

# Summer Growth Patterns in Gifted Students

by Karen Rambo

*Karen Rambo is an assistant professor in the School of Education and School of Teacher Education and Principal Preparation at Colorado State University. While a doctoral student at the University of Connecticut, she received a data award from the Kingsbury Center to look at summer growth patterns and to assess the impact of schools on high achievers.*

Do all students benefit equally from time in school? Using summer growth as a baseline estimate of how much students would achieve in the absence of school, I examined how schools change student growth trajectories. Broadly, I wanted to learn how much schools matter for students with varying initial achievement levels. Specifically, I wanted to see if students who are well above average received a similar benefit from time in school as students who start with achievement levels near average. Simply put, are gifted students actually being overlooked in education?

In an attempt to discern whether gifted students benefited as much from their time in school as average students, I pursued the following research questions:

- Do gifted students experience different school year and summer growth patterns in reading and mathematics than average ability students?
- Do students who are high achieving relative to their peers experience different school year and summer growth in reading and mathematics than their relatively average achieving peers?

I used a normal distribution to define both average (16<sup>th</sup>-84<sup>th</sup> percentile) and gifted (98<sup>th</sup>-99<sup>th</sup> percentile) on NWEA's MAP

assessment. NWEA provided data from 2000 schools from their Growth Research Database, and I tracked students who started 3rd grade in 2006 until they were starting 6th grade in 2009.

When gifted students show slower growth than average students, a common scapegoat is measurement error. For example, if the ceiling of the test is too low, then already high-achieving students cannot demonstrate their full growth. Also, most tests are designed to measure typical students well. These atypical students are very likely to have more error associated with their scores (conditional measurement error). As a result, these students may be less likely to demonstrate growth. Finally, regression to the mean is more likely to plague the scores of gifted students because they are more likely to start out with scores at the top of the range. Knowing that there is always some measurement error in the first score, their predicted scores are going to look more like an average student. These problems make determining growth for gifted students quite problematic.

Fortunately, MAP is designed well to answer questions about atypical students. The ceilings on the tests that I used were quite high for my sample, so students should be able to show accurate growth. Since the items in MAP assessments span a broad range of skills and are selected specifically for each student, conditional measurement error is not an issue. Finally, I designed the

study specifically to allow me to address regression to the mean. If gifted students grew less during the school year than average students, there are two likely possibilities- 1) gifted students' scores regressed to the mean because of measurement error, or 2) gifted students were not adequately challenged during the school year. To understand which was in play, I looked at how gifted students grew over the summer. If gifted students grew *less* than average students over the summer, then measurement error/regression to the mean was the likely culprit for slower growth from gifted students during the school year. However, if gifted students grew *more* than average students over the summer, then regression to the mean would not explain that pattern. The likely culprit for slower gifted growth was a lack of appropriate instruction for gifted students during the school year.

I used a multi-level growth model to answer the two questions. In my model, student scores were nested within students who were then nested within schools. At level one (repeated measures), I coded time in school and time in summer separately, so I could determine how much students grew in reading and mathematics during each. At level two (between students), I used student gifted status as a predictor of initial score, growth during school and growth during the summer. I also controlled for student gender and ethnicity at this level. At level three (between schools), I controlled for the percent of students who received free or reduced lunch at each school on the initial score, school year growth, and summer growth. I also controlled for the average starting score at each school on the two growth slopes. I also added quadratic terms to the level one more to be able to better model any acceleration or deceleration in

growth in reading and mathematics over time.

I also conducted separate analyses for schools that did not have any students that would qualify as gifted based on the 98<sup>th</sup> - 99<sup>th</sup> national percentile specifications. For these schools, I identified relatively gifted and relatively average using the same percentiles but based on local norms. The patterns I saw for both reading and mathematics were virtually identical- although somewhat muted- to the patterns observed for the nationally gifted and average.

## Findings

I hypothesized that gifted students would grow more slowly during the school year than average students but more quickly than average students over the summer. In reading, I basically saw identical trajectories for gifted students during the school year and during the summer. And the growth during the school year was much less for gifted students than average students. Whatever these students did in the summer was as effective at increasing their reading skills as their time in school and that increase was still less than the typical increase experienced by an average student. While this is what I hypothesized, I was surprised at how dramatic the results were.

In mathematics, we did not see such a dramatic pattern. While gifted students grew less than average students during the school year, there was a drop in growth over the summer. So, schools made a greater impact on mathematics growth for gifted students than they did for reading.

## **Recommendations**

Gifted students' slow growth in reading that persisted regardless of time in school was particularly troubling. Schools did not change the trajectories for gifted kids. They learned the same amount in school and out. There are a handful of possible explanations, but one seems the most plausible to me. If gifted students are reading at a comfortable level- not a challenging level- during the school year and then continue to read over the summer at that same level, these results would be expected.

Educators can do a couple of things to address the slower growth from gifted students during the school year. First, they can make sure that students are reading at challenging levels. We should be pushing these kids to read more difficult text- challenging them. Secondly, we should seriously consider accelerating students into higher grades so that they will automatically encounter more difficult text. Also, accelerating advanced students in mathematics also makes a lot of sense given the slower growth rate for gifted students in mathematics.