



# RESEARCH BRIEF

## Research Services

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### Relative Age Effect

#### Results at a Glance

There are several ways in which students' relative age has a disparate impact on their educational outcomes.

- Students who are the youngest in grade 3 have a substantially larger risk of being retained in grade 3 than do their older peers.
- Lower percentages of students who are relatively younger for their grade are classified as gifted.
- Higher percentages of relatively younger students are classified as specific learning disabled.

Educators should become aware of the relative age tendencies and guard against untested assumptions regarding student abilities.

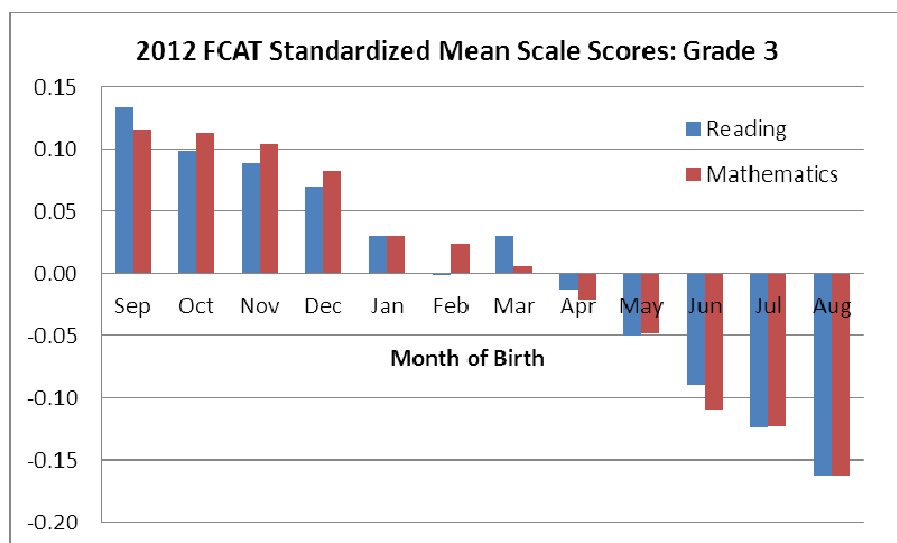
#### Background and Purpose.

In his recent book *Outliers: The Story of Success*, Malcolm Gladwell examines histories of some very successful people and explores the reasons for their remarkable achievement. One of the examples the author considers is the Canadian ice-hockey players. He notices that, remarkably, many more Canadian NHL players were born in the early months of the year than in the later ones. The explanation offered by the author is that because the deadline for children enrolling in age-relevant hockey programs is January 1 of every year, the kids born in January are the oldest in the program; they are a full 11 months older than those born in December. When the coaches need to refer players for elite teams, they choose the best players among 8- or 9-year-olds. Because the oldest children tend to be the most physically developed, very often the "best" simply turn out to be the oldest. Through the years, these selected players are given more and more practice and elite training, and by the time they are young adults, they are truly the best.

Similar effects of a relative age, or age relative to the grade level, extend to the educational arena. Children born early in an academic year have an initial developmental advantage over their same-grade peers. The goals of this brief are to explore the educational effects of relative age that are observed within the Miami-Dade County Public Schools and to raise educators' awareness of the relative age effect.

## Student Achievement

To explore the student achievement effects of relative age, we examined the 2012 student outcomes on the SAT-10 for grade K-2 students and on the FCAT for grade 3-10 students. To make the outcomes from the two different tests comparable, we standardized the scale scores by grade level and found the mean standardized scale scores by the student month of birth within grade level. (A standardized score shows the distance between a particular scale score and the mean of all such scores for a grade level in standard deviation units.) Below is typical graph of student achievement as it pertains to students' relative age for one grade level. Graphs for other grade levels, although not displayed here, show a very similar pattern of achievement differences by a month of birth.



As one can see, the effect of relative age is marked and consistent. The largest differences in achievement are observed between students born in September, the oldest in a grade level, and their peers born in August, the youngest children. These largest differences in standardized mean scale scores of students in grades K-10 are shown in the table below.

Grade	Reading	Mathematics
K	0.45	0.57
1	0.39	0.46
2	0.32	0.31
3	0.30	0.28
4	0.17	0.14
5	0.19	0.15
6	0.11	0.12
7	0.14	0.11
8	0.08	0.08
9	0.09	
10	0.08	

It can be observed that the differences shown in the table above are substantial for students in grades K-3 and that these differences diminish in later grades. One important consequence of achievement differences, especially for grade 3 students, is related to student retention.

## Student Retention

Beginning with the 2002-2003 school year, Florida Statutes require that if a student in grade 3 scores at achievement level 1 on the FCAT in reading, the student must be retained. The law also stipulates that the FCAT should not be the sole determinant of promotion and that additional evaluations, portfolio reviews, and assessments are to be used to determine whether a student is reading at or above grade level and can be promoted to grade 4. Certain categories of students with disabilities and English language learners are exempted from the mandatory retention requirement.

In M-DCPS, approximately 7% of the students who were in grade 3 during the 2011-12 school year were retained (as of November 2012). The percentages of students retained in grade 3 increased by the month of birth from a low of 6.0% for students born in September, the oldest for the grade, to the high of 9.1% for students born in August, the youngest. To further assess the effect of relative age on student retention, for each birth month we calculated the *Relative Risk* values as ratios of the percentage of retained students born in a particular month to that of students born in September. (That is, students born in September are used as a reference group.) The results are shown in the table below.

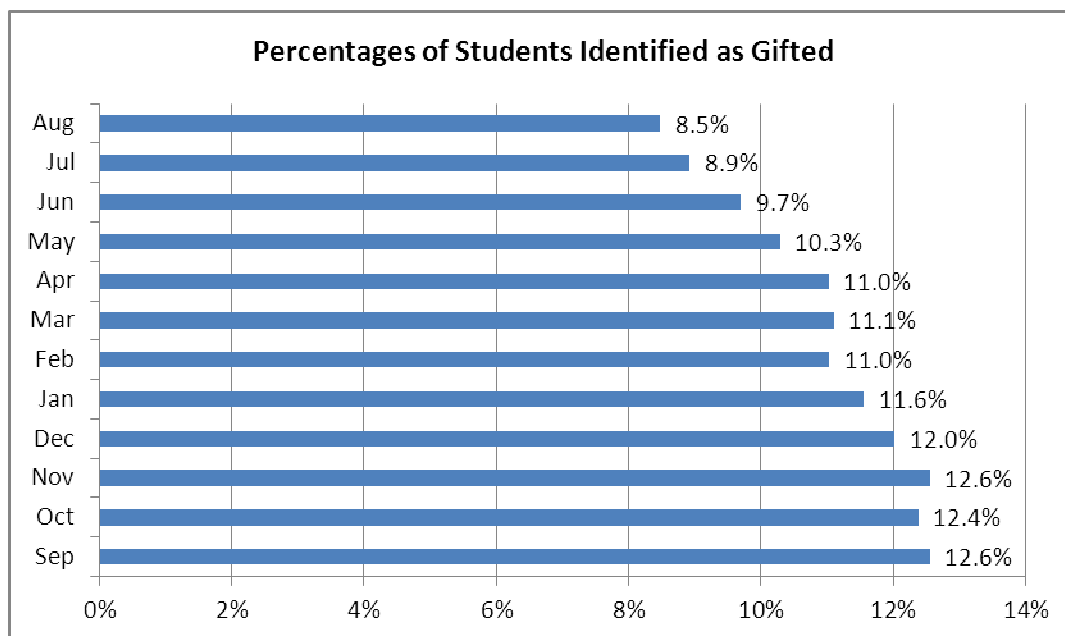
Birth Month	Relative Risk
September	1.00
October	1.10
November	0.95
December	1.20
January	1.22
February	1.23
March	1.14
April	1.30
May	1.26
June	1.24
July	1.55
August	1.52

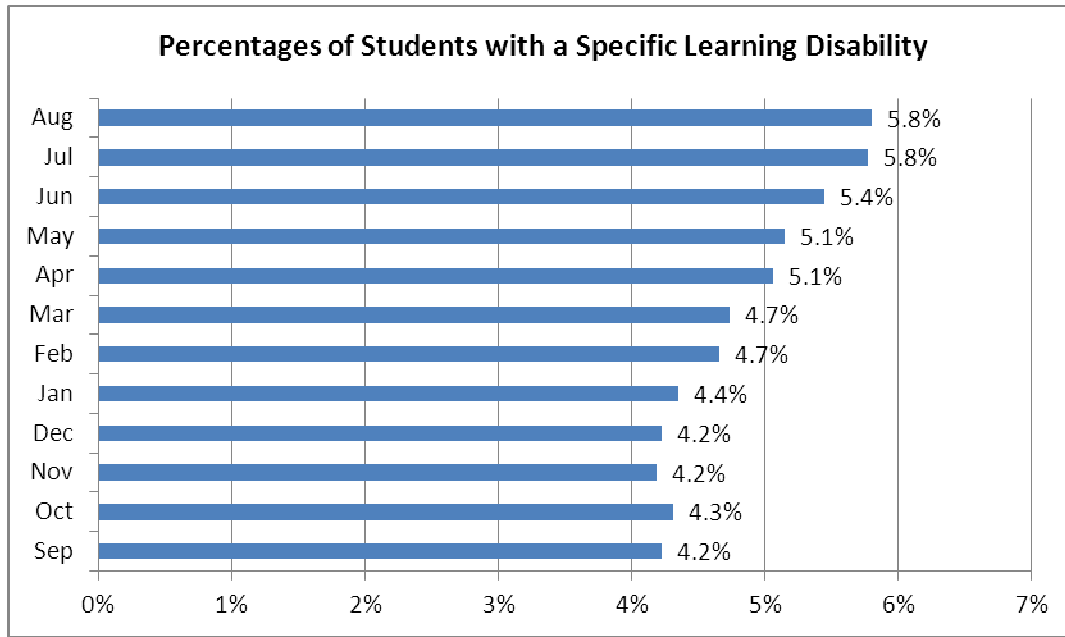
The table above shows that students who are the youngest in grade 3 have a substantially larger risk of being retained in grade 3 than do their older peers. In fact, based on the 2011-12 data, the risk of being retained in grade 3 for students who were born in the months of July and August was more than 50% higher than that for students born in September.

## Special Education

When students are referred for an evaluation to determine their eligibility for special education placement, including gifted programs/services, the referrals are often based on teachers' observing that the student exhibits either a lack of academic progress or some extraordinary capacity for learning. In M-DCPS, more than 70% of all student referrals for an initial psychological evaluation for a potential placement into an appropriate ESE program and almost 80% of referrals to determine eligibility for gifted education in 2011-12 were for students in grades K-3. As mentioned earlier, the effect of relative age on student achievement for students in early elementary grades is considerable. Thus, one can expect that the number of referrals would be related to the relative student age. Consequently, even though intelligence testing takes a student's date of birth into account, the number of students determined to be eligible for ESE or gifted services is likely to be related to students' relative age as well.

We used the October 2012 data to analyze whether the percentages of students classified as gifted and those determined to have a specific learning disability relate to the students' relative age. The charts below show the percentages of these students in grades K-12 by the month of birth.





The patterns shown in the charts above are unmistakable: higher percentages of students who are relatively older for their grade are classified as gifted and lower percentages are classified as specific learning disabled (SLD). The table below shows the Relative Risk values for a particular classification. Once again, students born in September are used as a reference group.

Birth Month	Relative Risk	
	SLD	Gifted
September	1.00	1.00
October	1.00	0.99
November	0.98	1.01
December	0.99	0.96
January	1.02	0.92
February	1.09	0.88
March	1.11	0.88
April	1.16	0.88
May	1.19	0.82
June	1.28	0.77
July	1.35	0.71
August	1.34	0.68

It can be observed that for students who are the youngest for their grade level (those born in the months of July and August) the relative risk of being classified as specific learning disabled is more than 30% higher than that for their peers born in September. On the other hand, students who are the youngest for their grade are about 30% less likely to be classified as gifted than their peers born in September.

We also found that the rates of referrals for eligibility for gifted programs/services generally follow a similar pattern as the rates of actual gifted classification: students born in July or August are 33-36% less likely to be referred for an evaluation than their peers born in September are.

## Summary and Discussion

The trends in achievement test scores, retentions, eligibility for gifted programs and programs for students with specific learning disability concerning the students' ages relative to those of their peers in the same grade are consistent and clear. Younger students are at a distinct disadvantage. Moreover, the effects of relative age described above can have wide-ranging consequences for students' educational endeavors. When students who are the youngest in their class are retained in third grade at substantially higher rates than their older peers, it affects students' future educational outcomes and opportunities as well as their self-perception. Similarly, when the youngest students in class are identified as gifted at lower rates than their older peers are and when they are identified at disproportionately higher rates as specific learning disabled, it negatively affects the equality of educational opportunity for all students.

It seems reasonable to assume that all students, regardless of the month of their birth, are blessed with the same academic potential. However, the trends in educational outcomes discussed previously show a clear impact of students' relative age on their various educational outcomes. While these are strong, there would be many exceptions for individual students. It would be unwise to make assumptions about a student's academic and social abilities based solely on his/her birth month.

It is highly unlikely that teachers would ever consciously discriminate against the youngest students in their classes. Thus, the disparate effect of students' relative age is likely unintentional. Perhaps it is only natural for teachers to identify a student who would be referred for an evaluation to determine eligibility for gifted programs/services by comparing the student's academic performance to that of his/her peers. Because of that way of comparing, younger students in elementary grades may appear as less able. It might be a good idea to examine student academic performance and progress with a reference to a particular age-specific standard. In addition, increasing the rate of referrals in middle- and high-school grades, where the effect of relative age is less evident, may help equalizing educational opportunity with reference to gifted education. Furthermore, in an effort to reduce third-grade retention rate, it may be advisable to pay special academic attention to relatively younger children in early elementary grades. Although we offer these suggestions, it should be noted that a main purpose of this report was to provide awareness to educators regarding the relative age tendencies and to caution against untested assumptions concerning student abilities.