

**Student Attendance and Mobility
and the Effects on Student Achievement
in Mathematics and Reading**

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Student Attendance and Mobility and the Effects on Student Achievement in Mathematics and Reading

I. Introduction

Each day that a student does not attend school is a day of missed knowledge through a lack of contact with his or her teachers. Missed educational time in school may lead to poor grades and further absenteeism, leading to a vicious cycle that is a major concern of all educators (Phillips, 1995). Along with high school and college GPA, attendance is considered important for adaptive functioning in the cognitive and behavioral realms (Roby, 2004).

There is now a growing body of literature that examines the empirical relationship between attendance and achievement. Lamdin (1996) examined the relationship between attendance and performance at the elementary school level using data from schools in the Baltimore public school system. High average levels of attendance at a school were found to have a positive influence on student performance.

Hinz, Kapp, & Snapp (2003) conducted a study on student attendance and mobility in Minneapolis Public schools. Students with nearly perfect attendance on average had reading scores 20 points higher than those who attended less than 84% of the time. Investigators at the Roy Wilkins Center of the University of Minnesota examined four years of test data on the Minnesota Basic Standards Test and confirmed the impact student mobility and attendance have on achievement.

Description and Purpose of Report

This report focuses on students in grades 1 through 12 in the Pittsburgh Public Schools (PPS). It is intended to serve as a supplement to the *Report to the Community on Public School Progress in Pittsburgh* (A+ Schools, 2006), which includes a variety of performance data and contextual data for each elementary, K-8, middle, and high school in the district.

The purpose of this report is two-fold. First, it describes the level of student attendance and mobility at each grade level. The district has created four categorizations of students, referred to in the report as the attendance/mobility variable. The categories are: stable attenders, stable nonattenders, mobile attenders, and mobile nonattenders. “Stable” students are defined as those students who remain in the same school for the entire school year, and “attenders” are those students who were absent less than 5% of the school year. Percentages of students in each of the four categories during the 2004-05 school year are provided by grade level for all students and by gender, ethnicity, and socio-economic status (i.e., eligibility for free/reduced lunch).

The second purpose of the report is to examine the relationship between student attendance/mobility and achievement on the state assessment, the Pennsylvania System of School Assessment (PSSA), in mathematics and reading. The PSSA is a standards based criterion-referenced assessment that measures student’s attainment of academic standards in reading, mathematics and writing. This report focuses on the reading and mathematics standards scores in grades 3, 5, 8, and 11 for the 2004-05 school year. Grade-level analyses were conducted to determine if: a) the attendance/mobility variable has an impact on achievement, b) an interaction exists between attendance/mobility and ethnicity in terms of achievement, and c) the nature of the results from the previous two analyses remain the same when accounting for

student's gender and socioeconomic status. Finally, the report takes a closer look at grade 11 by conducting an individual analysis for each of the district's ten high schools.

The contents of this report are organized into several sections. Each section and sub-section contains numerous tables, figures, and supporting data. The level of detail provided has led to a sizable document. However, each section is somewhat self-contained. Use of the table of contents will permit the reader to focus his/her attention on the sections of the report that are of most interest. In addition, a brief summary of all sections is provided at the end of the report.

II. Student Attendance and Mobility By Grade Level

This section presents the percentages of students within each of the four attendance/mobility categories: stable attenders, stable nonattenders, mobile attenders, and mobile nonattenders. Results are shown for each grade level (1 through 12). Table 1 shows that the largest percentage of stable attenders occurs in grade 1 (80.0%). The remaining elementary grades have successively lower percentages. The mobile attenders category also has high percentages. It appears that if elementary students are not stable attenders, they tend to be classified as mobile attenders. Only small percentages of elementary students are nonattenders (stable or mobile).

Compared to elementary grades, the middle grades show somewhat higher percentages of nonattenders (stable or mobile). This trend of nonattendance continues at the high school grades. In grade 12, only 39.5% of students were stable attenders, while 32.4% were stable nonattenders and 20.2% were mobile nonattenders.

Table 1. Percentages of students in grades 1 through 12 in the four attendance/mobility categories.

	Stable Attenders	Stable Nonattenders	Mobile Attenders	Mobile Nonattenders
Grade 1 (n=2435)	80.0%	7.8%	9.2%	3.0%
Grade 2 (n=2249)	65.4%	5.4%	23.5%	5.7%
Grade 3 (n=2325)	57.4%	3.1%	34.1%	5.4%
Grade 4 (n=2399)	52.2%	3.1%	38.6%	6.0%
Grade 5 (n=2388)	46.6%	1.9%	46.8%	4.7%
Grade 6 (n=2398)	76.7%	13.6%	6.7%	3.0%
Grade 7 (n=2617)	66.0%	11.4%	15.5%	7.1%
Grade 8 (n=2582)	55.5%	11.7%	20.4%	12.4%
Grade 9 (n=3057)	50.6%	34.0%	3.1%	12.3%
Grade 10 (n=2559)	47.6%	28.8%	7.2%	16.4%
Grade 11 (n=2057)	49.6%	25.2%	9.6%	15.6%
Grade 12 (n=2166)	39.5%	32.4%	7.9%	20.2%

There is a statistically significant relationship between grade level and the attendance/mobility variable ($\chi^2_{(33)}=7275.88, p<.001$). Due to the sensitivity of the chi-square test to large sample sizes, it is also important to note that the correlation between grade and attendance/mobility is relatively strong ($r=.499$). To further examine the significant relationship

across grades, the following three figures provide a visual representation of the percentages within elementary, middle, and high school grades.

Elementary Schools

Figure 1 displays the percentages given in Table 1 for grades 1 through 5 given. A significant relationship is found between these elementary grade levels and the attendance/mobility categories ($\chi^2_{(12)}=1096.49, p<.001$), and the correlation is .305. Percentages of stable attenders decreased from grade 1 to grade 5, while percentages for mobile attenders increased from grade 1 to 5. For instance, 80.0% of students in grade 1 were stable attenders and 9.2% were mobile attenders. However, in grade 5 almost equal percentages of stable attenders and mobile attenders were found (46.6% and 46.8%, respectively). The two nonattender categories (stable and mobile) have small percentages of students across each elementary grade, ranging from 1.9% to 7.8%.

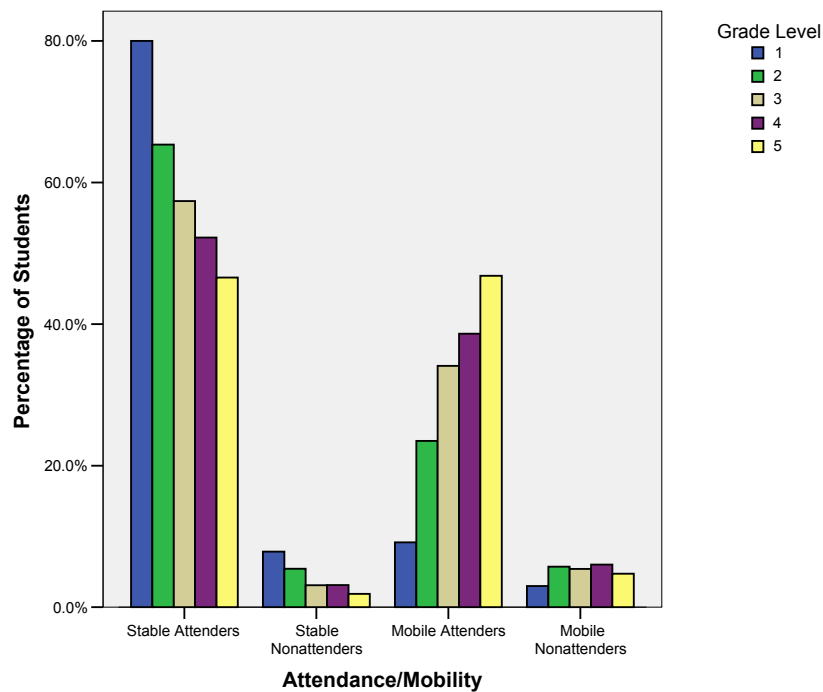


Figure 1. Attendance/mobility for elementary grades.

Middle Schools

In Figure 2, the percentages in Table 1 for grades 6 through 8 are displayed. The relationship between these grades and attendance/mobility is significant ($\chi^2_{(6)}=404.27, p<.001$), and the correlation is .231. Percentages of stable attenders decrease from grades 6 to 8 (76.7% to 55.5%), while percentages of both mobile attenders (6.7% to 20.4%) and mobile nonattenders (3.0% to 12.4%) increase with grade levels. Stable nonattenders are relatively consistent across grades (ranging from 11.4% to 13.6%).

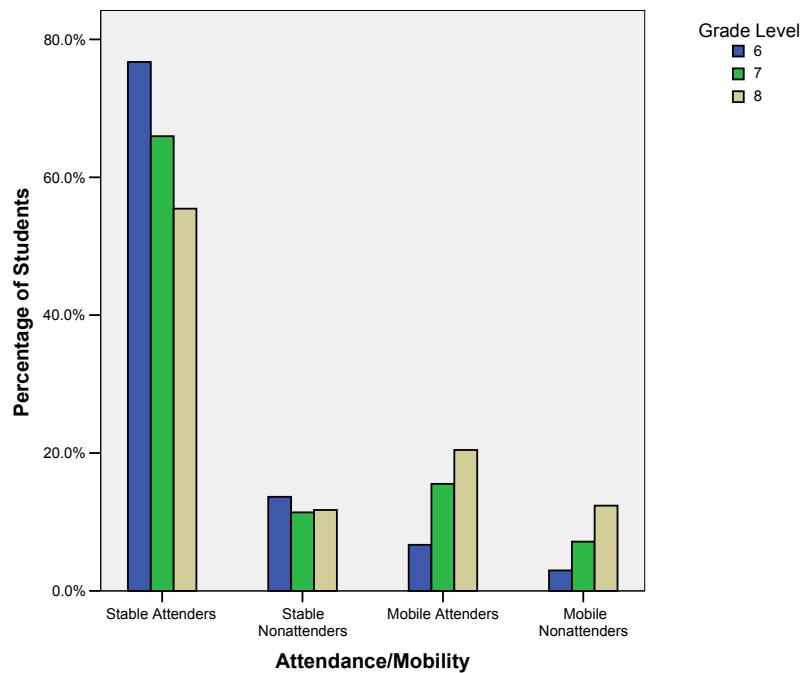


Figure 2. Attendance/mobility for middle grades.

To answer the question of whether K-8 schools differ in attendance/mobility compared to K-5 schools, percentages were calculated separately for the two school types. Overall, the results for grades 1 to 5 were similar. Both K-5 and K-8 schools had most of their students classified as stable attenders, and the majority of the remaining students were classified as mobile attenders. Only small percentages were nonattenders (stable or mobile). However, within the stable attendance category, slightly higher percentages of students were found in K-8 schools compared to K-5 schools. (See Appendix A for a complete table of results for K-8 versus K-5 schools.)

Next, results were examined to compare attendance/mobility in K-8 schools with middle schools (grades 6 to 8). Similar percentages for the two school types were found in the stable attendance category. However, more K-8 students than middle school students were classified as mobile attenders. Conversely, fewer K-8 students than middle school students were classified in the two nonattendance categories (stable and mobile). (See Appendix A for a complete table of results for K-8 versus middle schools.)

High Schools

Finally, the percentages given in Table 1 for grades 9 through 12 are displayed in Figure 3. Once again there is a significant relationship between grade levels and attendance/mobility ($\chi^2_{(9)}=215.79, p<.001$), although the correlation is not as strong ($r=.148$) compared to elementary and middle schools. The mobility categories (attenders and nonattenders) tend to increase in percentage as grade level increases. However, there is less of a relationship between grades for the two attendance categories.

When comparing this figure to the previous figures for elementary and middle grades, there is a notable difference. The stable attendance percentages are quite low in the high school grades (ranging from 39.5% to 50.6%). Percentages for the three other attendance/mobility categories

are quite high, especially for stable nonattenders (ranging from 25.2% to 34.0%) and mobile nonattenders (ranging from 12.3% to 20.2%).

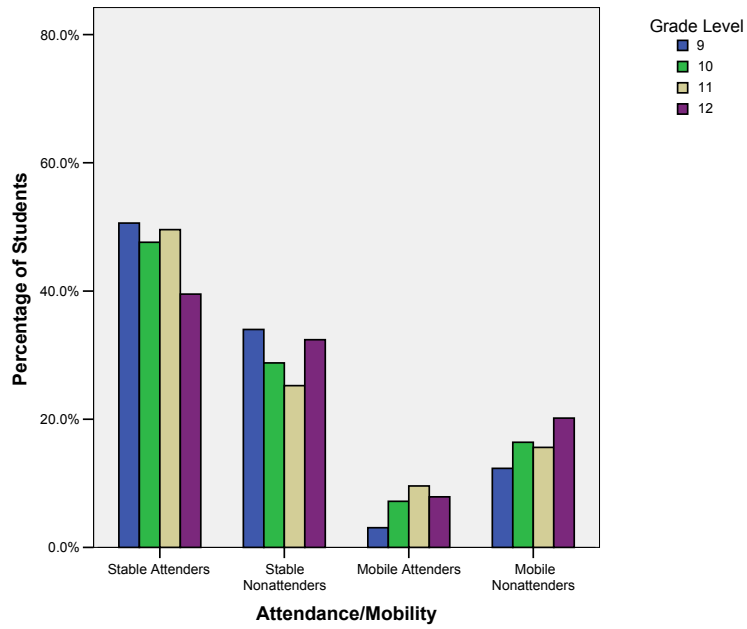


Figure 3. Attendance/mobility for high school grades.

III. Student Attendance and Mobility by Gender, Ethnicity, and Socio-Economic Status

Gender for Elementary, Middle, and High Schools

The following set of three figures displays the percentages of male and female students who were stable attenders, stable nonattenders, mobile attenders, and mobile nonattenders. Combined results for the elementary grades are shown in Figure 4. There is little difference in percentages between males and females, and results indicate no statistically significant relationship between gender and attendance/mobility ($\chi^2_{(3)}=5.82$, $p=.121$, $r=.022$).

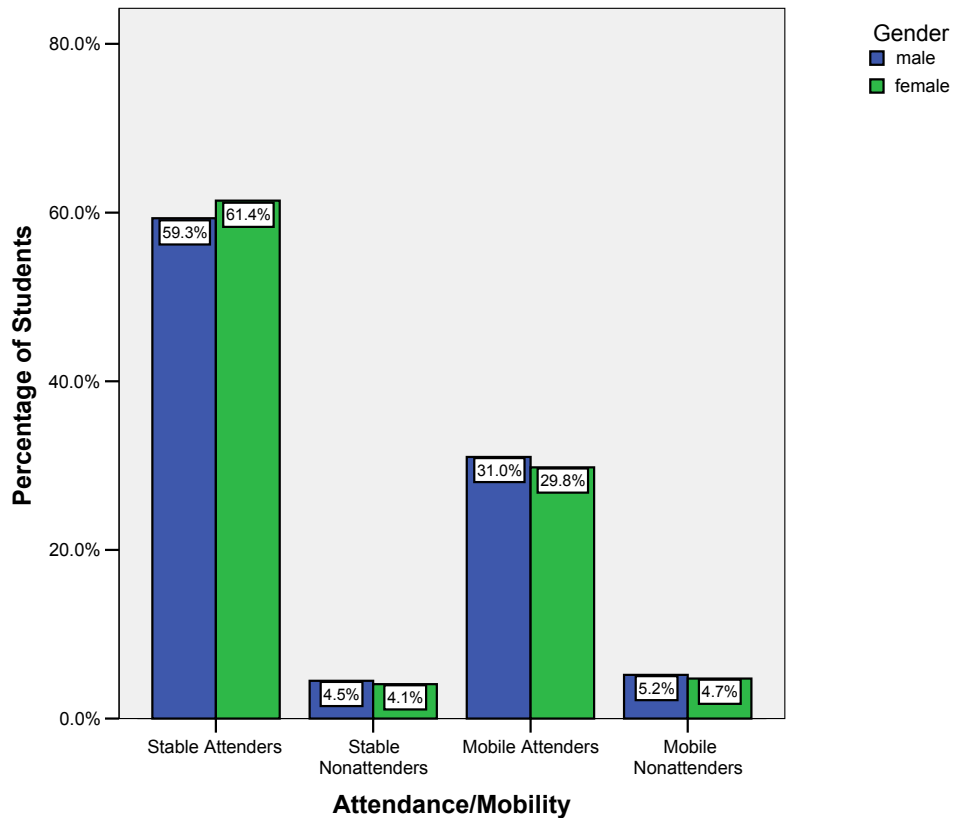


Figure 4. Attendance/mobility by gender for elementary grades (1-5)

At the middle school levels, figure 5 shows a similarity between percentages for males and females at most of the attendance/mobility categories. There is a small difference in stable attenders, with the percentage of females being slightly higher than males. Although statistically significant ($\chi^2_{(3)}=16.56$, $p=.001$), the magnitude of the relationship between gender and attendance/mobility was found to be very weak ($r=.047$). Likewise, figure 6 shows a statistically significant relationship at the high school grade levels ($\chi^2_{(3)}=16.67$, $p=.001$), but again the correlation between gender and attendance/mobility is very weak ($r=.041$).

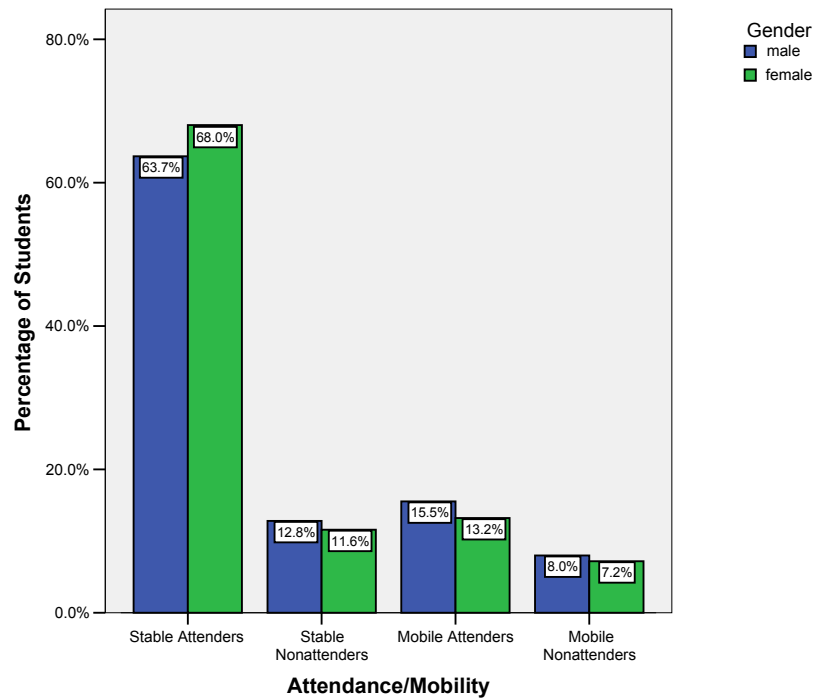


Figure 5. Attendance/mobility by gender for middle grades (6-8)

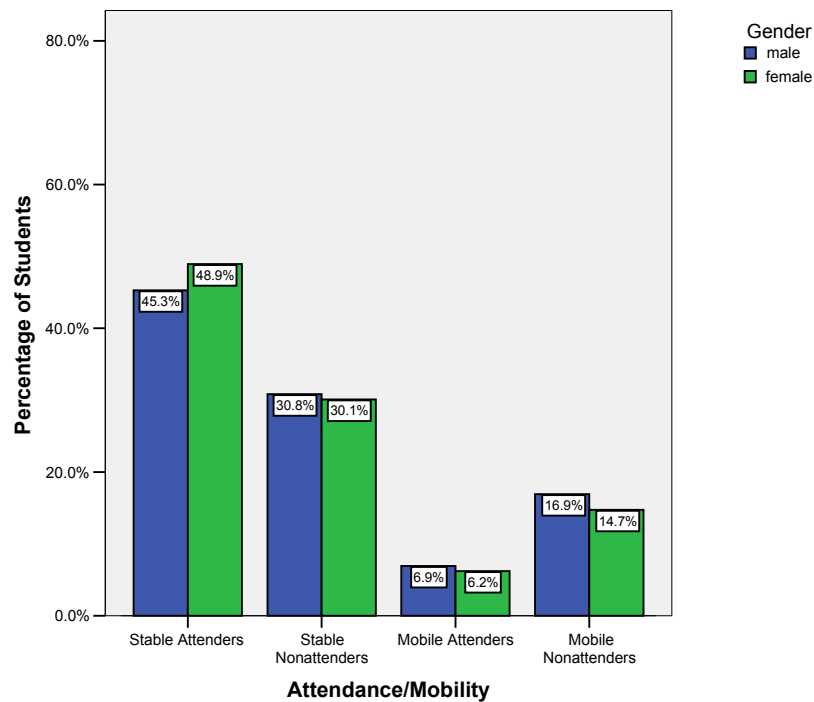


Figure 6. Attendance/mobility by gender for high school grades (9-12)

Ethnicity for Elementary, Middle, and High Schools

Next, figures 7, 8, and 9 display the percentages for three ethnicity groups of students (black, white, other) who were classified as stable attenders, stable nonattenders, mobile attenders and mobile nonattenders. Results for the “other” ethnicity category should be interpreted cautiously

since it represents a variety of student ethnicities including Asian-American, Hispanic, and American Indian. In addition, the number of students in the “other” category is considerably smaller than the black and white categories.

Figure 7 shows percentages for the elementary grades. The relationship between ethnicity and attendance/mobility is significant ($\chi^2_{(6)}=468.41, p<.001$) but with a relatively low correlation ($r=.199$). The difference among ethnicities appears to occur in the stable attendance and mobile attendance categories. Black students are somewhat more mobile than white students or “other” students. Differences are minimal among ethnicities for the two nonattendance categories.

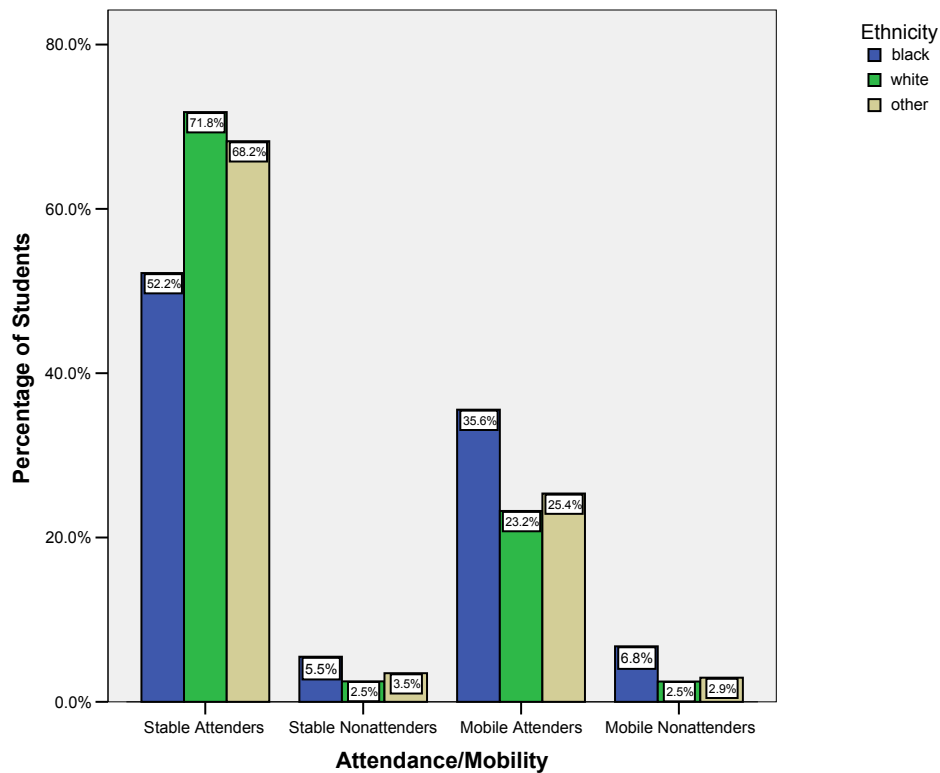


Figure 7. Attendance/mobility by ethnicity for elementary grades (1-5)

Figure 8 shows the ethnicity by attendance/mobility relationship within the middle grades. The white and “other” subgroups of students have higher percentages of stable attenders than the black subgroup. For the three other attendance/mobility categories, there are slightly higher percentages for the black subgroup compared to the white subgroup. The relationship is significant ($\chi^2_{(6)}=180.59, p<.001$), however, similar to the elementary grades, the correlation is relatively low ($r=.154$).

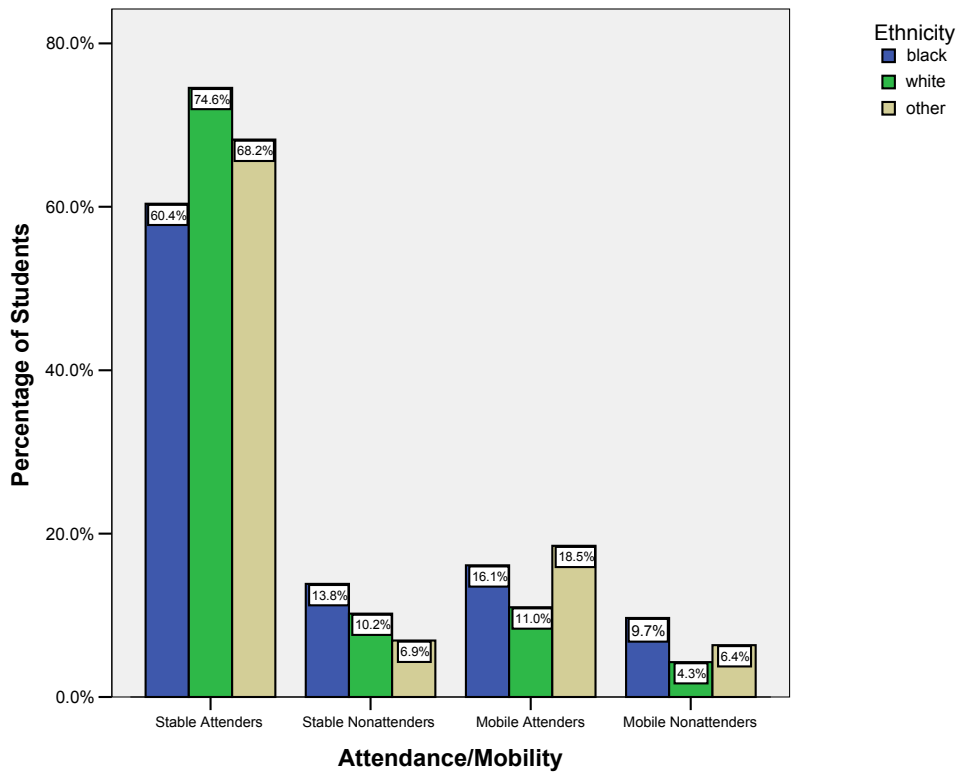


Figure 8. Attendance/mobility by ethnicity for middle grades (6-8)

At the high school level, Figure 9 displays a slightly higher correlation between ethnicity and attendance/mobility ($r=.257$), and the results are significant ($\chi^2_{(6)}=652.20$, $p<.001$). The most notable differences occur in the stable attendance and mobile nonattendance categories, with black students having a lower percentage of stable attenders and a higher percentage of mobile nonattenders than white or “other” students.

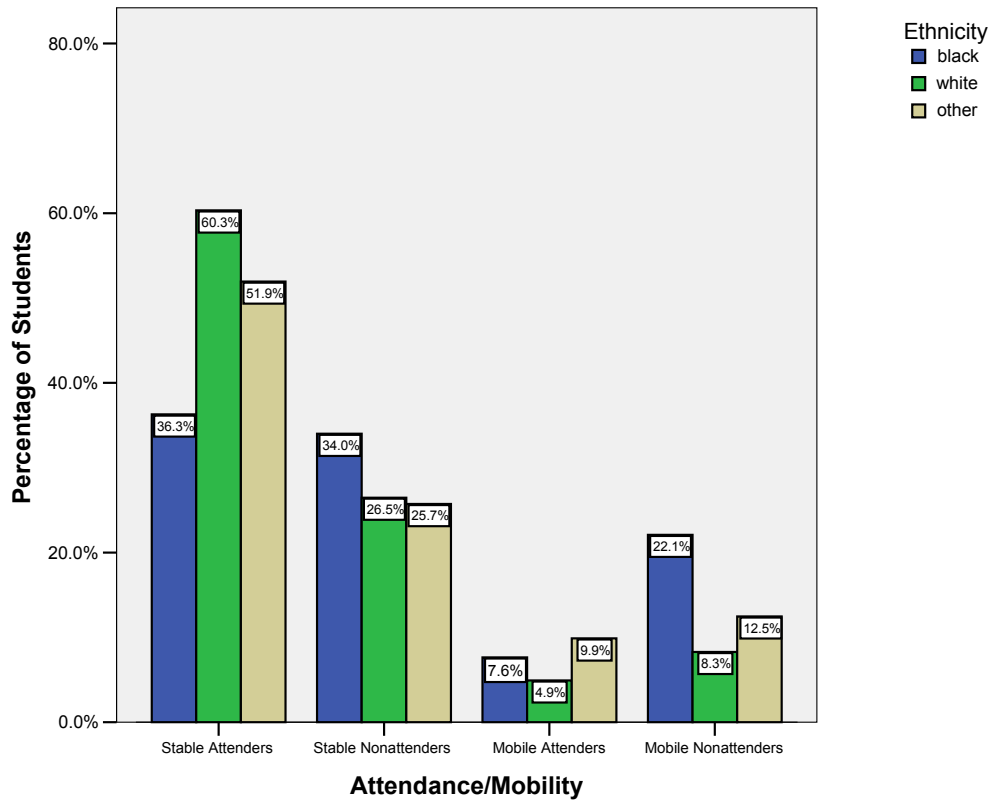


Figure 9. Attendance/mobility by ethnicity for high school grades (9-12)

Socio-Economic Status for Elementary, Middle, and High Schools

Prior to examining the relationship between attendance/mobility and socio-economic status (i.e., eligibility for free/reduced lunch), the relationship between ethnicity and lunch status was examined. The correlation between these two variables was significant and relatively high ($r=.378$ for elementary, $r=.382$ for middle, and $r=.367$ for high school grades.) As shown in Table 2, higher percentages of black students were eligible for free/reduced lunch compared to white students. However, it is interesting to note that the percentages of white students eligible for free/reduced lunch were still fairly high. About half of the white students in elementary grades (52.4%) and middle grades (47.3%) were eligible.

Table 2. Percentages of black, white, and “other” students who were eligible for free/reduced lunch.

	Free/Reduced Lunch	Regular Lunch
Elementary (grades 1-5)		
Black	87.7%	12.3%
White	52.4%	47.6%
Other	64.2%	35.8%
Middle (grades 6-8)		
Black	84.2%	15.8%
White	47.3%	52.7%
Other	65.2%	34.8%
High (grades 9-12)		
Black	67.4%	32.6%
White	29.7%	70.3%
Other	49.4%	50.6%

Figures 10 through 12 show percentages in the attendance/mobility categories for black free/reduced and regular lunch students versus white free/reduced and regular lunch students. The “other” subgroup is not included because of the small number of students and variety of ethnicities in this category.

At the elementary grades, the patterns in the bar graphs (see Figure 10), are similar for black students and white students. For instance, when looking at the stable attenders (the first two bars in each set), the percentage for black free/reduced lunch students is 50.5% versus 64.4% for black regular lunch students – a difference of 13.9 percentage points. The pattern is the same for white students. The percentage for white free/reduced lunch students is 65.4% versus 78.8% for white regular lunch students – a difference of 13.4 percentage points. (See Appendix B for a complete table of the percentages represented in the bar graphs.)

Likewise, in the middle grades (see Figure 11), the gap between the percentage of free/reduced and regular lunch students is somewhat similar for black and white students, 14.5 percentage points for black students and 20.8 points for white students.

At the high school grades (see Figure 12), the gap between free/reduced lunch and regular students is more pronounced for white students than black students. Although white students overall have higher percentages of stable attenders than black students, the gap between the two lunch categories for white students is 24.3 percentage points, but only 11.9 percentage points for black students.

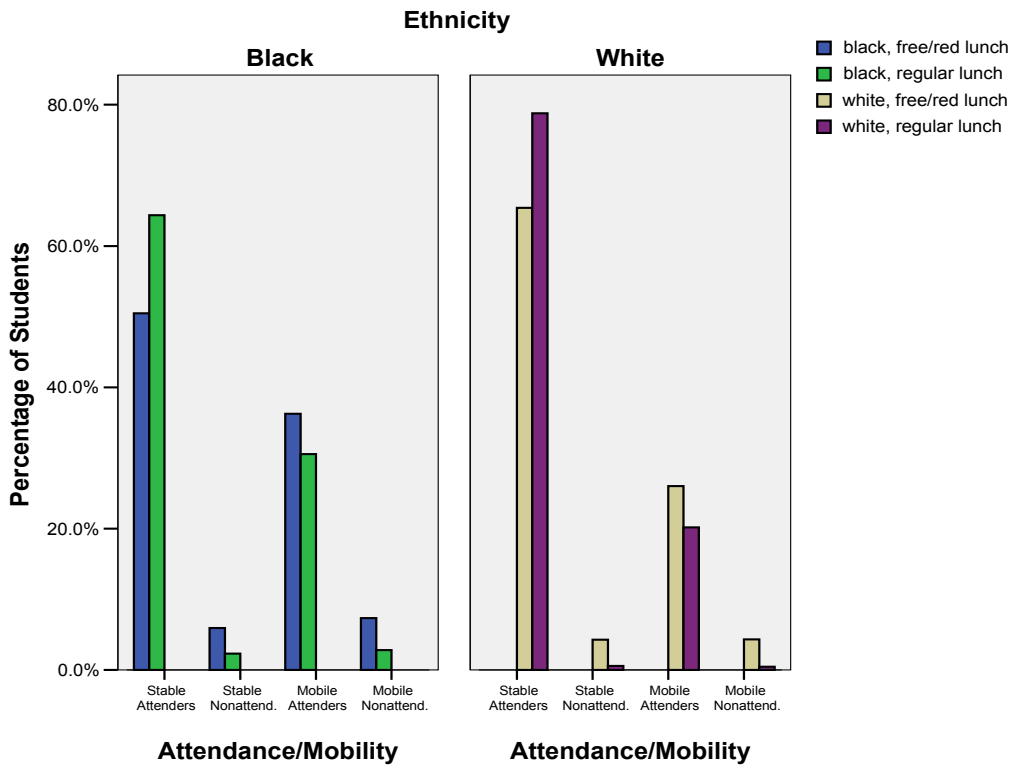


Figure 10. Attendance/mobility by ethnicity and lunch status for elementary grades (1-5)

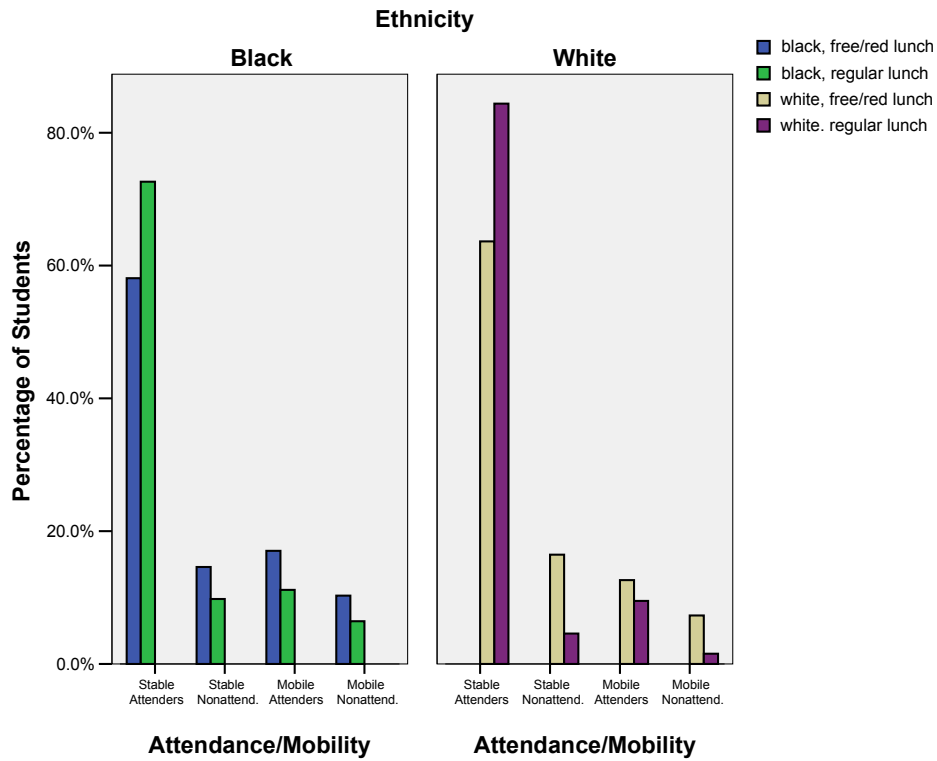


Figure 11. Attendance/mobility by ethnicity and lunch status for middle grades (6-8)

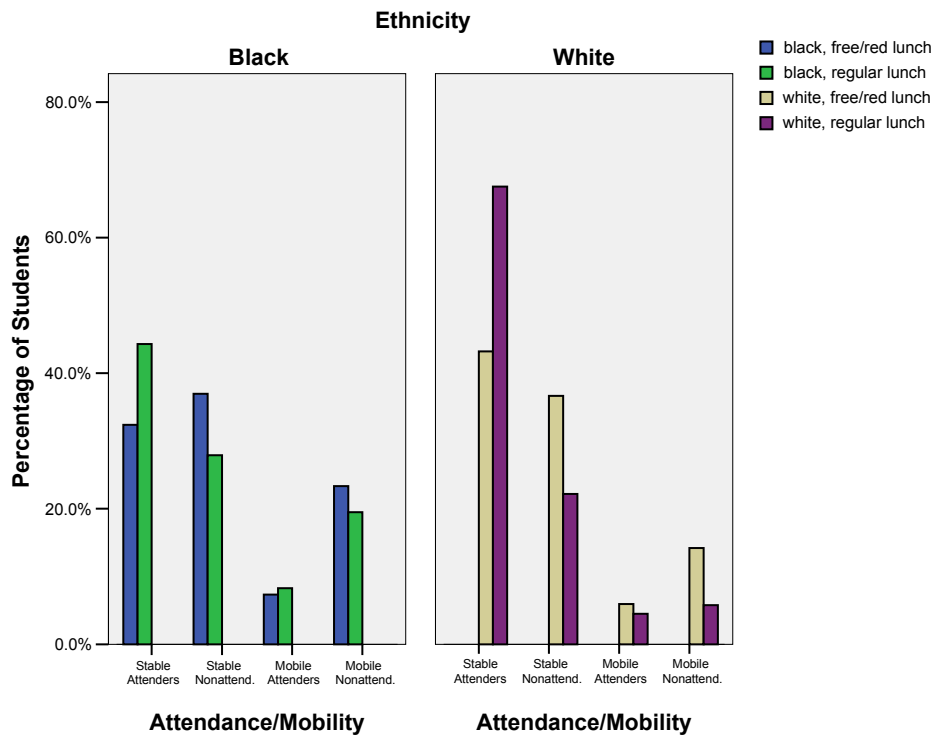


Figure 12. Attendance/mobility by ethnicity and lunch status for high school grades (9-12)

IV. Relationship Between Student Attendance/Mobility and PSSA Reading and Mathematics Scores

The purpose of this section is to examine the relationship between attendance/mobility and student achievement on the state assessment. The total number of students in these analyses was slightly less than in the previous sections. Only students who took the PSSA were included, and only black and white students were included. As mentioned earlier, the number of students in the “other” subgroup was quite small, and there was a mixture of ethnicities in this subgroup.

A two-factor analysis of variance (ANOVA) was conducted for each grade level 3, 5, 8, and 11 and each subject area (reading, mathematics). The purpose of this type of analysis was to determine if the attendance/mobility variable and the ethnicity variable had a significant effect on students’ reading and mathematics standard scores on the PSSA. In addition to the ANOVA, a two-factor analysis of covariance (ANCOVA) with two covariates was also conducted to determine if the results were the same after removing the influence of gender and socioeconomic status (lunch status). Grade 8 and 11 are discussed first because the analyses included all four attendance/mobility categories. For grades 3 and 5, the categories had to be combined because of the small sample sizes within each subgroup.

Grade 8 PSSA Mathematics Achievement

The ANOVA results showed that the attendance/mobility status of grade 8 students had a significant impact on mathematics scores ($F_{(3,2303)}=73.24, p<.001$). The mean standard score for stable attenders (1332) was significantly larger than the mean score in each of the other three categories: stable nonattenders (1193), mobile attenders (1228), and mobile nonattenders (1160). The only other significant difference among the four categories of attendance/mobility was between the two types of mobility. Mobile attenders had a significantly higher mean score than mobile nonattenders. Also, the ethnicity of grade 8 students had a significant impact on the mathematics scores ($F_{(1,2303)}=147.01, p<.001$). The math standard score (1377) for white students was significantly higher than for black students (1213).

An interesting result from the ANOVA was found when examining the simultaneous effect of the two variables on math scores. There was not a significant interaction ($F_{(3,2303)}=3.55, p>.01$) between ethnicity and attendance/mobility. In other words, although white students scored higher than black students overall, both white and black students had similar patterns of standard scores across the four categories of attendance/mobility. Examining Figure 13 allows for a better understanding of the meaning of this result. The figure provides a visual display of the non-interaction between ethnicity and attendance/mobility. Notice that the lines connecting the standard scores for each ethnicity are nearly parallel. This indicates that the pattern of math achievement across the four categories of attendance/mobility was similar for black students and white students. Therefore, regardless of students’ ethnicity, their attendance and mobility status impacted their math scores in the same way. It should be noted that all the results given in this section remained the same even after controlling for lunch status and gender.

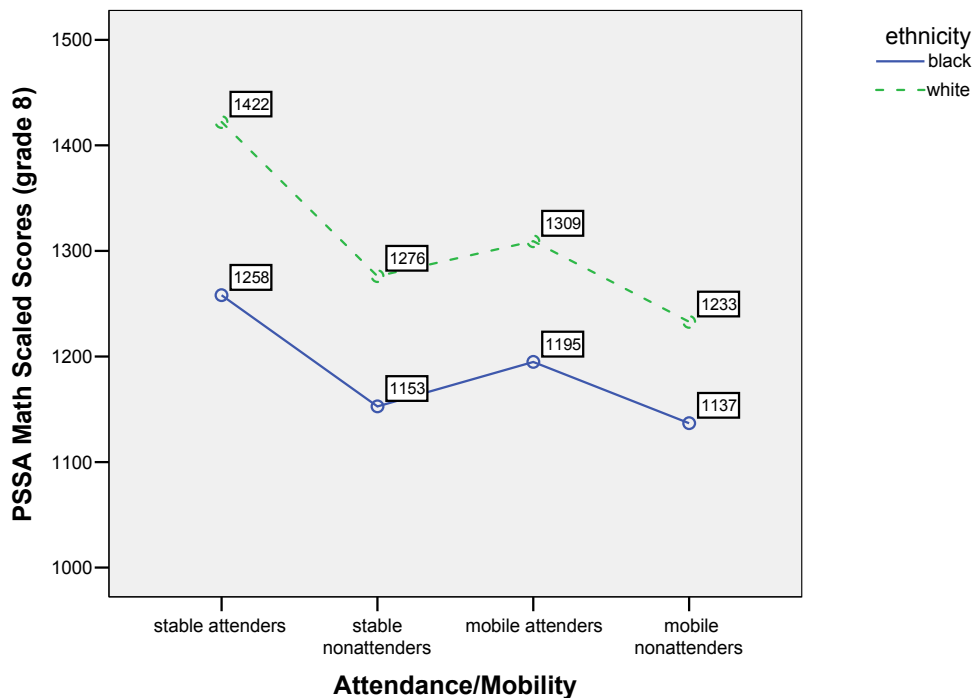


Figure 13. Grade 8 PSSA math standard scores for attendance/mobility by ethnicity.

Grade 8 PSSA Reading Achievement

The ANOVA results for reading were nearly identical as those for mathematics. Attendance/mobility status had a significant impact on reading scores ($F_{(3,2293)}=62.44, p<.001$). The mean standard score for stable attenders (1338) was significantly larger than the mean score in each of the other three categories: stable nonattenders (1178), mobile attenders (1216), and mobile nonattenders (1106). Mobile attenders also had a significantly higher mean score than mobile nonattenders, and stable nonattenders were higher than mobile nonattenders. In addition, ethnicity had a significant impact on the reading scores ($F_{(1,2303)}=147.01, p<.001$). The math standard score (1397) for white students was significantly higher than for black students (1190).

Similar to mathematics, there was not a significant interaction ($F_{(3,2303)}=3.552, p>.01$) between ethnicity and attendance/mobility on reading scores. Although white students scored higher than black students overall, both white and black students had similar patterns of reading scores across the four categories of attendance/mobility. Figure 14 provides a visual display of the non-interaction between ethnicity and attendance/mobility. Once again, the lines connecting the standard scores for each ethnicity are nearly parallel. This indicates that the pattern of reading achievement across the four categories of attendance/mobility was similar for black students and white students. Therefore, regardless of students' ethnicity, their attendance and mobility status impacted their reading scores in the same way. It should be noted that all the results given in this section remained the same even after controlling for lunch status and gender.

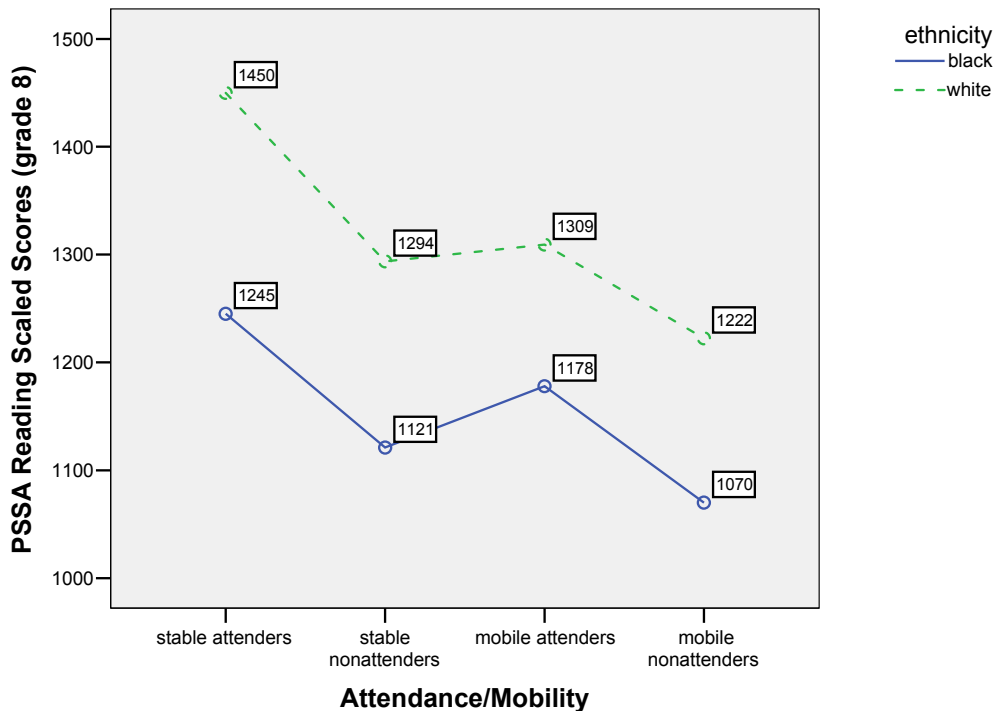


Figure 14. Grade 8 PSSA reading standard scores for attendance/mobility by ethnicity.

Grade 11 PSSA Mathematics Achievement

Unlike the analyses in grade 8, the results for grade 11 differed before and after controlling for lunch status and gender. The ANOVA showed a significant interaction between attendance/mobility and ethnicity, but after removing the influence of lunch status and gender the ANCOVA showed no significant interaction. The latter results are shown here.

The ANCOVA indicated a significant impact of attendance/mobility ($F_{(3,1770)}=57.82$, $p<.001$) and a significant impact of ethnicity ($F_{(1,1770)}=207.29$, $p<.001$). With respect to attendance/mobility, there were significant differences in math standard scores across all pairs of the four categories. From highest to lowest, the means scores were: stable attenders (1360), mobile attenders (1256), stable nonattenders (1175), and mobile nonattenders (1078). With respect to ethnicity, black students had a significantly lower math score (1130) than white students (1409).

The interaction between the two variables was not significant, ($F_{(3,1770)}=3.34$, $p>.01$). This means that when lunch status and gender were accounted for in the ANCOVA, the pattern in mathematics standard scores across attendance/mobility categories was similar for black and

white students. Figure 15 below shows a visual display of the scores for black students and white students at each attendance/mobility category. Although the line for white students is higher than for black students, both lines show a decrease in math scores from stable attenders to stable nonattenders, then an increase for mobile attenders, and a decrease for mobile nonattenders. In other words, for both ethnicities the two highest mean math scores were for the two attendance categories and the two lowest mean math scores were for the two nonattendance categories.

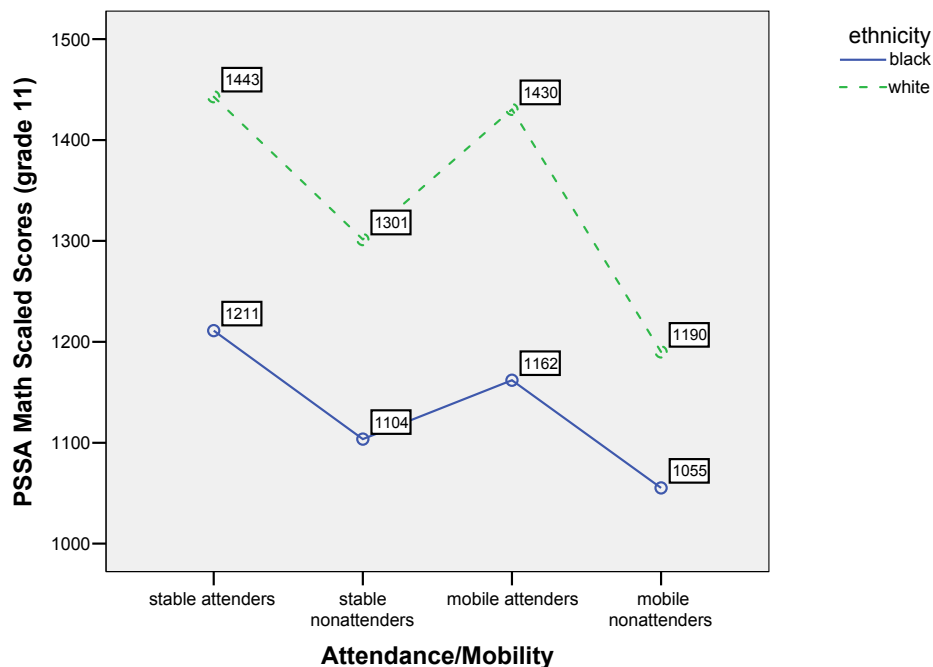


Figure 15. Grade 11 PSSA math standard scores for attendance/mobility by ethnicity.

Grade 11 PSSA Reading Achievement

Finally, when examining the grade 11 reading standard scores, the ANOVA produced results consistent with those previously described. That is, attendance/mobility had a significant impact on reading scores ($F(3,1776)=65.39, p<.001$). Each pair of the four categories were significantly different from each other. The mean scores ranging from highest to lowest are: stable attenders (1400), mobile attenders (1280), stable nonattenders (1178), and mobile nonattenders (1077). In addition, ethnicity significantly impacted reading scores ($F(1,1776)=247.53, p<.001$), with white students having a higher reading score (1445) than black students (1142).

Similar to the previous three sections, the pattern in reading scores across the four attendance/mobility categories was the same for black students and white students. The interaction between the two variables was not significant ($F(3,1776)=0.46, p=.712$). Therefore, regardless of ethnicity, reading scores were highest for the attendance categories and lowest for

the nonattendance categories. These results remained the same even after controlling for lunch status and gender.

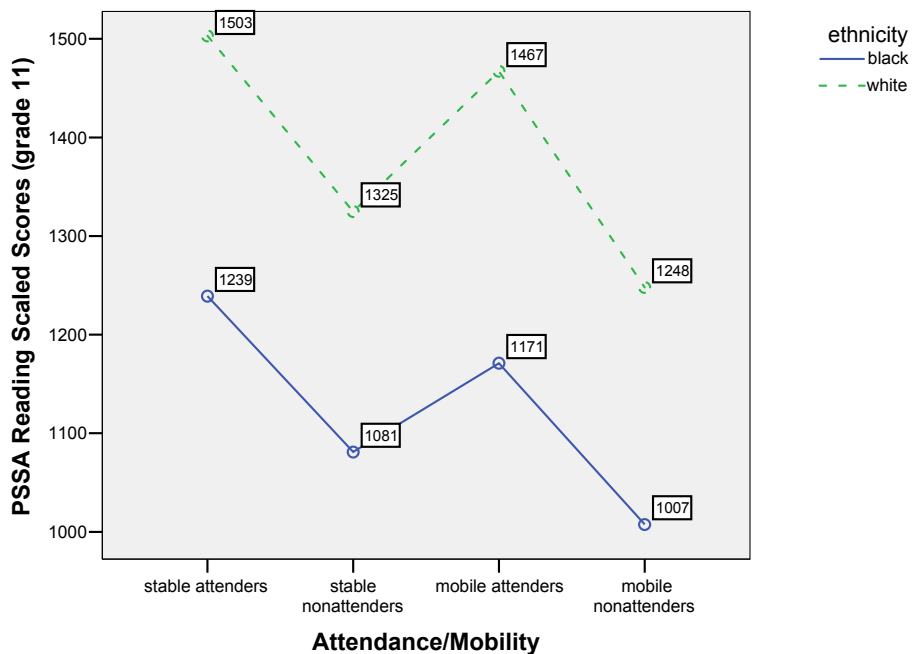


Figure 16. Grade 11 PSSA reading standard scores for attendance/mobility by ethnicity.

Grades 3 and 5 PSSA Mathematics and Reading Achievement

In the elementary grades, student nonattendance was less of an issue than it was in the higher grades. Table 1 and Figure 1 in the Section 2 of this report showed that the percentage of students who were classified as nonattenders (stable or mobile) was quite low. Due to these small frequencies, it becomes problematic to conduct analysis that examines the four attendance/mobility categories across black and white students. The results are less accurate and precise. Therefore, a decision was made to compare stable students to mobile students, combining across attendance status. Another rationale for this analysis is that as grade level increased in the elementary schools, the percentage of mobile students increased.

Grade 3

When analyzing the grade 3 PSSA standard scores, ANOVA results indicated that there was a significant impact of the mobility variable on both the reading scores ($p < .001$) and the mathematics scores ($p < .001$). In reading, the stable students had a mean standard score of 1259 compared to only 1169 for the mobile students. The comparison was similar for mathematics.

Stable students had a mean math standard score of 1300, whereas mobile students had a significantly lower math score of 1209.

Results also showed a significant impact of ethnicity on reading ($p < .001$) and math ($p < .001$) scores. In reading, white students had a higher mean standard score (1318) than black students (1165). In math, white students had a higher mean standard score (1359) than black students (1205).

Once again, however, there was no difference in the pattern of scores for black and white students across the stable and mobile categories. Figures 17 and 18 show this result for mathematics and reading, respectively. The interaction between ethnicity and stable/mobile was not significant for math ($p = .376$) nor reading ($p = .259$). For both black and white students, scores are higher for the stable students and drop significantly for the mobile students. Adjusting for lunch status and gender did not change the outcome of these results.

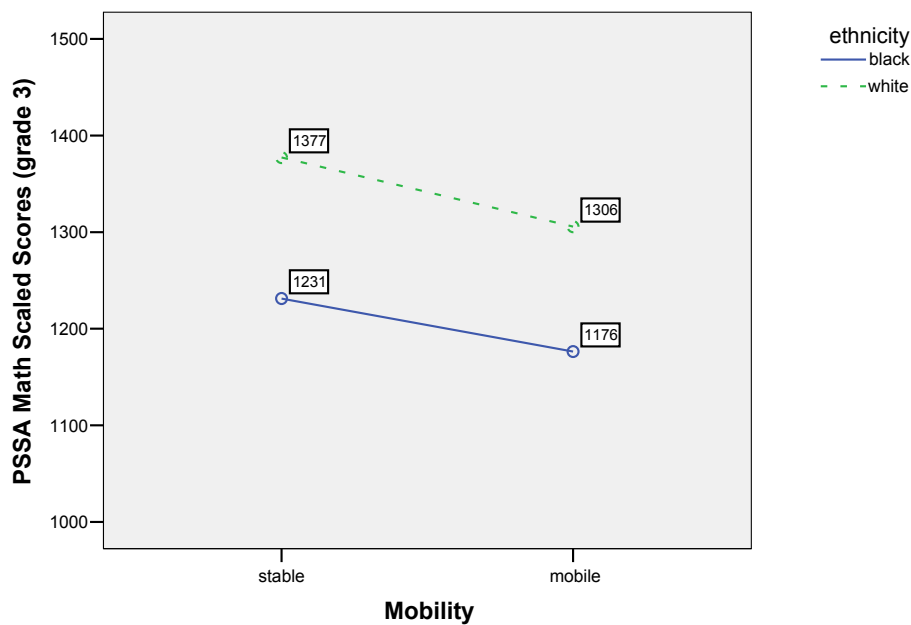


Figure 17. Grade 3 PSSA math standard scores for mobility by ethnicity.

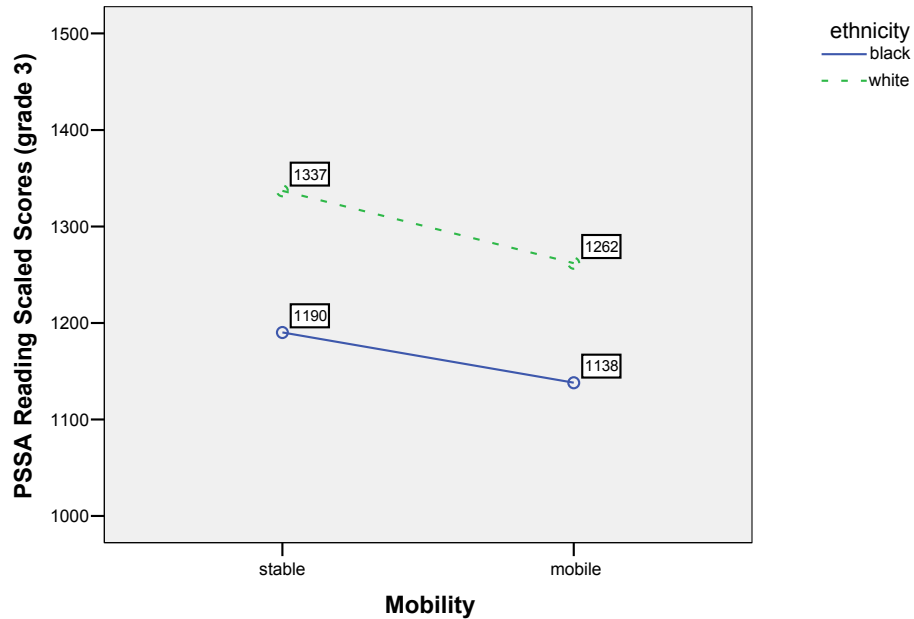


Figure 18. Grade 3 PSSA reading standard scores for mobility by ethnicity.

Grade 5

ANOVA results for the grade 5 PSSA scores indicated a significant impact of the mobility variable on both the reading scores ($p < .001$) and the math scores ($p < .001$). In reading, the stable students had a mean standard score of 1268 compared to only 1204 for the mobile students. Consistent comparisons were found for mathematics. Stable students had a mean math standard score of 1379, whereas mobile students had a lower score of 1307.

Results also showed a significant impact of ethnicity on reading ($p < .001$) and math ($p < .001$) scores. In reading, white students had a higher mean standard score (1334) than black students (1179). In math, white students had a higher mean standard score (1438) than black students (1287).

There was no difference in the pattern of scores for black and white students across the stable and mobile categories. Figures 19 and 20 show the mean scores for mathematics and reading, respectively. The interaction between ethnicity and stability/mobility was not significant for math ($p = .169$) nor reading ($p = .233$). Similar to the grade 3 results, scores for both ethnicities are high for the stable students and decrease for the mobile students. Adjusting for lunch status and gender did not change the outcome of these results.

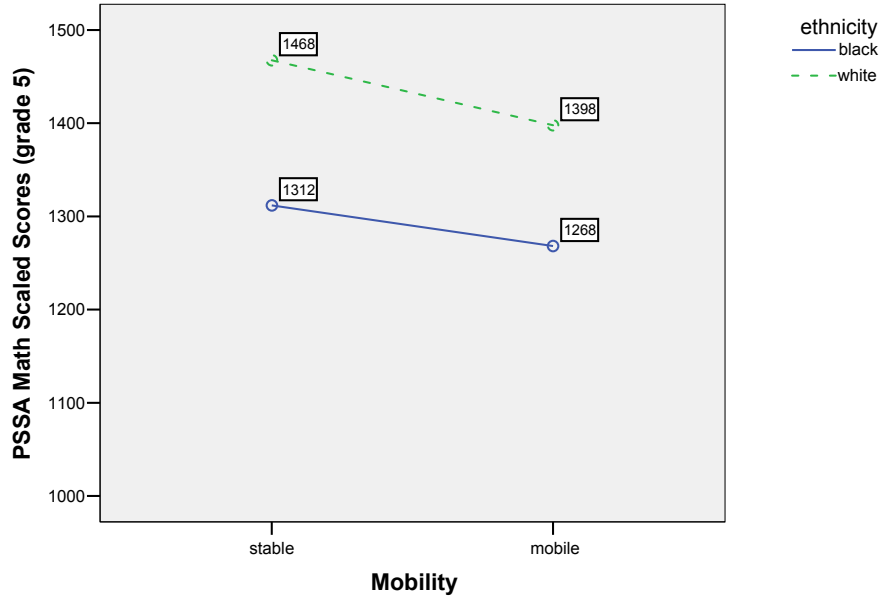


Figure 19. Grade 5 PSSA math standard scores for mobility by ethnicity.

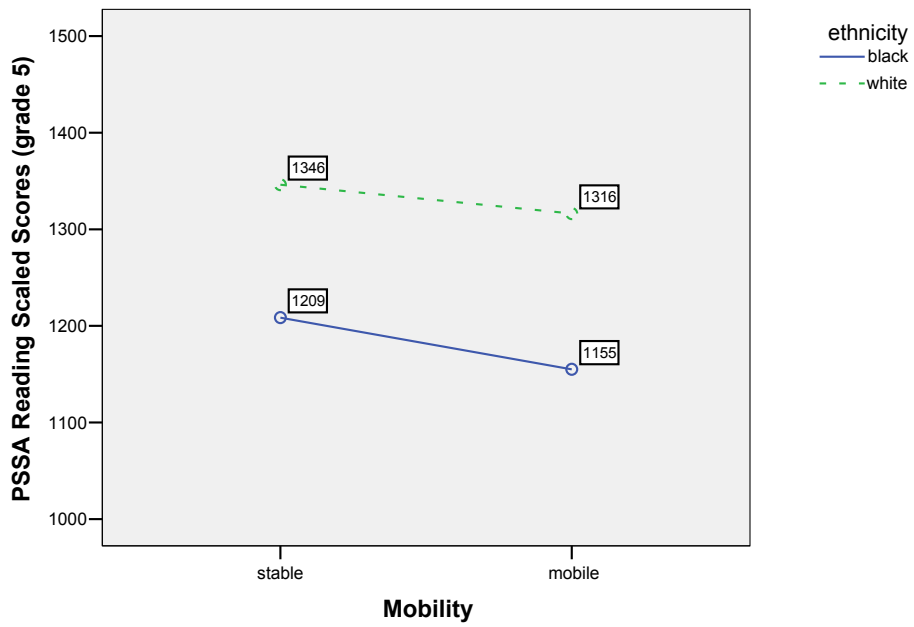


Figure 20. Grade 5 PSSA reading standard scores for mobility by ethnicity.

V. A Closer Look at the High Schools

At the beginning of this report, Table 1 and Figures 3, 6, 9, and 12 showed the attendance/mobility data overall, by gender, by ethnicity, and by lunch status combined across high schools and grade levels (9 through 12). In addition, Figures 15 and 16 showed the relationships between PSSA scores, attendance/mobility, and ethnicity. This section takes a closer look at the grade 11 students and their PSSA scores by examining the ten high schools individually.

Attendance and Mobility by High School

Table 3 below shows the attendance/mobility percentages for grade 11 students within each high school. To get a better visual examination of this data, Figure 21 displays these percentages in a bar graph format.

Table 3. Percentages of grade 11 students in each of the four attendance/mobility categories by high school.

	Stable Attenders	Stable Nonattenders	Mobile Attenders	Mobile Nonattenders
Allerdice (n=297)	75.8%	10.4%	11.4%	2.4%
Brashear (n=226)	38.5%	39.4%	4.9%	17.3%
Carrick (n=233)	46.8%	28.8%	9.0%	15.5%
Langley (n=111)	45.9%	22.5%	13.5%	18.0%
Oliver (n=132)	17.4%	54.5%	3.8%	24.2%
Peabody (n=86)	39.5%	25.6%	16.3%	18.6%
Perry (231)	62.8%	25.1%	8.7%	3.5%
Pgh HS Crt/Prfm Arts (n=112)	75.9%	7.1%	14.3%	2.7%
Schenley (n=279)	66.3%	16.5%	9.0%	8.2%
Westinghouse (n=108)	27.8%	38.0%	9.3%	25.0%

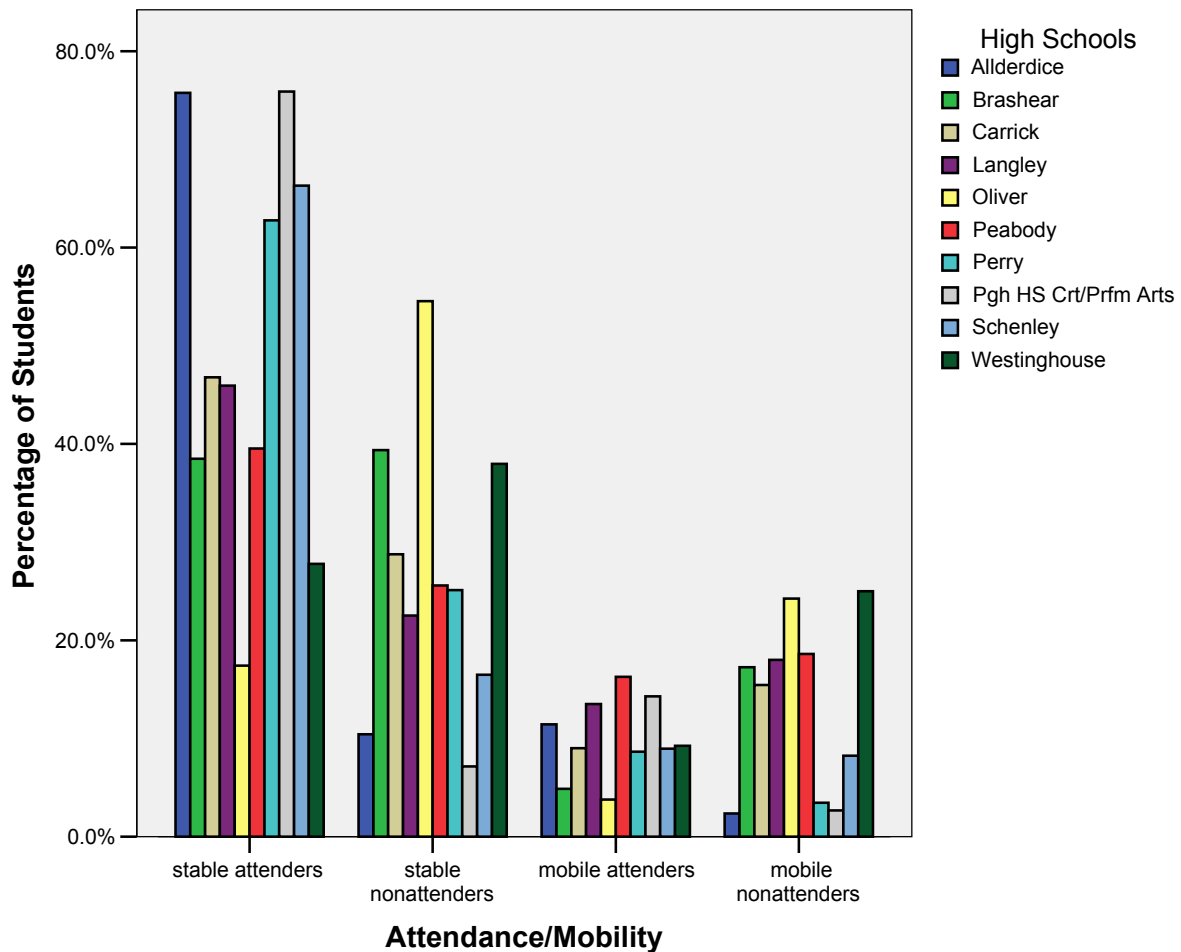


Figure 21. Percentages of grade 11 students at each attendance/mobility category for each of the ten high schools.

Within the category of stable attenders, Allerdice (75.8%) and the Pittsburgh High School of Creative and Performing Arts (CAPA) (75.9%) had percentages that were considerably larger than (more than one standard deviation above) the district average for all grade 11 students. Oliver (17.4%) and Westinghouse (27.8%) had percentages that were considerably smaller than (more than one standard deviation below) the district average.

Since Allerdice and CAPA had the majority of their students in the stable attendance category, it is not surprising that they had considerably lower percentages of stable nonattenders (10.4% and 7.1%, respectively) and mobile nonattenders (2.4% and 2.7% respectively) than the district average. CAPA, however, had a higher percentage of mobile attenders (14.3%) than the district average. The percentage for Allerdice in this category was near district average.

Since Oliver and Westinghouse had very low percentages of students in the stable attendance category, they were found to have considerably higher percentages of stable nonattenders (54.5% and 38.0%, respectively) and mobile nonattenders (24.2% and 25.0%, respectively) than the district average. For the mobile attendance category, Oliver had a lower percentage (3.8%) than district average, but Westinghouse (9.3%) was near district average. To summarize, when

looking across all four attendance/mobility categories, the majority of Oliver students (78.7%) and Westinghouse students (63.0%) were in the two “nonattendance” categories.

With regard to other high schools, Brashear had a higher percentage of stable nonattenders (39.4%) than the district average, but a lower percentage of mobile attenders (4.9%). The majority of Brashear students (77.9%) were in the two “stable” categories. Perry was near district average for all categories except mobile nonattenders—they had a lower percentage (3.5%) than the district average. Most of Perry’s students (98.0%) were in the two “stable” categories. In addition, Peabody and Langley had higher percentages of mobile attenders (16.3% and 13.5%, respectively) than the district average. Finally, Carrick and Schenley were at the district average for all four attendance/mobility categories.

Relationship Between PSSA scores and Attendance/Mobility by High School

The number of grade 11 students within each high school is too small to conduct analyses with the four attendance/mobility categories. Therefore, similar to the grade 3 and 5 data presented earlier, stability and mobility is compared (combined across attendance categories) and attendance and nonattendance is compared (combined across stable and mobile categories).

Attending versus Nonattending Students

For each high school, a t-test was conducted to determine if the PSSA standard score for “attending” students (mobile or stable) is similar to the score for “nonattending” students (stable or mobile). Appendix C includes a complete table of the mean PSSA math and reading standard scores by high school for attending versus nonattending students.

Figure 22 displays two math means for every high school. One mean represents the average PSSA math score for attending students, and the other mean represents the average PSSA math score for nonattending students. The vertical bars surrounding each mean represent the 95% confidence interval (the range of possible values for the true mean). The length of the interval varies across high schools because it takes into account the number of students and the amount of variation in individual students scores. At Allderdice, Brashear, Carrick, Langley, Oliver, Schenley, and Westinghouse, there is a significant difference between the two mean PSSA scores. In each of these high schools, mathematics achievement is significantly higher for attending students compared to nonattending students ($p < .01$). For Peabody, Perry, and the Pittsburgh HS for Creative/Performing Arts (CAPA), although the means are higher for attending students, there is not a significant difference between the two groups of students and the confidence intervals (vertical bars) around the mean overlap.

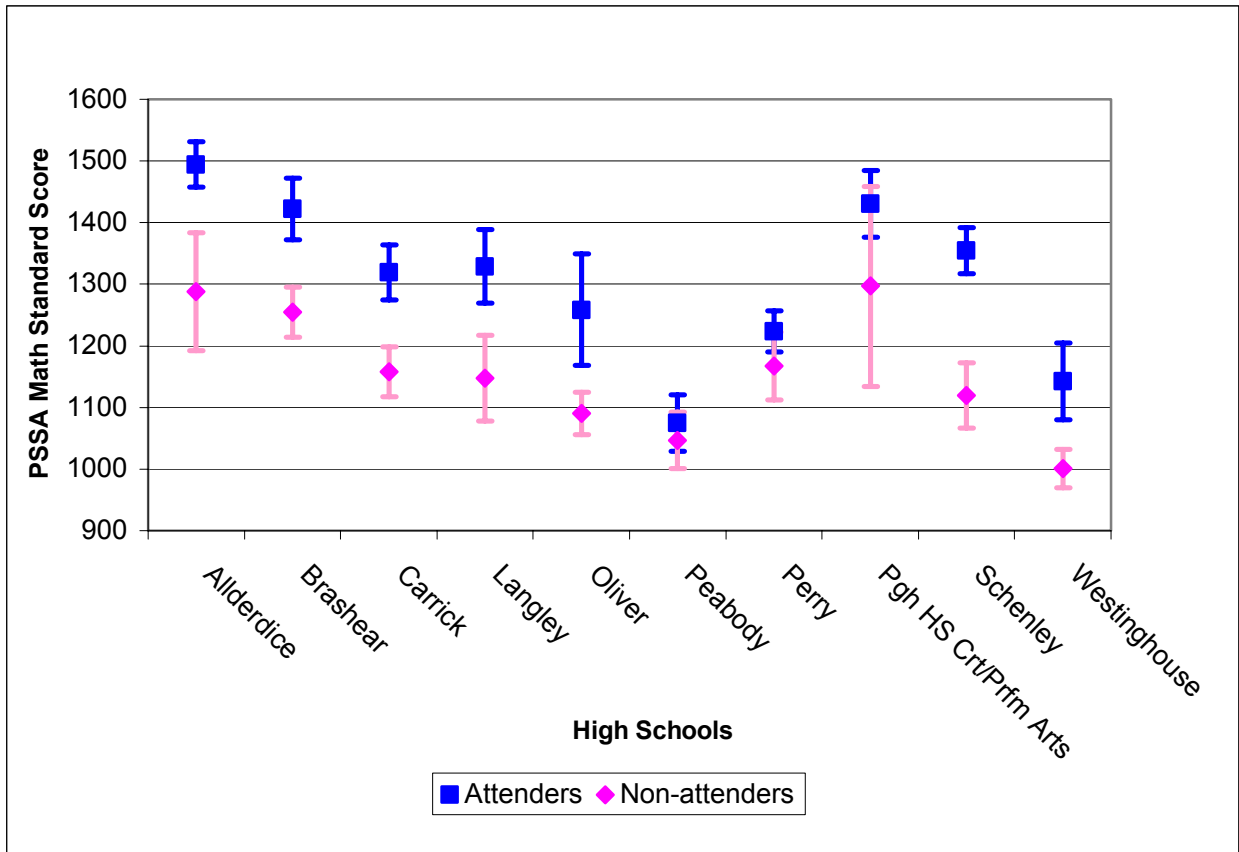


Figure 22. Grade 11 PSSA math standard scores for each high school by attendance versus nonattendance.

Figure 23 shows similar results for PSSA reading standard scores. In all high schools the mean score for attending students is above the mean score for nonattending students. With the exception of Peabody and CAPA, this difference in means is significant for each high school ($p < .01$), meaning that the average reading achievement is significantly higher for the attending students.

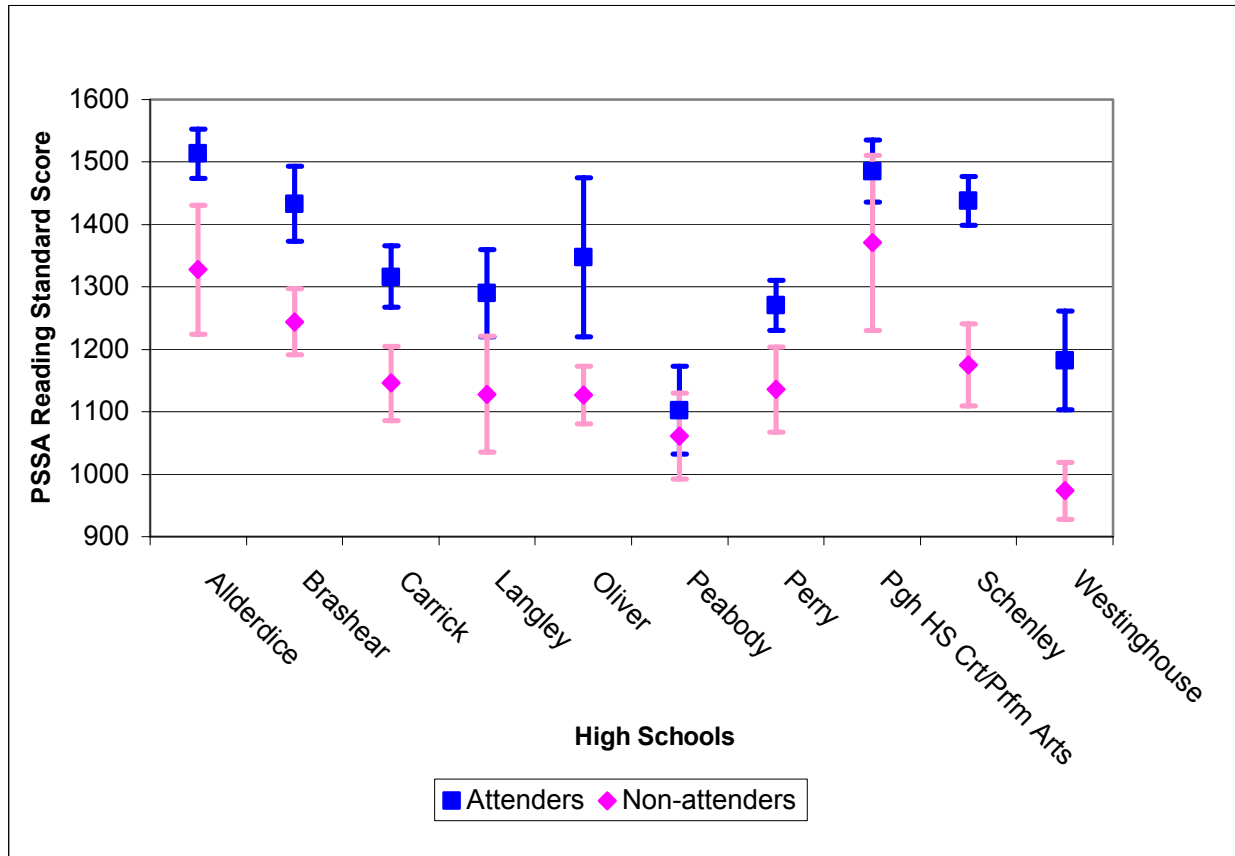


Figure 23. Grade 11 PSSA reading standard scores for each high school by attendance versus nonattendance.

Stable versus Mobile Students

The next analyses were conducted to determine if the PSSA scores for stable versus mobile students were similar. Appendix D includes two complete tables of the mean PSSA reading and math standard scores by high school for these two groups of students.

Figure 24 displays the means for PSSA mathematics standard scores for stable and mobile students. Although in each high school the mean score for stable students was above the mean score for mobile students, the difference between the two means was only significant in five schools: Brashear, Carrick, Oliver, Schenley, and Westinghouse. In these five schools, mathematics achievement was significantly higher for stable compared to mobile students. Note that the confidence intervals are larger for some means compared to others. This is mainly due to the differences in numbers of students in each category. When a mean is represented by a smaller number of students, the range of possible values of the true mean becomes larger.

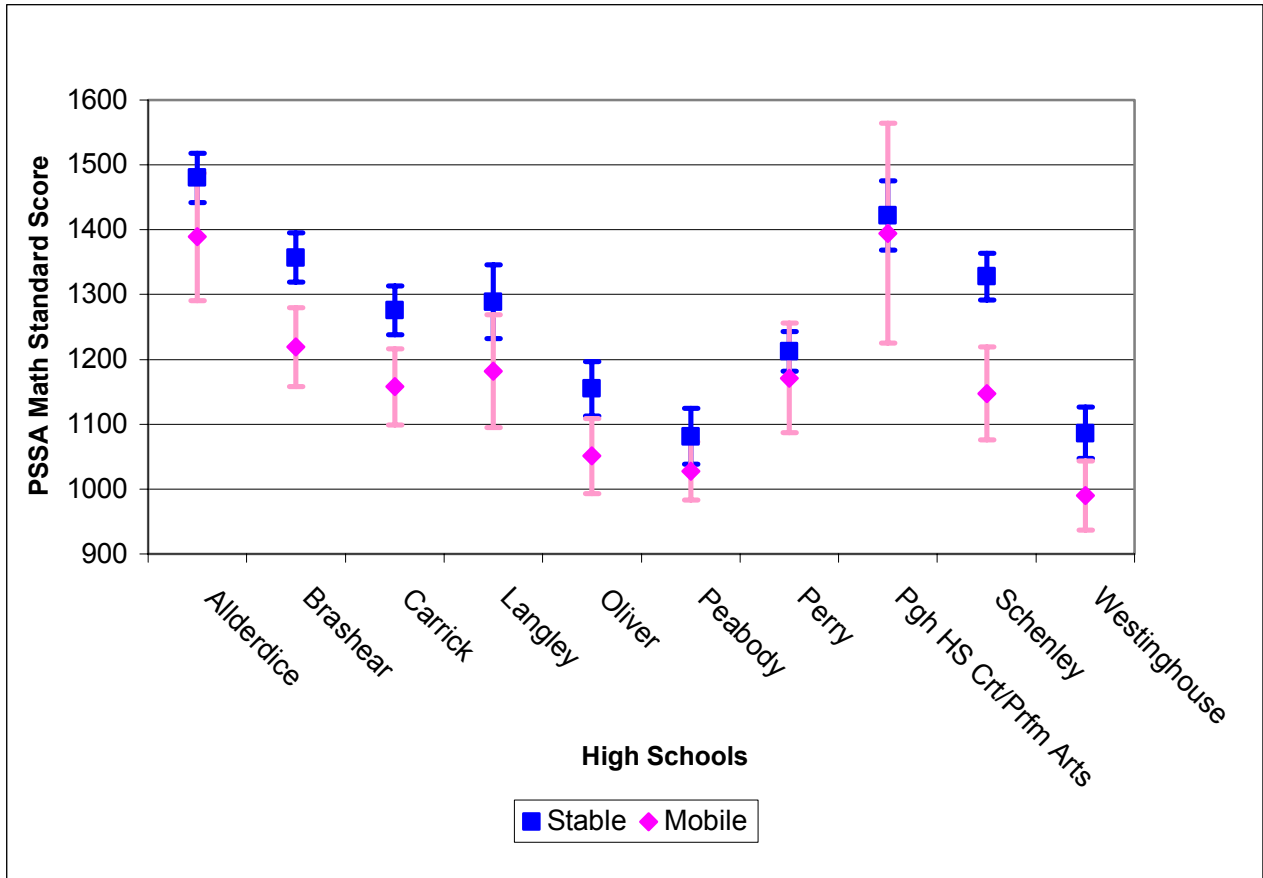


Figure 24. Grade 11 PSSA math standard scores for each high school by stable versus mobile students.

Finally, Figure 25 shows the means for PSSA reading standard scores by stable versus mobile students. Similar to the math results, the stable means are above the mobile means. However, there were only three high schools in which the difference in means was statistically significant. Allderdice, Brashear, and Schenley showed significantly higher reading achievement for stable students compared to mobile students. In the remaining seven high schools, the differences in reading achievement were considered to be similar for stable and mobile students.

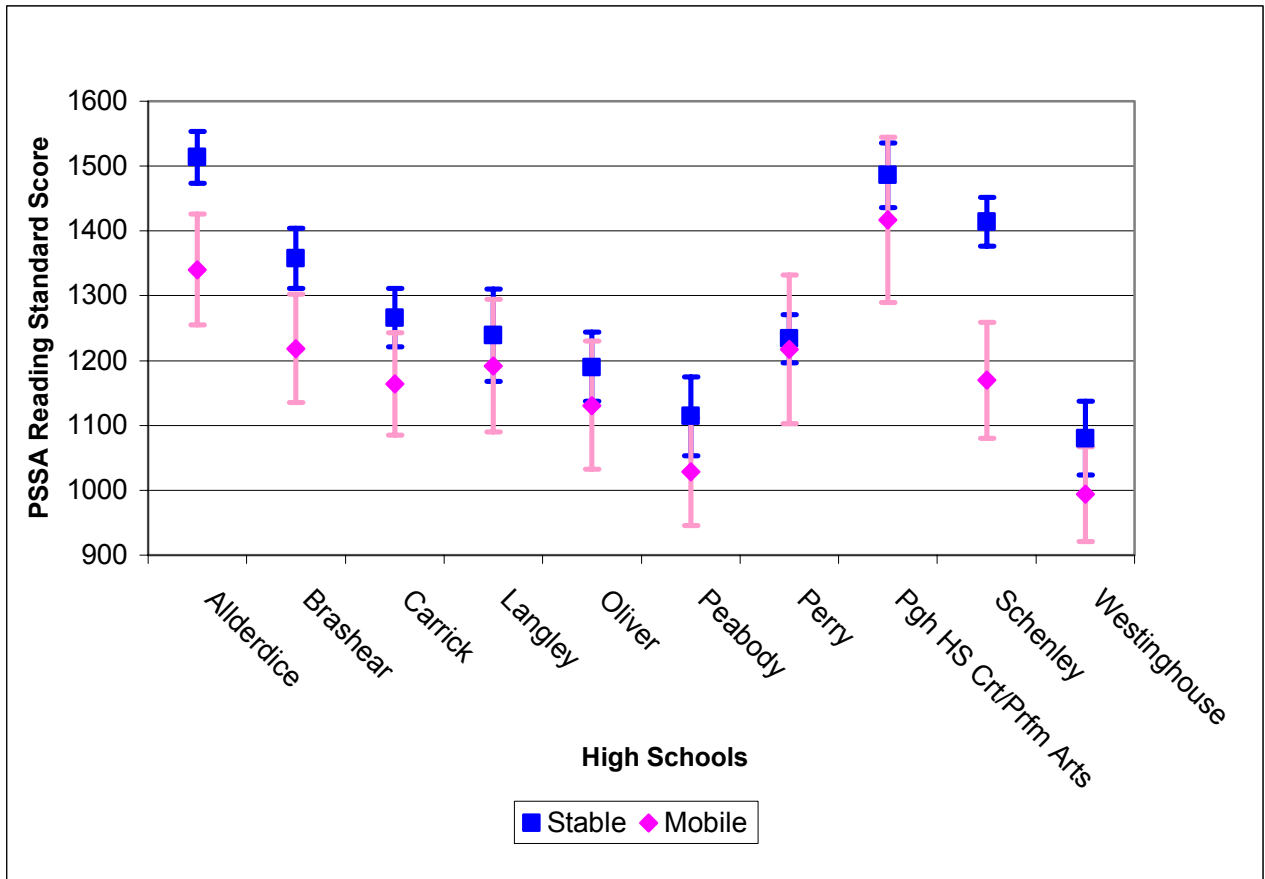


Figure 25. Grade 11 PSSA reading standard scores for each high school by stable versus mobile students.

VI. Impact of Attendance/Mobility on TerraNova and New Standards Examination Scores

To determine if the results described above for the PSSA scores and attendance/mobility were similar for other measurements of student achievement at different grade levels, the TerraNova and New Standards assessments were also examined. Mathematics and reading scaled scores from the TerraNova were obtained for grades 2, 4, 7, and 9 during the 2004-05 school year. In addition, reading scores for grade 10 and mathematics scores for grades 4 and 10 were obtained from the New Standards English Language Arts and New Standards Mathematics Examinations.

Although the specific data is not included in this report, in general the results from the TerraNova and New Standards assessments were similar to the results presented for the PSSA. It was found that in most grade levels there was a significant difference in achievement scores across the four attendance/mobility categories. Stable attenders had the highest scores, then mobile attenders, and finally the two nonattendance categories (stable and mobile) had the lowest scores. In addition, although scores for black students were higher in most cases than scores for white students, it was determined that there was no difference in the pattern of scores across the four attendance/mobility categories for black versus white students. In other words, low attendance and mobility had the same result of lowering achievement scores regardless of whether the students were black or white.

VII. Summary of Report

Section 2 of this report presented the percentages of students at each of the attendance/mobility categories: stable attenders, stable nonattenders, mobile attenders, and mobile nonattenders. At the early elementary grade levels, there were high percentages of stable attenders, but the percentage decreased in the upper elementary grade levels. For example, 80% of the grade 1 students were stable attenders compared to 47% of the grade 5 students. The next largest category of students were the mobile attenders. Percentages in this category increased from 9% in grade 1 to 47% in grade 5. On the other hand, very small percentages of elementary students (ranging from 2% to 8%) were found in the two nonattendance categories (stable and mobile).

Similar to elementary, the middle schools had decreasing percentages of stable attenders (77% to 56%) and increasing mobile attenders (7% to 20%) as grade levels progressed from 6 to 8. Percentages of stable nonattenders were a bit higher in middle versus elementary grades.

A look at K-8 schools compared to K-5 and middle schools showed that within grades 1 to 5, K-8 schools had slightly higher percentages of stable attenders than K-5 schools. Within grades 6 to 8, K-8 schools had fewer nonattenders (stable or mobile) than middle schools, but more mobile attenders.

At the high school level, percentages of stable attenders were low and decreased with the grade level (51% in grade 9 to 40% in grade 12). Most of the remaining students were classified as either stable or mobile nonattenders. The mobile attendance category had the smallest percentages (3% to 8% across grades).

Section 3 examined student attendance/mobility by gender, ethnicity, and socioeconomic status (i.e., eligibility for free/reduced lunch). Gender was not significantly related to attendance/mobility at the elementary grades. Although the relationship was statistically significant at the middle and high school grades, practically speaking the correlation between gender and attendance/mobility was quite weak ($r=.047$ and $r=.041$, respectively). Only slightly higher percentages of females than males were stable attenders.

The relationship between ethnicity and attendance/mobility, although significant at the elementary grades, was once again relatively weak ($r=.199$). The small differences that occurred indicated that black students are somewhat more mobile than white students or “other” students. Differences were minimal among ethnicities for the two nonattendance categories. Note that the results for “other” students should be interpreted cautiously as it represents a variety of student ethnicities and is considerably smaller in number than the black and white subgroups. Similar results were found at the middle grades ($r=.154$). For the high school grades, the magnitude of the relationship was larger ($r=.257$). The most notable differences occurred in the stable attendance and mobile nonattendance categories, with black students having a lower percentage of stable attenders and a higher percentage of mobile nonattenders than white students.

With regard to socioeconomic status, fewer free/reduced lunch students compared to regular lunch students were stable attenders. Interestingly, when further analyzing the results by ethnicity, the patterns in percentages were similar for black and white students. As an example, at the elementary grades, a lower percentage of black free/reduced lunch students (51%) compared to black regular lunch students (64%) were stable attenders (a gap of 13 percentage

points). Similarly, a lower percentage of white free/reduced lunch students (65%) compared to white regular lunch students (79%) were stable attenders (a gap of 14 percentage points). This pattern remained consistent for middle and high school grades, but the gap for white students (free/reduced versus regular lunch) became increasingly larger than the gap for black students.

In section 4, results for grades 8 and 11 showed that the attendance/mobility variable does have a significant impact on student achievement, even after controlling for socioeconomic status and gender. For example, when examining grade 8 PSSA mathematics performance, an analysis revealed that the mean scaled score for stable attenders (1332) was significantly higher than the scores in each of the other three categories: stable nonattenders (1193), mobile attenders (1228), and mobile nonattenders (1160). In addition, the mean scaled score for mobile attenders was significantly higher than the score for mobile nonattenders.

More interestingly, there was not a differential effect of attendance/mobility across ethnicities. This means that although white students scored higher than black students (1377 and 1213, respectively), both white and black students had similar patterns of scores across the four attendance/mobility categories. Figure 13 in the report provides a visual display of the non-interaction between the two variables for grade 8. It shows that regardless of students' ethnicity, their attendance and mobility status impacted their math scores in the same way. In other words, for both black and white students, the two highest mean math scores occurred in the two attendance categories, and the two lowest mean math scores occurred in the two nonattendance categories. Mobile nonattenders had the lowest of all the mean math scores.

Section 5 took a closer look at the ten high schools in the district. The majority of students in most high schools were in the two "stable" categories (attenders and nonattenders). Allderdice and Pittsburgh High School for the Creative and Performing Arts (CAPA) had the highest percentage of stable attenders (76% in both schools), while Oliver (17%) and Westinghouse (28%) had the lowest percentage of students in this category. Langley, Peabody, and CAPA were above the district average in terms of the percentage of students who were mobile attenders, although the percentages were relatively low (14%, 16%, and 14%, respectively). Oliver and Westinghouse had the two highest percentages in the mobile nonattendance category (24% and 25%, respectively).

When examining the impact of attendance on student achievement, each high school had a higher mean PSSA score for attenders compared to nonattenders. For mathematics, the means for these two categories were significantly different within seven of the ten high schools (Allderdice, Brashear, Carrick, Langley, Oliver, Schenley, and Westinghouse). For reading, the means were significantly different in eight of the ten high schools (Allderdice, Brashear, Carrick, Langley, Oliver, Perry, Schenley, and Westinghouse).

Stability seemed to have slightly less of an impact on student achievement in high schools than attendance, especially in terms of reading achievement. Although each of the school's reading PSSA means were higher for stable students than mobile students, the difference was only significant in three of the ten schools (Allderdice, Brashear, and Schenley). On the other hand, stability had a somewhat greater impact on mathematics achievement. In five of the ten high schools (Brashear, Carrick, Oliver, Schenley, and Westinghouse), the stable students significantly outperformed the mobile students in mathematics.

Finally, section 6 briefly described analyses conducted on the TerraNova and New Standards Examinations. The purpose was to determine if the relationships between achievement, attendance/mobility, and ethnicity held for assessments of student achievement other than the PSSA and also for different grade levels (2, 4, 7, 9, and 10). Results were found to be quite similar to those described for the PSSA.

VIII. References

- A+ Schools. (2006). *Annual Report to the Community on Public School Progress*. A+ Schools: A Community Alliance for Public Education.
- Hinz, E, Kapp, L. & Snapp, S. (2003). Students attendance and mobility in Minneapolis public schools. *The Journal of Negro Education*, 72, 141- 150.
- Lamdin, D.J. (1996). Evidence of students attendance as an independent variable in education production functions. *The Journal of Educational Research*, 89, 155 -162.
- Roby, D. E. (2004). Research on School Attendance and Student Achievement: A Study of Ohio Schools. *Education Research Quarterly*, 28, 3 -15.

Appendix A

Percentages in Attendance/Mobility Categories for K-8 Schools versus K-5 and Middle Schools

	Stable Attenders	Stable Nonattenders	Mobile Attenders	Mobile Nonattenders
Grade 1				
K-5	79.1%	8.3%	9.4%	3.2%
K-8	87.4%	3.7%	7.4%	1.5%
Grade 2				
K-5	63.9%	5.9%	24.0%	6.2%
K-8	76.0%	1.6%	20.0%	2.4%
Grade 3				
K-5	56.9%	3.3%	34.1%	5.7%
K-8	61.4%	1.4%	34.3%	2.9%
Grade 4				
K-5	50.6%	3.4%	39.8%	6.3%
K-8	64.4%	1.1%	31.1%	3.4%
Grade 5				
K-5	46.3%	1.9%	47.0%	4.8%
K-8	49.7%	1.7%	44.9%	3.7%
Grade 6				
Middle	77.0%	14.2%	6.2%	2.7%
K-8	79.4%	8.2%	9.0%	3.4%
Grade 7				
Middle	67.5%	12.5%	13.2%	6.8%
K-8	62.1%	4.8%	27.9%	5.2%
Grade 8				
Middle	56.8%	12.5%	18.8%	12.0%
K-8	53.5%	7.7%	32.4%	6.3%

Appendix B

Percentages in Attendance/Mobility Categories by Ethnicity and Student Lunch Status (Free/Reduced versus Regular)

	Stable Attenders	Stable Nonattenders	Mobile Attenders	Mobile Nonattenders
Elementary (grades 1-5)				
Black, free/reduced	50.5%	5.9%	36.3%	7.3%
Black, regular	64.4%	2.3%	30.5%	2.8%
White, free/reduced	65.4%	4.3%	26.0%	4.3%
White, regular	78.8%	.6%	20.2%	.5%
Middle (grades 6-8)				
Black, free/reduced	58.1%	14.6%	17.0%	10.3%
Black, regular	72.6%	9.8%	11.2%	6.4%
White, free/reduced	63.6%	16.5%	12.6%	7.3%
White, regular	84.4%	4.6%	9.5%	1.5%
High (grade 9-12)				
Black, free/reduced	32.4%	37.0%	7.3%	23.3%
Black, regular	44.3%	27.9%	8.3%	19.5%
White, free/reduced	43.2%	36.6%	5.9%	14.2%
White, regular	67.5%	22.2%	4.5%	5.8%

Appendix C

Grade 11 PSSA Math and Reading Standard Scores for Each High School by Attenders versus Nonattenders

High School	Mathematics Scores		Reading Scores	
	Attenders	Nonattenders	Attenders	Nonattenders
Allderdice	1494 (1457, 1531)	1288 (1192, 1384)	1514 (1474, 1553)	1328 (1224, 1431)
Brashear	1422 (1372, 1472)	1255 (1214, 1295)	1433 (1373, 1493)	1244 (1192, 1297)
Carrick	1319 (1274, 1364)	1158 (1117, 1198)	1316 (1267, 1366)	1146 (1086, 1205)
Langley	1329 (1269, 1389)	1147 (1078, 1217)	1290 (1220, 1360)	1128 (1035, 1221)
Oliver	1258 (1168, 1349)	1090 (1056, 1125)	1348 (1220, 1475)	1127 (1081, 1173)
Peabody	1075 (1029, 1120)	1047 (1001, 1092)	1102 (1032, 1173)	1061 (992, 1130)
Perry	1223 (1190, 1257)	1167 (1112, 1222)	1271 (1231, 1311)	1136 (1067, 1204)
CAPA	1431 (1376, 1485)	1297 (1134, 1459)	1485 (1436, 1535)	1371 (1231, 1511)
Schenley	1354 (1317, 1392)	1119 (1066, 1172)	1438 (1399, 1477)	1175 (1109, 1241)
Westinghouse	1143 (1080, 1205)	1001 (970, 1032)	1182 (1103, 1261)	973 (928, 1019)

Note: The number in each cell represents the mean standard score for each high school. The numbers in parentheses represent the lower and upper bounds for the 95% confidence interval surrounding each mean.

Appendix D

Grade 11 PSSA Math and Reading Standard Scores for Each High School by Stable versus Mobile Students

High School	Mathematics Scores		Reading Scores	
	Stable	Mobile	Stable	Mobile
Allerdice	1480 (1442, 1518)	1389 (1291, 1487)	1514 (1473, 1554)	1340 (1255, 1426)
Brashear	1357 (1319, 1395)	1219 (1158, 1280)	1357 (1311, 1404)	1219 (1135, 1302)
Carrick	1276 (1238, 1313)	1158 (1099, 1216)	1266 (1221, 1311)	1164 (1085, 1243)
Langley	1289 (1232, 1346)	1182 (1095, 1269)	1239 (1168, 1310)	1192 (1090, 1294)
Oliver	1155 (1113, 1197)	1051 (993, 1109)	1190 (1137, 1244)	1131 (1032, 1230)
Peabody	1081 (1038, 1124)	1028 (983, 1073)	1114 (1053, 1175)	1028 (945, 1112)
Perry	1212 (1182, 1243)	1171 (1087, 1256)	1234 (1197, 1271)	1217 (1103, 1332)
CAPA	1422 (1369, 1475)	1395 (1225, 1564)	1486 (1436, 1536)	1417 (1290, 1545)
Schenley	1328 (1292, 1364)	1148 (1076, 1219)	1414 (1377, 1452)	1170 (1080, 1259)
Westinghouse	1086 (1047, 1126)	990 (937, 1043)	1080 (1024, 1137)	994 (921, 1067)

Note: The number in each cell represents the mean standard score for each high school. The numbers in parentheses represent the lower and upper bounds for the 95% confidence interval surrounding each mean.