metric might be

attributable to regression toward the mean. In this study, students attending high-poverty schools might be more susceptible to this issue, because this group's initial performance was closer to the minimum threshold. Figure 1 shows relatively stable percentages of students on track for college readiness over time, suggesting that regression to the mean does not lead to dwindling percentages of "college readiness" over time. This pattern of stability was consistent across both cohorts and both subjects. While the attrition rate among students from the high-poverty schools was slightly higher (see Figure 2), the difference was not great enough to suggest that students from these schools were disproportionately affected by the phenomenon.

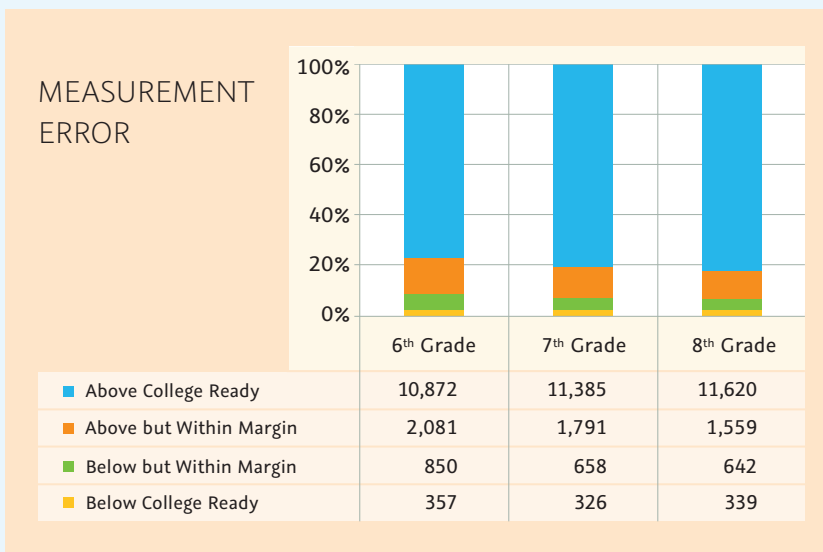


Figure 1: Measurement Error in the College Readiness Benchmarks for the Middle School Math Cohort

We do need to consider the possibility that students at the very top end of the achievement scale may have growth scores that reflect some regression to the mean and this is potentially a partial explanation for our finding that high achievers in low-poverty schools did not show growth that exceeded their counterparts from high-poverty schools. That's because more of the students in low-poverty schools performed in the higher reaches of the MAP measurement scale. The issue is a common one raised in studies of this type and we address the issue in some depth in *Do High Flyers Maintain Their Altitude?* (Xiang et al., 2011) and in two blog posts (Dahlin, 2011; Cronin, 2011). Overall, we believe the impact of regression to the mean on the sample is relatively minimal for two reasons:

1. The measurement instrument used to measure achievement is a computer-adaptive test with a measurement range that is capable of accurately capturing achievement to levels that represent adult literacy and beyond. One factor that impacts regression to the mean is ceiling effect that would be associated with the measure in use and only an extremely small portion of the identified sample actually tests the limits of that range on our assessment.
2. Regression to the mean assumes that an extreme first score makes it more likely that the next score will be

less extreme. However, what constitutes an extreme score depends on the individuals being studied. For example, Joe is an average bowler, and the mean score of the average bowler is 150, then if Joe rolls a 190, you'd expect that his next game will probably be lower. However, if Sarah is a professional bowler and she rolls a 230, one would not automatically expect that her next score will regress to the population mean, particularly if she averages 235.

In other words, if one employs a measurement instrument and scale that measure extreme performance accurately, and the population being studied is capable of extreme performance, the presence of a high initial score does not mean the score is high relative to that individual's capabilities and does not necessarily portend to a lower second score and growth estimate.

Finally, we used the College Readiness Benchmarks of the ACT as the threshold for establishing a student's college readiness. In some respects these reflect a minimum standard of college readiness. Students wishing to pursue certain specialized majors (engineering or pre-medicine for example), or gain admission to highly selective colleges, require higher scores than are reflected by the ACT benchmarks. Furthermore, our examinations of the proportions of students "on track" for college readiness used estimates (NWEA, 2012) of the scores on NWEA's MAP assessments corresponding to the college readiness benchmarks identified by ACT, since actual ACT scores were not available. For several reasons, this means we must be cautious not to over-interpret our findings. It is possible that students not currently "on track" for college readiness may exhibit extraordinary growth in the years between eighth grade and the end of high school, making up those deficits. It is also important to note that the MAP college readiness benchmarks are *estimates* of the ACT benchmarks—the two tests are not equivalent—such that some students who failed to meet the MAP benchmarks might actually succeed in meeting actual ACT benchmarks.

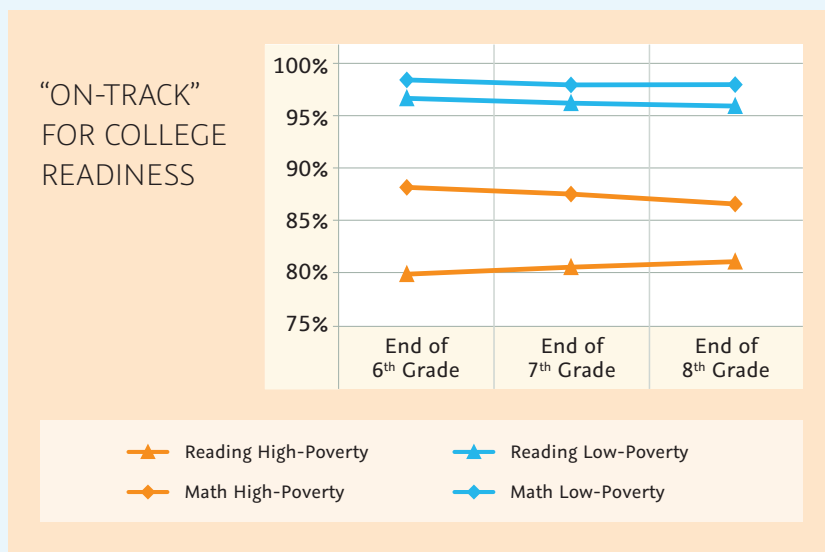


Figure 2: Percentages of Middle School High Achievers "On Track" for College Readiness

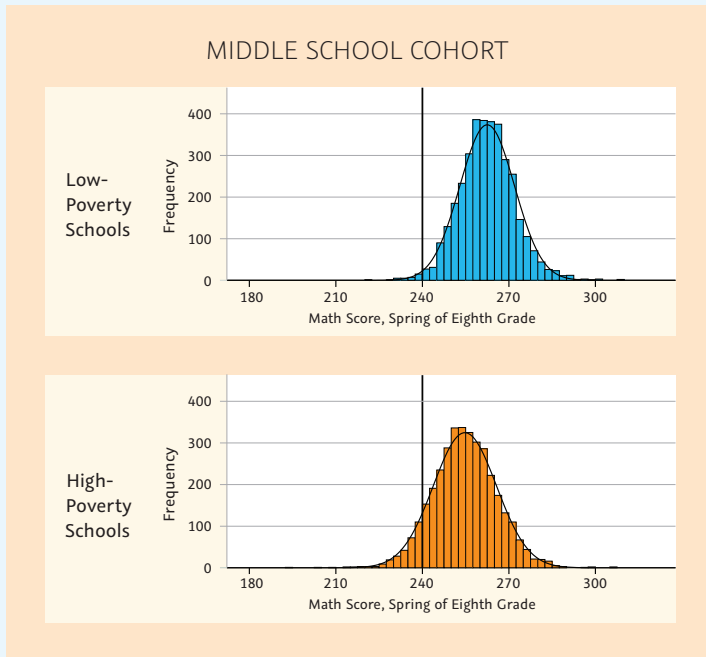


Figure 3: Range of Math Achievement for Middle School Cohort at End of Eighth Grade

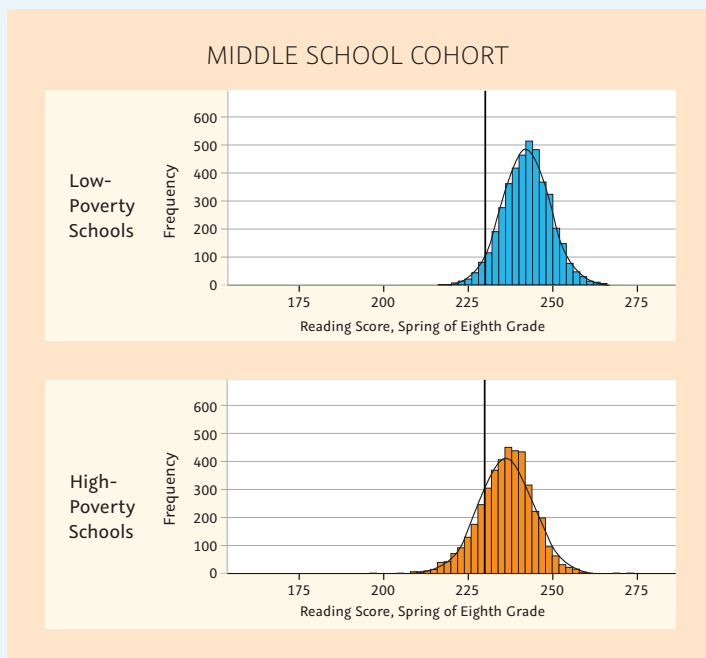


Figure 4: Range of Reading Achievement for Middle School Cohort at End of Eighth Grade

Research Findings

Finding: The Majority of Middle School High Achievers Were on Track for College Readiness

Figure 2 shows the proportions of high-achieving middle school students that were “on track” for college readiness, as estimated by ACT benchmarks. As expected, over 95% of the middle school high achievers in low-poverty schools started and remained on track to meet the college readiness benchmarks in reading and mathematics. Among the high-poverty schools over 85% of the middle school cohort was on track to achieve the college readiness benchmarks in reading at the end of grade eight and just over 80% were on track in mathematics. Over the study period, the college readiness status of the groups did not substantively change. Rates remained essentially constant for students attending low-poverty schools while the proportion of students from high-poverty schools meeting the college readiness status declined slightly in mathematics and improved slightly in reading.

Figure 3 and Figure 4 show the full distribution of math and reading performance, respectively, for the middle school cohort at the end of eighth grade. The black vertical lines in the two figures represent the college readiness benchmark. Here, the majority of top 10th in both high- and low-poverty schools are on track for college readiness, but the low-poverty schools are keeping nearly all these students above the line, while a larger percentage of high achievers in poorer schools fail to reach the college readiness benchmark. Nevertheless, the vast majority of the top 10th, even in high-poverty schools, perform comfortably above the benchmark.

Finding: School Poverty Predicts Academic Performance but Not Growth

In addition to examining college readiness, we investigated how school poverty relates to academic performance and growth. Figures 5 and 6 show the average math and reading performance, respectively, for the elementary and middle school students over time. The largely parallel lines show that high- and low-poverty schools produce roughly

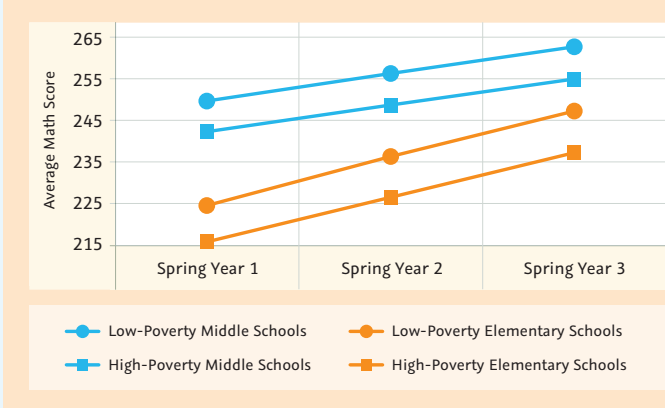


Figure 5: Average Math Performance over Time in High- and Low-Poverty Schools

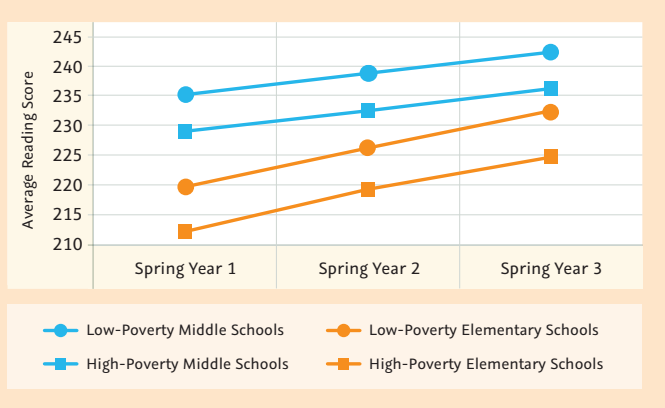


Figure 6: Average Reading Performance over Time in High- and Low-Poverty Schools

consistent rates of improvement over time in both reading and mathematics. The achievement gap between the high- and low-poverty school samples did not narrow during the study period.

We employed HLM to examine the predictive relationship between school poverty and individual student growth over time. Figures 7 through 10 show the relationships between the average growth rates produced by the elementary and middle schools in the sample for math and reading as a function of a school's poverty rate. Although statistically significant, in part because of the large sample

sizes involved, the predictive relationships between growth and school poverty were extremely modest. This trend was consistent for both reading and math, and in both the elementary and middle school cohorts.

Finding: There is Great Variation in Growth Across Low- and High-Poverty Schools

As shown in Figures 7 through 10, the variation in academic growth exhibited by students across school settings was striking, and it was as great across low-poverty schools as high-poverty schools. Such variation

SUBJECT	COHORT	POVERTY LEVEL	SCHOOL COUNT	AVERAGE STUDENT GROWTH	SD STUDENT GROWTH
MATHEMATICS	Elementary School	Low	356	31.26	4.43
		High	366	29.91	4.23
	Middle School	Low	137	17.29	3.75
		High	142	16.39	3.48
READING	Elementary School	Low	382	15.73	2.49
		High	390	16.31	3.01
	Middle School	Low	157	6.65	1.68
		High	161	6.75	1.92

Table 5: Average School Growth by Poverty Level

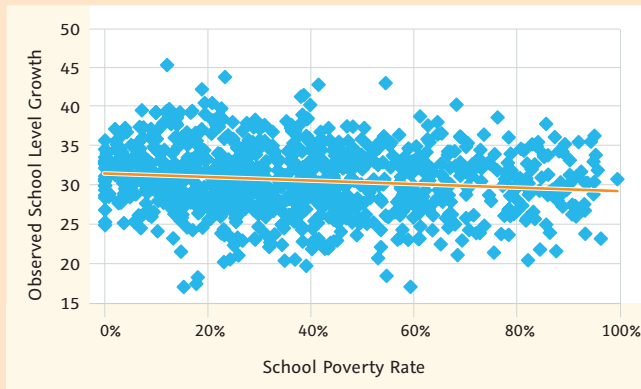


Figure 7: Average Math Growth by Elementary School High Achievers by School Poverty Rate

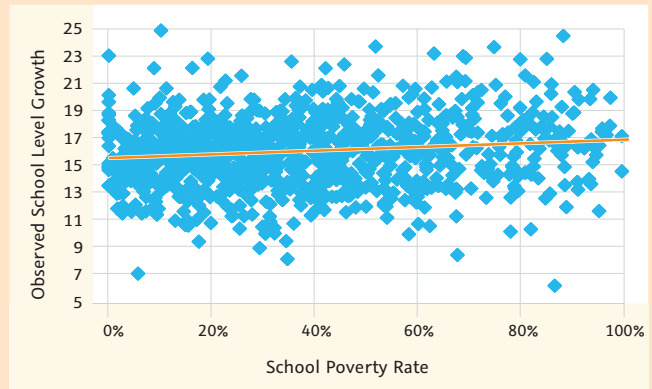


Figure 8: Average Reading Growth by Elementary School High Achievers by School Poverty Rate

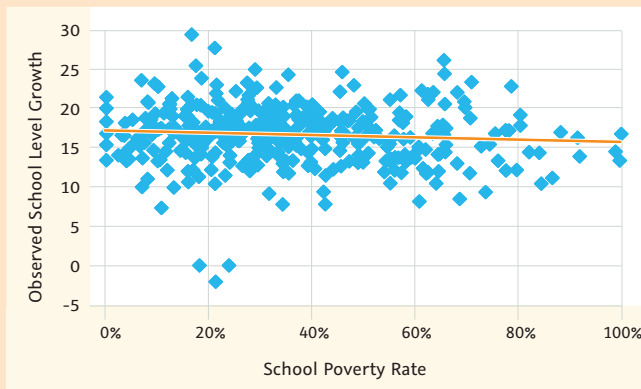


Figure 9: Average Math Growth by Middle School High Achievers by School Poverty Rate

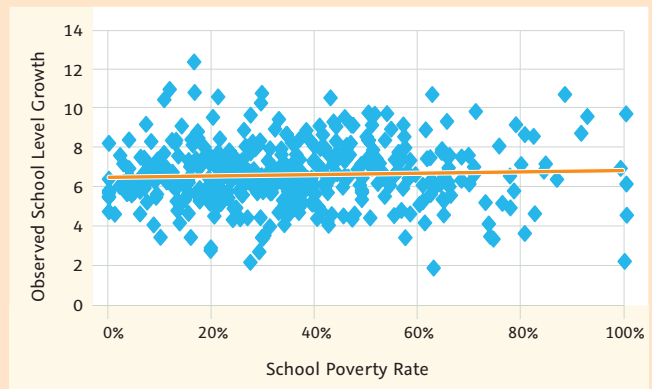


Figure 10: Average Reading Growth by Middle School High Achievers by School Poverty Rate

can have a huge impact on the prospects for college readiness among individual students and can also impact their eligibility for merit-based aid.

For example, at the beginning of the study, the average high-achieving math student in a high-poverty school started out performing at about the 90th percentile relative to national (NWEA) achievement norms. But if such a student attended a school that produced 10th percentile growth, that student would enter middle school performing at only the 77th percentile, whereas a comparable student at a 90th percentile growth school would enter middle school performing at the 93rd

percentile. For these two students, the differences in opportunities could be quite large. In short, given the large variance in growth across schools, it is quite clear that factors other than poverty largely control the relative growth of high achievers generated by any given school. This trend is interesting because it is counterintuitive. Given the advantages in resources available to wealthier schools, many might expect that students attending such schools would show superior growth over time. This was not necessarily the case.

Table 5 summarizes the school-level growth information portrayed in Figure 7 through Figure 10, showing the

SUBJECT	COHORT	SCHOOL POVERTY RATE	ABOVE AVERAGE GROWTH	BELOW AVERAGE GROWTH
MATHEMATICS	Elementary School	Low	54.2%	45.8%
		High	46.7%	53.3%
	Middle School	Low	51.0%	49.0%
		High	46.5%	53.5%
READING	Elementary School	Low	50.4%	49.6%
		High	53.6%	46.4%
	Middle School	Low	50.7%	49.3%
		High	54.3%	45.7%

Table 6: Probability of Exceeding Average Growth in High- and Low-Poverty Schools

average and standard deviations of growth for high- and low-poverty schools in both cohorts. The table shows that the growth in math achievement by high achievers in poorer schools was slightly smaller than the growth shown by high achievers in wealthier schools, though the magnitude of the difference was trivial (less than a point of growth, or less than one month’s typical growth over the 2.5 year span). In reading, this pattern was reversed for elementary level high achievers, with students from

wealthier schools exhibiting slightly less growth (about 0.6 points, or a few weeks of typical growth) than high achievers in poorer schools over the 2.5 year period. While this difference was statistically significant, the magnitude of the effect was trivial. In the case of middle school reading, the growth rates are essentially equivalent.

Table 6 shows a similar trend, conveying the percentages of students within low- and high-poverty schools that

SUBJECT	COHORT	GROWTH RATE	LOW-POVERTY	HIGH-POVERTY
MATHEMATICS	Elementary School	Observed	97%	85%
		75th Percentile	97%	99%
	Middle School	Observed	98%	88%
		75th Percentile	98%	97%
READING	Elementary School	Observed	96%	80%
		75th Percentile	96%	93%
	Middle School	Observed	95%	83%
		75th Percentile	95%	96%

Table 7: Percentage of Students on Track for College Readiness

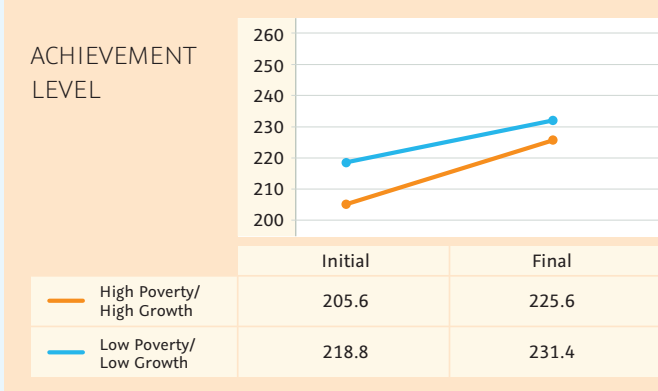


Figure 11: Elementary Reading Achievement Gap Reduction

achieved “above average growth.” Table 6 shows that students attending high-poverty schools were nearly as likely to achieve above average growth as students in wealthy schools. This trend is consistent across reading and mathematics, and across both elementary school and middle school cohorts. In some ways, this simply reflects the range of variability as shown within Figure 7 through Figure 10, yet it highlights an interesting finding, as shown in Table 7.

While the observation that high- and low-poverty schools produced nearly equivalent growth rates among their high achievers was interesting, it highlighted the earlier finding that high-poverty schools produce lower percentages of college ready high achievers. In other words, the achievement gaps among high performers that were present in the initial grade were maintained but did not widen over time. This raised the question, what level of growth among high-poverty schools would be necessary to eliminate the “college readiness gap” among high achievers in low- and high-poverty schools?

To examine this question, high-poverty schools were ranked from lowest to highest in order to identify the 75th percentile school, in terms of the average observed growth produced by these schools over the duration of the study. Table 7 shows that if all high-poverty schools could produce 75th percentile growth, the college readiness gap between low- and high-poverty schools would be essentially eliminated. This suggested a benchmark for growth that, while challenging, is actually achieved in many high-poverty schools.

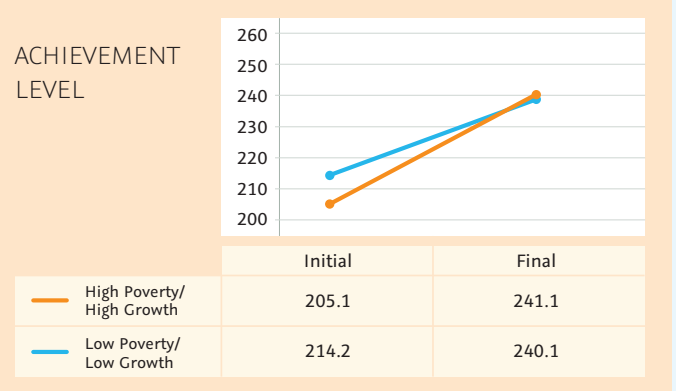


Figure 12: Elementary Math Achievement Gap Reduction

These growth data are represented graphically in Figures 11 through 14, which show the reduction in achievement gap that occurs across time between the highest poverty schools with the highest growth, relative to the lowest poverty schools with the lowest growth. In these figures, one sees that the achievement gap in mathematics is entirely removed over time, whereas the gap in reading is dramatically reduced.

Next Steps for Research

While it is clear from this study that huge variations in average growth for high achievers exist across high- and low-poverty schools, two broad lines of research warrant further investigation. One line might focus on identifying the specific school factors that are present in high-growth schools and missing in low-growth schools. Of particular interest will be identifying whether the same set of school factors predict growth in high- vs. low-poverty schools. A secondary line of research could seek to identify common factors that facilitate academic growth across students of all achievement levels vs. factors that primarily benefit high achievers. Whereas the current study has been primarily quantitative and descriptive, these new lines of research will require additional qualitative work to specifically identify successful school offerings associated with high academic growth. Another important question would be why, given the body of literature previously cited suggesting that high-poverty schools have fewer resources and more difficulty attracting and retaining talented teachers, would high-poverty schools show

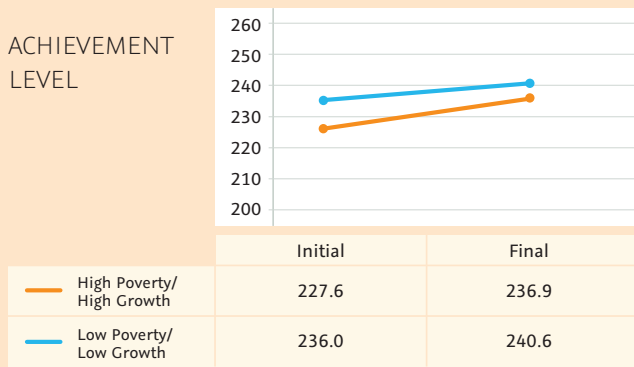


Figure 13: Middle School Reading Achievement Gap Reduction

growth for their high achievers that's generally on par with their better resourced and staffed counterparts? The top-performing students in high-poverty schools may share character and motivational traits with the high-achieving peers elsewhere that trump these resource disadvantages. Motivated kids and families can be quite resourceful. High-poverty schools may also recognize the promise of these high achievers and assure they get exposure to the school's best teaching talent, or the parents of these students may insist that this be the case. These potential explanations warrant further research

Policy Recommendations

We found that the top 10% of students in high-poverty schools lag behind their more affluent peers on performance measures of college readiness, but that their growth trajectories were comparable; that is, for the most part, they did not lose ground over time. Given that the students in high-poverty schools often have fewer external resources and support than students in wealthier schools, the fact that they maintained comparable growth is a testament to their schools.

Nevertheless, the current achievement gaps between high- and low-poverty schools are certain to persist unless intentional efforts are made to narrow the gap. Our findings echo a body of literature finding that many high-poverty schools are "doing their job" (Downey et al., 2008; Kannapel et al., 2005; Reeves, 2003). **Given the additional challenges often seen within high-poverty**

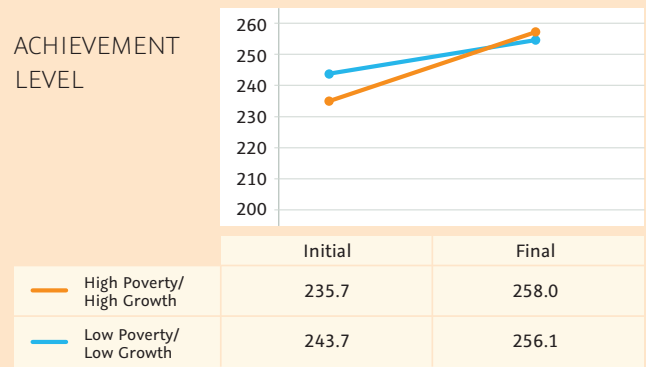


Figure 14: Middle School Math Achievement Gap Reduction

schools, where teachers and administrators must contend with home background factors associated with poverty that could limit student performance, the evidence from this study suggests that high-poverty schools are doing as good a job as their counterparts, despite producing fewer college-ready students.

What was discouraging was the large variance in academic growth produced by high achievers across all schools. In some respects, choosing a school for a high-achieving student seems like a lottery, though one whose outcome has a large impact on her/his future growth and the college prospects. Further, it was interesting to note that the school's poverty rate was not much help in selecting a high-growth school. Within the current sample, high-wealth schools were only about 5% to 7% more likely to produce above average growth in math achievement than high-poverty schools. In reading growth, wealthier schools demonstrated no advantage at all.

We see four challenges for policymakers. The first challenge is to present the problem transparently. The overwhelming majority of families aspire for their children to be college ready (Troop, 2010; "Great Expectations," 2006). Parents of all students, but particularly high achievers, do not get very strong, reliable information about how their children are progressing in school. The current metrics reported by schools, typically performance on state assessments, define proficiency at levels that do not reflect on-track performance for college readiness. Since most high achievers perform well above their state's proficiency bar, a school's proficiency rate

or Adequate Yearly Progress status do not communicate how well the school serves its high-achieving population. Further, most schools do not report progress measures that would allow parents and students to monitor their growth toward the kind of benchmarks they are striving to achieve. To illustrate, a child who may aspire to a career in science or engineering would have a hard time knowing, from the data commonly collected in schools, whether they are making enough progress in science and math to get into advanced courses in high school and later college.

The adaption of college and career ready standards through the Common Core should help address this issue. But equally important is the implementation of assessments and data systems that would allow all students, but particularly high achievers, to select and monitor progress toward their aspirations. College readiness benchmarks are likely to serve as the floor, but most high achievers have greater ambitions and we need to implement systems that tell them whether they are on track for these.

The second challenge is holding schools responsible for higher levels of achievement for all learners. We believe policymakers have taken important steps toward addressing this problem by encouraging states to raise standards in the direction of college and career readiness and by moving from proficiency-based accountability metrics toward metrics that evaluate schools based on the growth they produce. Previously, educational policy has focused on holding schools accountable for the results they get with low performers, by requiring that states meet Adequate Yearly Progress requirements to improve the proportion of students performing below relatively low proficiency bars. There is no consensus among researchers as to whether high achievers were hurt by this policy, but it is also not particularly relevant. **What is clear is that every school has a moral imperative to every student, which is to provide opportunities for learning that will help every child achieve her or his full potential. The failure to address this imperative, particularly in high-poverty schools, not only compromises the future prospects of high achievers everywhere, it jeopardizes the future of high-achieving poor students whose access to college admission may be more dependent on maintaining or increasing their level of academic achievement and growth. Thus the**

move toward higher standards and holding schools accountable for growth are the right first steps toward addressing these issues.

The third challenge is to implement changes to school accountability policy that incentivize schools to attend to the progress of high achievers. The most obvious way to do this is to move away from metrics that emphasize improving the number of students above a standard, which take the vast majority of high-achieving learners out of play (because they perform so far beyond the standard that they are not likely to fall below it), to metrics that emphasize measuring and improving growth, which weigh all students equally. We believe such efforts are a more accurate assessment of “school effectiveness.” But like Martineau (2009), we argue the true task for policymakers is to implement growth-based accountability models that balance the conflicting policy goals of setting common expectations for all educators’ and/or schools’ relative performance (e.g., student growth) *and* maintaining an aspiration for common achievement (e.g., college readiness standards) for all students. One approach is to use summative accountability that evaluates growth normatively and implements improvement requirements or sanctions to schools that perform poor relative to peers. Schools that did significantly better than peers at meeting growth goals that would move students to aspirational standards might be rewarded for that performance.

We also caution that student growth measures, although they are better indicators of school effectiveness than proficiency measures, are also more subject to random error, and are not immune to the influence of non-school factors while school is in session, and these factors should be considered when making decisions from this data. Additionally, we recommend that policymakers treat the high achievers in every school as a subgroup for purposes of reporting and accountability. This is not done because high achievers are “disadvantaged”; in academic terms they are not. It is done to recognize the effectiveness with which schools broadcast instruction that works for students across the entire achievement spectrum. We should clearly be concerned when schools are not implementing interventions to ensure low-performing students are catching up, but we should be equally concerned when the highest performing students in a school are lagging behind their full potential.

The fourth challenge is to identify and implement programs of instruction that maintain and improve the growth of high achievers. Merely imposing sanctions and rewards on schools does not suffice; they must also have the tools and the resources to enact the changes to enable success. The findings from this study indicate that some opportunities for success may come outside of school. Our growth results parallel studies on summer loss which find that although high- and low-poverty children show comparable growth during the academic year, high-poverty students experience greater educational losses in the summer months, due to differences in parental earnings, status, and education (Entwisle & Alexander, 1992). Differences in losses are particularly prevalent when students from economically privileged backgrounds engage in activities that are culturally enriching (e.g., going to art museums and traveling to large cities) compared to high-poverty students who primarily have access to home and community activities—commonly referred to as unstructured activities (Lareau, 2000; Burkam, Ready, Lee, & LoGerfo, 2004). Taken together, this body of research suggests school and/or district-level policies and interventions that reduce home background effects could have promise. For instance, summer school programs, year-round schooling, or longer school days could promote greater academic growth. Schools and districts could also implement academic programs that build cultural capital for students in high-poverty schools that encourage college readiness. The implementation of early college advisement, increased access to Advanced Placement coursework, and added mentoring programs could all have a meaningful impact on college readiness.

Philanthropic initiatives, technology innovations, and community development efforts offer additional ways high-poverty students may access resources in the future. For example, non-profit organizations (e.g., Khan Academy) offer free online micro lectures via video tutorials in a variety of subject areas and many universities now offer free online courses. Historically, schools' literary resources were a reflection of their library collections. Today, access to hundreds of thousands of classic literature texts can be accessed free of charge by students who have access to an electronic book, like a Kindle. These resources are truly revolutionary in that a student's access to rich, engaging learning content is no longer dependent on the availability of a well-resourced

school or library near the student's home. In this case, the missing link may be affordable broadband and cheaper mobile devices (laptops, tablets, etc.) that would be the remaining barrier to these resources for many low-income families. Finally, from early childhood initiatives (e.g., Annie E. Casey Foundation's Kids Count) to school-readiness models (e.g., Parents as Teachers) to scholarship opportunities (e.g., Gates Millennium Scholars), increasingly human service agencies and foundations are working in collaboration to expand enrichment opportunities for children.

If educational reform efforts to prepare all students for college do come to fruition, policymakers must also consider the additional burden this puts on high-poverty schools. In essence, we are asking such institutions to make up ground (or make up growth) at faster rates than more affluent schools. While we clearly support initiatives that promote college readiness for all students, it is important to recognize that high-poverty schools face additional challenges. Perhaps more radically, if school administrators really want to narrow the educational gap between high- and low-poverty students (high achievers included), recent research suggests shifting more of the best teaching talent to high-poverty schools is crucial. In practice this could take the form of policy initiatives designed to encourage new teachers to teach in high-poverty schools or differential compensation for highly effective experienced teachers willing to transfer to low-poverty schools. But Sass, Hannaway, Xu, Figlio, and Feng (2010) caution, changing the quality of new recruits or moving higher credentialed teachers into high-poverty schools might not be enough. Incentives and measures designed to induce highly effective educators to teach in high-poverty schools and that promote retention of the most effective teachers are more likely to be successful.



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Endnotes

¹ This school-level definition of “high achiever” was used in the previous study. However, the bulk of the High Flyers report focused on the external standard (norms-based), where students who scored at or above the 90th normed percentile on their MAP math and reading assessments were dubbed “high flyers.”

² We created two cohorts, since students change schools between the elementary and middle grades, rendering school-level analyses more complicated.

³ African American, Hispanic/Latino, and American Indian students were classified as minorities in this study, whereas Asian students were classified as non-minority, since Asian student groups as a whole are not traditionally academically disadvantaged (Kao & Thompson, 2003).

⁴ The sample contains proportionally fewer high-poverty schools and urban schools than the nation as a whole. Further, we selected students who have MAP test records at the beginning grades, and we limited the sample to those students who had MAP test records at the ending grades to investigate how many students maintained college readiness status. In this way the sample is rather limited, but these sampling methods allowed us to track intact cohorts of students over time, since these students remained in the same school over the duration of the study.

⁵ The use of Rasch modeling in assessments is common. Both the Scholastic Achievement Test (SAT) and the ACT report results on Rasch scales, as do many state assessments. Nevertheless, there is some controversy as to

whether the scales produced from Rasch models are equal interval. Critics argue that the scales are not equal interval, in part because student growth is not even across all grades and all points of the scale. While it is true that growth across grades and the scale is not constant, this has no bearing on whether the scales are equal interval. For example, newborns typically exhibit about 10 inches of growth in their first year, slowing down to about 2.5 inches of annual growth by year two. But this fact does not imply that inches, as a unit of length, are not equal interval. Rasch-based scales use the relative difficulty of items in the pool used to create the scale to make their estimates. The claim that the scales are equal interval is based on the fact that the difference in difficulty between an item estimated at 170 and one estimated at 175 is the same as the difference between an item estimated at 250 and one estimated at 255. Put another way, if a student performing at 170 was offered an item with a 175 difficulty (5 points above the student’s score), this student might answer the item correctly 45% of the time. Similarly, if another student, this one performing at 250, was offered an item estimated at 255 (also 5 points above the student’s score), we could also expect this student to answer the 255 item correctly about 45% of the time. In short, the scale is equal interval because the differences in item difficulty are a constant function, not because student progress along the scale is necessarily even.

⁶ Since students are exposed to different curricula as they progress across grades, MAP item pools are limited to ensure that students taking the assessment have the opportunity to be exposed to most of the content tested. For example, content requiring multiplication or division of fractions is introduced in the grade 6+ version of math, but not in the version used with students in grades two through five.

⁷ Because fixed-form tests are designed to measure across the entire spectrum of achievement, the number of items available to measure the performance of high achievers is limited, which contributes to a ceiling effect. Because so few items discriminate among high achievers, a high achiever who inadvertently misses an item (forgets to carry a 1 on an addition problem, for example) often finds his or her score takes a large (and unrecoverable) penalty. The same is not true on an adaptive test. Because the test adapts item difficulty to the performance of the student, ceiling effects are less common. In addition,

because of the adaptive nature of the test, students have an opportunity to recover lost score points due to inadvertent errors.

⁸ These classifications do not reflect the specific free-and-reduced lunch status of any particular student, thus there are non-eligible students in the sample who are classified as coming from high-poverty schools and vice-versa. Students are classified by the poverty status of their school and not their individual status.