Quantifying the **Achievement Gap**

Baseline characteristics of African-American Student Achievement in Michigan

MICHIGAN Department of Education

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Introduction and Purpose

The gap in achievement between African-American students and students of other racial or ethnic groups is a well-known issue in national education policy. It has been studied extensively since the publication of the Equality of Educational Opportunity report of 1966 (commonly referred to as the Coleman report) and shows up repeatedly in the National Assessment of Educational Progress (NAEP). In 2013, the Michigan Department of Education (MDE) articulated six strategic priorities, the first of which was to: "Close achievement gaps in reading and math, with an initial focus on African-American young men whom data show are Michigan's persistently lowest achieving student group."[1]

The purpose of this policy brief is to present statewide baseline data on the achievement of African-American students overall (on standardized state assessments), with a particular focus on African American males, in the form of guiding questions. The assessment data available to the state allows for multiple analyses, of which those presented here represent only a small sample. Other goals are to:

- Present a number of visual representations of achievement data.
- Move beyond aggregate measures toward more sophisticated ways of looking at the full distribution of student test scores.

The overarching purpose of this brief is to demonstrate the urgency of the problem for the nearly 287,000 African-American students in Michigan[2] and the need to develop differential strategies for African-American students in different school contexts as a step toward addressing disparate achievement.

Q1. What is the relative representation of each student subgroup in the Top 30 and Bottom 30 Percent of students statewide?

One of the metrics selected by MDE leadership to chart progress in closing the achievement gap is the representation of student subgroups within the Top 30 and Bottom 30 percent of the achievement distribution. The terms "Top 30" and "Bottom 30" are most often used in defining the within-school difference between the highest and lowest achieving students. This difference is used in calculating the Top-to-Bottom (TTB) school rankings familiar to school stakeholders and decision-makers. For the following discussion, "Top 30" and "Bottom 30" refer to student level performance for the entire state; specifically, the representation by ethnicity within the Top and Bottom 30 statewide.[3]

Z-scores are used in much of the discussion in this policy brief to allow for the inclusion of students in every grade, taking all forms of assessment. Z-scores are standardized test scores that allow for determining how far above or below the state average a student scored. Given a particular set of scale scores (e.g. third-grade reading MEAP scores), the mean and standard deviation are calculated and each scale score is converted to a Z score representing how many standard deviations above or below the mean it is. Once z- scores are calculated they can be used for comparison across grade levels.

The z-score cutoffs were calculated for the 30th and 70th percentiles and race/ethnicities tabulated to determine representation in the top and bottom groups respectively. Table 1 presents the number and percentage of tested students in the state, the percentage in the Top 30 math and reading, and the difference between those percentages and the overall state percentages (which we will call the "representation gap") for each racial/ethnic group. These numbers are calculated across all students with z-scores, and include students from every grade 3rd through 11th for which a math or reading test is given. The assessments included are: MEAP, MME, MI- Access, and MEAP-Access.[4] The table includes information for the top four race/ethnicities in Michigan K-12.

[1] Source: MICHIGAN STATE BOARD OF EDUCATION AND MICHIGAN DEPARTMENT OF EDUCATION GOAL AND REFORM PRIORITIES 2012-2013. Retrieved from: http://www.michigan.gov/documents/mde/FINAL_SBE_MDE_Goal_and_Reform_Priorities_2012-2013_389150_7.pdf?20140211143135

[2] MiSchoolData lists 286,952 African-American students (18% of the total state population) in all grades in 2012-2013.

[3] Numbers and percentages include all students with a valid z-score in the relevant subject; TTB calculations only assign z-scores to Full Academic Year (FAY) students.

[4] Z-scores are computed separately by exam and subject.

Table 1. Top 30% Representation by Race/Ethnicity						
Race/Ethnicity 2012-2013[5]	Number FAY Assessed in State	Percent in State	Math Top 30 Percent	Math Difference	Reading Top 30 Percent	Reading Difference
Black or African American	122,916	17%	7%	-10% (under-rep)	7%	-10% (under-rep)
Asian	21,304	3%	5%	2% (over-rep)	4%	1% (over-rep)
Hispanic or Latino	45,288	6%	4%	-2% (under-rep)	4%	-2% (under-rep)
White	520,891	71%	81%	10% (over-rep)	81%	10% (over-rep)
Total	734,201	100%				

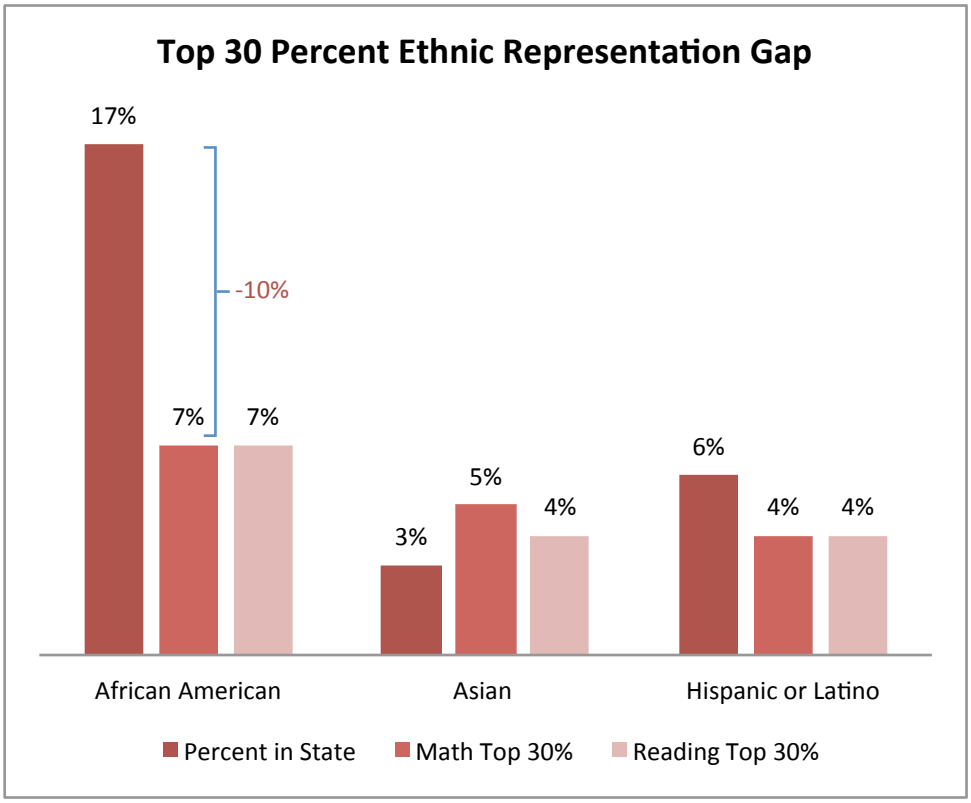

Figure 1. Ethnic representation of students statewide scoring in the Top 30 Percent in Math and Reading

Figure 1 compares the three nonwhite student populations' percentage of students in the state and in the Top 30 math and reading. White student information is omitted because the large percentage of white students in the state obscures gaps in the other student populations. Compared to the percentage of z-scored students within the state, there are several groups of students overrepresented or underrepresented in the Top 30. African-American students represent 17 percent of all tested students but only 7 percent of the Top 30 students across all grades, leaving a representation gap of -10 percentage points. White students (Table 1) are overrepresented by 10 percentage points.

[5] Ethnicity numbers are calculated based on numbers of students with non-missing z-scores in math (while exact numbers differ, percentages are the same for reading). "Native Hawaiian or Other Pacific Islander," though it appears in overall numbers (n=892), has no students with math or reading z-scores. The Total also includes "American Indian/Alaska Native" (7,471 students; 1 percent of state population); and "Two or More Races" (23,074; 2 percent).

Table 2 shows the same information for the Bottom 30 percent of students statewide. African-American students make up 31 percent of the math Bottom 30 and 29 percent of the reading Bottom 30, an overrepresentation of 14 and 12 percentage points respectively (Table 2). MDE has set a goal to achieve equitable distribution, i.e. eliminate the representation gap such that the percentage of African-American students in the Top and Bottom 30 mirrors the 19 percent representation in the state overall.

Table 2. Bottom 30% Representation by Race/Ethnicity

Race/Ethnicity 2012-2013	Percent in State	Math Top 30 Percent	Math Difference	Reading Top 30 Percent	Reading Difference
Black or African American	17%	31%	14% (over-rep)	29%	12% (under-rep)
Asian	3%	1%	-2% (under-rep)	2%	-1% (under-rep)
Hispanic or Latino	6%	8%	2% (over-rep)	8%	2% (over-rep)
White	71%	56%	-13% (under-rep)	56%	-13% (under-rep)
Total	100%				

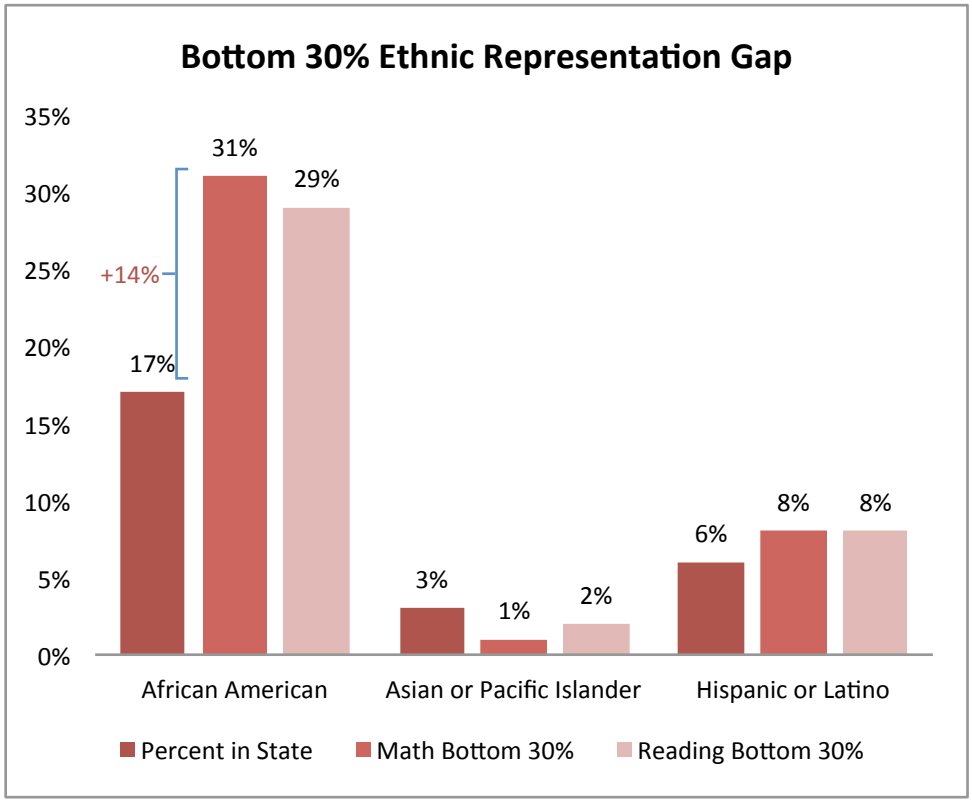

Figure 2. Ethnic representation of students statewide scoring in the Bottom 30 Percent in Math and Reading

Table 3. Top 30% Representation by Race/Ethnicity - Numeric					
Race/Ethnicity 2012-2013[6]	Number in State	Number in Math Top 30	Number in Math Bottom 30	Number in Reading Top 30	Number in Reading Bottom 30
Black or African American	122,916	15,351	67,106	15,517	63,238
Asian	21,304	10,965	2,613	9,750	4,014
Hispanic or Latino	45,288	13,158	18,220	8,195	18,716
White	520,891	177,634	120,648	175,494	127,213
Total	734,201	219,301	216,365	215,610	220,549

Table 3 presents similar information to Tables 1 and 2, but substitutes actual numbers of students for percentages. The Top and Bottom 30 numbers within each subject are placed side-by-side for comparison. As the table makes clear, the number of students in the Bottom 30 exceeds the number in the Top 30 for African-American and Latino students only. For African-American students, the number in the Bottom 30 is four times greater than in the top. Further, more than half of tested African-American students tested in the Bottom 30 in math and nearly half tested in the Bottom 30 in reading.

Q2. How are 2013 z-scores distributed among African-American students? How does this differ from the distribution of scores among other students statewide?

Distribution within the Top and Bottom 30 is really a result of differences in performance by subgroups of students on the assessments used in the TTB calculation. While the numbers and percentages presented in the previous section provide a useful snapshot of performance at two distinct levels, they obscure the precise distribution of performance within each ethnic group. The box plots used in this section provide more information.

Figure 3 explains the layout of a box plot.[7]

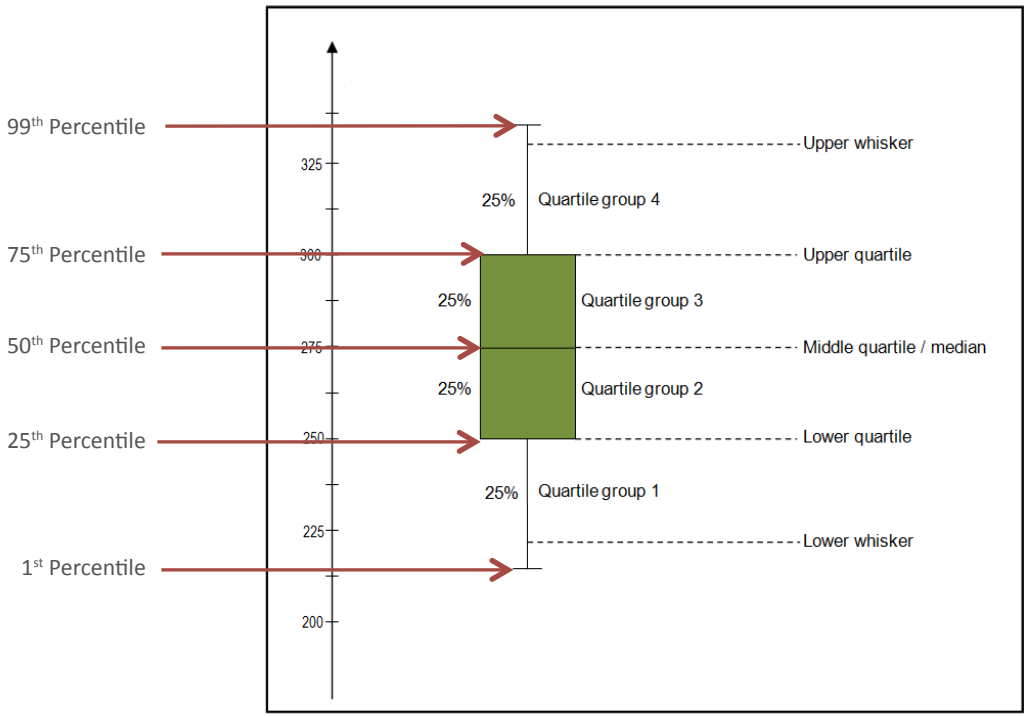

Figure 3. Explanation of box plots

[6] Ethnicity numbers are calculated based on numbers of students with non-missing z-scores in math (while exact numbers differ, percentages are the same for reading). "Native Hawaiian or Other Pacific Islander," though it appears in overall numbers (n=892), has no students with math or reading z-scores. The Total also includes "American Indian/Alaska Native" (7,471 students; 1 percent of state population); and "Two or More Races" (23,074; 2 percent).

[7] Source: http://www.wellbeingatschool.org.nz/sites/default/files/W@S_boxplot-labels.png

Box plots show the distribution of a single measure, organized by quartiles: the bottom line of each box presents the 25th percentile, the middle line is the median (50th percentile), and the top line shows the 75th percentile. The lines that extend from the box represent the tail ends of each distribution (approximately the 1st and 99th percentiles).[8] Any points that lie outside the caps of those lines are considered outliers. In Figure 4, a red line at zero represents the state average. Because box plots use the median as the measure of central tendency, the graphs actually compare median within-race scores to the average state score. As presented in the tables in the appendix, the performance means per ethnic group are generally close to the medians. Figures 4 and 7 present math and reading scores at the elementary level only; Figures 5 and 8 are at the middle school level, while Figures 6 and 9 are at the high school level. To simplify the graphs, numerical values for each percentile are not included; values can be found in the tables in the appendix.

It is apparent at a glance that African-American students' math scores are lower on the scale than are those of other races/ethnicities. Asian student scores are the highest, and scores for White students lie between those between those of African-American and Asian students. Other observations to be made from the math boxplots are:

- African-American students are one of the only groups with outliers depicted at the top of the score range (i.e. the 99th percentile had z-scores less than 2). All races/ethnicities have students at the bottom (z-scores of -2 or lower).
- The African-American 75th percentile reaches state average. This means that approximately 25 percent of African-American students scored above state average in 2013.
- White and Asian medians are above state average.
- Approximately 20 percent of African-American students score above the white student median score.

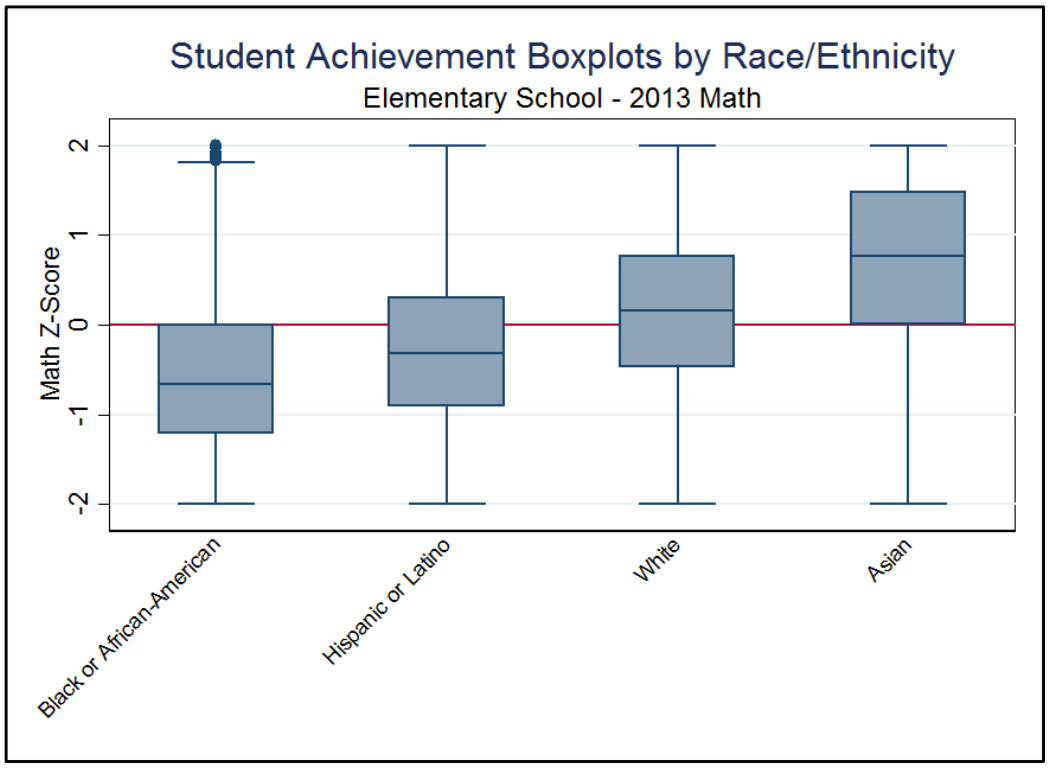

Figure 4. Student achievement box plots by race/ethnicity, elementary school math

[8] The statistical software package Stata was used to generate the box plots. Stata creates end-lines at +/-1.5 times the difference between the 75th and 25th percentiles (i.e. the interquartile range).

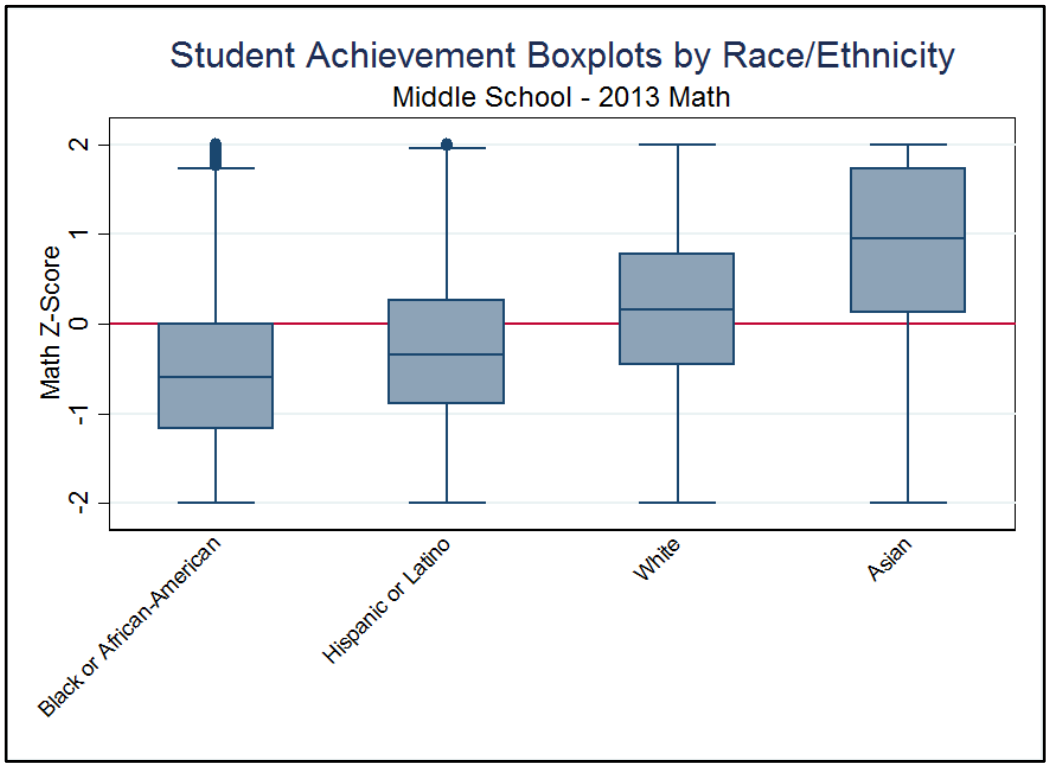

Figure 5. Student achievement box plots by race/ethnicity, middle school math

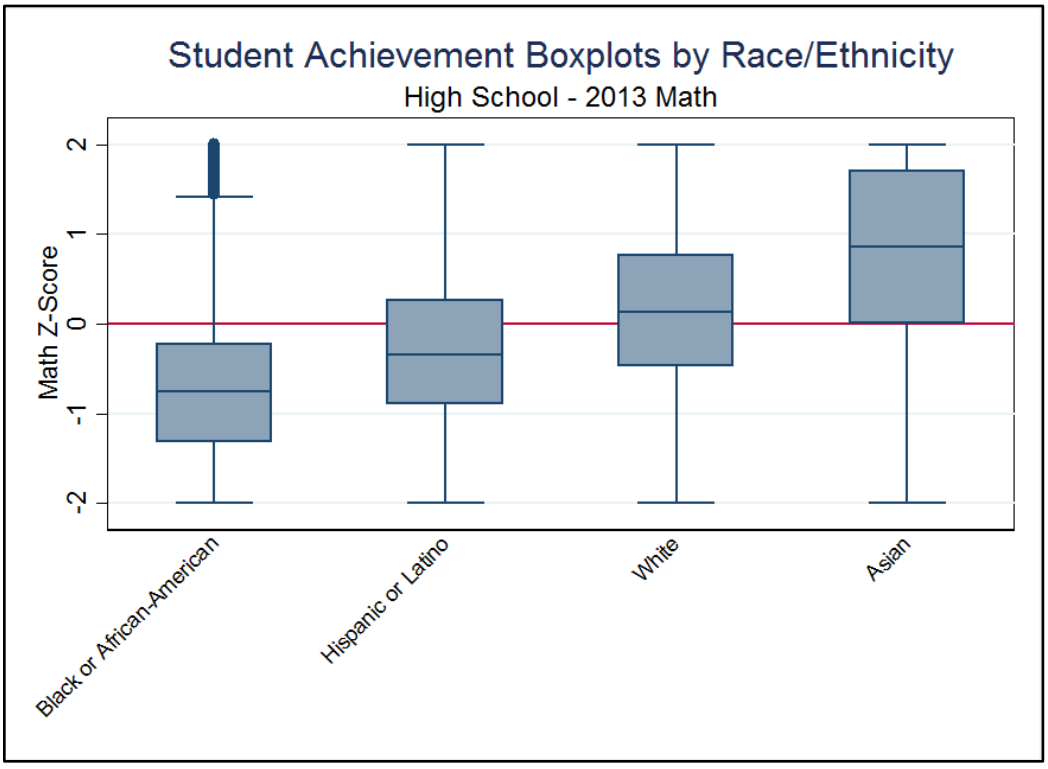

Figure 6. Student achievement box plots by race/ethnicity, high school math

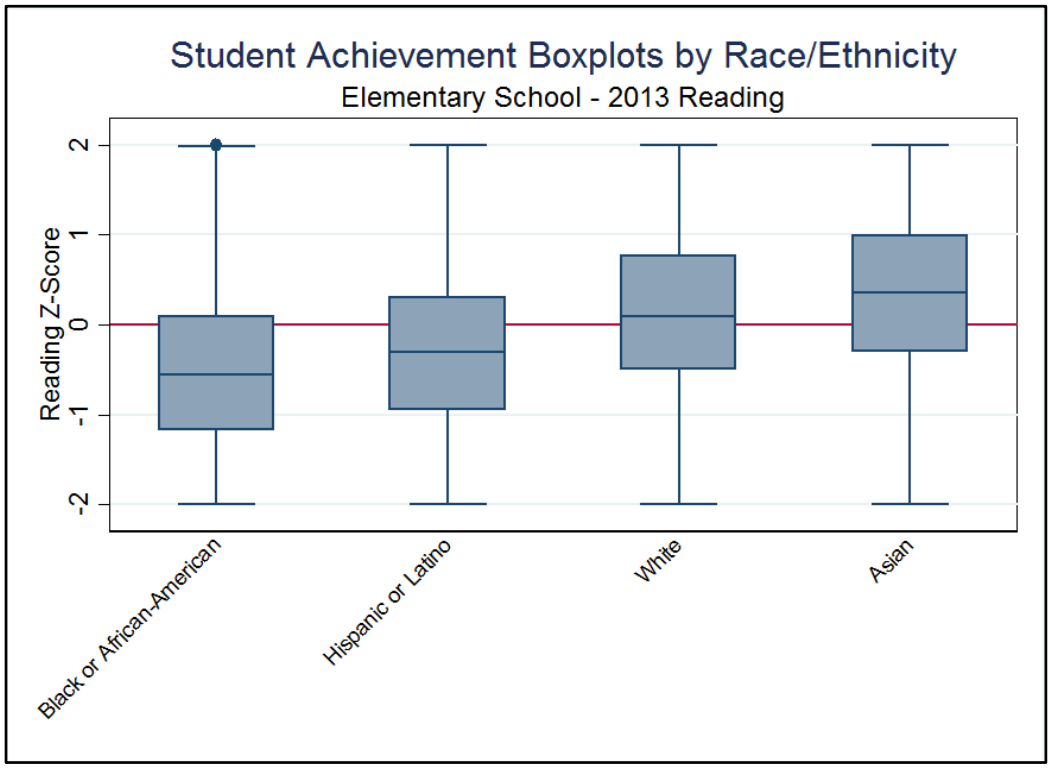

Figure 7. Student achievement box plots by race/ethnicity, elementary school reading

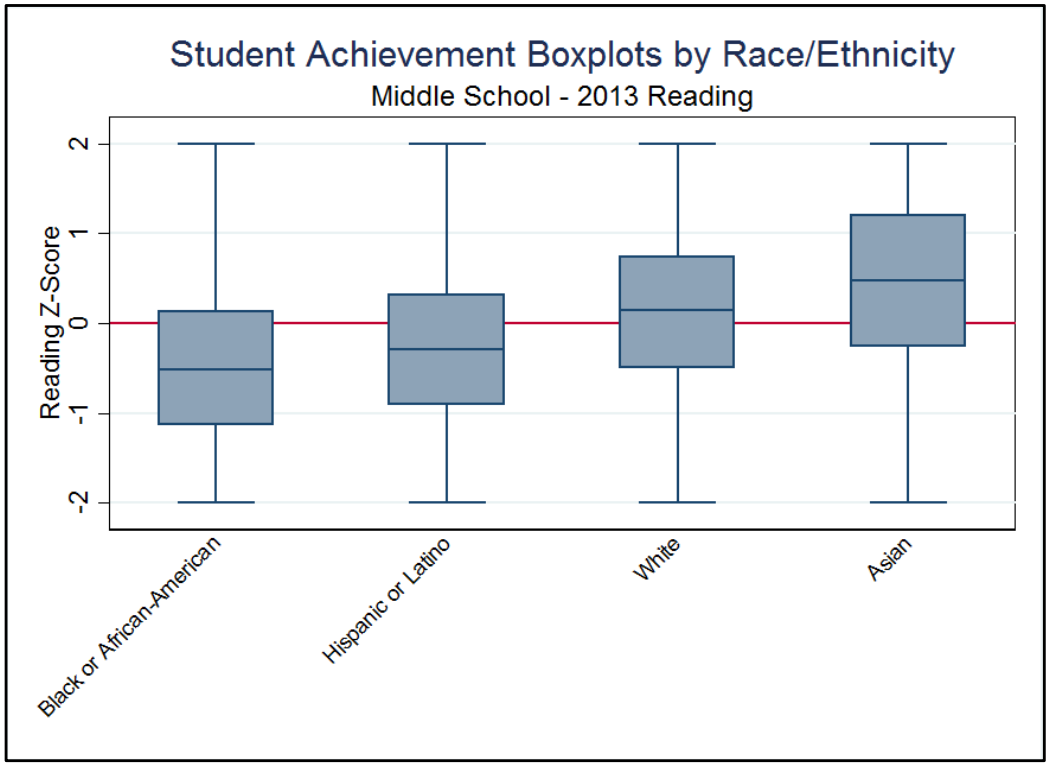

Figure 8. Student achievement box plots by race/ethnicity, middle school reading

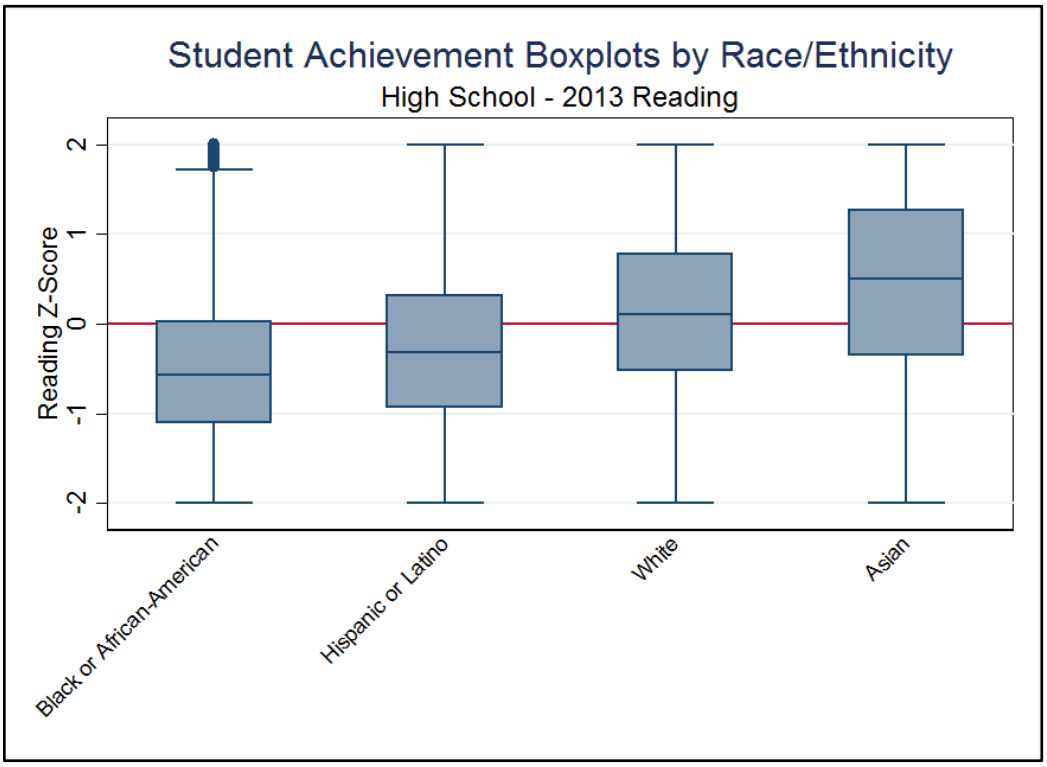

Figure 9. Student achievement box plots by race/ethnicity, high school reading

In the middle and high school math plots, the boxes are in the same relative positions to one another. Variation in Asian students scores is greater in high school (specifically, the 75th percentile is higher). While the overall distribution of test scores for other students remains fairly fixed in all three grades, the scores of African-American students decrease each year. In particular, it appears that the top portion of the distribution (99th and 75th percentiles) falls in the higher grades. For high school students, the 75th percentile of African-American students falls below the state average in math, meaning that more than 75% of African-American students score below the state average.

In reading, the pattern is not as stark. African-American students still perform below other groups, but not by as much, and there is a smaller decrease in the relative scores of higher-performing African-American students between third grade and 11th grade than in math.

African-American Male Students and Other Students at Transition Points (3rd, 6th, 11th Grades)

Toward MDE's goal of addressing the performance of African-American males, the following section contains a series of graphs comparing assessment results between African-American male and all other students. To isolate specific points in students' school life, Figures 10 through 15 compare African-American males' achievement against that of other students in grades three, six and eleven.[9] Again, z-scores are used to allow for students taking all forms of assessment.

[9] Third grade is chosen because it is the first grade in which state assessments are administered. Sixth is the beginning of middle school in many districts. Eleventh grade is chosen as the high school reference point because it is the only one for which math and reading scores are available.

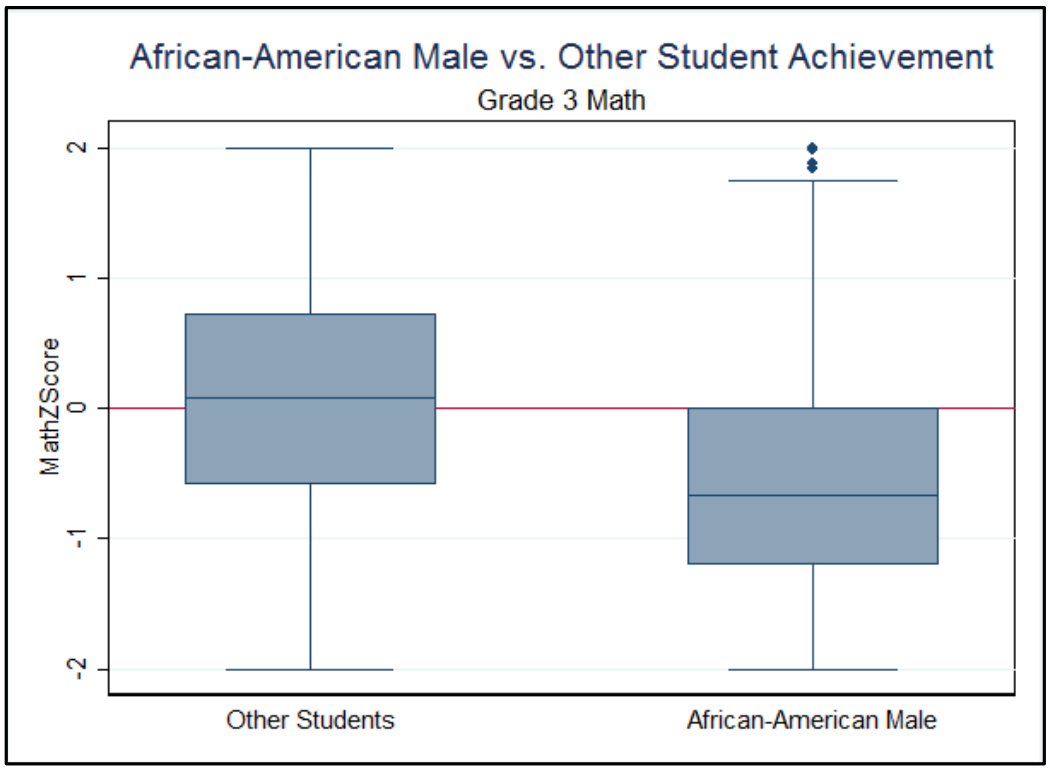

Figure 10. African-American Male Student z-scores compared to Other Students, 3rd grade math

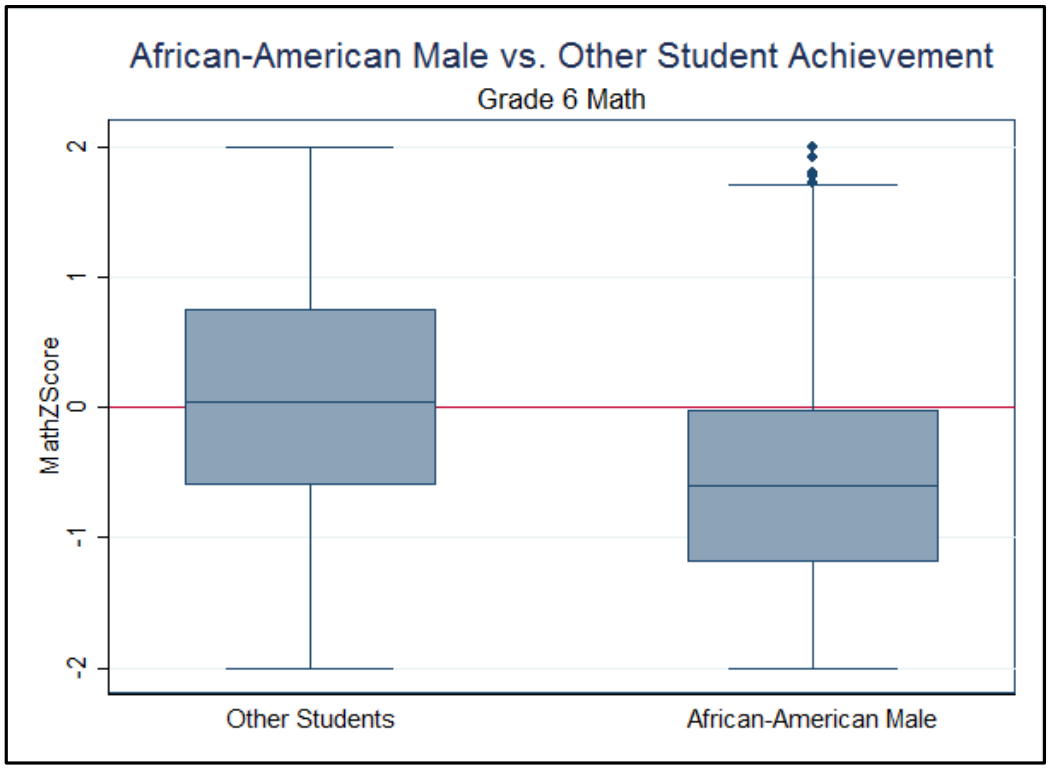

Figure 11. African-American Male Student z-scores compared to Other Students, 6th grade math

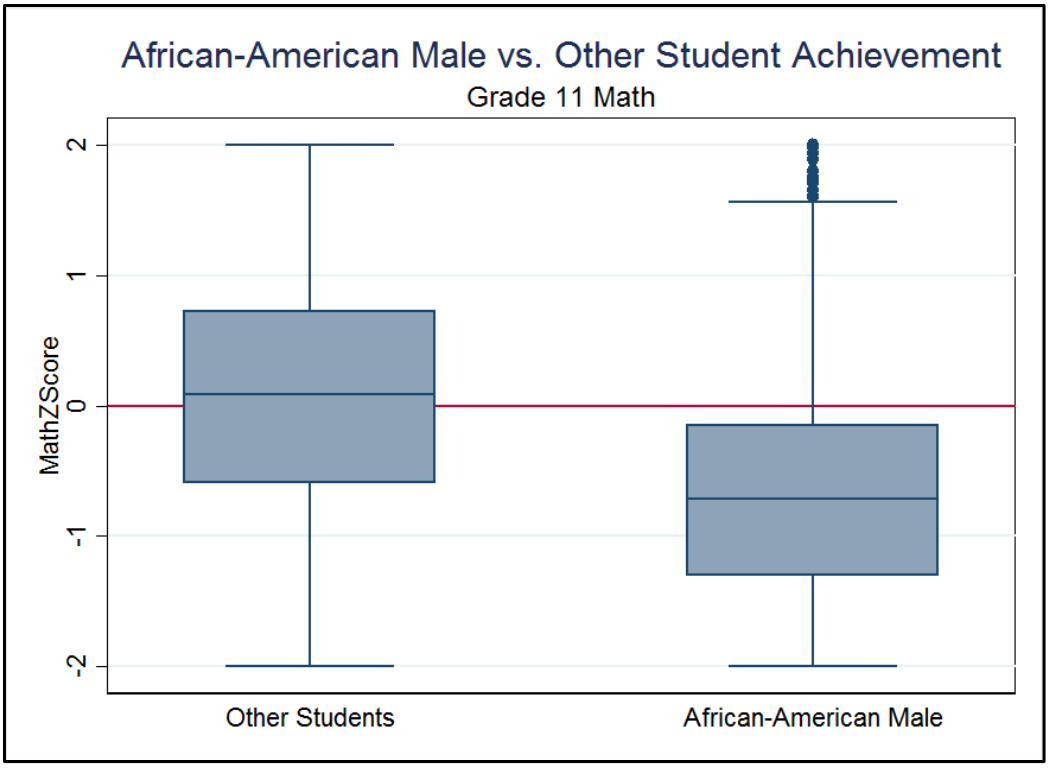

Figure 12. African-American Male Student z-scores compared to Other Students, 11th grade math

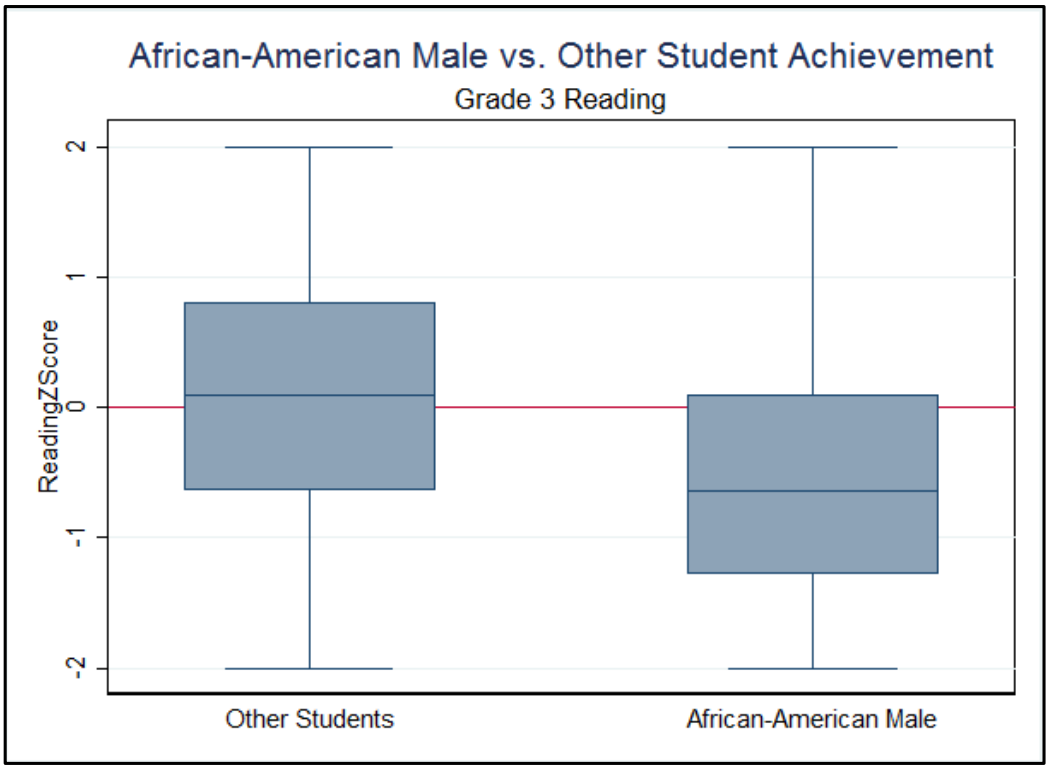

Figure 13. African-American Male Student z-scores compared to Other Students, 3rd grade reading

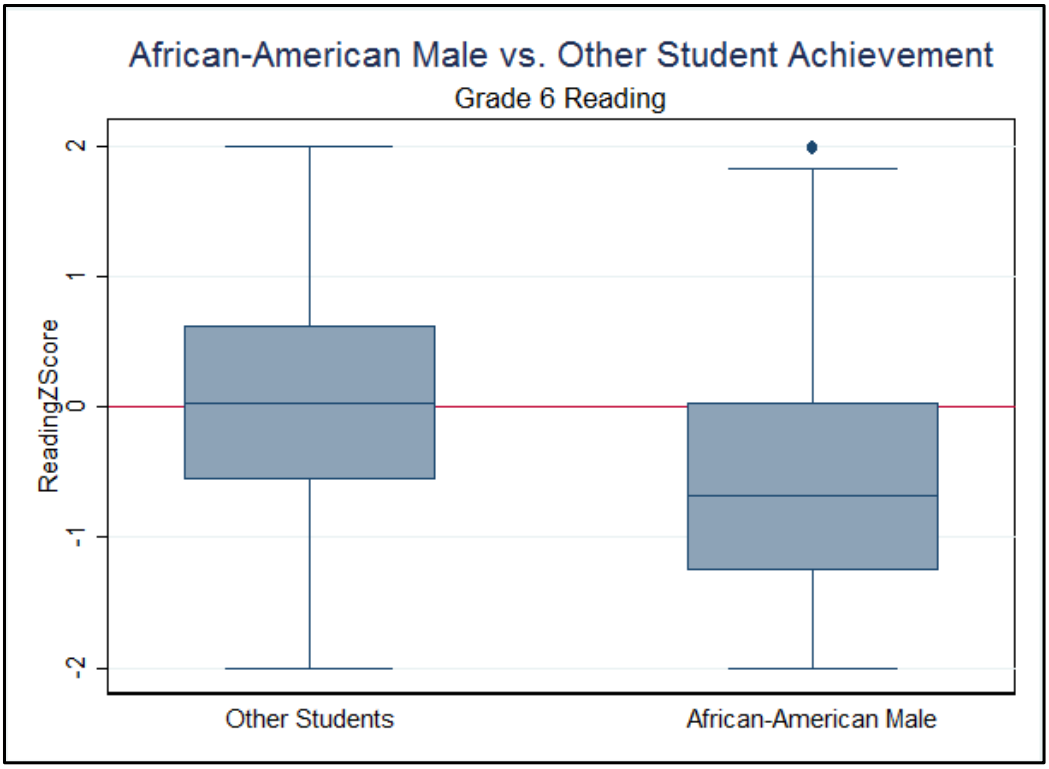

Figure 14. African-American Male Student z-scores compared to Other Students, 6th grade reading

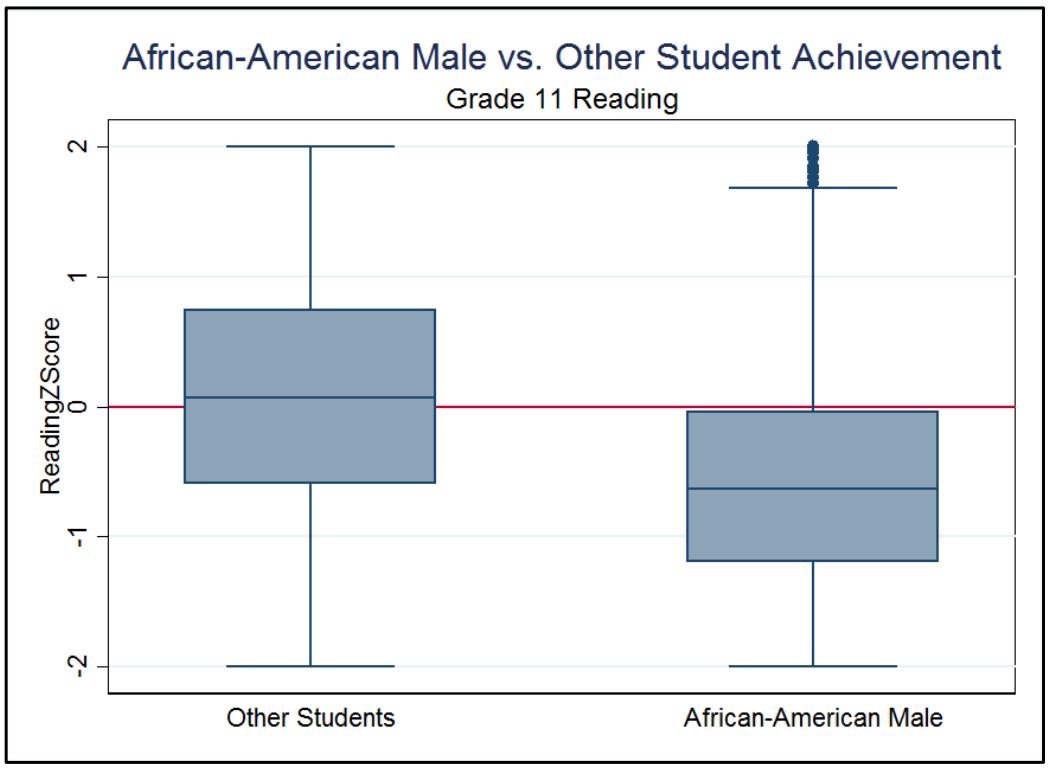

Figure 15. African-American Male Student z-scores compared to Other Students, 11th grade reading

The most obvious takeaways from the math graphs are that: 1) African-American male students already lag in achievement in the third grade, which is the first year state assessment data are available, and 2) as in the school level graphs, while the overall distribution of test scores for other students remained fairly stable in all three grades, for African-American male student scores, the top portion of the distribution (99th and 75th percentiles) is slightly lower in the higher grades.

Overall, the pattern for African-American males mirrors that of African-American students as a whole as presented in the previous set of graphs. One difference is that the decline in reading seems greater when considering males separately. This suggests that African-American females outperformed African-American males in reading, particularly in the upper grades, and is confirmed in the data (not included in the current policy brief).

While the overall situation is serious, it is important to note the outliers in this case. Though a lower proportion than that of overall students, there are African-American male students at each grade level achieving z-scores of two or above, i.e. there are some very high achieving African-American male students in Michigan in all three grades analyzed for this report.

Q3. How do these z-score differences translate to scale score differences? How does the distribution of MEAP scores relate to percent proficiency?

Table 3 presents percent proficiency for all tested subjects in grades 3-9 and 11, separately for African-American male students and all other students. It also presents MEAP and MME scale scores and the differences between African-American males and other students. Specialized assessments (MI- Access and MEAP-Access) are omitted for clarity, as the scales differ from assessment to assessment. Figure15 is a graph of the MEAP gaps for grades 3-9 and 11.

A number of observations can be made from these data:

- Proficiency rates are low for African-American male students, but are also fairly low for other students in math and science.
- Gaps range from 13 to 23 on MEAP (3rd-9th) and 54 through 79 on MME. (11th Grade). There is no particular pattern across groups and subjects, though it should be remembered that the data represent a snapshot rather than a longitudinal look at a cohort of students.
- The differences in percent proficiency seem large compared to the difference in scale scores. This phenomenon is discussed at length below.
- On the MME (11th grade), other students' average scores are nearly all below the cut-points for 11th grade proficiency, hence the low percentage of proficient students. However, African-American male student proficiency still lags behind.

Table 4. MEAP/MME Scale Scores and Percent Proficient[10], African-American Male Students and Other Students (2012-2013)

			Percent Proficient[11] 2012-2013			Scale Scores 2012-2013		
Grade	Subject	Proficiency Scale Score Cut-point	African-American Male Students	Other Students	Difference	African-American Male Scale Score Average	All Other Students Scale Score Average	Difference
3	Reading	324	39%	68%	29%	315.9	335	-19.1
	Math	336	21%	52%	31%	317.4	330.7	-13.3
4	Reading	419	39%	69%	30%	414	435	-21.0
	Math	434	23%	48%	25%	415.4	430.5	-15.1
	Writing	400	18%	47%	29%	384.2	398.9	-14.7
5	Reading	521	41%	70%	29%	516.3	534.5	-18.2
	Math	531	23%	47%	24%	509.1	528.7	-19.6
	Science	533	4%	15%	11%	502.1	525.4	-23.3
6	Reading	619	41%	68%	27%	612.5	632.3	-19.8
	Math	629	18%	42%	24%	609.5	625.2	-15.7
	Social Studies	625	7%	30%	23%	599.9	613.7	-13.8
7	Reading	721	34%	64%	30%	706.5	729.5	-23.0
	Math	731	16%	40%	24%	708.6	727	-18.4
	Writing	700	23%	52%	29%	682.3	701.4	-19.1
8	Reading	818	40%	67%	27%	809.5	825.7	-16.2
	Math	830	13%	36%	23%	803.8	820.3	-16.5
	Science	845	5%	17%	12%	804.7	821.8	-17.1
9	Social Studies	928	7%	29%	22%	900.6	917.1	-16.5
11	Reading	1108	25%	55%	30%	1033.4	1095.2	-61.8
	Math	1116	8%	30%	22%	998.7	1077.7	-79.0
	Science	1126	6%	27%	21%	1012.5	1086.4	-73.9
	Social Studies	1129	12%	38%	26%	1039.9	1106	-66.1

[10] The percent proficiency numbers are based on those students receiving a proficiency level of one or two. These percentages may be smaller than those reported elsewhere because accountability proficiency percentages include "provisional" and "growth" proficient students. The lower percentages are used in this brief because they represent "true" base performance on the relevant assessment.

[11] Reported scale scores and percentages proficient are for all students, not just full academic year (FAY) students, as would be reported by MDE accountability.

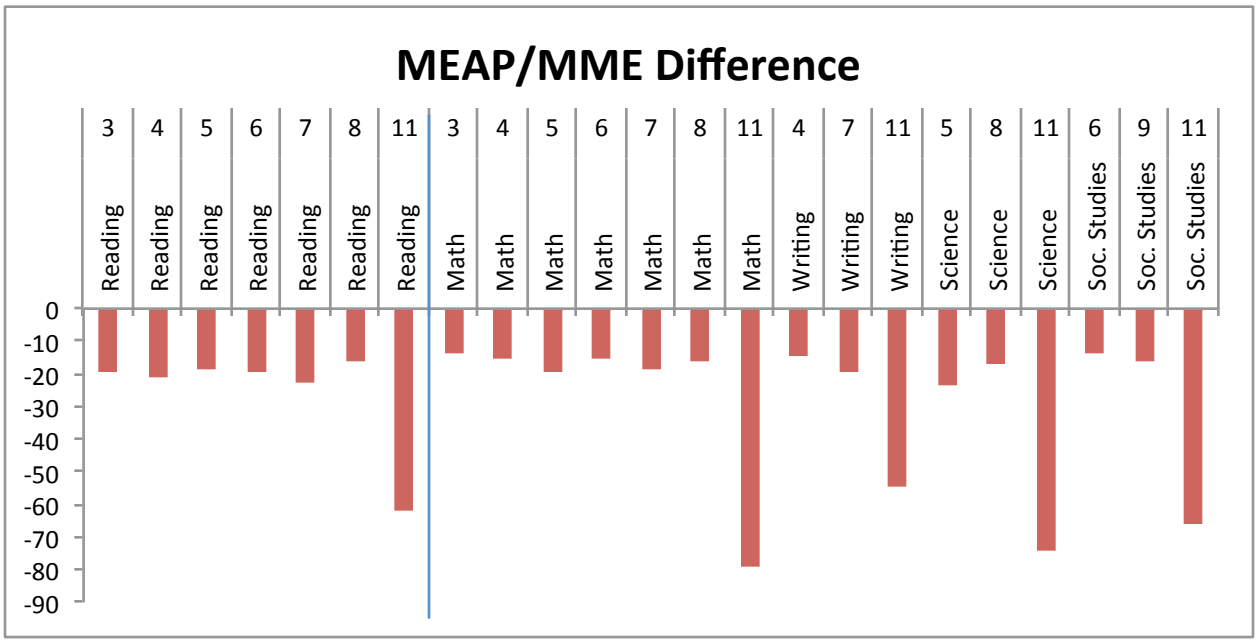

Figure 15. Difference between African-American Male and Other Student MEAP/MME scale scores, 2012-2013

Figure 16 illustrates how the distribution of math scale scores and percent proficient interact. The graph is a histogram of African-American scores: each tan bar represents the number of students receiving the corresponding score on the x-axis. The overall range of scores for the 2012-2013 Math MEAP was 208-416. The four vertical lines are placed at the proficiency level cutoffs set by MDE. The bold line is the cut-point to be considered "proficient." As shown in the graph, the greatest number of African-American male students scored between 305 and 310 in 2012-2013, with the majority in the area closest to 310, while the proficiency cut-point was 336. As reflected in the value for third grade math proficiency in Table 3, the area to the right of the proficiency mark contains only about 20% of African-American male students. The distribution for other students (in black) is shifted to the right, with more students having achieved scores that met proficiency. In reading (Figure 17), the possible range of scores was 188-423; the proficiency cut-point was 324.

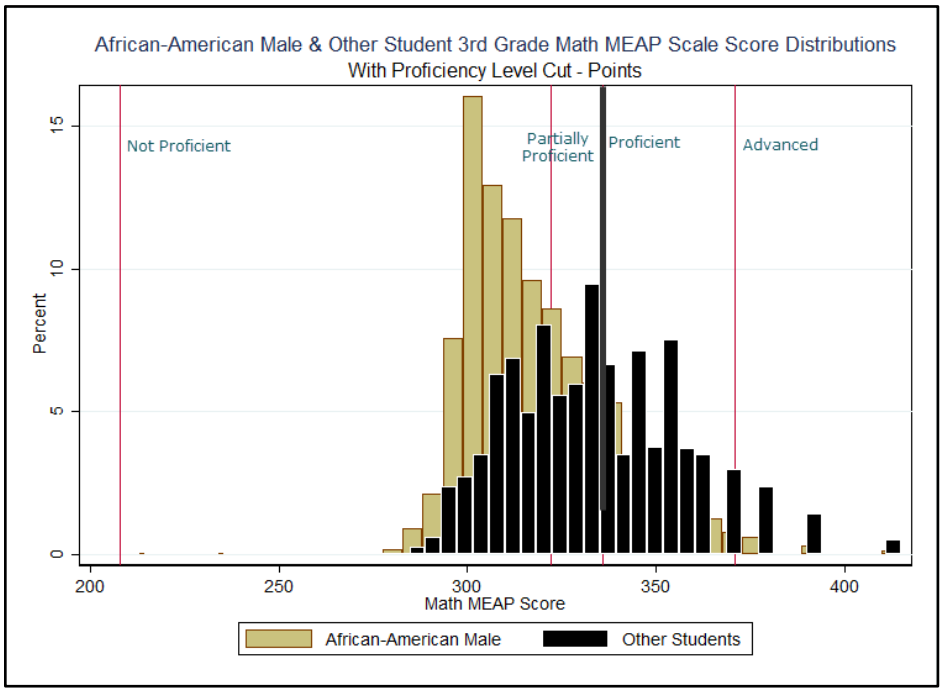

Figure 16. Relation between scale score numbers and percent proficiency (example: 3rd grade math)

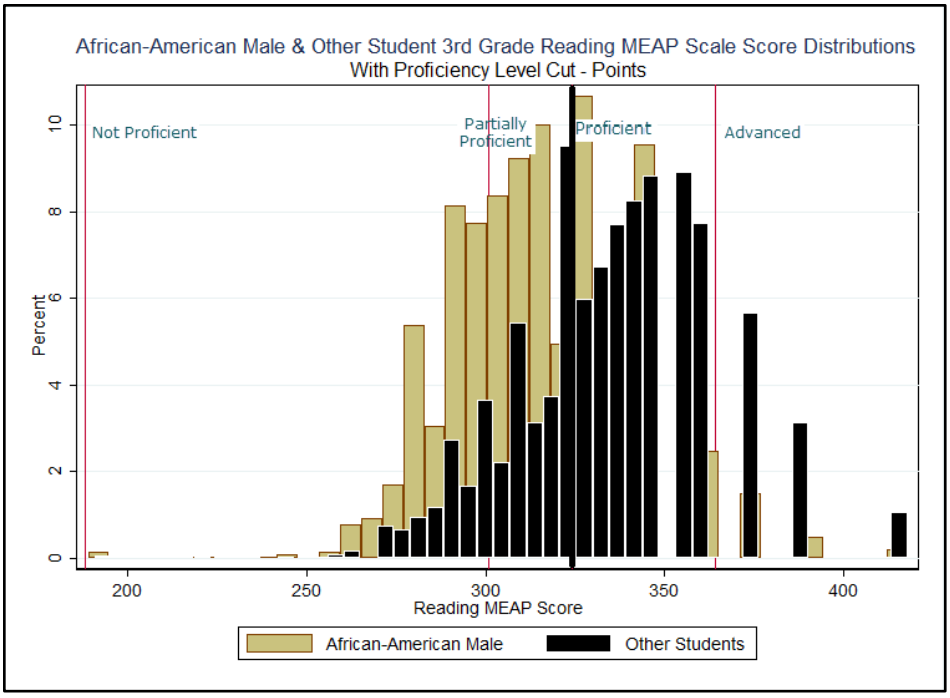

Figure 17. Relation between scale score numbers and percent proficiency (example: 3rd grade reading)

Q4: Is there a way to view individual – rather than aggregate – student achievement by race/ethnicity?

Achievement distribution graphs using individual student scores provide a way to visualize performance at the state level. Figure 18 shows how students of different race/ethnicities perform relative to other students of the same race/ethnicity, as well as relative to the state as a whole. Although in the graph within-ethnicity student scores appear as curves, each point on the curve actually represents one student (i.e. one single test score). The x-axis represents students' within-ethnicity ranking by percentile. The y-axis represents the z-scores, which themselves are a measure of students' performance relative to the state average. Vertical red lines are placed at the 30th percentile and the 70th percentile; scores to the left of the 30th percentile line represent the Bottom 30 and to the right of the 70th percentile represent the Top 30 within each ethnic group. The gray curve passing through the state average (the z-score equal to 0) at 50% (0.5) is the curve for all students of all ethnicities. As an example, looking at the 30th percentile mark, those scores of Asian students are approximately 0.25, slightly above the state average; the 30th percentile of African-American students is at -1, a full standard deviation below the state average.

In addition to providing comparisons across percentiles, some important additional information offered by this graph is the relative number of students at the top and bottom of the distribution, in this case at -2 and 2. It is readily apparent that there are more African-American students at the bottom of the distribution than other ethnicities, and that there are many more Asian students at the top of the distribution.

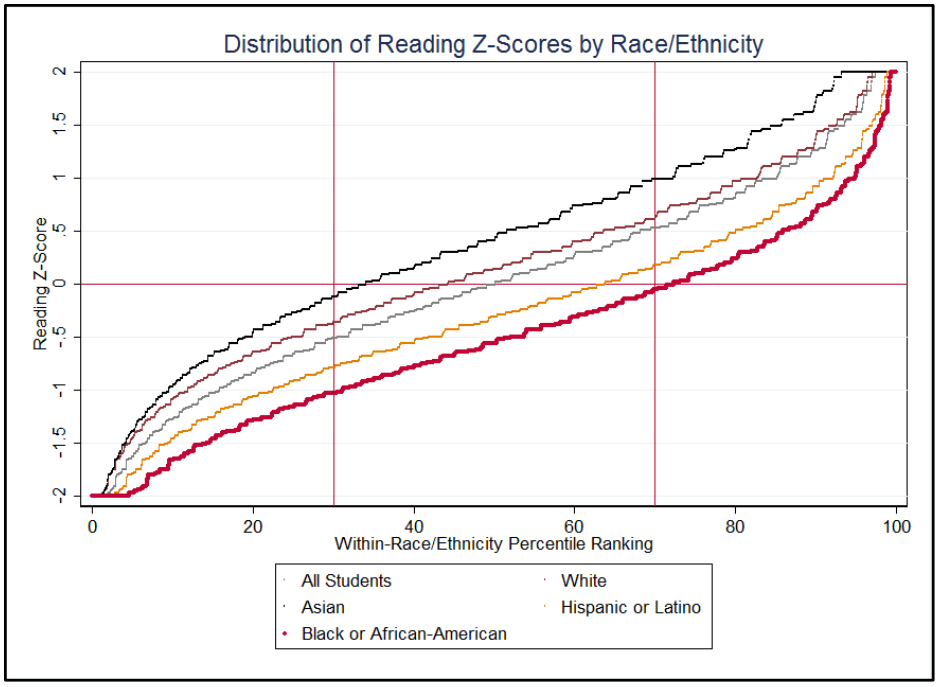

Figure 18. Distribution of individual student reading z-scores within race/ethnicity, 2012-2013

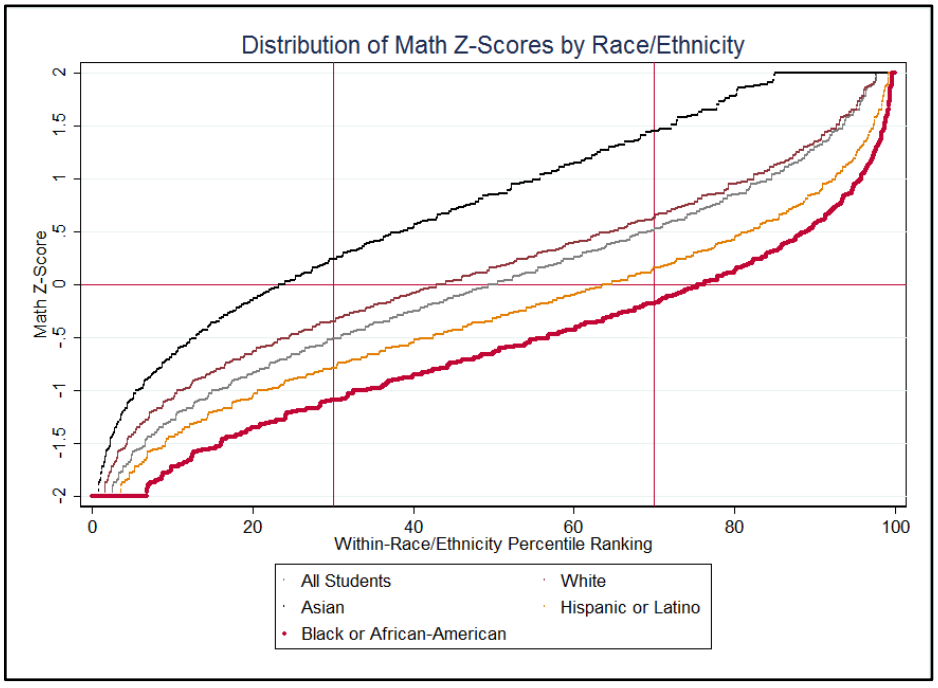

Figure 19. Distribution of individual student math z-scores within race/ethnicity, 2012-2013

Q5: What does school-level achievement look like by student? How does it relate to the overall over-representation of African-American students in the Bottom 30?

Figures 20 through 23 present student achievement distributions within school buildings for four different "types" of school. School names have been omitted to preserve student privacy. For each school, each student z-score was assigned a rank based on percentile. As in Question 4, percentiles are listed on the x-axis. The y-axis reflects the z-score itself. The red vertical lines are placed at the 30th and 70th percentiles; all points below the 30th percentile constitute the Bottom 30 within the school and all points above the 70th percentile constitute the Top 30. Though a graphic formulation rather than mathematical, the difference between these two groups is what is evaluated as part of the top to bottom ranking and to determine focus school status. All scores are from the 2012-2013 school year; all students with valid math z-scores are included.

The four figures represent different ways in which African-American student achievement is distributed throughout some schools in Michigan. High level information is presented in this policy brief; a separate policy brief goes more deeply into the details of the construction and utility of these types of graphs.

Individual Student Achievement Distribution: Example School Graphs

The first two student achievement distribution graphs represent schools in which African American students are achieving at high levels, or at least proportionately, relative to their peers. Figure 20 is an elementary reward school in which 99% of the students are African-American. From the graph, we can see that the curve crosses the state average at the 30th percentile, meaning that 70% of the students scored above the state average in math in 2013. Very few students received a z-score below -1.

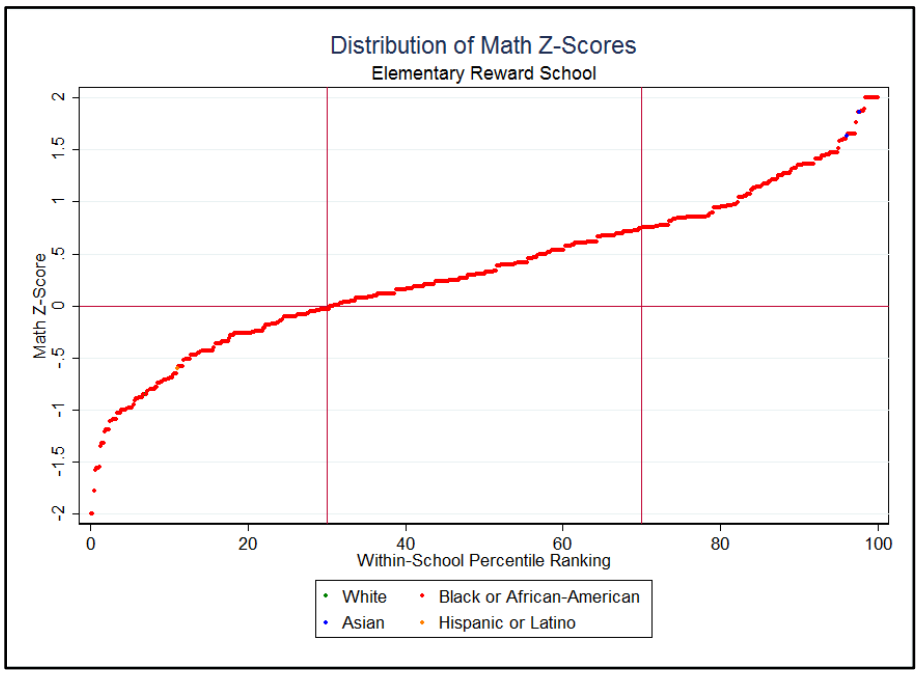

Figure 20. Distribution of within-school individual student z-scores at an Elementary Reward School

Figure 21 shows the z-scores of students at a Beating the Odds high school. This is a diverse school (27% African-American, 9% Latino, 52% White and 6% Asian), with student groups equitably distributed in achievement. In other words, there are students who scored low, high and in-between, and students of all races are scattered throughout the distribution rather than concentrated in any one area. If this type of distribution were replicated in all schools throughout the state, Michigan would achieve the equitable distribution discussed in Question 1.

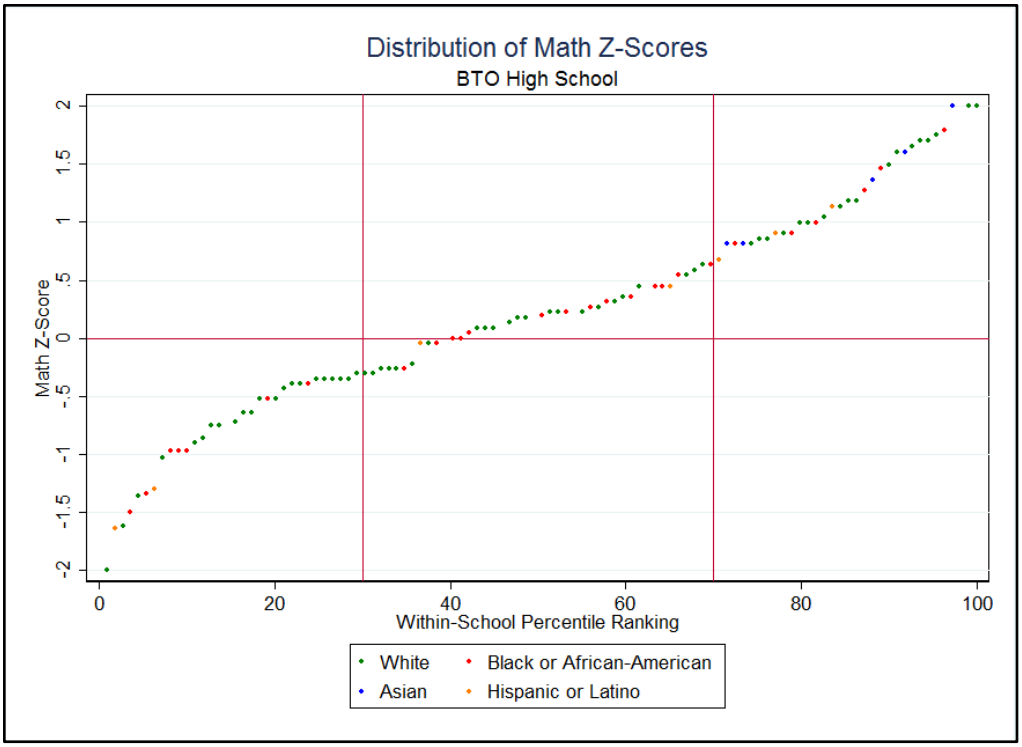

Figure 21. Distribution of within-school individual student z-scores at a Beating the Odds high school

The next two student achievement distribution graphs represent schools in which the performance of African-American students is particularly problematic. Figure 22 is a high school in which there is a notable racial achievement gap: while the school has a fairly diverse population (21% African-American, 1% Latino, 74% White and 2% Asian) and the overall school scores span the distribution from -2 to 2, the African-American students are largely concentrated in the bottom 30%. There are several students whose scores were capped at -2 or below according to Top-To-Bottom (TTB) business rules and most of them are minority students.

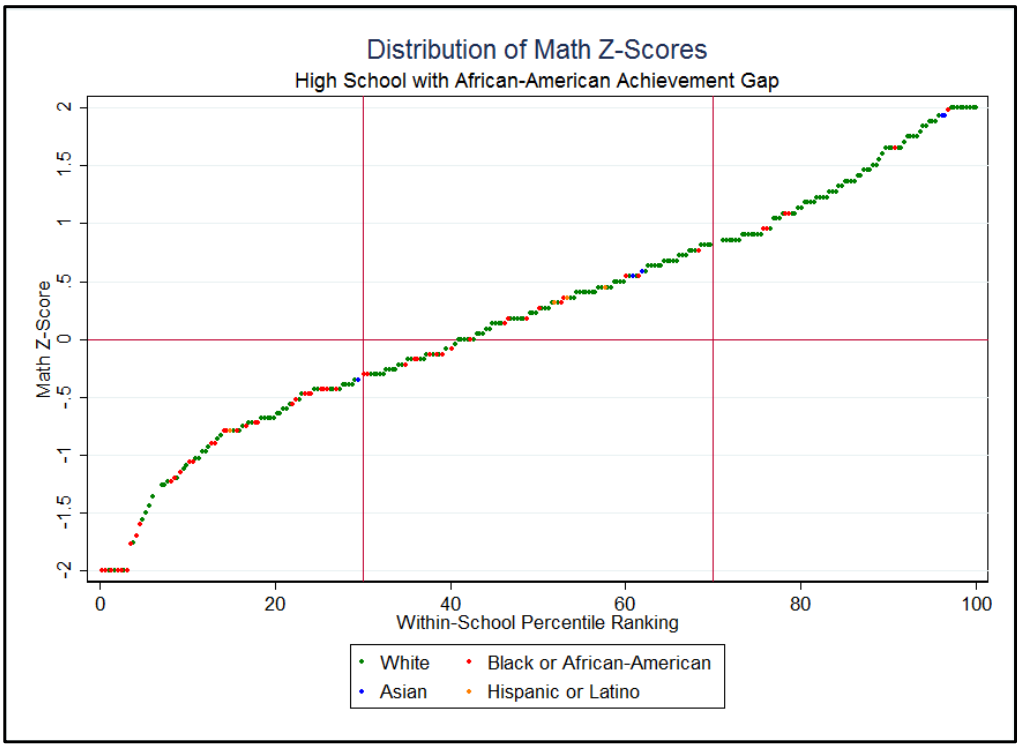

Figure 22. Distribution of within-school individual student z-scores at a high school with African-American scores clustered at bottom

Figure 23 represents a situation of systematic school-wide under-achievement for African-American students. The graph is from a high school in which 99% of the students are African-American. Approximately 32% of the students at the school received a score of -2 or below on the math assessment. The 70th percentile of students is more than one standard deviation below the state average, and the highest scoring student at the school still scored below the state average. There are certainly factors outside of the control of schools that contribute to scoring patterns such as these, but these types of results suggest a significant failure in preparing students to be career and college ready.

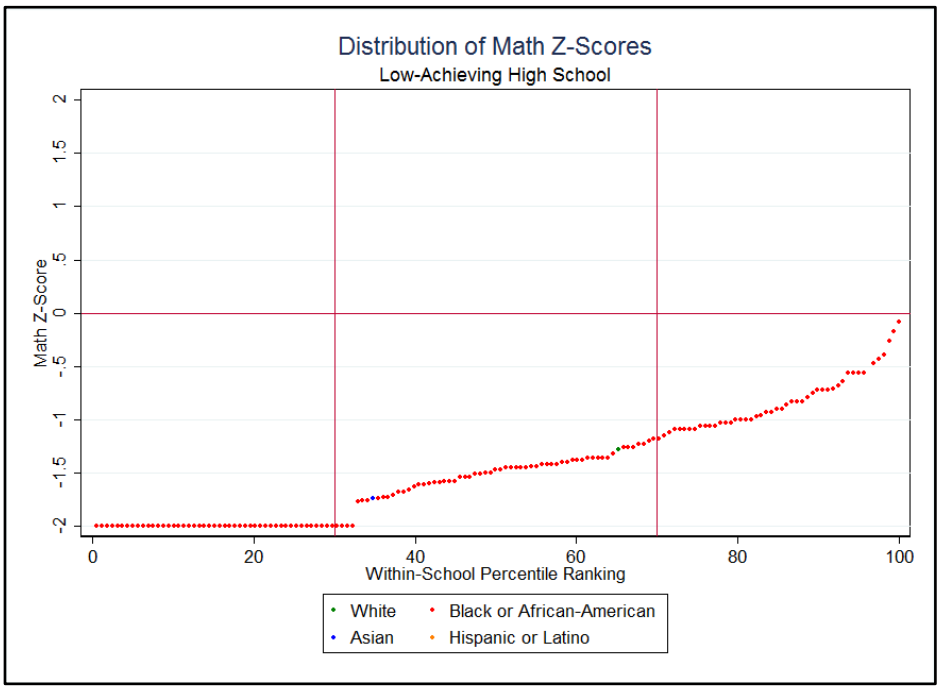

Figure 23. Distribution of within-school individual student z-scores at a predominantly African-American low-achieving high school (priority school)

Conclusions & Implications

Although the information in this brief has been presented at a high level, a number of conclusions and implications can be drawn from the data.

- The gap between African American students and other students is already present in the third grade, the first point at which state assessment data are collected. There is therefore great need for interventions and monitoring in early childhood and early elementary school.
- It would also be helpful to have more information on performance in high school, perhaps via standardized interim assessments in 9th and 10th grades. Though challenging at the state level, research is needed to gain better insight into how practice changes across grade levels to account for the relative achievement decrease of higher performing African-American students in higher grades.
- The graphs of school level performance indicate that academic contexts (such as demographic characteristics and test performance of other students) can differ significantly for African-American students depending on which schools they attend. This suggests a need for differentiated strategies to reach students in different environments and at differing levels of ability. Among other variables, in 2012-2013:
    - 72% of students in Priority Schools were African-American.

Of all African-American students tested in Michigan in 2012-2013:

- 16% of African-American students attended Priority Schools (29,547 tested students)
- 11% of African-American students attended Focus Schools (17,094 tested students)
- 9% of African-American Students attended Reward Schools and (14,206 tested students)
- 63% of African-American Students attended Non-Labeled Schools (101,054 tested students)

By contrast:

- 1% of white students attended Priority Schools
- 15% of white students attended Focus Schools
- 11% of white students attended Reward Schools
- 73% of white students attended Non-Labeled Schools

The greatest discrepancy between black and white students is in the percentage attending Priority Schools, the bottom 5% of ranked schools in TTB; much higher percentage of African-American students attended these low achieving schools in 2012-2013. The needs of students and the resources available to supplement their learning are likely very different at each type of schools. If the academic performance of African-American students were raised in priority schools and focus schools alone, nearly 48,000 students could be affected.

- As shown in the statewide achievement distribution graphs, there are 19,985 students with math z-scores capped at -2 (i.e. -2 or below, or lowest possible assessment scores). Of those, 43% (8,499) are African-American students despite the fact that African-American students make up only 18% of the Michigan student population. Simply raising the achievement of the lowest- performing students would have an impact on a significant number of Michigan students.

- There are high-performing African-American students in Michigan as well as high-performing schools with large African-American student populations, but there are many schools with no high-performing black students. There is a moral imperative to determine how to raise achievement quickly at these schools, currently reflected in MDE policy by increased supports to priority schools and investment in research resources specifically targeted at the achievement gap.

The data also suggest avenues for future research and dissemination to the public, as well as to schools and districts to help inform practice. Planned future research includes:

- District statistics similar to the state level statistics, correlations between percentage African-American students and overall achievement scores

- Interactions between economically disadvantaged status and race

- Interactions between subgroups (e.g. African-American and special education; differential male and female performance by gender)

- More specific research on students scoring at -2 and +2 z-scores. For instance, are there patterns in the types of schools at these scores?

- Investigation into resource gaps that contribute to the assessment score gaps that are more readily discernible in state level data

- Continued investigation into practices in schools that have been successful with their African-American students, either as a whole or in preventing or eliminating gaps between groups

The major limitation of this policy brief is that it is limited to analysis of outcome data, and only one form of outcome data (test scores), with no attempt to control for variables like poverty or school level characteristics such as teacher quality or experience, school resources, curricular offerings or practices. It is intended to provide a baseline rather than to identify causes for the gaps in achievement. It is hoped that future research will help to fill this need.

Appendix

Student Achievement Box Plots by Ethnicity Z-Scores for Selected Percentiles Elementary School Math				
	African-American	Latino	White	Asian
99th percentile	1.7	2	2	2
75th percentile	0.004	0.3	0.76	1.5
50th percentile (median)	-0.66	-0.32	0.16	0.76
25th percentile	-1.2	-0.9	-0.47	0.004
1st percentile	-2	-2	-2	-1.9
Mean	-0.58	-0.29	0.14	0.68
Standard Deviation	0.89	0.89	0.91	0.98

Student Achievement Box Plots by Ethnicity Z-Scores for Selected Percentiles Middle School Math				
	African-American	Latino	White	Asian
99th percentile	1.6	1.9	2	2
75th percentile	0	0.26	0.78	1.7
50th percentile (median)	-0.597	-0.35	0.16	0.95
25th percentile	-1.18	-0.89	-0.47	0.114
1st percentile	-2	-2	-2	-1.8
Mean	-0.57	-0.3	0.14	0.81
Standard Deviation	0.85	0.87	0.92	1.0

Student Achievement Box Plots by Ethnicity Z-Scores for Selected Percentiles High School Math				
	African-American	Latino	White	Asian
99th percentile	1.3	2	2	2
75th percentile	-0.22	0.3	0.77	1.7
50th percentile (median)	-0.76	-0.3	0.13	0.9
25th percentile	-1.3	-0.9	-0.5	0.0
1st percentile	-2	-2	-2	-2
Mean	-0.73	-0.32	0.13	0.73
Standard Deviation	0.80	0.87	0.92	1.1

Student Achievement Box Plots by Ethnicity Z-Scores for Selected Percentiles Elementary School Reading				
	African-American	Latino	White	Asian
99th percentile	1.8	2	2	2
75th percentile	0.1	0.30	0.76	1
50th percentile (median)	-0.56	-0.31	0.1	0.35
25th percentile	-1.2	-0.95	-0.5	-0.31
1st percentile	-2	-2	-2	-2
Mean	-0.51	-0.3	0.14	0.34
Standard Deviation	0.89	0.90	0.93	0.96

Student Achievement Box Plots by Ethnicity Z-Scores for Selected Percentiles Middle School Reading				
	African-American	Latino	White	Asian
99th percentile	1.8	2	2	2
75th percentile	0.13	0.31	0.74	1.2
50th percentile (median)	-0.51	-0.29	0.14	0.48
25th percentile	-1.1	-0.92	-0.50	-0.27
1st percentile	-2	-2	-2	-2
Mean	-0.49	-0.28	0.13	0.43
Standard Deviation	0.9	0.9	0.93	0.99

Student Achievement Box Plots by Ethnicity Z-Scores for Selected Percentiles High School Reading				
	African-American	Latino	White	Asian
99th percentile	1.5	1.8	2	2
75th percentile	0.03	0.31	0.78	1.3
50th percentile (median)	-0.57	-0.32	0.10	0.51
25th percentile	-1.1	-0.94	-0.53	-0.36
1st percentile	-2	-2	-2	-2
Mean	-0.53	-0.31	0.10	0.40
Standard Deviation	0.81	0.88	0.95	1.1


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